



Lead Poisoning Prevention Programs Biennial Report

Minnesota Department of Health
Report to the Minnesota Legislature 2019

2019 Lead Poisoning Prevention Programs Biennial Report

Minnesota Department of Health
Health Risk Intervention Unit and Asbestos and Lead Compliance Unit
PO Box 64975, St. Paul, MN 55164-0975
(651) 201-4620
<http://www.health.state.mn.us/divs/eh/lead/>

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Acronyms and Abbreviations

ABLES	Adult Blood Lead Epidemiology and Surveillance
ALC	MDH Asbestos and Lead Compliance Unit
BLIS	Blood Lead Information System
CDC	US Centers for Disease Control and Prevention
CPIT	Chemicals in Products Interagency Team
EBLL	Elevated blood lead level; 5 µg/dL under current Minnesota statutes
EPA	US Environmental Protection Agency
ESA	MDH Environmental Surveillance and Assessment Section
FDA	US Food and Drug Administration
FY	Fiscal Year
HRI	Health Risk Intervention Unit
HUD	US Department of Housing and Urban Development
IER	Indoor Environments and Radiation Section
LHHP	Lead and Healthy Homes Program
M-CLEAN	Minnesota Collaborative Lead Education and Assessment Network
MDE	Minnesota Department of Education
MDH	Minnesota Department of Health
MHCP	Minnesota Health Care Plans
MN	Minnesota
MS	Minnesota Statutes
NIOSH	National Institutes of Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PRE	Pre-Renovation Education
RFP	Request for Proposals
RRP	Renovation, Repair, and Painting
µg/dL	Micrograms of lead per deciliter of whole blood

Executive Summary

Although the toxicity of lead has been known for many years, lead remains one of the most common environmental hazards for children. Lead exposure is a salient environmental justice concern, as certain populations, such as refugees and low-income communities, are more likely to be affected. The State of Minnesota has consistently played a leading role in identifying and addressing public health issues related to lead exposure. This report documents activities conducted by the Minnesota Department of Health (MDH) between January 2017 and January 2019.

MDH continued to collect information on all lead tests performed on Minnesota residents through the Blood Lead Information System (BLIS). During 2017 and 2018 the number of blood lead tests performed remained at a high level. The number of elevated blood lead level (EBLL) cases continued to decrease, which is consistent with national trends.¹ When children with EBLLs are identified, MDH provides case management support to local public health agencies.

MDH lead program compliance staff have continued their efforts in compliance assistance, compliance monitoring and enforcement activities. This is accomplished by promoting education and compliance training, licensing, and registering lead professionals and certifying firms performing regulated lead work, approving training courses, and conducting compliance monitoring and enforcement activities.

Although reported EBLLs are declining nationally¹ and in Minnesota, the state needs to continue to effectively reach the remaining at-risk populations. High-risk populations tend to be diverse, underserved, highly mobile, and often face barriers that impede effective communication.

In addition to lead poisoning, the lead program addresses general healthy housing issues in Minnesota, focusing on housing conditions related to lead exposure as well as other health threats. MDH administers the Healthy Homes Grants program, as outlined in Minnesota Statutes, section 144.9513.

Future activities will focus on maintaining current program capacity and assuring effective use of available funds. These activities will include continuing:

- Examination of trends in lead poisoning in Minnesota children
- Outreach and education to contractors working on residential projects; education about the hazards associated with working with lead based paint and recent developments in federal rules and regulations
- Work with external partners to promote awareness of lead and ensure appropriate delivery of services to at-risk children
- Modernization of BLIS to improve the efficiency of the system and ensure data remain of high quality
- Evaluation of compliance monitoring and enforcement efforts to ensure that a properly trained and skilled lead workforce exists in Minnesota
- Compliance assistance and outreach to the public and the regulated community

Introduction

This biennial report addressing state lead poisoning prevention activities is required by Minnesota Statutes, section 144.9509, subdivision 3, which states:

The commissioner shall examine compliance with Minnesota's existing lead standards and rules and report to the legislature biennially, beginning February 15, 1997, including an evaluation of current lead program activities by the state and boards of health, the need for any additional enforcement procedures, recommendations on developing a method to enforce compliance with lead standards, and cost estimates of any proposed enforcement procedure. The report shall also include a geographic analysis of all blood lead assays showing incidence data and environmental analyses reported or collected by the commissioner.

Due to the time lag involved in collecting, analyzing, and reporting data, numbers are presented through the end of 2017.

Controlling exposures to lead is critical to protecting the health of all Minnesotans. Exposure to lead can cause learning difficulties, reduction in IQ, and behavior problems in children. Lead exposure has also been associated with infertility, miscarriages, and increased risk of stroke, heart disease, and kidney disease in adults. Children under the age of six and pregnant women are most at risk for harmful impacts of lead. Deteriorated lead paint in homes remains the primary source of lead exposure, but many other sources of lead have been found, such as contaminated soil and water, some imported products and traditional remedies, and occupational sources.

Elevated Blood Lead Levels

The Centers for Disease Control and Prevention (CDC) current reference level for an elevated blood lead level is 5 micrograms of lead per deciliter of whole blood ($\mu\text{g}/\text{dL}$). This value is based on the 97.5th percentile of the blood lead distribution among U.S. children and is expected to be lowered as average blood lead levels continue to decline. Confirmed blood lead test results above the 5 $\mu\text{g}/\text{dL}$ reference value are expected to trigger a public health response. The CDC also acknowledges that there is no safe level of exposure to lead, and the effects of lead exposure appear to be irreversible. Therefore, primary prevention, or preventing lead poisoning before it can start, is crucial to eliminating lead exposure. However, secondary prevention, or preventing ongoing exposure among children identified as having elevated blood lead levels, is also necessary to control the detrimental effects of lead exposure.

Minnesota Statutes, section 144.9504, mandates environmental interventions for confirmed blood lead levels of 15 $\mu\text{g}/\text{dL}$ or greater in children less than six years old and authorizes environmental interventions for levels between 5 and 14 $\mu\text{g}/\text{dL}$ as resources permit. For levels of 5 $\mu\text{g}/\text{dL}$ or greater, existing state case management guidelines recommend that local public health nurses work with families to decrease lead levels. For most children and adults with lead poisoning, identification and elimination of the source of lead is the main treatment.

