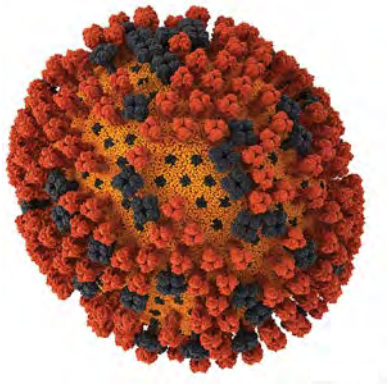
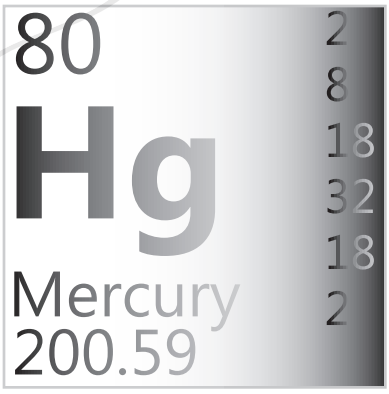
MINNESOTA MDH DEPARTMENT OF HEALTH



Public Health Laboratory



Fiscal Year 2011 Annual Report

Clinical Laboratory	Environmental Laboratory	Newborn Screening	Environmental Laboratory Accreditation

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Message from the Director

I am pleased to be able to write this letter introducing the annual report of the Minnesota Department of Health, Public Health Laboratory (PHL). This year's report summarizes the laboratory activities and captures the highlights for fiscal year 2011 (FY 11). Although every year has its triumphs and its trials, FY 11 was especially challenging for state agencies in Minnesota. As the end of the fiscal year approached without a budget agreement, PHL, along with most state agencies, found ourselves preparing for a disruption in state services. So, we dusted off our continuity of operations plans and called upon our management team to generate a list of essential services to present to our agency leadership. Core public health laboratory services were deemed essential: however, as we soon learned, the most vexing challenge that we faced was not what to put on the list of core services, but what to leave off the list. The PHL performs a large number of laboratory tests (many of which are not available in the community) in the areas of disease detection and prevention, food safety, environmental health and protection, and emergency response. This testing provides essential data to support state and national public health programs. Ultimately, we collaborated with our program partners to identify those areas that could not be interrupted without an immediate adverse impact on the health of the public. We came away from this experience with an even greater understanding of the extent to which our partners value the work that the laboratory performs and of the role that our testing plays in protecting, maintaining, and improving the health of all Minnesotans.

I would like to congratulate the staff of the PHL for another year of hard work and to commend them for their skill, dedication, and professionalism in service to the people of the state of Minnesota.

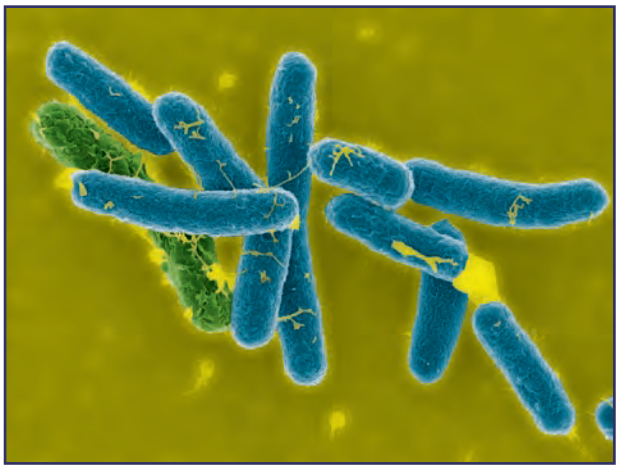
Joanne M. Bartkus

Joanne Bartkus, Ph.D.
Public Health Laboratory Director

Executive Summary

The Minnesota Department of Health (MDH) Public Health Laboratory (PHL) consists of multiple sections that perform an array of public health testing activities and cultivates public and private partnerships at local, state, and national levels. During FY 11 the laboratory performed 76,163 tests on clinical specimens for infectious bacteria, viruses, fungi, and parasites for assessment of infectious disease trends and investigation of food and water borne disease outbreaks; analyzed over 38,000 samples to detect chemical and bacterial contaminants in water, soil, and air for threats to human health; screened 67,538 infants for more than 50 treatable, life-threatening congenital and heritable disorders; and accredited 140 environmental laboratories.

The Clinical Section performs tests to diagnose infectious diseases of public health importance and contributes to infectious disease prevention and control. In FY 11, the Clinical Laboratory responded to a re-emergence of measles in Minnesota by testing patients for the disease and developing new tests to assist epidemiologists and healthcare providers with patient care and infection prevention decisions. In addition, we are continually responding to foodborne disease outbreaks. The types of foodborne disease are constantly changing; using its highly acclaimed model, PHL partners with the MDH Foodborne Diseases Epidemiology Unit to monitor these diseases and detect and investigate outbreaks. At a time when infectious diseases are emerging or re-emerging, the Section is faced with shrinking budgets and is seeking the most efficient and effective means of operation without loss of quality and testing integrity.



