



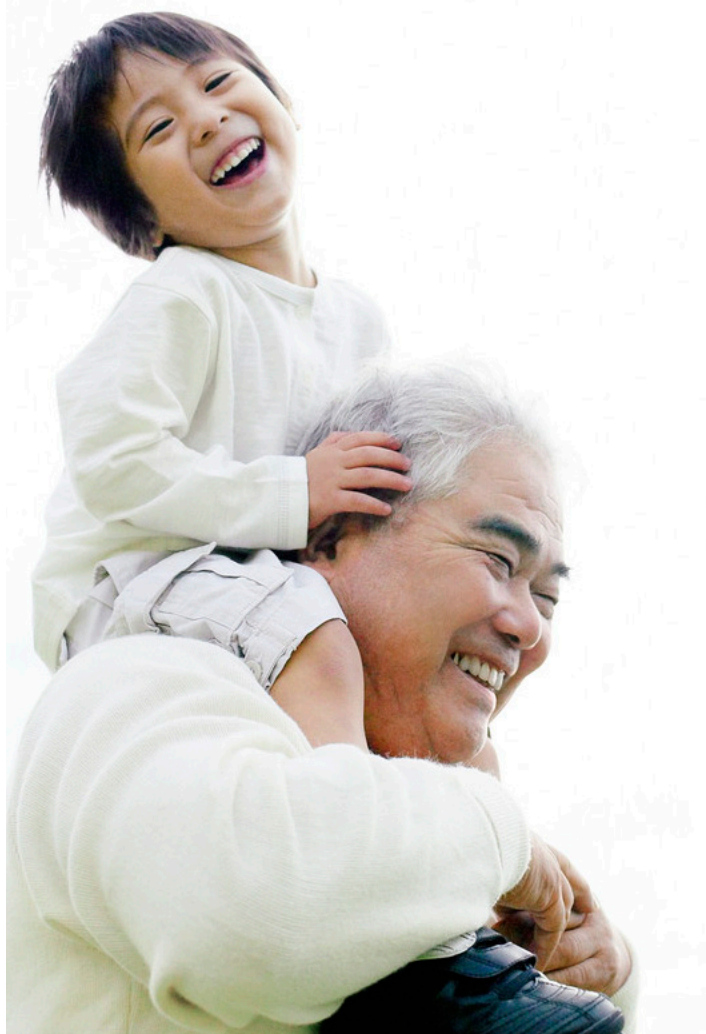
# **Environmental Health Tracking and Biomonitoring:**

## **Connecting Environment, Exposure, and Public Health**

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MINNESOTA DEPARTMENT OF HEALTH  
REPORT TO THE LEGISLATURE 2013

JANUARY 2013







*Protecting, maintaining and improving the health of all Minnesotans*

January 15, 2013

Chairs and Ranking Members  
Health and Environment Committees  
Minnesota State Legislature

Dear Legislators:

The Minnesota Department of Health (MDH) is pleased to share this Legislative Report on the progress of our Environmental Health Tracking and Biomonitoring Program, in accordance with Minnesota Statute 144.996, Subdivision 1.2. In 2007, the Minnesota Legislature passed *Environmental Health Tracking and Biomonitoring* legislation, directing MDH to gather and share with the public data on environmental hazards, chemicals in people (biomonitoring), and chronic diseases in Minnesota. MDH has successfully used these new tools to conduct community-based biomonitoring, foster public health and environmental data sharing across agencies, and make the data easily accessible to citizens, communities, policymakers, health officials, and scientists via a web-based data portal.

This report showcases Minnesota's Biomonitoring Program, which responded to community needs for information, demonstrated that actions to reduce exposure have worked, and, in one case, recommends further investigation and action to protect public health. The *East Metro PFC Project* showed that local, state, and community efforts to remove drinking water contaminants reduced PFCs in people. The *Mercury in Newborns in the Lake Superior Basin Project* identified a need for more targeted public health investigation and action.

The report also highlights the *Environmental Public Health Tracking* program and MDH's new web-based data portal: *Minnesota Public Health Data Access*. The portal offers data on a wide range of public health and environmental topics through interactive maps, queries, and graphs. Tracking is developing new ways to measure the public health effects of environmental health policy, such as how air pollution reduction strategies reduce chronic respiratory disease.

Finally, the *Environmental Health Tracking and Biomonitoring Advisory Panel* offers several recommendations for further work during fiscal years 2014-15. Continuing investment in this program will enable MDH to track and share its progress in addressing Minnesota health issues, such as mercury in newborns, air quality in our cities, and developmental disabilities in children. Improving public access to current, accurate information helps citizens, communities, and health officials make better decisions and policy to protect the health of Minnesota communities and future generations.

Sincerely,

A handwritten signature in black ink, appearing to read "Edward P. Ehlinger", is positioned above the printed name.

Edward P. Ehlinger, MD, MSHP  
Commissioner  
P.O. Box 64975  
St. Paul, MN 55164-0975





## **ENVIRONMENTAL HEALTH TRACKING AND BIOMONITORING: CONNECTING ENVIRONMENT, EXPOSURE, AND PUBLIC HEALTH**

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MINNESOTA DEPARTMENT OF HEALTH  
REPORT TO THE LEGISLATURE 2013

JANUARY 2013

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## EXECUTIVE SUMMARY

Minnesota's Environmental Health Tracking and Biomonitoring (EHTB) program *connects the dots* between environmental hazards, human exposures, and health. Biomonitoring measures chemical exposures in people. Tracking brings together data from environmental monitoring, biomonitoring in people, and chronic diseases, and analyzes it for geographic patterns, trends over time, and associations. Tracking shares data with citizens, communities, policymakers, and health officials, who then use the data to inform actions that protect health in Minnesota communities (<http://www.health.state.mn.us/tracking>).



Since 2007 when the EHTB program began, MDH has used tracking and biomonitoring successfully to achieve the following outcomes:

- Discovered that 10% of Minnesota newborns tested in the Lake Superior Basin had elevated mercury exposures, which identified the need for more public health investigation and intervention.
- Demonstrated that actions taken to remove perfluorochemicals (PFCs) from drinking water in East Metro communities were reducing PFCs in people.
- Measured arsenic levels of Minneapolis children in response to community concerns; showed that the few children with higher levels were exposed to less-toxic arsenic found in foods, not to arsenic in residential soils. Counseled parents about ways to avoid arsenic exposure.
- Found racial and income disparities in bisphenol A (BPA) and paraben exposures among pregnant women; these chemicals are used in plastics and personal care products.



- Advanced the Public Health Laboratory's capacity to measure organic chemicals and toxic metals in human blood and urine, which has led to MDH conducting additional studies.
- Leveraged federal resources to develop a web-based portal so citizens, policymakers and communities could have easier access to public health data that they can explore and map for their own use.
- Responded to community needs for information on cancer, asthma, and other chronic diseases and conditions.
- Linked data between air quality and respiratory disease in the Twin Cities in order to track the impacts of pollution reduction strategies.

## RECOMMENDATIONS

The 2007 Minnesota law that established the Environmental Health Tracking and Biomonitoring program also established an external Advisory Panel of experts in public health and environmental science. The panel provides scientific guidance and recommendations for program priorities and projects. Given the program's findings and successes to date, the panel recommends that MDH:

- Conduct additional mercury biomonitoring to find out whether newborns in regions outside of the Lake Superior Basin are also exposed to harmful levels of mercury during prenatal development and to identify the sources of those exposures. Elevated mercury exposure puts newborns at risk of experiencing deficits in learning later in life.
- Continue PFC biomonitoring in the East Metro area to further assure the community that the actions taken to reduce exposures are still working. Although PFC levels in community residents have declined since 2008, the average 2010 levels were still somewhat higher than levels found in the general U.S. population. It can take several years for the body to remove PFCs.
- Build an ongoing biomonitoring program within the legislative appropriation for Protecting Future Generations. This program will focus on vulnerable children and disadvantaged communities, identify disparities in exposure, and track progress over time. Before birth and through infancy and childhood, children are highly sensitive to chemicals in their environment. Yet, many gaps exist in the data on pregnant women and children. The EHTB program can address these gaps by providing data that will be used to inform decisions and evaluate actions for protecting the next generation.

### PUTTING IT ALL TOGETHER

Understanding the connections between environment, exposures, and health is crucial to understanding how best to protect the health of Minnesota communities. It can help individuals make healthy choices and prevent chronic health conditions, such as asthma. Chronic illnesses and learning disabilities cause suffering. And they are expensive. Nationwide, 75% of the \$2.6 trillion spent for health care goes for chronic disease treatment. Using data to support decisions and actions not only can protect health, but also reduces costs by directing resources to where they are most needed and effective.

You can see examples of how tracking and biomonitoring data are being used to inform public health action in Minnesota on MDH's website: <http://www.health.state.mn.us/divs/hpcd/tracking/stories>.





## INTRODUCTION

The environment is not just the natural world; it is also our homes and workplaces, the air we breathe, the water we drink, our foods, our habits, and our hobbies. We know that clean water, clean air, and healthy foods are essential to good health, and that some chemical exposures, such as tobacco smoke or lead, can lead to poor health. Meaningful information about our environment and our health, for everyone, can lead to actions that result in healthier communities.

Before Minnesota's Environmental Health Tracking and Biomonitoring (EHTB) program was initiated by the Minnesota Legislature<sup>1</sup> in 2007, no program existed in the state to track and bring together, in one place, existing data from environmental monitoring, biomonitoring in people, and chronic diseases. EHTB works by "connecting the dots" between environment, exposures, and health, because understanding these connections is key to understanding how best to improve and protect the health of Minnesota communities.

*Tracking* gathers together existing data on environmental *hazards*, such as indoor and outdoor air pollution, along with data on their related *health* problems, such as asthma attacks. Data shown in charts and maps enable public health officials and the public to see and explore time trends and geographic patterns in hazards and disease. To explore the data, go to [MN Public Health Data Access](#).