Current State Lead Programs

Lead poisoning prevention activities at MDH continue to be housed within the Division of Environmental Health. The Health Risk Intervention (HRI) Unit, in the Environmental Surveillance and Assessment (ESA) Section, is responsible for lead-related surveillance activities and case management. The Asbestos & Lead Compliance (ALC) Unit, in the Indoor Environments and Radiation (IER) Section, is responsible for assuring compliance with state rules and statutes dealing with identification and management of lead hazards in target housing and child-occupied facilities (affected properties). In addition, the Drinking Water Protection Section provides guidance on lead in drinking water. Other state agencies dealing with lead or blood lead testing include the Pollution Control Agency, Department of Agriculture, Department of Labor and Industry, Department of Natural Resources, Housing Finance Agency, Department of Human Services, Department of Education, Department of Employment and Economic Development, and local housing rehabilitation programs across Minnesota. MDH, the City of Minneapolis, and St. Paul/Ramsey County have duties with respect to environmental case management.

The ESA section manages the federally funded CDC Childhood Lead Poisoning Prevention Program as well as the state-funded Swab Team Services Grants and Healthy Homes Grants. The ESA section also manages the Adult Blood Lead Epidemiology and Surveillance (ABLES) Program through the CDC National Institutes of Occupational Safety and Health (NIOSH).

MDH strives to provide the best possible service to Minnesota families whose children have possible lead-related health problems. MDH also provides needed information about lead issues to local public health officials, physicians, organized health care providers, and other professionals responsible for preventing and managing lead risks in the most effective and efficient manner possible.

Funding from both state and federal sources allows MDH to operate the statewide database (which is used to evaluate programs, assess population trends, and target limited resources to areas of highest need), maintain guidelines for screening, case management and clinical treatment, provide funding to local agencies for healthy homes assessments, and conduct strategic planning with an array of collaborative partners from government, health care, private industry, and non-profit organizations. Additional funding is provided by the U.S. Environmental Protection Agency (EPA) in the form of a Lead Cooperative Agreement and Enforcement Grant (EPA Grant) and program fees related to accreditation. The EPA Grant supports the ALC Unit with regulatory activities that include licensing individuals, certifying firms, permitting lead training courses, administering independent lead examinations, compliance assistance and enforcing current Minnesota lead regulations with regard to lead hazard reduction and lead hazard evaluation activities.

Surveillance Activities

MDH maintains a secure blood lead surveillance system for the purpose of monitoring trends in blood lead levels in adults and children in Minnesota. Whenever Minnesota residents are tested for blood lead, analyzing laboratories submit the results to the MDH lead program, as mandated by Minnesota Statutes, section 144.9502. The results are entered either manually or electronically into the BLIS database.

Since not all Minnesota children are at high risk for lead exposure, targeted screening based on established risk factors is currently recommended for most areas of the state. As a result, the tests reported to BLIS are not representative of the entire population of Minnesota. A direct comparison of numbers of children with EBLLs between Minnesota counties is not appropriate because the counties have different rates of testing, per recommendations. However, the data may be used to identify trends in screening practices from year to year, compare the total number of EBLLs reported to MDH over time, and characterize the population currently being screened.

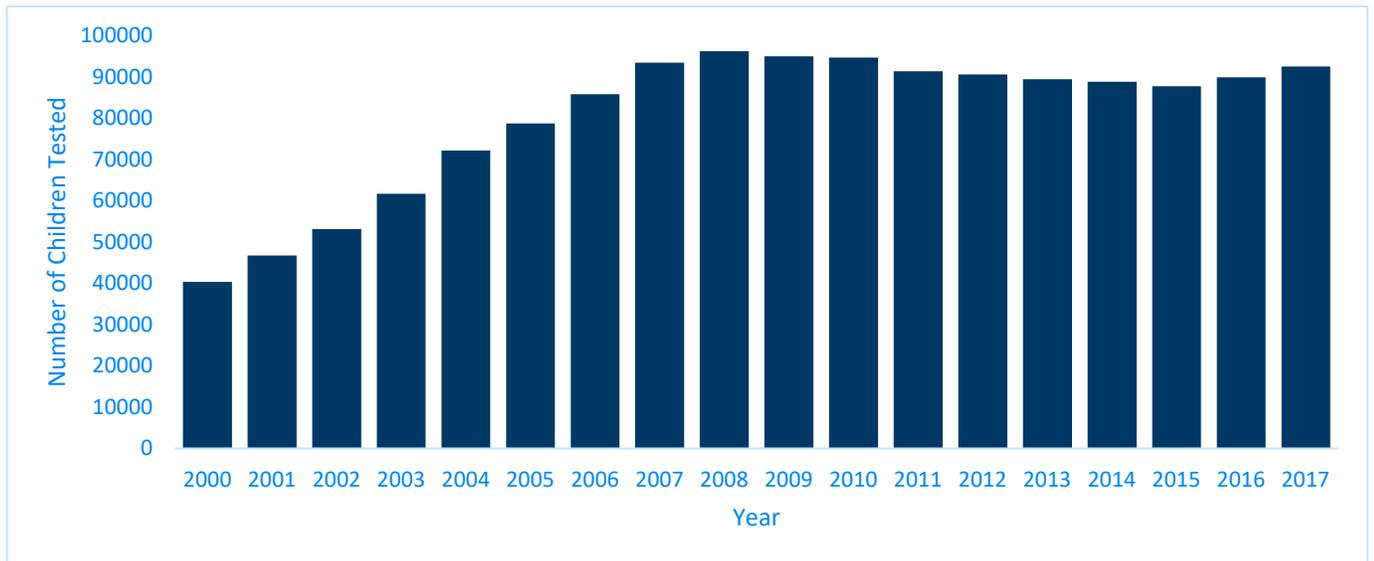
Presented below are data on lead poisoning in children less than six years old and adults, an overview of projects targeted to at-risk populations, and MDH statewide lead guidance. Further surveillance data are available in the 2017 Surveillance Report (**Appendix A**).

Elevated Blood Lead Levels (EBLLs) in Minnesota

Blood Lead Levels in Children

The number of children tested for lead in Minnesota increased steadily from 2000 through 2008, decreased slightly during 2009–2015, and increased again in 2016 and 2017. Over 92,500 children were tested in 2017 (**Figure 1**). Since not all Minnesota children are at equal risk for elevated blood lead levels, targeted testing is currently recommended rather than universal testing. Therefore, the optimal level of testing is less than 100 percent, as the goal is to test all children at risk for exposure to lead. Among children born in 2014, 80 percent were tested at least once prior to 3 years of age.

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



Trends in the number of EBLL cases (e.g., tests greater than or equal to 5 µg/dL) in Minnesota children may be compared across years (**Figures 2A-B**). The general downward trend shown in Figures 2A-B is consistent with national trends.¹ Numbers are also shown for venous blood lead levels greater than or equal to 15 µg/dL, the level at which an environmental assessment is required to identify and mitigate lead exposure.