The Environmental Section offers a wide range of chemical analyses and delivers results to state agency partners that further serve Minnesotans. Analytical services provide accurate and reliable data to state regulatory programs for compliance monitoring. Analytical chemists help with biomonitoring study grant submissions, method and study development, as well as provide data that contribute to

the understanding of how Minnesotans may be exposed to environmental contaminants. The Environmental Section's laboratory scientists provide technical expertise as well as analytical results to support intra- and interdepartmental public health investigations.

The Newborn Screening Section provides infants born in Minnesota access to early diagnosis, follow-up, and treatment for over 50 serious or life-threatening disorders. The Minnesota Newborn Screening Program, in collaboration with the Cellular and Molecular Immunology Laboratory at the Mayo Clinic, applied for a grant from the CDC to help form the foundation for SCID screening. In FY 12 we will request that the Minnesota Commissioner of Health approve the addition of SCID screening to the state's newborn screening panel of tests. Newborn Screening genetic counselors now notify providers of all results previously reported by Mayo Clinic Biochemical Genetics Laboratory. To meet that need, an MDH genetic counselor is on-call 24 hours a day, 7 days a week. Newborn hearing screening continues to decrease the "lost to follow-up" rate, which is already well below the national average.

Minnesota's Environmental Laboratory Accreditation Program (MN-ELAP) helps to ensure that laboratories around the state submit reliable and consistent data to Minnesota's environmental programs. In FY 11, MN-ELAP launched its E-licensing initiative, which has potential use as a nationwide model. The Accreditation Program received national recognition in a peer-evaluation from accrediting bodies and federal agencies. MN-ELAP has streamlined its operating structure, which has significantly reduced out-of-state travel and costs.

PHL maintains an All-Hazards approach to responding to public health emergencies that involve potential exposure of Minnesotans to chemical, biological, or radiological agents. PHL Clinical Laboratory provides rapid diagnostic and reference services for potential bioterrorism agents for all of the clincial laboratories in the state. PHL plays an integral role in potential radiologic emergencies through analysis of samples collected for the purpose of identifying contaminated areas and preventing or limiting exposures. As a Laboratory Response Network chemical laboratory, PHL maintains the capacity to determine if any Minnesotans may have been the victims of an intentional chemical exposure, and supports a national effort for events that may occur anywhere in the United States.

Clinical Laboratory

The Clinical Laboratory Section supports the state's healthcare community and state, local, and federal programs concerned with prevention and control of diseases of public health significance by:

- Performing tests on patient specimens to determine the presence or absence of disease-causing agents;
- Characterizing agents submitted by other laboratories;
- Testing in response to public health emergencies;
- Training and consulting with other laboratory, medical, and public health colleagues; and
- Participating in applied research such as laboratory method development.

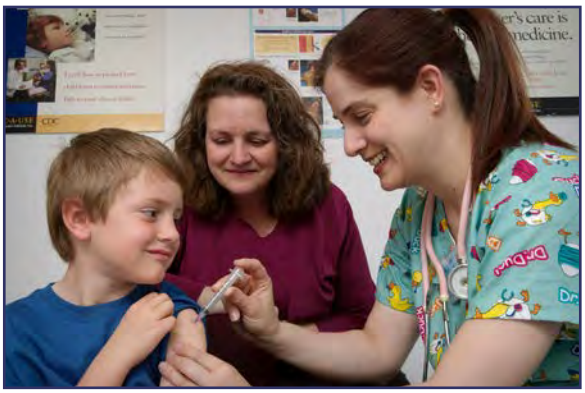
The Clinical Section includes the Virology and Serology, Microbiology, Molecular Epidemiology, and Emergency Preparedness and Response Units. The staff of 41 is highly skilled, with an average of 10 years of experience in the PHL (range = 1 to 41 years).

Testing by PHL Clinical Laboratory in FY 11:

Disease	Number of Analyses
Syphilis	11,773
Influenza	6,514
Foodborne diseases	5,756
Tuberculosis	4,572
Routine air samples for biothreat agents	4,027
HIV	2,789
Rabies	2,676
Blood or intestinal parasites	1,290
Measles	590
West Nile Virus	465

Measles

Rapid measles testing at PHL and subsequent collaboration with MDH Epidemiology was crucial to identifying a large outbreak of measles in a Minnesota community, and minimizing transmission of the virus. Prior to the introduction of the Measles Mumps and Rubella (MMR) vaccine in 1963, there was an average of 500,000 annual cases of measles in the U.S. Measles is a highly contagious disease that infects the respiratory system causing fever, cough, coryza, conjunctivitis, and rash. Less commonly seen severe complications include pneumonia, encephalitis, and death. Cases of endemic measles have largely been eliminated in the U.S. since 2000 due to high vaccination rates. However, a recent decrease in MMR vaccination rates in the U.S. has allowed on-going transmission and periodic measles outbreaks. When measles cases are identified, rapid identification of individuals that may have been exposed during the infectious stage is critical to prevent transmission. This requires both rapid laboratory testing and case tracing.