*Biomonitoring* measures chemicals in people, or *exposure*, as the level of a chemical hazard or its breakdown products in samples of people's blood or urine – the amount that actually entered the body. Monitoring and tracking chemicals in people helps us make the link for understanding how environmental hazards impact public health. To learn more about biomonitoring and the biomonitoring pilot projects, go to [Biomonitoring](#).

**Biomonitoring  
and Tracking  
allow us to:**

**Track trends in  
exposure and  
health over  
time**

**Identify  
disparities in  
exposure and  
health**

**Set priorities  
for public  
health action,  
research, and  
policy**

**Evaluate  
actions  
to reduce  
exposure  
and promote  
health!**

1 Minn. Stats. 144.995-998 (2007).

Together, tracking and biomonitoring are valuable new tools for informing environmental health programs and policies. Using data to support decisions and actions protects health and reduces costs by directing resources to where they are most needed and effective.

The report that follows provides

- An overview of the EHTB legislation and Advisory Panel's role
- A more detailed summary of the program's achievements
- Descriptions of the pilot projects that were finished in the past two years.
- The Advisory Panel's recommendations

The section, *Protecting Future Generations*, provides Advisory Panel and stakeholders' recommendations for fulfilling the legislation's requirement that MDH develop a base biomonitoring program for the state of Minnesota. Finally, the report summarizes the progress of the *Environmental Public Health Tracking* program and the new MDH data portal, called Minnesota Public Health Data Access, funded by a grant from the Centers for Disease Control.

### **Environmental Health Tracking and Biomonitoring Legislation: Overview and Role of the Advisory Panel**

In 2007, the Minnesota Legislature passed a law creating the Environmental Health Tracking and Biomonitoring (EHTB) program at the Minnesota Department of Health (MDH). This legislation, Minnesota Statutes, sections 144.995-998, was signed into law and took effect on July 1, 2007 (Appendix B). It directs MDH, in cooperation with the Minnesota Pollution Control Agency, to do the following:

Collect, analyze and share data to track how much people in Minnesota are exposed to hazards in the environment and related chronic diseases or health outcomes.

Coordinate data collection with the Pollution Control Agency, Department of Agriculture, University of Minnesota, and any other relevant agencies to promote the sharing of and access to health and environmental databases.

Implement a pilot biomonitoring program to measure communities' exposure to arsenic, perfluorochemicals (PFCs), mercury, and a fourth chemical to be chosen by EHTB and the Advisory Panel. [The chemicals chosen were bisphenol A (BPA), several parabens (used as preservatives in personal care products), and cotinine, a marker of tobacco exposure.]

Develop guidelines that address the science and practice of biomonitoring and make recommendations for conducting ongoing biomonitoring.

Create an Environmental Health Tracking and Biomonitoring (EHTB) Advisory Panel to recommend program priorities and guide decisions with respect to the selection of communities, chemicals and disease outcomes for tracking and biomonitoring.

Provide a biennial status report to the Legislature, according to Minnesota Statutes, section 144.996, subdivision 1, paragraph (6) and subdivision 2, paragraph (5).

In 2011, the Minnesota Legislature further authorized MDH to complete the tracking and biomonitoring of mercury and PFCs. This report fulfills the requirements of the statute that MDH submit a biennial report to the chairs and ranking members of the legislative committees with jurisdiction over environment and health on “the status of environmental health tracking activities and related research programs, with recommendations for a comprehensive environmental public health tracking program” and on “the status of the biomonitoring program and any recommendations for improvement.”

A current roster of the Environmental Health Tracking and Biomonitoring Advisory Panel is provided in the appendices. The panel members have strong scientific backgrounds and represent a broad range of stakeholder interests (business, local government, state government, non-profit organizations, and state universities). Since the inception of the program, the Advisory Panel has made recommendations on a wide variety of issues, including project design, community selection, program guidelines, interpreting the results of the biomonitoring projects, criteria for selecting new data for tracking, and strategic directions for the program.

For more information, including background materials on all Advisory Panel meetings, see the Advisory Panel meetings archive at: <http://www.health.state.mn.us/divs/hpcd/tracking/panel/archive.html>.



## TRACKING AND BIOMONITORING PROGRAM ACCOMPLISHMENTS

The Minnesota Department of Health (MDH) Environmental Health Tracking and Biomonitoring (EHTB) program has made major progress in fulfilling the legislature's vision to provide new tools for informing actions that improve environmental public health and responding to the information needs of Minnesota communities.

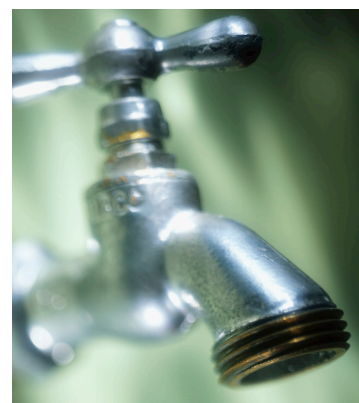
Over the five years since the EHTB program was established in 2007, MDH has achieved the following outcomes:

- **Discovered high mercury exposure in some Lake Superior newborns, indicating a need for more public health action.** EHTB helped support the Fish Consumption Advisory Program and Public Health Laboratory study of mercury exposure in newborns in the Lake Superior Basin. Although exposures for most babies were low, biomonitoring found that elevated mercury levels in 10% of newborns tested in the Lake Superior Basin put these newborns at greater risk for deficits in abilities to learn and process information. An investigation and clinical intervention that includes more study of mercury exposures in the Lake Superior area is pending.
- **Measured the effectiveness of public health actions to reduce PFC exposure.** In the East Metro community where citizens had been exposed to perfluorochemicals (PFCs) in drinking water, biomonitoring found that PFC levels in the blood of community members declined on average over a 2 year period. Biomonitoring also demonstrated that public health actions to remove PFCs from drinking water had reduced exposure in the population.



- **Responded to community concerns about arsenic levels in Minneapolis children.** In a community where soil had been polluted with arsenic from a pesticide manufacturing facility, biomonitoring identified children with higher than average arsenic levels. But laboratory tests showed that the source of exposure was a much less toxic form of arsenic found in foods (e.g., fish and rice), not the more toxic arsenic form that had alarmed the community. MDH informed community members and advised parents on how to avoid arsenic exposure for their children.<sup>2</sup>
- **Found racial and income disparities in bisphenol A (BPA) and paraben exposures among pregnant women.** These chemicals, used in plastics and personal care products, are common exposures; animal studies suggest possible effects on hormone function. Higher levels of BPA and parabens were found among low income and non-white pregnant women at a Minneapolis clinic compared to their white counterparts, possibly because of differences in their use of canned foods or consumer products. Exposures in most of the other women in the study were below US average levels. Biomonitoring of cotinine, an indicator of tobacco exposure, showed that 14% of the women were likely active smokers during pregnancy.
- **Through biomonitoring, advanced the Public Health Laboratory's capacity** to identify and measure PFCs, BPA, parabens, and various forms of arsenic and mercury in human blood or urine. The MDH laboratory developed novel methods to test newborns' mercury exposure in heel-stick spots and cord blood and has successfully leveraged this new capacity for conducting additional studies.
- **Linked data sets for understanding health impacts of air pollution.** Using advanced statistical methods, MDH environmental epidemiologists measured the link between air quality data and respiratory disease, developing a new method for tracking the impacts of air pollution and traffic density on health in the Twin Cities 7-county area and Rochester.
- **Responded to community needs for cancer information.** Tracking program staff worked closely with MDH cancer epidemiologists to provide greater public access to community-level cancer data in response to cancer concerns and questions in Fridley, Anoka County, and other communities.
- **Informed communities and participants about biomonitoring project results.** EHTB staff successfully piloted and implemented communications for participants and communities using letters, community meetings, public media and outreach to public health

2 For more on this project, go to [www.health.state.mn.us/divs/hpcd/tracking/biomonitoring/projects/mpsarsenic.html](http://www.health.state.mn.us/divs/hpcd/tracking/biomonitoring/projects/mpsarsenic.html)



and medical professionals about biomonitoring results and recommendations to protect health.

- **Successfully leveraged Minnesota's investment in environmental health tracking** when the program received federal funding to join the Centers for Disease Control and Prevention (CDC)'s Environmental Public Health Tracking Network of 22 states and New York City. The Tracking Network enhances the work of the EHTB program, provides a national perspective, promotes research collaborations with Universities, and improves service and public access to data for the citizens of Minnesota.
- **Established Minnesota Public Health Data Access**, a new interactive web portal that provides access to public state and county level tracking data in 17 topic areas with maps, charts and queries. Community level data, including custom maps of health and environment data, are provided in response to special requests as resources allow.







## BIOMONITORING PROGRESS REPORT

In 2011, the legislature directed MDH to complete the tracking and biomonitoring of mercury and PFCs in people from Minnesota communities that were likely to be exposed.<sup>3</sup> These projects were completed; their findings are described below. Based on the findings, the EHTB Advisory Panel recommends continued work on mercury and PFCs in FY2013-14.

### MERCURY IN NEWBORNS IN THE LAKE SUPERIOR BASIN

**What MDH did:** This project assessed total mercury exposure in newborn infants within the Lake Superior Basin. Fetuses, infants, and young children are most at risk from mercury exposure because small amounts can damage the developing brain and nervous system. Methylmercury from fish is toxic; babies exposed to relatively high levels before birth may be at greater risk for deficits in learning, memory, sight, hearing, or motor skills in later stages of life. The project was led by the Fish Consumption Advisory Program at MDH, with support from the U.S. Environmental Protection Agency (EPA) and EHTB, and used leftover newborn blood spots collected by three state newborn screening programs (Minnesota, Wisconsin and Michigan).