While the rate of lead testing has remained high in the past decade, the number of EBLL cases has steadily declined. Although these data are difficult to interpret due to many confounding factors, the downward trend for EBLLs suggests that the amount of lead exposure is declining in Minnesota.

Figure 2a. Number of Children with Blood Lead Levels of at Least 5 µg/dL

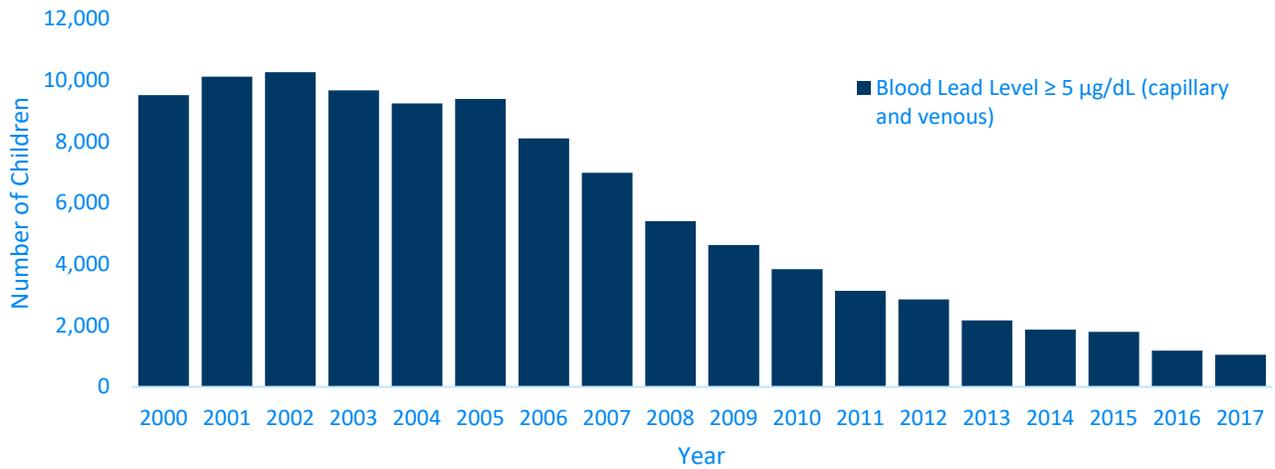
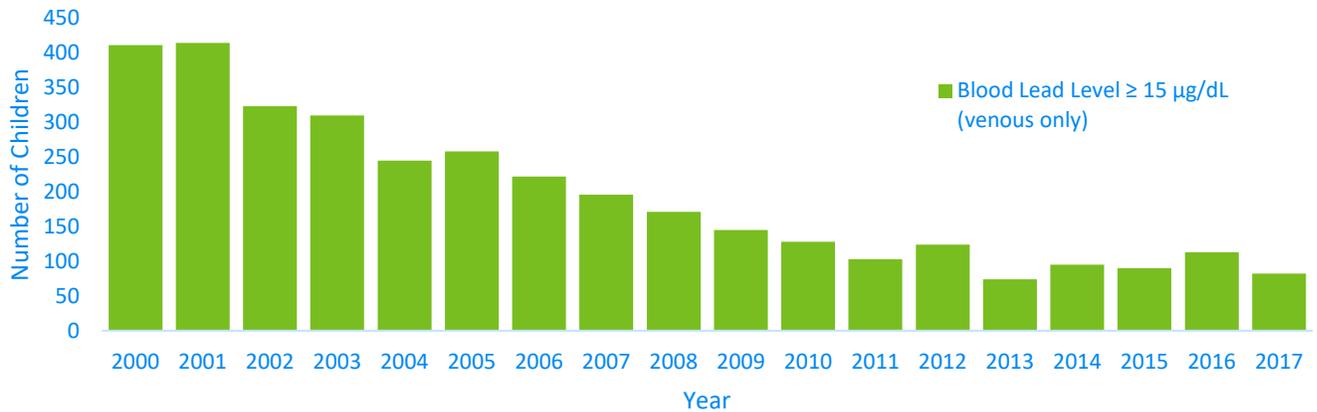


Figure 2b. Number of Children with Blood Lead Levels of at Least 15 µg/dL



Rate of follow-up testing for children with EBLLs

MDH guidelines recommend follow-up blood lead tests for children with EBLLs. The period of time recommended for retesting varies according to the initial blood level, but the maximum time is 90 days for any child with a blood lead level of 5 µg/dL or greater (an EBLL). Of the 1,134 Minnesota children whose first EBLL was a capillary test in 2017, 704 (62%) received a diagnostic venous test within 90 days of their initial test.

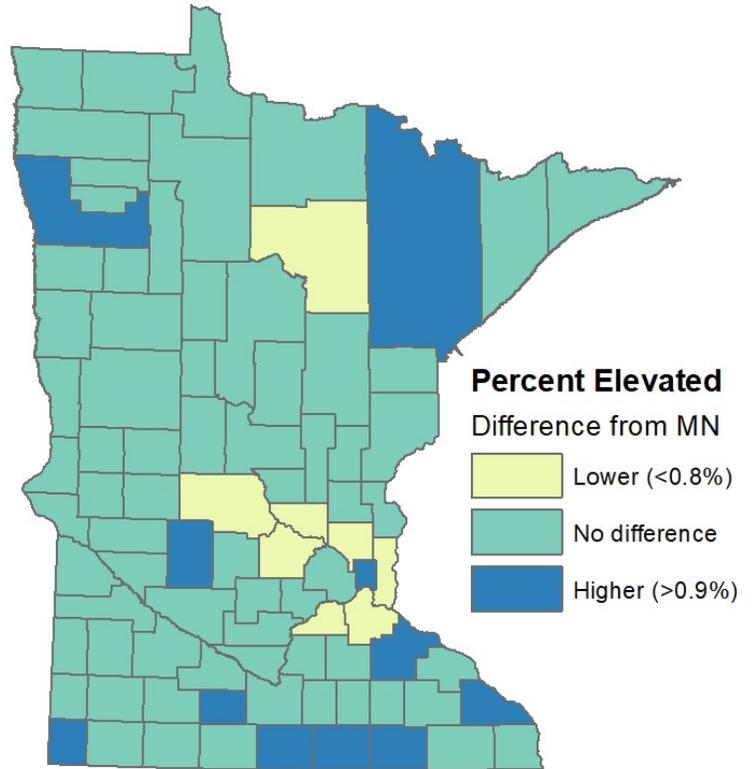
Follow-up testing has been recommended for blood lead tests of at least 5 µg/dL since 2011. In 2011, only 23% of children received a diagnostic venous test within 90 days of an elevated capillary test. Follow-up rates have been steadily increasing since then. Further increasing the follow-up rate and

reducing the time between tests will take the combined efforts of providers, case managers, families, and the MDH Lead Program.