In March 2011, PHL detected a case of measles in an infant that had been exposed to an individual with recent international travel. The case patient spent time during the infectious period in a homeless shelter, a drop-in day care center, and a hospital. MDH collaborated with the facilities to rapidly identify and test any individuals that were exposed and exhibited measles symptoms. Healthy individuals exposed to measles were treated prophylactically in order to prevent future illness. Twenty-three cases of measles were identified in this outbreak.

In addition to rapid measles testing, PHL also has the capability to perform measles virus genotyping to determine whether patient symptoms are due to a recent vaccination or to an actual measles infection.

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This specialized testing was developed at PHL in response to the need for this distinction during case investigations. Close communication and collaboration with the clinical community, local public health departments, and other agencies involved in this outbreak were critical to identifying possible cases. This outbreak, along with other recent outbreaks seen in other parts of the U.S. and around the world, highlights the continued need for measles testing to rapidly identify cases and measles vaccination to prevent disease.

Estimating the Burden of Arboviral Disease

PHL has the capability to detect not only diseases newly endemic to Minnesota, but also global disease threats - a capability that is becoming essential as global travel increases. Arboviruses, including West Nile virus and the newly described Powassan virus, are a significant cause of encephalitis in susceptible populations. However, encephalitis due to arboviral disease often goes undiagnosed, meaning the true burden of arboviral diseases remains unknown. As climate change allows tick and mosquito populations to expand across Minnesota, potential for exposure to disease-causing agents is likely to expand as well. With increasing global travel, arboviruses like Dengue and Chikungunya that were once found only in other parts of the world are more likely to come to Minnesota.

In an effort to estimate the proportion of arboviral disease cases that are undiagnosed as well as to evaluate Powassan virus as a possible emerging infectious disease, PHL has partnered with the

Centers for Disease Control and Prevention (CDC) on a project titled "Underdiagnosis of Powassan virus encephalitis and other arboviral diseases in Minnesota." Because of this initiative, nine confirmed cases and several more probable cases of Powassan virus were reported in 2011 in Minnesota, including the first death due to Powassan virus infection. The first illness due to Powassan virus in Minnesota was detected in 2008, and between 2008 and 2010 there were five total cases of Powassan virus. The increase in cases observed in 2011 mark Powassan as a true emerging disease in Minnesota. This project also identified the first case in Minnesota of Ross River virus infection, a disease endemic to Australia.

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A Nutty *E. coli* O157:H7 Outbreak

The following story about the hazelnut food-borne outbreak that occurred in late 2010 illustrates how the utilization of advanced DNA subtyping methods done at PHL can significantly contribute to outbreak investigations. This outbreak demonstrates the crucial role of collaboration between MDH and Minnesota Department of Agriculture (MDA) in identifying outbreaks. PHL detected a cluster of individuals infected with *Escherichia coli* O157:H7 of the same DNA subtype. PHL performed a novel genetic subtyping method (Multiple Locus Variable-number tandem repeat Analysis [MLVA]) and identified an additional case, which led to laboratory comparison of the outbreak subtype to the national database and identified additional cases in Wisconsin and Michigan. A broad-based food history questionnaire revealed that all cases consumed hazelnuts prior to illness. In collaboration with MDA, PHL determined that the *E. coli* O157:H7 cultured from hazelnuts was identical to the DNA subtype in the case patients. The hazelnuts were eventually traced to a company in Oregon and the product was recalled, thus preventing additional illness, the ultimate goal in public health. PHL was involved with a number of additional outbreaks in 2010, including *Salmonella* Newport from blueberries, *E. coli* O157:H7 from raw milk, *Salmonella* Chester from microwavable meals, non-O157 *E. coli* associated with home butchering, and *E. coli* 0157:H7 from raw milk cheese. Early recognition and subsequent reduced transmission of foodborne illness protects citizens and saves the healthcare system millions of dollars annually.

Environmental Laboratory

The Environmental Laboratory Section offers a wide range of chemical analyses and delivers results to multiple state partners that further serve the citizens of Minnesota. Analytical services include compliance monitoring that provides accurate and reliable data to state regulatory programs. Among many uses, these data support remediation decisions made at contaminated sites and help ensure a safe source of public drinking water. The Section also provides analytical results and consultation for public health investigations and emergency response activities.

In FY 11, PHL Environmental Lab accepted, processed, analyzed, and reported results for the following samples:

Unit	Number of Analyses
Inorganics	
General Chemistry	77,019
Metals Chemistry	21,862
Water Microbiology	5,652
Radiation Chemistry	1,800
Organics	
Semi-volatile Compounds	5,259
Volatile Compounds	3,386

Compliance Monitoring

The Environmental Section's regulatory group combines 18 skilled environmental analysts with advanced instrumentation. In FY 11, this team accepted, processed, analyzed, and reported out results for nearly 115,000 analyses conducted on over 38,000 samples. In addition to the bench chemists and lab assistants, this group employs sample receiving and operations specialists that ensure that each sample is handled efficiently and within established quality assurance parameters.