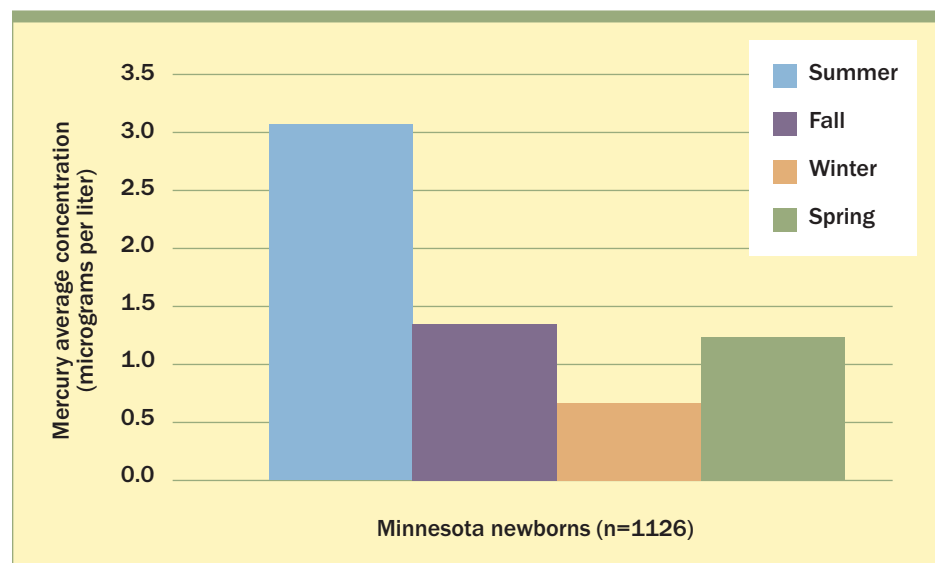
Of the Minnesota mothers contacted for the study, 44% gave consent to allow their newborn's leftover blood spots to be analyzed for mercury. In Minnesota, a total of 1,126 spots were collected between November 2008 and May 2011 and analyzed. The spots were stripped of personal information before laboratory analysis. The MDH Public Health Laboratory (PHL) analyzed mercury in the spots, which involved developing a new and sensitive testing method.

**"I was surprised that some of the infant mercury levels were that high. Because mercury exposure has significant effects on newborns, investigating this further is important. It would be helpful to know whether this occurs in other parts of the state, especially among ethnic groups that eat more fish."**

*—Beth Baker, MD. Specialists in Occupational and Environmental Medicine, St. Paul*

**What MDH learned:** Results showed that most babies' exposures were low, but 10% of the Minnesota newborns tested had mercury levels above the U.S. EPA reference level for methylmercury (the form of mercury found in fish). One percent of these babies had mercury above a level that has been linked to poorer performance in tests of neurobehavioral function. Babies born during the summer months tended to have higher mercury levels, which suggest that their mothers may have eaten more fish during the warm months (Figure 1).<sup>4</sup> Methylmercury from eating large predatory fish typically is the main source of mercury in people, but other sources can be important (Table 1). The full report is ["Mercury in Blood from Newborns in the Lake Superior Basin."](#)

**FIGURE 1. BLOOD MERCURY LEVELS IN NEWBORNS IN THE LAKE SUPERIOR BASIN BY SEASON**



4 From McCann, P. 2011. Mercury in Blood from Newborns in the Lake Superior Basin. EPA GLNPO ID 2007-942.

**TABLE 1. HOW ARE PEOPLE EXPOSED TO MERCURY?**

<b>Main source</b>	<ul style="list-style-type: none"> <li>• Methylmercury in larger, older fish and fish that eat other fish. Eating these fish is the most common source of mercury exposure.</li> <li>• Mercury in lakes comes primarily from industrial sources that emit mercury in the air. Rain and snow carry mercury into rivers, lakes, and lands over large areas of the US.</li> </ul>
<b>Less common sources</b> (sometimes high enough to be of concern)	<ul style="list-style-type: none"> <li>• Dental amalgam ('silver' fillings)</li> <li>• Ritual and medicinal use of mercury</li> <li>• Mercury vapor from broken thermometers or fluorescent lights</li> <li>• Illegal skin-lightening creams that contain mercury</li> </ul>

**THE CHALLENGES:**

- **Lack of knowledge about other populations exposed to mercury.** The project was limited to babies born to mothers who gave consent and were living in the Lake Superior Basin area of the state, which includes portions of Duluth and North Shore communities. However, newborns throughout the state may also be exposed. Long term monitoring shows that mercury is widespread in Minnesota lakes. Although fish-mercury levels had been trending significantly downward since the 1970s, beginning in the mid-1990s, the data began to show "a significant upward trend" in fish-mercury levels.<sup>5</sup> The state has strong fishing traditions and many rely on fish, both local and commercial, as a healthy source of protein in their diets. Some Minnesota communities may be more exposed than others due to geographic, cultural, or ethnic differences, but MDH lacks data on vulnerable groups and has no statewide or national comparison data for newborns.
- **New methods for laboratories.** One goal of this project was to pilot new laboratory methods for measuring exposure in newborns. Dried blood spots, collected from newborn heel sticks taken shortly after birth, contain very small amounts of blood, so they are a challenging specimen for biomonitoring. State public health laboratories, including MDH, are working to develop new and better ways of extracting and measuring mercury from these very small amounts of dried blood. Cord blood is also being tested to see how the results compare to tests in dried heel stick spots.



5 MN Pollution Control Agency et al., 2012. [Clean Water Fund Performance Report](#).

**PUBLIC HEALTH BENEFIT:**

The Mercury in Newborns study identified an area where more public health investigation and action are needed. In spite of fish consumption advisories, the study found that some newborns are exposed to mercury levels that put them at risk for learning disabilities. This information is helping MDH further target fish consumption advisory efforts and biomonitoring efforts. With these findings, for example, MDH's Fish Consumption Advisory program successfully applied in 2012 for additional federal funds to support fish consumption advisory efforts and to work with health care providers to educate women of childbearing age in the Lake Superior Basin community.

**ADVISORY PANEL RECOMMENDATION:****Follow-up Mercury Biomonitoring**

In September 2012, the Environmental Health Tracking and Biomonitoring (EHTB) Advisory Panel members reviewed the results, concluding that more work is needed and that the Mercury in Newborns of the Lake Superior Basin project raised several critical questions:

1. Are newborns in other regions of Minnesota also at risk?
2. Are some groups more exposed or vulnerable than others?
3. In addition to fish consumption, what other sources contribute to the exposure?
4. How much is mercury exposure affecting the health of newborns in Minnesota?

**The EHTB Advisory Panel recommended** that additional biomonitoring be done to find out whether newborns in other parts of the state are also being exposed to potentially harmful levels of mercury during prenatal development.

Currently, no published studies exist for comparing Minnesota findings to other studies of newborn blood spots, and little is known nationally about mercury exposure in newborns. The Centers for Disease Control and Prevention's (CDC) national biomonitoring program tracks data on women of childbearing age (16-49 years old), but has no data on mercury in newborns and very limited data on mercury exposure in pregnant women. Studies show that a newborn's umbilical cord blood usually will have levels of mercury that are nearly twice as high as levels in the mother's blood.<sup>6</sup>

<sup>6</sup> Stern AH, Smith AE. 2003. An Assessment of the Cord Blood: Maternal Blood Methylmercury Ratio; Implications for Risk Assessment. *Environ. Health Perspect.* 111: 1465-1470.

MDH has identified several useful strategies for further biomonitoring to inform actions that will reduce exposure in the future:

1. Measure total mercury in a statewide sample of newborns, with consent, to identify disparities in exposure and provide a baseline for tracking progress in preventing exposure.
2. Learn whether other sources of exposure (e.g., products that contain mercury) might also explain mercury exposure in some Minnesota newborns, in addition to fish consumption.
3. Conduct targeted investigations of exposure in vulnerable groups that are more likely to be exposed, including immigrant groups.

These new data will help to inform actions to reduce exposure, and may help to prevent deficits in children's abilities to learn and process information. Prevention will save on the costs of diagnosis, treatment, and lifelong struggles of children with developmental disabilities. The average annual cost of educating a child with a specific learning disability is nearly twice that of educating a child without one:<sup>7</sup> \$14,157 in 2012 dollars.<sup>8</sup>

**In March 2012, the EHTB Advisory Panel also recommended** that MDH's EHTB program should pursue further work on refining methods for mercury biomonitoring in Minnesota newborns. To find out whether dried newborn blood spots accurately reflect the blood mercury levels seen in umbilical cord blood, MDH is now collaborating with the University of Minnesota on the Pregnancy and Newborns Exposures Study (see below).

### Special Investigation

#### **The Pregnancy and Newborns Exposure Study compares methods to identify exposure in newborns**

Most studies of chemical exposure in newborns have used umbilical cord blood, considered to be the standard specimen for measuring late prenatal exposure. Samples of umbilical cord blood are large enough to allow the laboratory to identify and quantify different forms of mercury in order to clarify likely sources of exposure. Unfortunately, collecting cord blood specimens for biomonitoring is costly, and not routine. Specimens must be collected by trained hospital staff at the time of birth.

Heel-stick blood spots, on the other hand, are routinely

7 Chambers, J.C. et al. 2003. Total Expenditures for Students with Disabilities, 1999-2000: Spending Variation by Disability. SEEP (Special Education Expenditure Project). Center for Special Education Finance, American Institutes for Research. URL: [http://csef.air.org/publications/seep/national/final\\_seep\\_report\\_5.pdf](http://csef.air.org/publications/seep/national/final_seep_report_5.pdf)

8 DollarTimes. URL: <http://www.dollartimes.com/calculators/inflation.htm>

collected from new babies across the country for newborn screening and are tested for treatable health conditions that are not evident at birth. Leftover newborn screening blood spots are convenient specimens for use in various studies, with informed consent. But methods for measuring metals, such as mercury, in newborn blood spots are new. And the small amount of blood in the spots makes it difficult for the laboratory to find out what forms of mercury they contain.

MDH is collaborating with the University of Minnesota to collect and measure cord blood and newborn heel-stick spots as paired samples from newborns, with the consent of pregnant women enrolled in The Infant Development and Exposure Study (TIDES). The MDH project will test newborn spots against cord blood to verify blood spots as a reliable way to measure mercury in newborns. Cord blood will also be tested for other metals: lead and cadmium. And the public health laboratory will test to see whether all or only some mercury in the umbilical cord blood is methyl mercury.