Geographic Distribution of Elevated Blood Lead Levels

Hennepin and Ramsey are the counties of residence with the largest numbers of children with EBLLs in Minnesota, representing over half of the children with EBLLs in 2017. Universal screening of all 1- and 2-year olds is recommended for residents of Minneapolis and St. Paul. The percentage of children tested for lead with a confirmed EBLL, by county, for 2017 is shown in **Figure 3**. Counties with high rates of EBLLs are primarily in the inner-metro and the southern half of the state. This can be explained in part by the age of the housing stock in these areas. Area socioeconomic conditions also impact the prevalence of elevated blood lead levels in children. More deprived areas (e.g., those with lower average income, lower educational attainment levels, and higher proportions of rental properties) tend to have higher prevalences than less deprived areas with similarly aged housing stock.

Figure 3. Percentage of children less than 6 years of age tested for lead who had confirmed results of at least 5 µg/dL, by county, 2017. The statewide percentage was 0.83%.



Blood Lead Levels (BLL) in Adults

Adults can experience negative effects from exposure to lead such as increased blood pressure, stroke, kidney disease, and reproductive effects. Adults are generally exposed to lead in the workplace and these exposures can potentially impact both the individual and their family if lead-contaminated items such as clothing are taken home. Adult lead testing is most common among people working in high-risk industries and in pregnant women with either occupational or non-occupational risk factors for lead exposure.

The National Institute for Occupational Safety and Health (NIOSH), CDC, and the State of Minnesota use a reference value of 5 µg/dL in adults, as well as children, to define an EBLL. MDH reports work-related BLLs of 25 µg/dL or higher to the Minnesota Occupational Safety and Health Administration (MNOSHA) so MNOSHA can investigate the conditions that led to the EBLL.

In 2017, 10,950 blood lead test results were received from 9,365 adults. There were 454 adults with BLLs of 5–9 µg/dL, 450 adults with BLLs of 10–24 µg/dL, and 79 adults with BLLs greater than or equal to 25 µg/dL. Of the 9,365 adults tested, 42 percent were men and 58 percent were women, however, 92 percent with an EBLL of at least 5 µg/dL were men. This was likely due to more men than women working in industries and occupations with high risk for lead exposure. At least 79 percent of adults with reported elevated blood lead levels had documented occupational lead exposures.

Projects and Studies

LeadCare® Recall

LeadCare® Testing Systems are a family of blood lead analyzers commonly used for point-of-care testing. LeadCare® devices had been approved for testing on both capillary and venous blood specimens, however, in May 2017, the U.S. Food and Drug Administration (FDA) issued a safety communication and Class 1 recall for all LeadCare® machines because they were giving falsely low test results when processing tests on venous samples. In response to the recall, CDC recommended retesting for children under 6 years and pregnant women who had venous samples analyzed on LeadCare® devices.

MDH identified persons meeting CDC's retesting criteria as well as refugees 6–17 years of age whose venous blood specimens had been analyzed on LeadCare® devices. In total, MDH identified 26,490 persons who received a pre-recall test during 2007–2017 to be retested. MDH sent lists of these patients to the laboratories who completed the initial testing as well as to supporting local public health agencies to encourage retesting for the identified patients. As of December 2018, MDH has received retests for 5,644 (21%) of the individuals identified for retesting.

Lead Exposure among Refugee Children

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. A blood lead test is included in the standard schedule of medical checks for incoming refugees. In recent

years, the majority of refugees arriving in Minnesota have originated from East Africa and Southeast Asia.

Blood lead tests are matched to refugee information. In 2017, 12 percent of refugee children under 17 years of age had an EBLL of at least 5 µg/dL during their intake exam. Refugee children under six years of age receive routine follow-up from their local public health department following the same guidelines as other children with EBLLs. For children older than six years of age, the main source of education and follow-up is their primary care provider.

Chemicals in Products Interagency Team

The Minnesota Department of Commerce, Minnesota Pollution Control Agency, and MDH established the Chemicals in Products Interagency Team (CPIT). CPIT aims to reduce the amount of chemical hazards in products, their dispersion into Minnesota's environment, and their presence in the bodies of Minnesota citizens, especially our most vulnerable communities.

CPIT conducted two studies in 2017 and 2018 looking for lead and cadmium in 196 children's jewelry products. The studies' results led to cooperation with manufacturers, distributors, and retailers to recall jewelry products containing lead and cadmium under the Safe Toys Act. In the 2018 investigation, one distributor coordinated with the U.S. Consumer Product Safety Commission for a national recall of approximately 5,300 girls' clothing sets that included a metal pendant containing lead.

Lead in Drinking Water

Lead in drinking water is a concern that has received increasing attention nationally, largely due to the crisis in Flint, Michigan. While lead-based paint remains the most common source of lead exposure for children in Minnesota with EBLLs, lead in drinking water is more likely to create a lower-level exposure for a larger population.² Therefore, efforts toward reducing lead in drinking water are a means of primary prevention of lead exposure.

The ESA Section and ALC Unit provide technical assistance to the Drinking Water Protection program at MDH. The Drinking Water Protection program prepared a report on lead in Minnesota water.³ The report identifies lead service lines and lead in premise plumbing as the two greatest sources of lead in Minnesota water. It outlines the different points at which lead can enter the water system, the costs of lead removal from those sources, and recommendations to minimize the impact of lead in Minnesota drinking water. The report is available on the MDH website:

<https://www.health.state.mn.us/communities/environment/water/docs/leadreport.pdf>.

MDH also provides technical assistance to the Minnesota Department of Education (MDE) in testing for and responding to lead in drinking water in schools. In collaboration with MDE, MDH released guidance and a model plan in April 2018 titled *Reducing Lead in Drinking Water: A Technical Guidance and Model Plan for Minnesota's Public Schools*. The plan reflects the commitment of public health, education, and legislative leaders, as well as those directly responsible for operating school drinking water systems, to reduce the chance that children are exposed to the health hazards of lead through

school drinking water. It provides information on both required steps (testing and reporting) and flexible guidance that schools can consider to meet their individual needs. It also builds on existing guidance that schools have used since 1989 to help develop and implement plans to test for lead in drinking water and communicate results to parents and the public, fulfilling the requirements of a new state law passed in 2017. The plan can be found at:

<https://www.health.state.mn.us/communities/environment/water/docs/pbschoolguide.pdf>.

The ALC Unit began testing routinely for lead-contaminated drinking water during environmental risk assessments in 2017. Four (15%) of the 26 residences tested in 2017 had a detectable level of lead in the water sample that was tested, however, all samples tested were found to be below the EPA action level of 15 parts of lead per billion parts of water for public water systems. This action level specifies that a public water system must take actions to reduce the amount of lead in the water if more than 10 percent of the water samples have lead levels over 15 parts per billion. It is an action level; there is no safe level of lead in water.