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Public Health Investigations

Another group within the Environmental Section provides analyses that support public health investigations. These projects vary in size from large scale grant-funded studies that take several years to plan and complete, to smaller studies that may address a more immediate public health threat. The information that follows describes several of these projects.

Sample analysis was completed for the Lake Superior Biomonitoring Study during FY 11. Written informed consent was received to test nearly 1,500 residual dried bloodspots from newborns born in the Lake Superior Basin region of Minnesota, Wisconsin, and Michigan for total mercury

concentration. The results from this study will be used to determine the range of mercury concentrations in infants from this region, comparing variables such as birth month, sex of infant, and urban versus non-urban births. Another goal of this study is to assess the feasibility of using dried bloodspots as an indicator for mercury exposure. This method proved challenging due to the limited availability of sample remaining after newborn screening utilizes the specimen, but may prove useful for characterizing high end exposure distributions and as a screen for follow-up care, similar to the MDH blood lead screening program.

Closer to the Twin Cities, the "Perfluorochemicals in Homes and Gardens Study" is being performed by MDH in consultation with the Minnesota Pollution Control Agency (MPCA). The study is working to analyze water, produce, soil, and dust samples from houses in Washington County that have historically had a public or private water supply that was contaminated with perfluorochemicals (PFCs). The water contamination has been linked to waste

The Fond du Lac Community Biomonitoring Study

Another study including populations living around Lake Superior is the Great Lakes Restoration Initiative (GLRI). The study was established by the U.S. Environmental Protection Agency (EPA) to protect, restore, and maintain the Great Lakes ecosystem. As part of this EPA-led multiagency partnership, the Agency for Toxic Substances and Disease Registry (ATSDR) established the Great Lakes Biomonitoring Program. This program is a non-research public health effort that focuses on vulnerable subpopulations with the potential for increased risk of exposure to persistent contaminants common to the Great Lakes watersheds and ecosystems. ATSDR awarded funds to MDH, along with Michigan and New York, to conduct human exposure assessments and to advance jurisdiction-specific public health actions. With these funds, MDH and the Fond du Lac Band of Lake Superior Chippewa (FDL) are collaborating on the FDL Community Biomonitoring Study. Little or no data currently exist to determine whether members of this community are at increased risk of exposure to contaminants present in the Great Lakes Basin due to higher consumption of traditional foods from local sources for instance. This study offers a unique opportunity to carry out biomonitoring to determine actual levels of selected contaminants within a potentially sensitive population. The Environmental Laboratory is building on previous biomonitoring work to analyze specimens for metals, PFCs, and bisphenol A, which were measured previously in the Environmental Health Tracking and Biomonitoring Pilot Projects initiated by the legislature in 2007. The FDL Community Biomonitoring Study also includes analyses for fatty acids using a method that was recently validated in the Environmental Laboratory for this project.

disposal sites located in Washington County that were used by 3M for disposal of PFC-containing waste in the 1950s-1970s. Of particular interest is the potential correlation between contaminated water and elevated PFC levels in the soil and produce. The study is also looking at whether using non-potable, PFC-contaminated water outside of the house leads to an increase in indoor PFC contamination. The laboratory has received 24 water samples, 44 soil samples, 66 dust samples, and 278 produce samples. Analysis of the water samples is complete. A new method for the extraction of PFCs from a wide variety of produce was developed and validated. Analysis of the produce samples has begun and will conclude early in FY 12. A soil extraction method was modified to fit the program's needs and is currently in the process of being validated. The extraction method for dust is still being developed. The investigators in this study plan to use the data to evaluate the potential contribution of this pathway to overall PFC exposure and to provide residents in the affected areas with information to reduce their exposure to PFCs.

In May 2011, the Environmental Laboratory received several samples of skin lightening products sold in the Twin Cities due to concerns that some of the products contained dangerous concentrations of mercury. Working with Saint Paul-Ramsey County Public Health, the Office of Minority and Multicultural Health and the International Health unit within MDH, and the MPCA, 93 samples were submitted for testing. Mercury is a potent neurotoxin detected throughout the environment, although typically at levels in the parts per trillion (ppt) range. Federal regulations permit cosmetic products to contain trace amounts of up to one part per million (ppm). Exposure to excessive amounts of mercury may cause serious human health and environmental problems. Of the products MDH tested, 28 contained mercury levels ranging up to 33,600 ppm, thousands of times more than the federal legal limit of one ppm.

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Based on laboratory results, MDH published a news release advising consumers to stop using some skin-lightening products and alerted them to be aware of the products' ingredients. As a result of this public health investigation, local public health officials and MPCA staff have been able to take steps within their jurisdictions to help reduce or prevent future exposures of Minnesotans to these potentially harmful products.