- If the mercury is all or mostly methylmercury, the source is fish or shellfish.
- If the mercury is mostly *inorganic* mercury, the mother may have been exposed to other sources of mercury, such as vapor from spilled mercury from a broken thermometer or from mercury-containing skin creams.

Results will be reported to the mothers along with information about ways to prevent exposure in the future.



## THE EAST METRO PFC BIOMONITORING PILOT PROJECT AND FOLLOW-UP

**What MDH did:** In 2008, the East Metro Perfluorochemical (PFC) Biomonitoring Project successfully recruited 196 adults from the East Metro communities of Oakdale and Lake Elmo/Cottage Grove who agreed to provide a blood specimen for analysis. MDH's Public Health Laboratory (PHL) tested their blood for 7 PFCs (PFOA, PFOS, PFBA, PFBS, PFHxS, PFPeA, and PFHxA).

The people randomly selected for the project represented community members who had been exposed to PFCs through either a contaminated private drinking water well or the Oakdale municipal water supply. Contaminated drinking water from past disposal of PFC-containing waste in the area was discovered in 2005, and by 2008 most residents had been switched to filtered drinking water sources, effectively removing PFCs from the water supply.

In 2010, the Environmental Health Tracking and Biomonitoring (EHTB) Advisory Panel recommended a follow-up study to track whether people's PFC levels had changed after two years of drinking filtered water. The 2010 study measured PFCs in the blood of 164 adults who had participated in the original 2008 project; 88% of the people who were contacted agreed to take part in the second round of blood tests. The 2010 follow-up study also included a detailed questionnaire that collected information about other sources of PFC exposure, such as occupations, diet, hobbies, and consumer products.

**What MDH learned:** The 2008 project found that three PFCs (PFOA, PFOS, and PFHxS) were in all participants' blood. Older people and people who had lived in the area for 10–30 or more years had higher PFC levels than younger people and people who had lived there for only 4 to 9 years. Men tended to have higher PFC blood levels than women. Average levels were higher than those in the general US population, but comparable to or lower than levels seen in other communities exposed to PFCs in water. People on private wells had PFOA and PFOS levels in their blood that correlated with the pre-treatment levels in their drinking water. For more about the first PFC project, see the report posted on the MDH website: [East Metro PFC Biomonitoring Pilot Project](#).

The 2010 follow-up project found the same three PFCs in all 164 blood samples. But most study participants had lower levels in 2010 than in 2008. On average, individual PFOS levels went down by 26%, PFOA by 21%, and PFHxS by 13%. The 2010 levels were still somewhat higher than the most recent information for the general U.S. population (Figure 2). A few people had slight increases in PFC exposure, and EHTB staff are analyzing questionnaire data to identify other sources of PFCs that may explain this result. To read about the complete results of this project, see this report on the MDH website: [East Metro PFC Follow-Up Project](#).

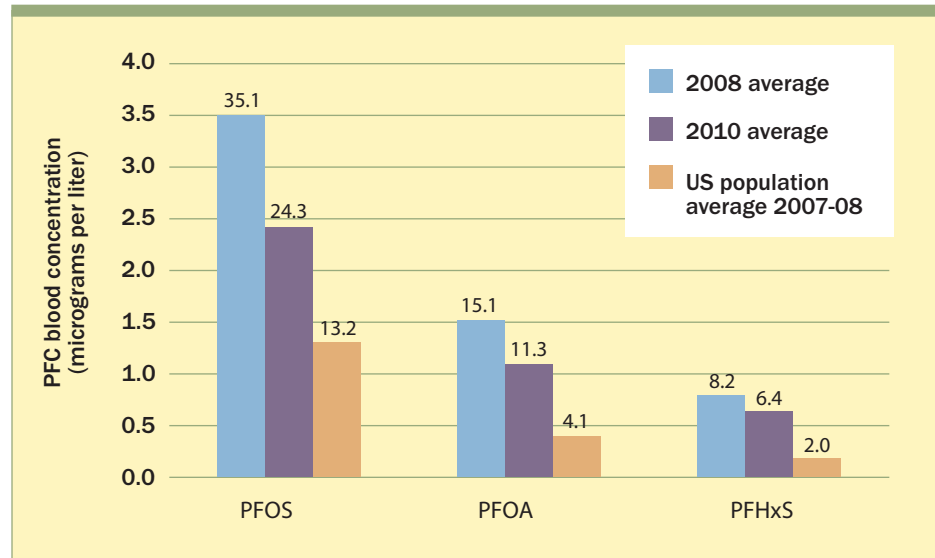
**“ The reductions of PFCs in blood levels in the east metro are a clear testament to what can be accomplished with collaboration among state agencies, local government, business and citizens. The interventions to lower PFC levels in drinking water in these communities are working. While these results are encouraging, we would like to see the levels continue to decline, and expect that will occur.”**

—Minnesota  
Health  
Commissioner,  
Dr. Edward  
Ehlinger

Explaining exposure is challenging when health effects of a chemical are unknown.

Simply finding a chemical in people's bodies does not mean that the chemical will harm health.

**FIGURE 2: CHANGE IN PFC LEVELS IN EAST METRO PARTICIPANTS FROM 2008 TO 2010**



**The challenge:** *Explaining results when health effects are unknown.*

Communicating biomonitoring results and explaining what the numbers mean for individuals and for communities is important, but it is also challenging when health effects of the chemicals are unknown. Simply finding a chemical in people's bodies does not mean that the chemical or its breakdown products will harm their health, or increase disease in the community.<sup>9</sup> Currently, scientists can't say definitively whether PFCs do, or do not harm health, and this makes the explanation of what study results mean and providing health advice difficult. Community members were advised to see their physicians about health concerns and to follow physician recommendations.

**The public health benefit:** This two-stage study demonstrated the value of ongoing biomonitoring in a community to measure change over time and evaluate the effectiveness of public health actions. The first measurements of PFCs in 2008 confirmed that many people had been exposed to PFCs in the drinking water. The second round of measurement in 2010 in the same people showed that filtering their drinking water had reduced their exposure and provided assurance to the community that the public health intervention was working.

9 Burke et al., 2006. Committee on Human Biomonitoring of Environmental Toxicants, National Research Council. Human Biomonitoring for Environmental Chemicals. National Academy Press: Washington DC.



## RECOMMENDATIONS FOR FUTURE PFC BIOMONITORING

In September 2012, the EHTB Advisory Panel voted to recommend that MDH should pursue continuing PFC monitoring in the same participants and should expand the sample in the East Metro area so that more people, including newcomers, are represented. Because the efforts to reduce PFCs in drinking water began in 2006, younger residents, and especially newcomers, are likely to have PFC levels that are more like the background levels seen in national surveys. Continued biomonitoring in the community would provide further assurance that the actions still being taken to protect public health are successful.

### **Survey of biomonitoring communications asks participants:**

#### **“How are we doing?”**

An important part of any community-based project is communication with the affected community and with project participants. During the East Metro PFC project, participants received by mail from MDH letters of invitation, consent forms, information sheets, invitations to 2 community meetings, individual results letters, and a community results summary. In addition, staff contacted participants by phone to discuss the project, and a project coordinator and a medical consultant were available by phone to answer questions.

After the first project was complete, we invited all East Metro project participants to fill out a survey to measure how well the materials and information about the project were communicated, their perceptions about the benefits of the project, and what we can do to improve communications in the future. We received 119 responses to the survey.

Most participants responded that the information about the project was helpful and clear, and the project was beneficial to them and to the community. Several expressed frustration about the lack of information about health effects, and wanted more follow-up studies. Few participants (24%) reported that they had shared their results with their health care providers. We learned that future biomonitoring communications should provide participants with an opportunity for private health consultation with a medical provider. This individual consultation was offered to participants in the 2010 follow-up project.

### **Responses from PFC Biomonitoring Participants**

**“I wish more was known on this for long-term health effects...I do want to thank the staff for your involvement and help regarding this ... You were all so professional and tried to do your best in all aspects of this difficult and scary issue.”**

**“Follow-up needs to be done. Additional blood levels for myself and family members.”**

**“Happy to put this behind us, problem has been resolved and my family can now brush teeth out of the sink and make our own frozen ice cubes; things we typically take for granted....”**

**The environment isn't just the natural world; it's also our homes and workplaces, the air we breathe, the water we drink, our foods, habits, and hobbies.**

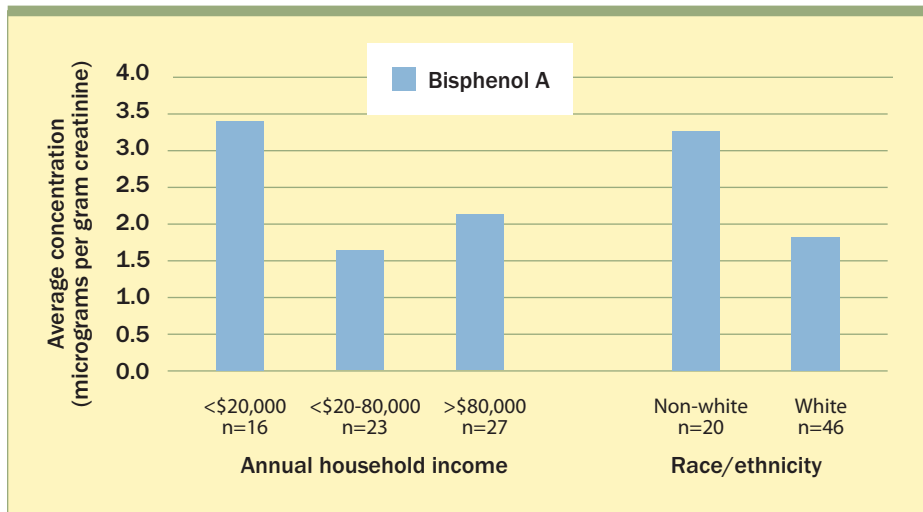
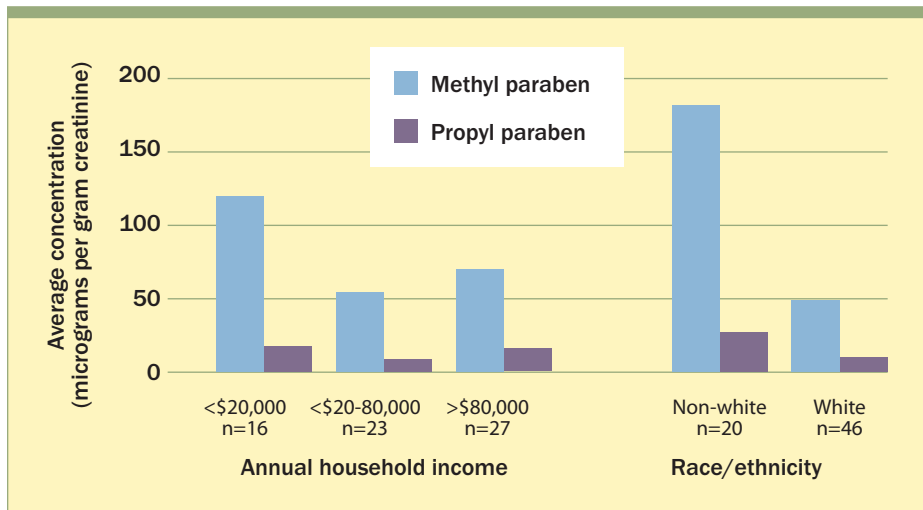
### **RIVERSIDE PRENATAL BIOMONITORING PILOT PROJECT**