Screening and Case Management

MDH has developed and periodically updates a set of four guidelines for lead: Blood Lead Screening for Pregnant and Breastfeeding Women, Childhood Blood Lead Screening, Childhood Blood Lead Case Management, and Childhood Blood Lead Clinical Treatment. 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

<https://www.health.state.mn.us/communities/environment/lead/prof/guidelines.html>. The

Childhood Blood Lead Case Management Guidelines were revised in 2017 based on national recommendations, changes to the elevated blood lead level definition, and input from a multi-disciplinary workgroup. These guidelines represent a set of best practices and recommendations for case managers working with children exposed to lead. The Childhood Blood Lead Clinical Treatment Guidelines are currently being updated, and the next revision will be released in 2019.

MDH also provides technical assistance to all local public health agencies in Minnesota to ensure case management activities and follow-up testing for children and pregnant women are performed consistent with MDH guidelines. As of December 2018, there were 1,270 open cases. The number of open cases has decreased since January 2017, when there were over 1,600 open cases. However, both numbers are a large increase from the 67 open cases in 2011, when a different case definition was used. This significant caseload for MDH and local public health nurses/lead program staff across the state emphasizes the need for continued support for the program.

Environmental Case Management

Minnesota Statutes, section 144.9504, requires assessing agencies to ensure that children with blood lead levels greater than or equal to 15 µg/dL are provided risk assessment services to limit exposure to lead hazards. Assessing agencies may also conduct lead risk assessments and issue lead hazard reduction orders (orders) on a property for any child with an EBLL (≥5 µg/dL), as resources allow. MDH

conducts risk assessments for children with blood lead levels of 5–14 µg/dL with extenuating circumstances or as resources permit.

A licensed lead risk assessor working under an assessing agency opens the environmental case on affected properties. A lead case manager and local public health professionals are also involved with education and follow-up with the affected family.

The basic steps in the environmental case management process include:

1. Conducting lead risk assessments at the affected property or properties
2. Issuing orders to the property owner
3. Conducting lead clearance testing after lead hazard reduction work is completed and is then verified by the assessing agency

An environmental case closure occurs when all Lead Hazard Reduction (LHR) orders are completed and a clearance inspection demonstrates no deteriorated lead paint, bare soil, or lead dust exceeding standards exist at the affected property or properties.

ALC Unit Compliance and Enforcement

The 2017 American Community Survey estimates that Minnesota has over 2.4 million housing units, with over 508,000 of those units built before 1950, down from over 560,000 pre-1950 houses in 2005. Homes built prior to 1950 are the most likely to contain the highest levels of leaded paint. The ALC Unit ensures through compliance monitoring and enforcement that the public receives safe and proper lead hazard reduction, evaluation, and analytical services by requiring those services to be conducted according to state regulations, and by trained and licensed individuals and certified firms. The ALC Unit licenses lead risk assessors, lead inspectors, lead workers, lead supervisors, and lead project designers, and certifies firms who conduct regulated lead work. In addition, the ALC Unit approves and permits initial and refresher lead training courses for the above-mentioned disciplines.

Table 1 reflects the current number of lead licensed individuals in Minnesota as of January 2018. The table also includes the number of registered lead sampling technicians. These licenses are renewed annually if the individuals want to continue conducting regulated lead work in Minnesota.

Table 1. Total Number of Credentials Issued Across Minnesota – January 2018 to 2019

Credential Issued	Total in MN
Certified Firm	147
Inspector	0
Project Designer	6
Risk Assessor	184
Supervisor	248
Worker	150
Lead Sampling Technicians	39

MDH was authorized by the EPA in September 1999 to administer and enforce the Minnesota Lead Poisoning Prevention regulations (lead regulations). The lead regulations allow regulated parties to obtain lead accreditation within Minnesota, which reduces the burden on EPA operating the lead abatement program. As permitted training courses are presented and their performance monitored, the quality of lead-related personnel in Minnesota is ensured. This, along with monitoring the conduct of licensed individuals, certified firms, and training course providers, helps to protect the public health as regulated lead work is performed in pre-1978 residences and child-occupied facilities (affected properties).

The goal of regulation and enforcement in the MDH lead abatement program is to limit lead exposure for children and pregnant women with EBLs and their families, and increase their understanding of lead-related health hazards by ensuring compliance with the lead regulations. This regulatory role contributes to the core public health function of assurance: making physical environments safe and healthy.

EPA implemented the Pre-Renovation Education (PRE) and Renovation, Repair and Painting (RRP) regulations in April 2010. The purpose of the RRP regulation is to safely address and control lead painted surfaces impacted by renovation and maintenance activities in affected properties. The RRP in Minnesota is currently administered by EPA Region Five. The EPA compliance model has limited capacity and resources to provide sufficient outreach and enforcement that ensures renovation firms are protecting the public from lead exposure. Establishing a RRP program in Minnesota will fill in major gaps by providing direct outreach and education, evaluation of work practices, timely responses to calls of concern, and additional credentialing of lead professionals.

The ALC Unit is developing RRP rules in order for MDH to become an authorized state program with EPA. Becoming an EPA authorized state would allow regulated parties to obtain accreditation, training and compliance assistance within Minnesota and provide a local enforcement presence for conducting compliance monitoring of RRP work in affected properties. The goal is to have an authorized state program established during FY2020, as authorized by Minnesota Statutes § 144.9508.

Compliance Monitoring

MDH is the primary agency for regulating lead activities in Minnesota. MDH provides leadership on Lead Hazard Reduction (LHR) program issues and works closely with federal, state, and local agencies, as well as other interested parties. Compliance monitoring involves efforts by the ALC Unit to monitor and evaluate individuals and companies as they perform regulated lead work.

A key objective of lead compliance is to make sure that potential environmental sources of lead exposure for persons with lead poisoning are properly addressed. The medical needs of the lead-poisoned person are addressed through the collaborative efforts of surveillance staff, health care providers and case managers. EBL investigations are conducted by the ALC Unit to identify actual and potential environmental sources of lead exposure for persons with EBLs. The ALC Unit is

responsible for performing environmental investigations in areas not covered by a local assessing agency.

Training Courses

For an individual to be licensed in Minnesota, they must successfully complete a training course provided by an approved training course provider. Currently six providers offer initial and refresher training courses for the six disciplines located in **Table 1**. Additional information can be found at: <https://www.health.state.mn.us/communities/environment/lead/training/index.html>.