Newborn Screening Program

The Newborn Screening Program provides screening six days per week with prompt notification of abnormal results and follow-up to make sure that all screening recommendations are followed. Initiatives and areas of focus for FY 11 are described below.

Newborn Screening Laboratory

In early 2011, the CDC announced a grant opportunity to support laboratory capacity building for newborn screening for severe combined immune deficiency (SCID). The grant's objective is to expand laboratory capacity to screen for SCID by funding capital costs for purchases (laboratory equipment, reagents, etc.), increasing the number of laboratory scientists with relevant knowledge and skills, training the public health community about SCID newborn screening, and encouraging collaboration to explore data analysis and statistical algorithms that can improve SCID screening.

During FY 2011, there were:

Births Registered	67,457
Infants Screened	67,538*
Specimens Tested	70,476
Infants identified with bloodspot disorders	190
Infants identified with hearing loss	220
Refusals of bloodspot screening	125
Refusals of hearing screening	97
Requests for specimen destruction	338
Requests for bloodspot result destruction	280
Requests for hearing result destruction	228

**The number of screened children matched to birth certificates exceeds the number of births registered because the methods used reference different birth cohorts.*

The Minnesota Newborn Screening Program, in collaboration with the Cellular and Molecular Immunology Laboratory at the Mayo Clinic, applied for a grant from the CDC to help form the foundation for SCID screening. PHL and Mayo Clinic hope to form a unique partnership with clinical immunologists in the state to provide a SCID intervention plan with enhanced communication, complete follow-up through diagnostic testing and confirmation, and treatment of affected infants.

In FY 12 we will request that the Minnesota Commissioner of Health approve the addition of SCID screening to the state's newborn screening panel of tests.

The Minnesota Newborn Screening Program, in collaboration with the Cellular and Molecular Immunology Laboratory at the Mayo Clinic, applied for a grant from the CDC to help form the foundation for SCID screening.

Newborn Screening Short Term Follow-Up

The Newborn Screening Short Term Follow-Up Unit (STFU) continues to work towards improving time to diagnosis, treatment, and intervention for all children identified with a positive or non-passing screen result.

Much of STFU's efforts focused on newborn hearing screening and the goal to further decrease lost to follow-up (LTFU) rates in Minnesota. Thanks to several new projects, STFU was able to reduce the LTFU rate from 16% in FY 10 to 13% in FY 11 (the national rate is at 45%). To address an identified gap of follow-up within the primary care clinics, a series of 'Lunch N' Learn' sessions was scheduled with the 16 clinics with the highest did-not-pass rates or LTFU rates. Training was tailored to key clinic staff to provide information and recommendations to improve follow-up in their system. Additionally, STFU began participation in a Local Public Health (LPH) grant which allowed staff to utilize LPH services to aid in helping families overcome barriers to obtaining follow-up.

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STFU maintained a high-level of follow-up for those disorders identified through bloodspot newborn screening. Because of Minnesota's unique collaboration with clinicians at Mayo Clinic, the University of Minnesota Amplatz Children's Hospital, and Children's Hospitals and Clinics of Minnesota, time to treatment for children identified by newborn screening is within days (mean = 7 days).

A Close Call

Based on newborn screening lab values and the experience of the University of Minnesota specialist, it was likely that the 5 day old with an abnormal galactose-1-phosphate uridyltransferase result may already be sick with early complications of galactosemia, such as liver failure, poor blood clotting, or infection.

The genetic counselor called the small clinic in northern Minnesota listed on the screening card. The baby didn't have an appointment yet, but the receptionist knew the family and was sure they would be in. She urged the genetic counselor to fax the report so the doctor could read it after vacation. Since time was critical, the genetic counselor explained galactosemia to the receptionist. She understood the urgency when she said, "So I should go to the doctor and say 'The Health Department says to call this expert at the University,' and stand there until she calls."

When the baby arrived at the neonatal intensive care unit, his blood was not clotting, even though he was seen within the hour and treatment was initiated immediately. Rapid care prevented further complications. The neonatologist reported, "Without newborn screening and quick follow-up, he would have bled into his brain and died in his sleep."

Newborn Screening Communication and Education

FY 11 brought significant challenges to the Communication and Education Unit. In an effort to streamline result notification, newborn screening genetic counselors assumed responsibility for notifying providers of the results that were previously reported by Mayo Clinic Biochemical Genetics Laboratory. A genetic counselor is now on-call 24-7 to address all results and clinical concerns.

During FY 11, the Newborn Screening Program provided more than 40 trainings statewide to over 780 healthcare professionals in order to improve understanding about the newborn screening process. Presentations are tailored to each site to ensure attendees receive relevant information.

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Prenatal education continued to be a main focus. Given the broad call for prenatal education about newborn screening, the Program took a multipronged approach. See box below for the Minnesota Prenatal Education story. The Program continues to seek opportunities to promote and encourage newborn screening education during the prenatal period and is excited to promote its prenatal education materials.