**What MDH did:** The Riverside Prenatal Biomonitoring Pilot Project measured BPA (bisphenol A), parabens, and cotinine in the urine of 66 pregnant women. All women were receiving prenatal care at the Fairview-Riverside clinics in Minneapolis and participants in a University of Minnesota health study. Chemicals were chosen for this project with advice from the EHTB Advisory Panel. BPA is common in the lining of canned foods, and parabens are preservatives used in many shampoos, lotions, and skin creams. Animal studies have raised concern that these chemicals may affect hormone systems. Cotinine is a marker for exposure to tobacco, which can harm developing fetuses.

**What MDH learned:** Most of the women had BPA, methyl paraben, and propyl paraben in their urine. Although most women's levels were below the national average, non-white women and low-income women had much higher BPA and methyl paraben levels than white women and higher income women (Figures 3 & 4). About 14% of the women appeared to be active smokers during their pregnancy, based on their cotinine levels.

**The challenge:** Recruitment in minority groups. Knowing about inequalities in exposure can help public health officials set priorities for actions that address health disparities. Yet recruiting some minority and low income groups for studies requires additional planning and resources. Working with our University collaborators, we attempted to recruit a larger number of ethnic minorities for the study, but more resources and time were needed to reach the goal. Translation services and partnerships within the community are needed to be effective in overcoming language and cultural barriers.

**The public health benefit:** This project monitored pregnant women, a vulnerable population, and showed that low-income women and minority women were more exposed than their higher income and white counterparts. Identifying and addressing exposure and health disparities in populations is vital to our society's future, because all women must have healthy pregnancies to give their children a healthy start in life.

**FIGURE 3: BPA IN PREGNANT WOMEN BY INCOME & ETHNICITY****FIGURE 4: PARABENS IN PREGNANT WOMEN BY INCOME & ETHNICITY**

Figures 3 and 4 show BPA and paraben concentrations in urine. Creatinine is a marker in urine that is used to adjust for different urine concentrations.

### RECOMMENDATIONS FOR FUTURE STUDIES

The Riverside project represents a shift in the focus of concern about environmental chemicals. Today, we find that common, everyday exposures from foods and consumer products in the home are an important focus for biomonitoring in the general population. These widespread exposures can lead to disparities due to income, racial, and ethnic differences in use of consumer products, home environments, and diets. Continued biomonitoring for these types of chemicals will inform individual lifestyle and consumer choices that Minnesotans make every day.

### **The Public Health Laboratory Biomonitoring Accomplishments & Challenges**

Since the EHTB program began in 2007, MDH's Public Health Laboratory (PHL) has developed new laboratory methods for measuring chemicals in human specimens. These methods include:

- Environmental phenols (bisphenol A and parabens) in urine
- 7 perfluorochemicals (PFCs) in blood serum
- Mercury in newborn screening blood spots
- Speciation methods to distinguish different forms of arsenic and mercury (important because some forms are more toxic than others)

The PHL also validates its methods through extensive quality control analyses and carries out quality control assessments with all biomonitoring analyses.

**The public health benefits:** Biomonitoring has enabled the MDH PHL's Environmental Laboratory to develop extensive experience with measuring toxic chemicals in human specimens.

- The biomonitoring program benefits from the PHL's involvement in the CDC's Laboratory Response Network as a Level One Laboratory. The two programs can share instruments, personnel, and methods, increasing capabilities.
- Biomonitoring experience enables the PHL to identify substances that may pose a public health threat.

- The biomonitoring program enabled the PHL to establish biomonitoring methods, rather than sending the samples out of state.
- Experience with biomonitoring has helped MDH leverage new projects and funding opportunities to further develop the biomonitoring program

**The challenges:** Blood, urine, and other human specimens are complex matrices that contain many components, such as proteins and fats, as well as chemicals of interest for biomonitoring studies.

- Method development and validation is time consuming. Methods are usually adapted to PHL instruments from published methods or developed completely in-house. Both approaches require rigorous investigation into the method's performance to ensure quality results.
- Handling, storing, and disposal of human specimens pose health and safety issues.
- Analytical instruments that process complex specimens such as blood require more maintenance than instruments used to process chemicals in water.
- Analyzing human specimens involves meeting regulatory requirements, such as compliance with Clinical Laboratory Improvement Amendments (CLIA).
- Proficiency testing studies for biomonitoring, especially emerging contaminants, are not readily available.



## PROTECTING FUTURE GENERATIONS:

### A FRAMEWORK FOR AN ONGOING BIOMONITORING PROGRAM

The 2007 Environmental Health Tracking and Biomonitoring (EHTB) legislation directs MDH with the task of developing and implementing recommendations for an ongoing biomonitoring program on completion of the pilot projects.<sup>10</sup> To do so, MDH gathered advice in a series of interviews with a wide range of experts and stakeholders. These included the EHTB Advisory Panel, public health officials, the Minnesota Department of Agriculture (MDA), the Minnesota Pollution Control Agency (MPCA), the University of Minnesota, state legislators, citizens' groups, and experts from CDC and biomonitoring programs in six other states and New York City.

Using insights gathered from these interviews, MDH worked with Advisory Panel members and agency partners to develop a vision, purpose, and strategies for an ongoing biomonitoring program.

#### The Vision:

- *Minnesotans will lead healthier lives and live in safer environments.*

#### The Purposes:

- *Identify differences in the levels of chemicals in people among Minnesota's diverse populations, which may differ by income, ethnicity, culture, or geographic location.*
- *Assess the need for public health policy and action*
- *Track changes over time to find out whether actions taken to reduce chemical exposures have been effective.*

**“Many studies of environmental exposures focus on adults. Fewer focus on pregnant women and infants. Given that funding for the National Children’s Study in Minnesota is faltering, there is a huge gap in data about pregnant women and children. With continued funding, the MDH Biomonitoring Program can help to address this gap.”**

—Beth Baker, MD.  
Specialists in Occupational and Environmental Medicine,  
St. Paul

<sup>10</sup> Minn. Stats. 144.995-998 (2007).



**“The foundation of adult health begins in utero.”<sup>11</sup>**

**Some chemicals, pollutants, foods, and other behavioral changes that may have minimal adverse effects in adults may impact a developing fetus and have long-lasting effects on a child’s health even into adulthood.<sup>12</sup>**

### **Strategy: Protect Future Generations**

Stakeholders and Advisory Panel members agreed: focus the program on people and communities who are most vulnerable to the effects of chemicals at low levels commonly found in our environment, and on those who are least able to modify their environment to avoid exposure. Such a program would protect future generations and focus on:

- Children and newborns
- Pregnant women and the developing fetus
- Women of childbearing age
- Disadvantaged communities

Before birth and through infancy and childhood, children are highly sensitive to exposures in the environment. Per pound of body weight, children drink more water, eat more food, and breathe more air than adults do, increasing their exposures<sup>13</sup> When infants and toddlers explore the world with their hands and mouths, they may touch and swallow materials in dust or soil.<sup>14</sup>

Some chemicals that get into people during prenatal development can affect the nervous system. The outcomes can include damaged hearing or sight, slow learning, delayed development, and behavior problems. For this reason, preventing disability and disease—a major public health goal—needs to begin early to ensure that all Minnesota children get a healthy start in life.

The national biomonitoring program at the CDC collects little information on exposures in children under 6 years of age<sup>15</sup> except for lead and mercury, and none on infants’ exposures. CDC has limited data on pregnant women’s exposures. In addition, CDC does not provide data on state exposures, but only on a national scale.

11 Hellerstedt, McGovern, et al. 2008. Prenatal Environmental Exposures and Child Health. Minnesota Medicine, September 2008.

12 National Institute of Environmental Health Sciences. *Child Development and Environmental Toxins*

13 NAS 1993. Measuring Lead Exposure in Infants, Children, and Other Sensitive Populations. National Academies Press: Washington DC

14 National Academy of Sciences. Pesticides in the Diets of Infants and Children. Washington DC: National Academy Press, 1993

15 Sexton K, Adgate JL, et al., 2006. Using Biologic Markers in Blood to Assess Exposure to Multiple Environmental Chemicals in Inner-City Children 3–6 Years of Age. Environmental Health Perspectives 114(3): 453–459

**Strategy: Choose Chemicals Wisely So People Can Take Action**

Stakeholders and Advisory Panel members strongly recommend having public health professionals guide the choices of chemicals for biomonitoring. Their advice stressed the following:

- Choose chemicals that are a particular concern or common in Minnesota, either because of our natural environment (climate, geology), our industries, our communities, or our diverse people and cultures.
- Choose chemicals that provide the most meaningful data for making health-based decisions. This would include chemicals with known health effects and/or chemicals for which the sources of exposure can be identified and remedied.