Training providers must furnish documentation that they employ a training manager and a principal instructor for each of the courses they offer. Both the training manager and principal instructor must meet experience, training and education requirements established in the lead poisoning prevention regulations. Compliance staff routinely audit training course providers to ensure that training course content and student training materials contain all the required topics and modules.

MDH Compliance Inspections

MDH monitors firms and individuals performing regulated lead work. This is done by verifying that certified firms are employing MDH-licensed individuals to perform regulated lead work in affected properties. The monitoring includes both notices and inspections. Enforcement activities are conducted in accordance with the Health Enforcement Consolidation Act (Minnesota Statutes, sections 144.989 to 144.993) and the Plan for the Use of Administrative Penalty Order, Cease and Desist Authority, and Other Enforcement Tools. MDH also provides compliance assistance and consultation to the regulated community and others by providing information on regulated lead work and compliance issues observed during routine and follow-up inspections.

Table 2 reflects the number of LHR notices submitted to MDH, the number of inspections conducted by MDH and the number of project sites where enforcement actions were taken against certified lead firms and licensed individuals. LHR notices are required when the “intent” of the work is lead abatement or interim control work or a combination of both. MDH conducts inspections of LHR projects based on notification submitted by certified lead firms and licensed individuals. The numbers reflected in this table are based on the federal fiscal cycle years 2017 and 2018. A federal fiscal cycle year runs from October 1st to September 30th.

The number of field inspections, compliance audits, and desk reviews is based on benchmarks defined in the work plan submitted and approved by EPA Region Five. Compliance audits include the review of risk assessment reports, inspection reports, clearance inspection reports, and LHR reports. Desk reviews include the formal review of training course materials as part of the training course permitting approval process.

Table 2. Number of Lead Hazard Reduction (LHR) Notices and Compliance Activities for Federal Fiscal Cycle 2017 and 2018

Item	2017	2018
LHR Notices	306	241
Training Course Permits	27	25
Training Course Notifications	111	99
LHR Inspections	73	82
LHR Report Audits	45	19
Training Course Audits	21	23
Advisory Letters	2	2
Compliance Letters	83	77
Enforcement Cases	9	14

Health Education and Outreach

The MDH Lead and Healthy Homes Program (LHHP) currently performs outreach and education activities for health care providers and the public through a variety of activities. A strong network has been forged through collaborative approaches to dealing with lead issues. Educational outreach has been conducted for numerous segments of professional and public groups through many types of meetings and presentations. Public awareness of lead issues is further raised through National/Statewide events such as Lead Poisoning Awareness Week and federal requirements for home sellers to disclose information about lead hazards.

Collaborative Workgroups

The development and implementation of effective lead poisoning prevention strategies are collaborative activities. Success requires strong partnerships between public health agencies, health care providers, housing agencies, non-profit organizations, and individual citizens.

The ALC Unit provides updates on policies, rules, and related issues to contractors, firms, trainers, risk assessors, and other professionals engaged with lead-regulated work activity. Updates are provided on regional enforcement actions by EPA with regard to the RRP regulation compliance findings by inspections staff, HUD regulations that impact affected properties, state policies for medical and environmental case management, and information on innovative technologies and regulatory updates.

The MDH LHHP also participates in the Minnesota Collaborative Lead Education and Assessment Network (M-CLEAN), which is a workgroup that discusses lead exposure prevention initiatives and legislative developments. Membership is open to all interested stakeholders and often includes local public health agencies, other governmental agencies, community action agencies, non-profit organizations, and industry groups.

Outreach

The MDH LHHP has collaborated with community partners through Swab Team Services Grants since 2006. The grants are authorized under Minnesota Statutes, section 144.9512. MDH's Swab Team Services Grants provide nonprofit organizations with funding to increase the screening of children and pregnant women, organize lead screening events in communities with high lead exposure, provide outreach and education services when elevated blood lead levels are identified, and provide swab team services to protect populations from lead hazards in their residences.

The MDH LHHP provides educational material in multiple languages to assist with these efforts, including Spanish, Somali, Karen, and Hmong.

Internet Resources

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, found at: <https://www.health.state.mn.us/communities/environment/lead/index.html>. This site contains numerous fact sheets, a list of "frequently asked questions" and responses, publications and reports, a downloadable version of a lead education workshop, and links to external lead resources. The website also includes information from the ALC Unit for homeowners and licensed residential contractors in the state, as well as a search for lead training courses.

MDH also maintains a healthy homes webpage, available at: <https://www.health.state.mn.us/communities/environment/healthyhomes/index.html>. Information is available on asbestos, asthma, carbon monoxide, drinking water, food safety, injury prevention, lead, mold/moisture, pest management, radon, ventilation, and volatile organic compounds.

The MDH Data Access Portal is a valuable resource for exploring county-level data on lead testing, EBLs, and testing trends in Minnesota children over time. The Data Access Portal's Childhood Lead Exposure page is found at: <https://data.web.health.state.mn.us/web/mndata/lead>.

Swab Team Services Grants

Swab Team Services grants are authorized under Minnesota Statutes, section 144.9512. A request for proposals (RFP) from nonprofit organizations was issued in 2017. For October 1, 2017–June 30, 2019, \$904,959 in grant funds were available. The current grant recipients are [East Side Neighborhood Development Company](#) and [Sustainable Resources Center](#). A grant was also awarded to CLEARCorps USA. CLEARCorps is now owned by East Side Neighborhood Development Company.

Swab team services are activities that provide protection from lead hazards primarily through the use of interim controls. Examples include thoroughly cleaning the residence using methods that do not further spread lead dust, removing loose paint, repainting, and covering or replacing bare soils. In addition to providing swab team services, the purpose of the Swab Team Services Grants is to:

- Increase lead screening among children under 6 years and pregnant women in populations at high risk for lead exposure
- Conduct lead screening events in communities with high lead exposure
- Provide education and outreach services regarding the home environment so that residents are protected from lead hazards

From October 2017–January 2019, over 540 children and pregnant women received blood lead testing through the Swab Team Services Grants. In this group, 42 (about 8 percent) were identified as having elevated blood lead levels. This indicates those tested were at high-risk for lead exposure since about 1 percent of children tested statewide have elevated blood lead levels. In addition, over 130 educational events were conducted throughout the state, 259 families received culturally-appropriate home visits, and swab team services were provided in 58 homes. Finally, training on how to safely control lead was provided to over 110 individuals.