Minnesota's Prenatal Education Efforts

Coinciding with literature studies suggesting the need for prenatal education about newborn screening, the American College of Obstetricians and Gynecologists (ACOG) released a position statement advocating for awareness of newborn screening to prospective parents. After consulting prenatal providers (obstetricians, childbirth educators, midwives, and primary care physicians) and examining literature, Program staff developed a comprehensive prenatal education program including a prenatal flier for expectant parents; a reference guide for providers; and a dedicated prenatal education webpage for providers. The goal was to build awareness and empower parents to seek out additional information about newborn screening and their options.

To determine the effectiveness of the prenatal flier, Program staff conducted a study in seven metro area clinics that see prenatal patients. The survey measured newborn screening awareness before and after the new education flier was introduced. Results indicate that while awareness of newborn screening was generally high (>80% averaged across all clinics), awareness at one clinic that serves predominantly low income and minority populations was lower (48%). After implementation of the prenatal education flier, newborn screening awareness at that clinic increased from 48% to 91%, demonstrating the effectiveness of the new prenatal campaign. The newborn screening prenatal education materials will be made available throughout the state in FY 12.

Environmental Laboratory Accreditation Program

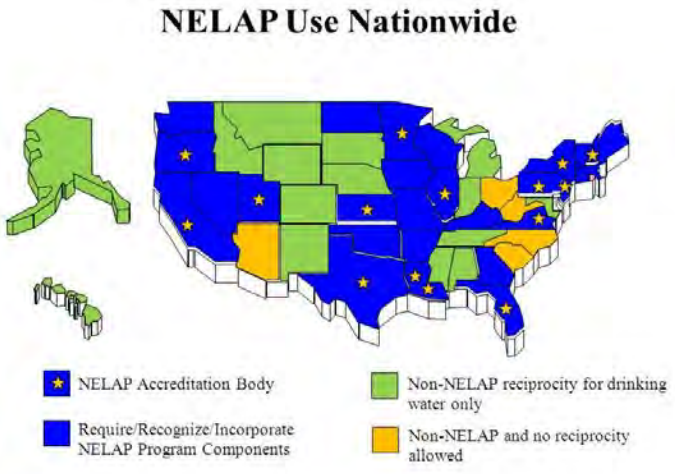
Minnesota's accredited laboratory community tests domestic wastewater, by-products of industrial treatment, drinking water, air, and hazardous wastes. The laboratories regulated by this program include municipalities, small businesses, and corporations operating in multiple states.

The number and types of laboratories in the program are relatively unchanged from one year ago. Six laboratories attributed the decision to withdraw from the accreditation program to: (1) a lack of business opportunity in Minnesota; (2) a change in the Minnesota Statutes, which prevents MN-ELAP from issuing a certificate to laboratories with potential conflicts of interest (e.g., other state agencies); and (3) technical issues related to identifying qualified personnel, a requirement of the standard.

MN-ELAP successfully participated in a peer-evaluation from accrediting bodies and federal agencies in May 2010 and received national recognition for the program's operations. The action effectively established reciprocity between the Department and 14 agencies from other states, a move which potentially reduces the travel costs and obligations for direct oversight for 20 laboratories located outside the state of Minnesota.

In 2010, MN-ELAP fully implemented its E-licensing initiative. The system streamlines the application process for the program staff and the regulated community. Through flexible user agreements, MN-ELAP distributed the online system to five other states, further adding to overall efficiency of information exchange. MN-ELAP staff is working on a project that will add functionality to the Minnesota system for possible nationwide implementation.

MN-ELAP offers compliance assistance to all laboratories through several venues, including web-based training. In 2010, MN-ELAP requested assistance from its Advisory Committee to identify training needs. Focus groups were established to develop specific training on topics of interest. The projects will extend through 2012 and may expand based on feedback from the community at large.



PHL Preparedness & Emergency Response

PHL has an "All Hazards" approach to emergency preparedness. Scientists throughout PHL collaborate to provide emergency analysis of samples for a variety of matrices and analytes. Some of the analytes are contaminants for which other laboratories routinely test, although many require specialized equipment and procedures that most commercial laboratories do not possess. PHL belongs to several federal laboratory networks including the Laboratory Response Network (LRN), managed through the CDC; the Emergency Response Laboratory Network (ERLN), managed through the EPA; and the Food Emergency Response Network (FERN), collaboratively managed by the Food and Drug Administration (FDA) and the U.S. Department of Agriculture (USDA).

Minnesota has maintained a radioactivity monitoring program since 1953. This program includes sampling air, water, milk, soil, and vegetation, which are then analyzed by PHL for radionuclides that may be from man-made and naturally occurring sources. The Environmental Laboratory can detect radiation levels at and below the natural background levels we are exposed to daily. In March 2011, a Japanese nuclear power plant released radioactive material as a result of damage the plant suffered during an earthquake and tsunami. Because of our long established monitoring program, we were able to measure and confirm the slightly elevated readings in Minnesota due to the radiation release. These readings were well below any levels of concern for public health.