Mercury is only one example of a substance that can harm Minnesota's children and vulnerable groups. Other environmental chemicals of concern include:

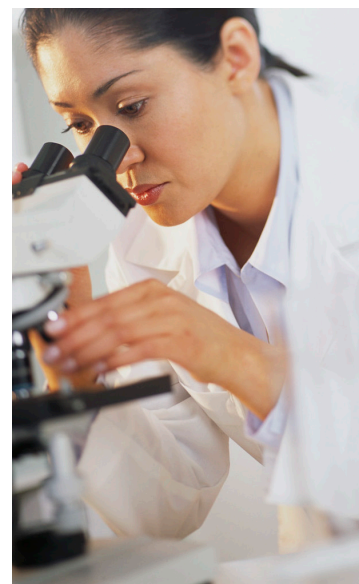
- Arsenic, manganese, and other metals in drinking water;
- Lead, secondhand tobacco smoke, carbon monoxide, or formaldehyde from indoor environments;
- Particles and ozone from traffic and fuel burning;
- Chemicals that alter the hormone system, affecting growth and development
- Pesticides, used in our homes and in agriculture.

**Strategy: Use a Smart, Cost-Effective Tracking Approach**

A cost-effective strategy would start small, and would use systematic, repeated biomonitoring (a *tracking* approach) in one or more vulnerable communities in Minnesota. A smart strategy would focus on a few select chemicals, such as metals: lead, cadmium, mercury. Specimens can be divided up and used for more than one chemical analysis, and they can be stored for more analysis at a later time, with informed consent.

Data collected in this way could be integrated with Tracking's environmental monitoring and health data, and used to inform public health action and decision-making by communities, policy makers and public health officials. Individuals can use the information to make personal health choices as well.

Understanding the connections between environment, exposures, and health is important to understanding how best to improve and protect the health of Minnesota communities. For these reasons, stakeholders and experts emphasized repeatedly that *biomonitoring is most effective when it is integrated with tracking*. Communities want to know how the levels in our bodies are connected to health.





## ENVIRONMENTAL PUBLIC HEALTH TRACKING PROGRESS REPORT

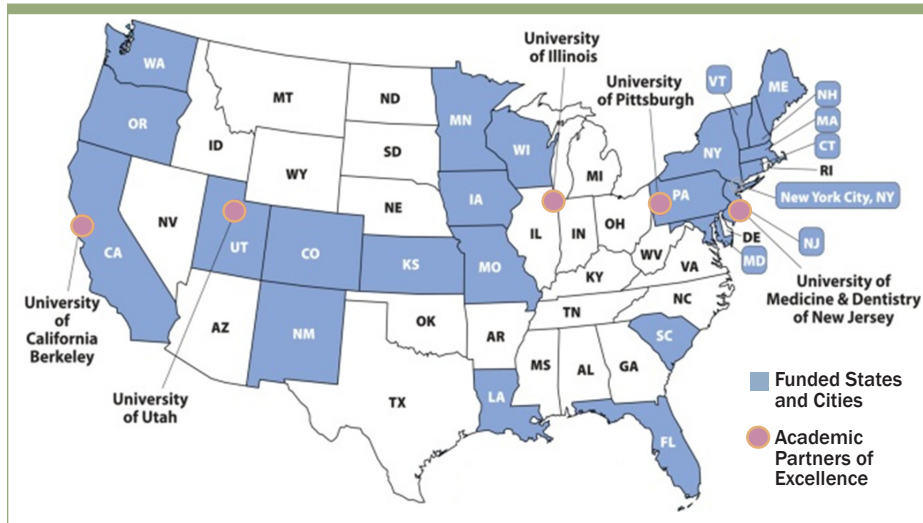
*Connecting the Dots* means bringing together data from across many state programs, including environmental monitoring and chronic disease surveillance, and finding the connections to discover how our changing environment is impacting our health. This collection, analysis, and integration of data for informing public health action is the unique work of the *Minnesota Environmental Public Health Tracking* (MN EPHT or Tracking) program.

Minnesota's Tracking program began with the 2007 Environmental Health Tracking and Biomonitoring Legislation. This law created the first state program specifically directed to collect and integrate state *biomonitoring* data within Tracking, thereby providing a critical link for understanding environmental chemicals and their potential health effects through a **hazard** → **exposure** → **health effect** framework. Tracking gathers data on environmental hazards and related health effects, while biomonitoring measures and documents environmental chemicals in people (exposure).



Minnesota  
Environmental  
Public Health  
Tracking



**FIGURE 5: THE NATIONAL ENVIRONMENTAL PUBLIC HEALTH TRACKING NETWORK**

Since 2009, Minnesota's Tracking program has largely been funded by the CDC National Environmental Public Health Tracking Network (Figure 5). Minnesota now collaborates with a Network of 22 other states and New York City for collecting and disseminating data in ways that are nationally consistent across all states, and contributes to a national Tracking database.

### **TRACKING IN ACTION: DATA TO INFORM PUBLIC HEALTH ACTION AND POLICY**

Tracking is more than just gathering and sharing health and environment data. Tracking promotes uses of the data to save lives, protect people, and save money by preventing exposure and disease. You can see examples of how tracking and biomonitoring data are being used to inform public health action in Minnesota on MDH's web site: <http://www.health.state.mn.us/divs/hpcd/tracking/stories>

**Protecting public health is not solely the work of state government programs. Protecting public health involves the work of many organizations, communities and individuals.**

### **Examples:**

- Evaluating how actions to reduce secondhand smoke exposure are working
- Providing insights on how to prevent and treat COPD (emphysema, chronic bronchitis)
- Tracking the impact of Minnesota's carbon monoxide alarm law
- Evaluating ways to prevent heat-related deaths and illness during extreme heat events
- Measuring people's PFC exposures to evaluate efforts to reduce PFCs in drinking water
- Informing local communities about cancer risks and the environment
- Measuring whether actions to reduce air quality impacts on health are working
- Biomonitoring people to reduce mercury exposures in the Great Lakes Basin
- Examples of how tracking data are being used by the National Tracking Network are on CDC's web site:  
<http://www.cdc.gov/nceh/tracking/successstories.htm>

### **MINNESOTA PUBLIC HEALTH DATA ACCESS**

Tracking systematically gathers a wide range of data on Minnesota environmental hazards, chemical exposures, and health in one place and makes the data available for everyone on a web-based data portal, [MN Public Health Data Access](#).

Protecting public health is not solely the work of state government programs. Protecting public health involves the work of many organizations, communities and individuals. The public health data portal is available to everyone, including:

- Minnesota citizens and elected officials seeking information about their communities to support local decision-making
- Local public health officials conducting health assessments or preparing grant proposals
- Non-governmental organizations seeking data to support policy positions and actions
- Academic researchers using data for studying the relationships between environmental risk factors and health
- State disease and exposure prevention programs seeking data to target their activities and evaluate the effectiveness of programs

**TABLE 2: LIST OF DATA TOPICS**

<ul style="list-style-type: none"> <li>• Air Quality</li> <li>• Asthma</li> <li>• Birth Defects</li> <li>• Cancer</li> <li>• Carbon Monoxide Poisoning</li> <li>• Chemicals in People (biomonitoring)</li> <li>• Childhood Blood Lead Poisoning</li> <li>• Childhood Immunizations</li> <li>• Chronic Obstructive Pulmonary Disease</li> </ul>	<ul style="list-style-type: none"> <li>• Drinking Water Quality</li> <li>• Environmental (second-hand) Tobacco Smoke</li> <li>• Heart Attacks</li> <li>• Heat-Related Illness</li> <li>• Obesity</li> <li>• Population Characteristics (income, poverty, % insured)</li> <li>• Reproductive and Birth Outcomes</li> <li>• Smoking</li> </ul>
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### TRACKING TRENDS AND MAPPING PATTERNS

Since the data portal's launch in 2011, Tracking has expanded the available data to 17 health and environment topics (Table 2), laid out in new interactive maps, queries, and charts (Figures 6 and 7). Charts and maps displayed on the portal show important public health trends in time as well as geographic patterns across the state. Viewing trends or patterns in the data can enable public health officials to see when and where public health policies are making a difference. These data can be downloaded into spreadsheets, reports, and presentations, which enhance efficiency and usability of data available to the public. Many data topics are directly relevant to children's health.

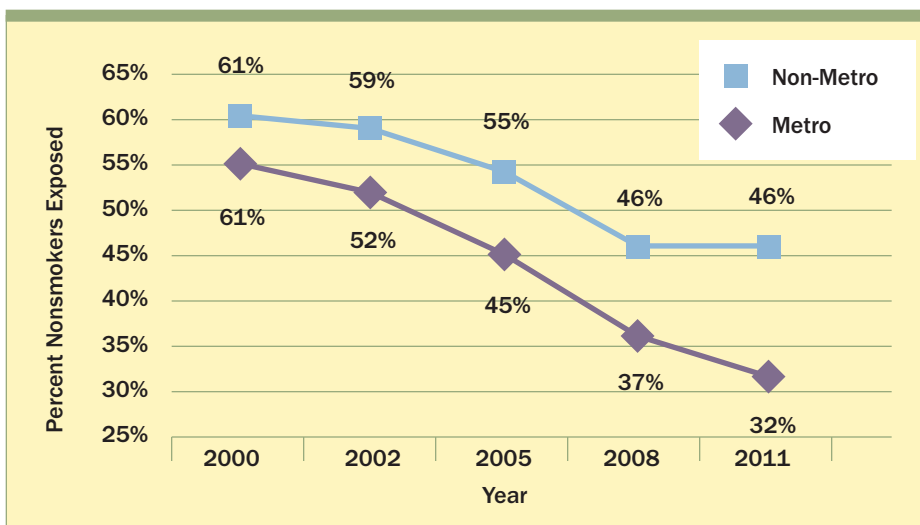
**FIGURE 6: YOUTH EXPOSED TO SECONDHAND SMOKE, 2000-2011**

Figure 6 shows downward trends for exposure among Twin Cities metro and greater MN youth as communities set up smoking bans and the Freedom to Breathe Act was implemented in 2007.