Healthy Homes Grants

Minnesota Statutes, section 144.9513, defines healthy housing and establishes a healthy housing grant program that awards \$240,000 in grants annually. In 2017, MDH issued an RFP for community health boards, community action agencies, and nonprofit organizations to participate in implementation grant agreements for healthy homes. The housing-based health threats to be addressed through these grants include:

- Lead
- Asthma
- Radon
- Injuries
- Smoking
- Excessive moisture/mold
- Pests
- Carbon monoxide
- Fire hazards
- Private wells

The scope of work in the RFP had a number of specific focus areas from which the grantees could choose, including:

1. Primary Prevention
2. Training and Technical Assistance
3. Developing Evidence-Based Best Practices
4. Community Engagement and Education
5. Healthy Home Assessments and Interventions

6. Coordination with Health Care/Secondary Prevention

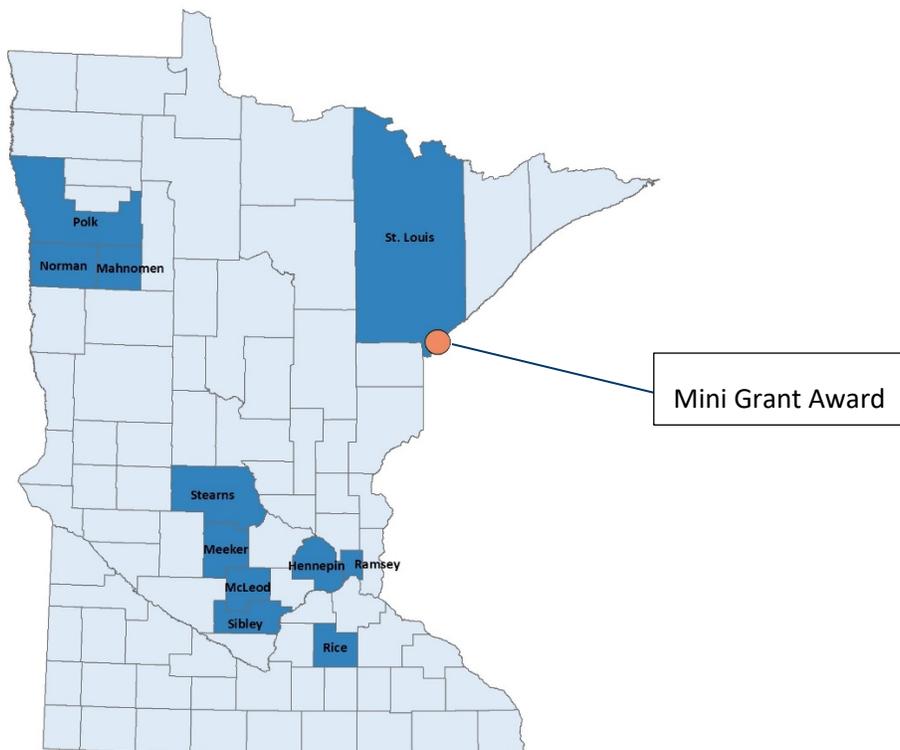
Each grant agreement is for three years, contingent on continued appropriations. Awards range from \$20,000–40,000 annually. One award is designated for mini-grants. The organization administering the mini-grant awards will administer five grants per year of approximately \$2,000 each. The goal of the mini-grants is to promote health equity by funding smaller organizations that would not have the capacity to apply for larger state grants. Grantees were distributed through the metro and non-metro areas of the state, and are listed below and shown in the map (Figure 4).

- Bois Forte Band of Chippewa (\$30,000/year)
- Central Minnesota Housing Partnership (\$20,000/year)
- Hennepin County (\$20,000/year)
- Meeker-McLeod-Sibley Community Health Services (\$40,000/year)
- Polk-Norman-Mahnomen Community Health Board (\$20,000/year)
- Rice County Community Health Services (\$20,000/year)
- St. Paul-Ramsey County Public Health (\$30,000/year)
- Twin Cities Habitat for Humanity (\$40,000/year)

Mini Grant Award Administration

- Ecolibrium3 (\$20,000/year)

Figure 4. Grant recipients for the 2017 Healthy Homes Grants



Legislative Activities

According to Minnesota Statutes, section 144.9501, an EBLL is defined as a diagnostic blood lead test of at least 10 µg/dL in any person, unless the commissioner finds that a lower concentration is necessary to protect public health. On April 16, 2014, the Commissioner found that this definition was insufficient to protect public health. The new threshold for an EBLL is 5 µg/dL, which is consistent with the latest scientific literature and current MDH case management and clinical treatment guidelines. The new definition is also consistent with the current CDC “reference level” for lead. Decreasing the threshold for an EBLL gives MDH and lead assessing agencies additional regulatory authority to ensure that lead hazards are addressed. Housekeeping bills have been introduced to clarify the language in the statute, but have not been passed by the legislature.

MDH was authorized during the 2009 Legislative Session to adopt rules consistent with sections 402(c)(3), 406(a) and 406(b) of the Toxic Substance Control Act also known as the RRP and PRE regulations. According to MS 144.9508, the Commissioner is required to create rules for oversight of renovation work or maintenance work that impacts lead paint in affected properties. MDH received legislative approval in August 2015 to develop PRE/RRP rules and rulemaking is currently underway.

The ALC and HRI Units routinely assist in preparing responses to legislative inquiries on lead hazard reduction, intervention levels, and enforcement. This includes preparing fiscal notes, bill summaries, and required reports.

Lead program staff members are regularly called upon to provide data, background, and technical perspective on bills addressing lead poisoning and healthy homes.

Policy Planning and Program Evaluation

Data Quality Evaluation

Quality control procedures have reduced errors and increased completeness in the reporting of testing data. Missing information such as the patient's date of birth, address, and the type of test used are obtained for all reported tests when available from testing clinics and providers. The completeness of data and the timeliness with which it is reported and entered in the database are reviewed annually. Results of this review are shared with the reporting laboratories, and MDH collaborates with the laboratories to continually improve the quality of their data. MDH also monitors trends in the testing practices of primary care providers and provides outreach when those practices are not in alignment with testing guidelines.

Process Evaluation

Continual reevaluation of internal processes is important for assessing the use of resources and its value to stakeholders. In the spring of 2018, staff from the IER and ESA Sections came together in a

Kaizen event to evaluate the case management process for individuals with EBLs. The purpose of the exercise was to identify inefficiencies and gaps in the process and to determine solutions to those problems. Goals of the project included a decrease in the total time from determination of an EBL through the final lead clearance inspection, improved internal and external communication throughout the process, and the identification of clear deliverables towards an improved future process. As a result of the Kaizen event, communication between the sections and with external stakeholders has improved, processes and business needs have been documented, and staff have been cross-trained to eliminate single-person dependencies. The Kaizen team continues to work toward achieving their outlined future state process.