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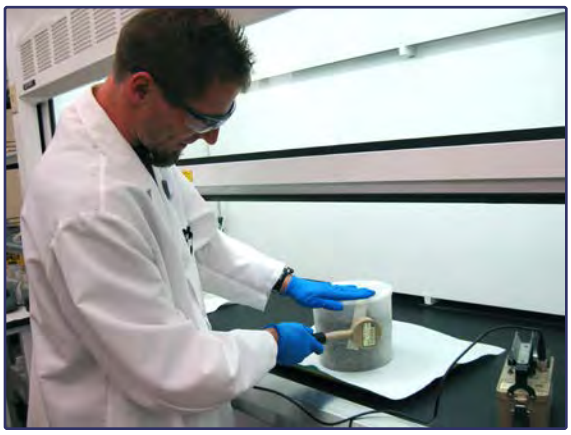
As part of the Radiological Emergency Preparedness (REP) program regulated by the Nuclear Regulatory Commission, PHL responds to radiological emergencies by providing defensible results to other response organizations, without compromising the safety of PHL personnel. The REP team can mobilize for an emergency in less than one hour and can analyze roughly 200-300 samples per day. The main goal is to protect the health and safety of the public, and the responders, during a nuclear power plant emergency or a crisis caused by the release of ionizing radiation.



In addition to radiological emergencies, the Environmental

Laboratory responds to emergencies that involve the accidental or intentional release of chemicals. During FY 11, MDH continued to expand our LRN-C (Chemical) Level 1 capabilities and increase our emergency response capacity. In the past year, PHL participated in approximately 40 LRN-C analytical testing events, including method revalidations, proficiency testing challenges, and special exercises. These tests covered 43 different chemical threat agents and required the analysis of over 2,200 samples.

During FY 11, MDH continued to expand our LRN-C (Chemical) Level 1 capabilities and increase our emergency response capacity.

Two of the special exercises were "surge support" exercises designed to test the LRN-C's nationwide support mechanism in response to a large scale chemical exposure. These two scenarios involved mass exposure to hydrogen cyanide and uranium. For both exercises, MDH was notified of a chemical exposure, followed by the identity of the target analyte. PHL had roughly 24 hours before the start of the exercise to prepare instrumentation and cross-train additional staff. Once samples were received (300 blood tubes for cyanide and 500 urine samples for uranium), MDH laboratory staff worked around the clock to analyze, review, and report the results.

The Emergency Preparedness and Response Unit (EPR) of the Clinical Laboratory is responsible for preparing for, responding to, and identifying events involving highly pathogenic organisms, viruses, and biological toxins. The EPR Unit has staff trained in all of the LRN identification methods for these agents and toxins. In addition, the EPR Unit, in collaboration with on-call scientists from the Environmental Laboratory, coordinates the receipt, opening, and analysis of suspicious unknown substances, including "white powder" letters and other substances of public health significance.

Much of EPR's preparedness efforts are focused on the hospital-based LRN Sentinel laboratories within the Minnesota Laboratory System (MLS), which serve as the front lines of identification of infectious disease outbreaks and unusual disease cases. As part of the Sentinel laboratory outreach efforts, PHL offers Annual Regional Laboratory Conferences which bring together Sentinel laboratory scientists within each region to learn from PHL and other scientists within their region about preparedness information and emerging public health threats. PHL also provides training to LRN Sentinel laboratories on methods to recognize, rule-out, and refer potential bioterrorism agents to PHL. This training consists of a day-long, hands-on workshop that provides Sentinel laboratorians the opportunity to see and work safely with these rare agents, ensuring their ability to recognize and refer them to PHL. These training and education opportunities

reinforce PHL's ability to mount timely and effective public health responses to outbreaks and potential bioterrorism threats.

The EPR also works regularly with the first responder community, including hazmat responders, law enforcement, and the Federal Bureau of Investigation (FBI) to ensure that they have the proper training to respond to materials that may pose a public health threat.

The EPR also works regularly with the first responder community, including hazmat responders, law enforcement, and the Federal Bureau of Investigation (FBI) to ensure that they have the proper training to respond to materials that may pose a public health threat. The EPR has provided practice samples to the State Chemical Assessment Teams and State Civil Support Team for the past two years. These quarterly samples encourage the teams to practice using their field detection equipment to screen and characterize unknown samples.

The preparedness efforts of PHL, both internally and externally with our emergency response partners, have been effective in preparing the state to respond to public health emergencies. Continuing to build and develop these programs is critical to maintaining the existing level of preparedness.