**Tracking gathers existing data on environmental hazards, along with data on their related health problems.**

**Biomonitoring measures chemicals in people (exposure) as the level of a chemical hazard in their blood or urine—the amount that actually entered the body.**

**“Interactive maps are powerful tools for informing public health actions and priorities. Local health departments can use these new maps to assess actions to prevent asthma, cancer, and childhood lead poisoning.”**

—Julie Ring,  
Legislative  
Coordinator  
and Health &  
Human Services  
Policy Analyst,  
Association  
of Minnesota  
Counties

Many of the data topics in Table 2 include data and measures developed through a cooperative agreement between MDH and the CDC, in collaboration with 22 other states and New York City. These data and measures are used for comparing state to state or to national benchmarks available through CDC’s [National Environmental Public Health Tracking Network](#).

In addition, Tracking has developed state-specific data and measures of interest for the data portal. In 2012, Minnesota tracks chronic obstructive pulmonary disease (COPD), obesity, smoking, population demographics, and environmental tobacco smoke exposure as unique state measures. Within available resources, Tracking will continue to explore other data topics important in Minnesota, including developmental disabilities (such as autism), PFCs, pesticides, mercury, and radon.

**FIGURE 7. CHILDREN TESTED FOR BLOOD LEAD**

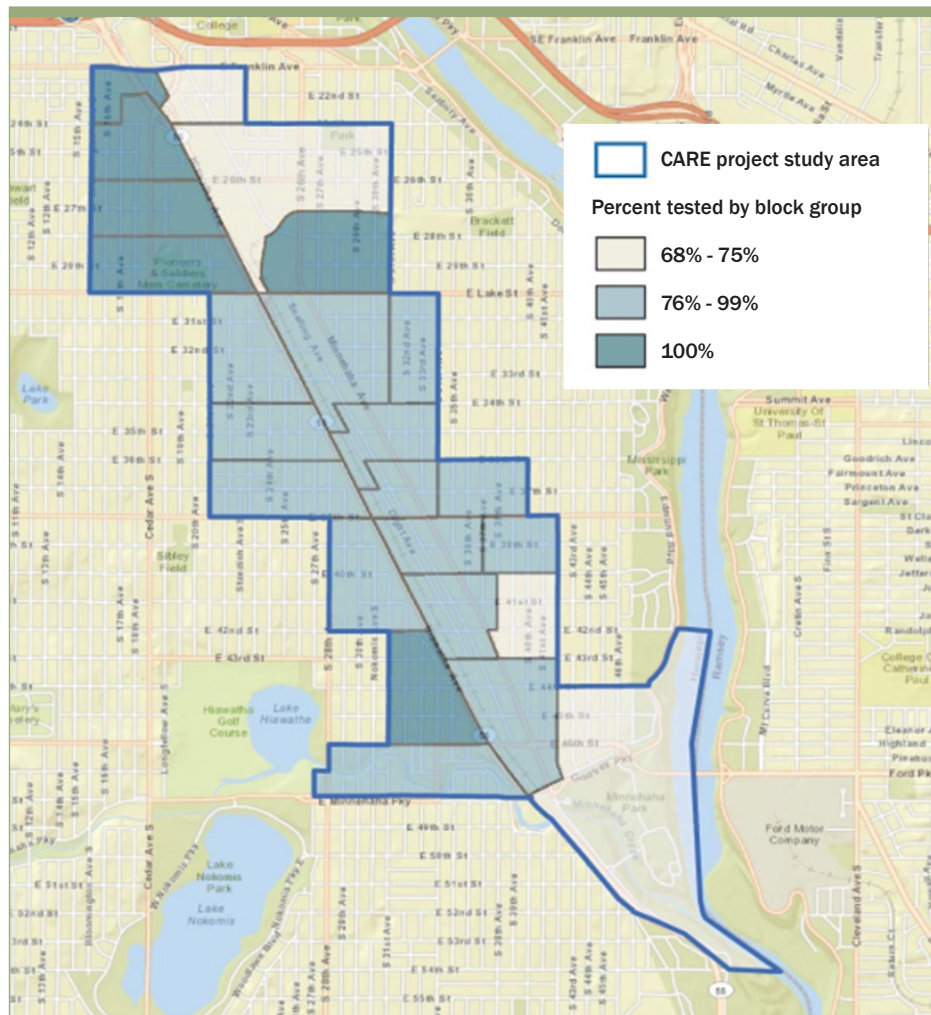


Figure 7 shows the percent of children born in 2006-2008 and tested for blood lead before age 3 in the Hiawatha US EPA Community Action for a Renewed Environment (CARE) Project area (Minneapolis). This map and other custom maps were developed at the community’s request.

## RESPONDING TO COMMUNITY NEEDS FOR COMMUNITY DATA

Most currently available public health data are provided at the state and county level. Increasingly, communities are asking MDH staff to provide community-level data, either at the zip-code or census tract level, for informing local decisions or responding to local concerns. As resources allow, the Tracking and Biomonitoring program will be meeting the challenge of community requests by conducting additional analyses and special investigations. Through the Minnesota Public Health Data Access portal, Tracking will offer new tools for addressing this need in the year ahead.

### Tracking Assists Response to Local Cancer Concerns

In spring 2012, the MN Environmental Public Health Tracking Program, in partnership with the MN Cancer Surveillance System (MCSS), launched a series of new interactive maps, charts, and queries for state and county-level cancer data on Minnesota Public Health Data Access, the state tracking data portal. At about the same time, residents of Anoka County, Minnesota, became concerned about higher cancer rates and environmental contamination (Superfund sites; volatile organic chemicals in groundwater) in their community. Many turned to the portal's cancer data.

In response, MN EPHT and MCSS developed a fact sheet summarizing cancer data for the City of Fridley and Anoka County (see: Community Concerns about Cancer in Fridley and Anoka County, MN <http://www.health.state.mn.us/divs/hpcd/cdee/documents/AnokaCancerBrief.pdf> )

The data showed that the total number of cancers in Anoka County was about 4% higher than expected and that lung cancer accounted for most of the overall excess. This effort enabled MN EPHT and MCSS to use data and explanations on the portal to inform the community and local officials about smoking and radon (leading causes of lung cancer) and to remind citizens about the public health actions they can take to prevent lung cancer.

MN EPHT is using these insights and working with American Cancer Society and MN Cancer Alliance partners to enhance the use of MCSS cancer data. Improved access to data at the community level, along with information about new cancer types (colon, melanoma), and important risk factors for cancer, such as obesity and smoking, will be available soon.

**“The interactive maps and charts on the data portal can provide focus for statewide organizations looking to target specific communities and for local leaders who want to understand why a particular strategy for improving health might be important in their area. This information can increase the effectiveness of our activities as we seek to save lives and reduce cancer among all Minnesotans.”**

*—Matthew Flory, Minnesota Director of Healthcare Partnerships, American Cancer Society*



**Benefits: Why We Use Data to Inform Public Health Action**

Chronic illnesses and conditions cause suffering. And they are expensive. Nationwide, 75% of the \$2.6 trillion spent for health care goes for chronic disease treatment. Minnesota's costs are around \$5 billion/year.<sup>16</sup> Using data to support decisions and actions not only can help prevent future disease, but it also produces significant savings by directing resources to where they are most needed and effective.

Both biomonitoring and tracking data can enable MDH to:

- Identify state and local public health priorities, particularly in times of limited resources
- Evaluate and measure the effectiveness of public health initiatives over time
- Enhance data access and timeliness for responding to public inquiries for data

**Putting it all together.** Environment, exposure, and health data can help communities and individuals learn about healthy choices and prevent chronic diseases, such as asthma and cancer. Using data to promote health provides major benefits: it prevents disease and saves money, but more important, it brings us closer to the vision that Minnesotans will lead healthier lives and live in safer environments.

Links to more information:

- Minnesota Public Health Data Access (MDH): <https://apps.health.state.mn.us/mndata/>
- Minnesota Environmental Public Health Tracking and Biomonitoring Program (MDH): <http://www.health.state.mn.us/tracking/>
- MN Tracking in Action (MDH): <http://www.health.state.mn.us/divs/hpcd/tracking/stories/index.html>
- National Tracking Network (CDC): <http://ephtracking.cdc.gov/showHome.action>
- CDC Tracking Success Stories: <http://www.cdc.gov/nceh/tracking/successstories.htm>



<sup>16</sup> Healthy Minnesota 2020: Chronic Disease & Injury Report. Prepared by the Health Promotion and Chronic Disease Division and the Office of Statewide Health Improvement Initiatives. Minnesota Department of Health. September 2012.

# APPENDIX A:

## ENVIRONMENTAL HEALTH TRACKING AND BIOMONITORING ADVISORY PANEL ROSTER

*As of November 2012*

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**Vacant**

Minnesota Senate appointee

## BIOGRAPHICAL SKETCHES OF ADVISORY PANEL MEMBERS

**Bruce H. Alexander, PhD**, is a Professor in the Division of Environmental Health Sciences at the University of Minnesota's School of Public Health. Dr. Alexander is an environmental and occupational epidemiologist with expertise in cancer, reproductive health, respiratory disease, injury, exposure assessment, and use of biological markers in public health applications.

**Fred Anderson, MPH**, is an epidemiologist at the Washington County Department of Public Health and Environment and has over 30 years of public health experience. He holds a Master's of Public Health (MPH) in environmental and infectious disease epidemiology from the University of Minnesota and is a registered environmental health specialist. For over 20 years, he has led county-wide disease surveillance and intervention programs, including numerous multidisciplinary epidemiologic investigations.

**Alan Bender, DVM, PhD**, is the Section Chief of Chronic Disease and Environmental Epidemiology at the Minnesota Department of Health. He holds a Doctor of Veterinary Medicine degree from the University of Minnesota and a PhD in Epidemiology from Ohio State University. His work has focused on developing statewide surveillance systems, including cancer and occupational health, and exploring the links between occupational and environmental exposures and chronic disease and mortality.