Funding Status

The bulk of funding for the MDH lead program has traditionally come from federal sources via grants and cooperative agreements. State general funds are also important for addressing lead poisoning in Minnesota. MDH receives about \$230,000 from the general fund annually. The majority of these funds support staff salaries; these funds are used to help meet MDH statutory obligations and are a critical source of matching funds for federal grant applications. Assessment, assurance, and policy/planning are the three core functions of public health authorities. The environmental health trends identified by assessment (e.g., lead surveillance and compliance activities) require a strong response with respect to assurance (e.g., compliance monitoring, case management) and policy/planning (e.g., primary prevention, provider/physician education). In addition, the crisis in Flint, Michigan highlighted the issue of lead in drinking water in homes and schools, as well as the importance of a strong state lead surveillance system.

Although federal funding for lead poisoning prevention and surveillance activities has fluctuated in recent years, the MDH lead program received \$385,079 annually for federal fiscal years 2017–2018, and \$598,541 for federal fiscal year 2019. These funds were received as grants from CDC, as authorized through the Affordable Care Act through the Prevention and Public Health Fund. Funding is expected to continue through September 29, 2020. The program also received \$10,000 annually from the National Institutes of Occupational Safety and Health (NIOSH) for adult blood lead surveillance.

MDH has received Lead Cooperative Agreement and Enforcement grants from EPA Region Five since 1994. The funding amount has averaged about \$348,000 for each of the past two years. This funding provides ongoing support for compliance assistance, compliance monitoring, and enforcement activities. EPA doesn't guarantee that future funding will remain at the current level but continues to work on behalf of MDH to ensure funding to support our critical program areas.

The State Government Special Revenue Fund fee account was appropriated at \$107,000 for SFY 2018 (July 1, 2018–June 30, 2019). This revenue is generated from license, certification and permit fees. MDH does not charge a fee for the independent lead exams or to register lead sampling technicians. A small number of lead professionals (risk assessors) are employed by local government (e.g.,

assessing agencies) and are exempt from credentialing fees. Following adoption of an RRP program in Minnesota (to begin during FY 2019), the ALC Unit will collect fees from renovation firms and training organizations seeking accreditation, as authorized by Minnesota Statutes § 144.9505.

For October 1, 2017–June 30, 2019, MDH awarded a total of \$904,959 in state-funded Swab Team Service Grants. The current grant recipients are [East Side Neighborhood Development Company](#) and [Sustainable Resources Center](#). A grant was also awarded to CLEARCorps USA. CLEARCorps is now owned by East Side Neighborhood Development Company. The grants are authorized under Minnesota Statutes, section 144.9512, subdivision 2, to provide swab team services training to workers and property owners, and provide swab team services on affected properties. Grant funds may also be used to remove and replace building components that are identified by a licensed lead risk assessor as being a deteriorated component that also has deteriorated lead-based paint on it.

Minnesota Statutes, section 144.9513 established the healthy housing grant program. A total of \$300,000 annually was appropriated for the program; the MDH LHHP receives \$60,000 of the appropriated funds to administer the program. Nine grants of \$20,000–40,000 have been awarded through this program for 2017–2020, and the recipients are distributed throughout the state.

As noted in the 2014 Economic Burden Report, the total economic burden of childhood lead poisoning in Minnesota for children born in 2004 is estimated to be \$1.9 billion.⁴ Therefore, it is critical that state funding continue to support the program, help leverage federal support, and ensure that future generations are not burdened with the negative impacts of lead poisoning.

Future Directions

Future directions for MDH are determined by data on sources and locations of lead exposure, the requirements set by funding providers (e.g. CDC and EPA), and the state legislature. MDH will continue to partner with other agencies and organizations to reduce exposure to lead using a multi-disciplinary approach.

Lead program staff will continue to actively improve the recording and transfer of lead test data. The BLIS database requires upgrades to meet the technological needs of both MDH and the local public health agencies that provide case management services for families. MDH also strives for ways to conduct primary prevention, or preventing exposure to lead before it occurs, rather than waiting for children to be exposed to lead to initiate a response.

Education, compliance assistance, compliance monitoring, and enforcement of lead poisoning prevention regulations continue to be priorities for the state as part of federal grant funding provided by Region Five EPA. Lead compliance staff are actively involved in public education, compliance assistance and monitoring, and routinely respond to public inquiries and data requests regarding general indoor air, lead and asbestos issues. Compliance and administrative staff have the necessary training and skills to ensure that compliance and enforcement activities are conducted in accordance with MDH standardized processes and policies.

The department has completed a final draft of the RRP regulation and forwarded to the Office of the Revisor for review and final editing. EPA regional staff and EPA Headquarter's legal experts have reviewed and commented on the draft RRP language. This partisan approach has assisted the department in working with its federal partners to ensure a successful rulemaking effort. MDH anticipates it will self-certify the PRE/RRP program with EPA during FY2020. EPA has a six-month period following self-certification to fully authorize the Minnesota RRP program.

As an interdisciplinary program, MDH lead staff will continue to generate unique and innovative approaches to institutional and scientific problems. Approaches will include forming cooperative workgroups to solicit input prior to generating guidelines, cooperating with other agencies to meet common goals, conducting research to address basic problems, and overseeing LHR efforts to ensure complete and timely resolution of orders.

It will be a challenge to incorporate consistent healthy homes messages in the lead program and all of the diverse collaborating organizations. However, many agencies are excited about the potential for increased capacity to address a range of housing-based health hazards and are looking forward to new ideas and approaches to promoting public health. The program will strive to remain flexible, responsive, and grounded in the core public health functions of assessment, assurance, and policy/planning.

Conclusions

Lead is a preventable environmental health risk. Although lead is found throughout the environment, the major exposure pathway of public health concern for children is through deteriorated lead-based paint and lead-containing dust.

The MDH blood lead surveillance system collects blood lead reports on all tested Minnesota residents. State guidelines help standardize screening practices and raise awareness of high-risk populations. The average blood lead level reported to MDH has been gradually declining, consistent with national trends. Diverse populations are targeted to help address public health disparities. While very high lead exposure levels have thankfully become relatively rare in the state, there are many high-risk areas where lead remains as a significant public health threat.

Compliance monitoring and enforcement ensures that LHR work is completed in accordance with state regulations and best public health practices. This involves working with assessing agencies and the regulated community to address exposure issues in affected properties. Training is provided to homeowners and contractors, inspections are performed on LHR projects, and risk assessments and lead inspections are audited as needed to ensure that public health concerns are addressed. Health education is performed by all staff within the lead program using well-established information sources and targeted outreach opportunities.

Transition of lead resources to healthy homes needs to continue in order to address housing-based health threats. Successfully implementing healthy homes will involve expanding program

relationships to include additional housing and health organizations, an upgrade of data collection systems, and development of new policies.

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