Case Study: Unknown White Powder

In January 2011, a local retail chain came under the attack of a malicious individual. This individual was mailing threatening letters to Home Depot and Renewal by Anderson stores. The envelopes contained an unknown white powdery substance. Some store employees were exposed to the powder, and managers were required to make decisions about store closures. During this event, 13 letters were mailed to the stores and subsequently referred to PHL for testing. Based on the concerns of the individuals receiving these letters, it was imperative that PHL process and identify the substance as quickly as possible. This event highlighted the challenges of testing multiple samples in a short period of time and has allowed PHL to make adjustments.

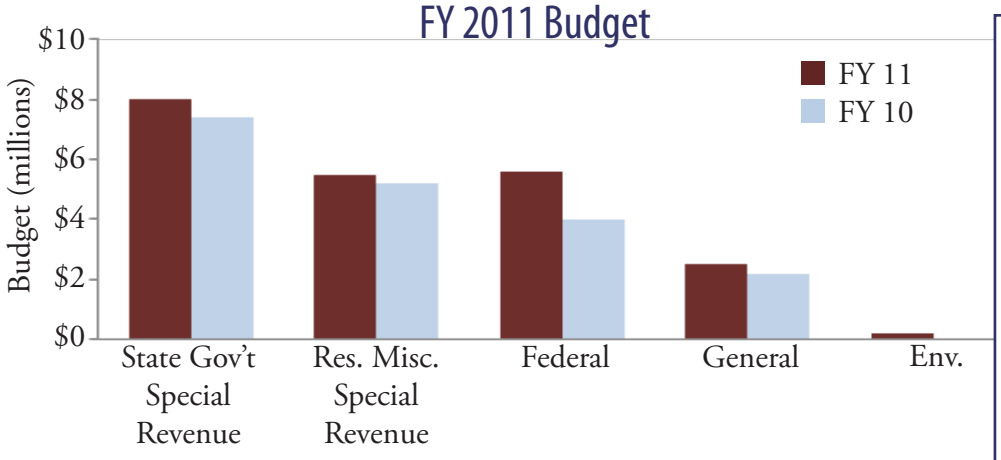
When these types of samples are being processed, the scientists opening the samples take the highest precautions available, utilizing state of the art safety containment equipment. Just opening the sample for testing is a time consuming process. As the only laboratory in the state of Minnesota that can provide this type of testing, PHL provided analytical testing for radioisotopes, biological agents, and chemical compounds. PHL analyzed and reported results for 13 samples in one week. None of the samples contained a biological threat, chemical, or radiological hazard. PHL determined that the substance contained inside the letters was sodium bicarbonate, or baking soda, a non-toxic, readily available baking ingredient. While the results in this case pointed toward a less serious outcome, PHL's response reassured members of the public who were exposed that they were not in danger. This type of scenario provides real world experience for laboratory and other preparedness staff to train for potentially more serious events.

Laboratory Happenings & Budget

The quality of work performed by PHL is directly related to the skill and dedication of our employees. PHL's workforce comprises 133 full and part-time staff. Most staff members are in the technical sections of Clinical Microbiology (41), Environmental Chemistry (37), and Newborn Screening (30). Remaining staff are in administrative functions including the Director's office, and clerical and laboratory support services. PHL operations are complex and our employees are highly trained. Most staff (75%) hold bachelor's or associate's degrees, and 35% of the staff hold advanced degrees. Because of the projected shortages of skilled public health workers, attracting and retaining highly skilled staff is essential. The laboratory management team encourages staff to pursue training and educational opportunities to foster professional development and to strengthen their day-to-day laboratory skills and knowledge of technological advancements, in order to better meet public health needs of the future.

The laboratory management team worked closely with the agency Information Systems Technology Management (ISTM) division over the last two years to plan and draft a laboratory IT reorganization plan. In October 2010, the team implemented the plan which consolidated 12 project management, business analysis, database administration, and application development staff into the ISTM division. The plan benefited both divisions by reducing the PHL budget, adding new IT skills to ISTM, increasing IT project accountability, and increasing career opportunities for laboratory IT staff.

Over the last fiscal year PHL has implemented a number of operational changes to reduce costs while maintaining core laboratory testing. The laboratory has moved towards a model that integrates more laboratory support functions, such as budgeting, purchasing, business analysis, and client services, into the testing units. This has allowed laboratory managers and staff to be more nimble by taking on some support roles that fall outside of their traditional bench work. Although it has been a challenging transition, the new model has reduced costs and added new skill sets to core laboratory staff.



PHL's FY 11 budget was $21.8 million.*
For description of fund categories, please go to http://www.health.state.mn.us/divs/phl/

*Laboratory building rent is typically paid out of MDH Indirect funds, with the exception of FY 11. The FY 11 budget does not reflect a one-time direct laboratory building rent payment of $3.2 million.

Minnesota Department of Health
Public Health Laboratory

mail PO Box 64899
St. Paul, MN 55164-0899

visitor 601 Robert Street N
St. Paul, MN 55155-2531

651.201.5200
http://www.health.state.mn.us/divs/phl/index.html