**David DeGroot, PhD**, is Dean of the College of Science and Engineering and Professor of Biological Sciences at St. Cloud State University. He has been at St. Cloud State University since 1985, initially as an Assistant Professor in Biological Sciences. He served as Department Chair from 1996 to 2003 before moving to the Dean's Office. Most recently he has focused on providing up-to-date academic programming and facilities that serve the needs of Minnesota employers in the health sciences, engineering, computing, biosciences, and STEM education.

**Melanie Ferris, MPH**, is a Research Scientist at Wilder Research, a nonprofit research organization based in St. Paul, Minnesota. She conducts a variety of program evaluation and applied research projects focused primarily in the areas of public health and mental health. She has worked on a number of recent projects that focus on identifying disparities across populations and using existing data sources to develop meaningful indicators of health and wellness. Examples of these projects include a study of health inequities in the Twin Cities region related to income, race, and place, development of a dashboard of mental health and wellness indicators for youth living in Hennepin County, and work on local community health needs assessments. She has a Master's of Public Health degree in Community Health Education from the University of Minnesota's School of Public Health.

**Tom Hawkinson, MS, CIH, CHP**, is the Corporate Environmental Health and Safety Manager for the Toro Company in Bloomington, MN. He completed his MS in Public Health at the University of Minnesota, with a specialization in industrial hygiene. He is certified in the comprehensive practice of industrial hygiene and a certified safety professional. He has worked in EHS management at a number of Twin Cities based companies, conducting industrial hygiene investigations of workplace contaminants, and has done environmental investigations of subsurface contamination both in the United States and Europe. He has taught statistics and mathematics at both graduate and undergraduate levels as an adjunct, and is on the faculty at the Midwest Center for Occupational Health and Safety, a NIOSH-Sponsored Education and Research Center in the School of Public Health, University of Minnesota.

**Jill Heins Nesvold, MS**, serves as the Director of the Respiratory Health Division for the American Lung Association in Iowa, Minnesota, North Dakota, and South Dakota. Her responsibilities include program oversight and evaluation related to asthma, chronic obstructive lung disease (COPD), lung cancer, and influenza. Jill holds a master's degree in health management and a short-course master's degree in business administration. Jill is extensively published in a variety of public health areas.



**Pat McGovern, PhD**, is a Professor in the Division of Environmental Health Sciences at the University of Minnesota's School of Public Health. Dr. McGovern is a health services researcher and nurse with expertise in environmental and occupational health policy and health outcomes research. She serves as the Principal Investigator for the National Children's Study (NCS) Center serving Ramsey County, one of 105 study locations nationwide. The NCS is the largest long-term study of children's health and development in the US, and the assessment of environmental exposures will include data collection from surveys, biological specimens, and environmental samples.

**Geary Olsen, DVM, PhD**, is a corporate scientist in the Medical Department of the 3M Company. He obtained a Doctor of Veterinary Medicine (DVM) degree from the University of Illinois, a Master's of Public Health (MPH) in veterinary public health, and a PhD in epidemiology from the University of Minnesota. For 27 years he has been engaged in a variety of occupational and environmental epidemiology research studies while employed at Dow Chemical and, since 1995, at 3M. His primary research activities at 3M have involved the epidemiology, biomonitoring (occupational and general population), and pharmacokinetics of perfluorochemicals.

**Gregory Pratt, PhD**, is a research scientist at the Minnesota Pollution Control Agency. He holds a Ph.D. in Plant Physiology from the University of Minnesota, where he worked on the effects of air pollution on vegetation. Since 1984 he has worked for the MPCA on a wide variety of issues including acid deposition, stratospheric ozone depletion, climate change, atmospheric fate and dispersion of air pollution, monitoring and occurrence of air pollution, statewide modeling of air pollution risks, personal exposure to air pollution, and human health effects of air pollution. He is presently working on a study monitoring the occurrence of polycyclic aromatic hydrocarbons (PAHs) in the Phillips community of Minneapolis.

**Cathy Villas Horns, MS, PG**, is the Hydrologist Supervisor of the Incident Response Unit (IRU) within the Pesticide and Fertilizer Management Unit of the Minnesota Department of Agriculture. Cathy holds a Master's of Science in Geology from the University of Delaware and a Bachelor of Science in Geology from Carleton College and is a licensed Professional Geologist in MN. The IRU oversees or conducts the investigation and cleanup of point source releases of agricultural chemicals (fertilizers and pesticides including herbicides, insecticides, fungicides, etc. as well as wood treatment chemicals) through several different programs. Cathy has worked on complex sites with Minnesota Department of Health and MPCA staff, and continues to work with interagency committees on contaminant issues. She previously worked as a senior hydrogeologist within the IRU, and as a hydrogeologist at the Minnesota Pollution Control Agency and an environmental consulting firm.

**Lisa Yost, MPH, DABT**, is a Principal Consultant at ENVIRON, an international consulting firm. She is in their Health Sciences Group and is based in Saint Paul, Minnesota. Ms. Yost completed her training at the University of Michigan's School of Public Health and is a board-certified toxicologist with expertise in evaluating human health risks associated with substances in soil, water, and the food chain. She has conducted or supervised risk assessments under CERCLA, RCRA, or state-led regulatory contexts involving a wide range of chemicals and exposure situations. Her areas of specialization include exposure and risk assessment, risk communication, and the toxicology of such chemicals as PCDDs and PCDFs, PCBs, pentachlorophenol (PCP), trichloroethylene (TCE), mercury, and arsenic. Ms. Yost is a recognized expert in risk assessment and has collaborated in original research on exposure issues, including background dietary intake of inorganic arsenic. She is currently assisting in a number of projects including a complex multi-pathway risk assessment for PDDD/Fs that will integrate extensive biomonitoring data collected by the University of Michigan. Ms. Yost is also an Adjunct Instructor at the University of Minnesota's School of Public Health.



## APPENDIX B:

### ENVIRONMENTAL HEALTH TRACKING AND BIOMONITORING STATUTE

\$1,000,000 each year is for environmental health tracking and biomonitoring. Of this amount, \$900,000 each year is for transfer to the Minnesota Department of Health. The base appropriation for this program for fiscal year 2010 and later is \$500,000.

#### **144.995 DEFINITIONS; ENVIRONMENTAL HEALTH TRACKING AND BIOMONITORING.**

(a) For purposes of sections 144.995 to 144.998, the terms in this section have the meanings given.

(b) "Advisory panel" means the Environmental Health Tracking and Biomonitoring Advisory Panel established under section 144.998.

(c) "Biomonitoring" means the process by which chemicals and their metabolites are identified and measured within a biospecimen.

(d) "Biospecimen" means a sample of human fluid, serum, or tissue that is reasonably available as a medium to measure the presence and concentration of chemicals or their metabolites in a human body.

(e) "Commissioner" means the commissioner of the Department of Health.

(f) "Community" means geographically or nongeographically based populations that may participate in the biomonitoring program. A "nongeographical community" includes, but is not limited to, populations that may share a common chemical exposure through similar occupations, populations experiencing a common health outcome that may be linked to chemical exposures, populations that may experience similar chemical exposures because of comparable consumption, lifestyle, product use, and subpopulations that share ethnicity, age, or gender.

(g) "Department" means the Department of Health.

(h) "Designated chemicals" means those chemicals that are known to, or strongly suspected of, adversely impacting human health or development, based upon scientific, peer-reviewed animal, human, or in vitro studies, and baseline human exposure data, and consists of chemical families or metabolites that are included in the federal Centers for Disease Control and Prevention studies that are known collectively as the National Reports on Human Exposure to Environmental Chemicals Program and any substances specified by the commissioner after receiving recommendations under section 144.998, subdivision 3, clause (6).

(i) "Environmental hazard" means a chemical or other substance for which scientific, peer-reviewed studies of humans, animals, or cells have demonstrated that the chemical is known or reasonably anticipated to adversely impact human health.

(j) "Environmental health tracking" means collection, integration, analysis, and dissemination of data on human exposures to chemicals in the environment and on diseases potentially caused or aggravated by those chemicals.

#### **144.996 ENVIRONMENTAL HEALTH TRACKING; BIOMONITORING.**

Subdivision 1. Environmental health tracking. In cooperation with the commissioner of the Pollution Control Agency, the commissioner shall establish an environmental health tracking program to:

(1) coordinate data collection with the Pollution Control Agency, Department of Agriculture, University of Minnesota, and any other relevant state agency and work to promote the sharing of and access to health and environmental databases to develop an environmental health tracking system for Minnesota, consistent with applicable data practices laws;

(2) facilitate the dissemination of aggregate public health tracking data to the public and researchers in accessible format;

(3) develop a strategic plan that includes a mission statement, the identification of core priorities for research and epidemiologic surveillance, and the identification of internal and external stakeholders, and a work plan describing future program development and addressing issues having to do with compatibility with the Centers for Disease Control and Prevention's National Environmental Public Health Tracking Program;

(4) develop written data sharing agreements as needed with the Pollution Control Agency, Department of Agriculture, and other relevant state agencies and organizations, and develop additional procedures as needed to protect individual privacy;

(5) organize, analyze, and interpret available data, in order to:

(i) characterize statewide and localized trends and geographic patterns of population-based measures of chronic diseases including, but not limited to, cancer, respiratory diseases, reproductive problems, birth defects, neurologic diseases, and developmental disorders;

(ii) characterize statewide and localized trends and geographic patterns in the occurrence of environmental hazards and exposures;

(iii) assess the feasibility of integrating disease rate data with indicators of exposure to the selected environmental hazards such as biomonitoring data, and other health and environmental data;

(iv) incorporate newly collected and existing health tracking and biomonitoring data into efforts to identify communities with elevated rates of chronic disease, higher likelihood of exposure to environmental hazards, or both;

(v) analyze occurrence of environmental hazards, exposures, and diseases with relation to socioeconomic status, race, and ethnicity;

(vi) develop and implement targeted plans to conduct more intensive health tracking and biomonitoring among communities; and

(vii) work with the Pollution Control Agency, the Department of Agriculture, and other relevant state agency personnel and organizations to develop, implement, and evaluate preventive measures to reduce elevated rates of diseases and exposures identified through activities performed under sections 144.995 to 144.998; and

(6) submit a biennial report to the chairs and ranking members of the committees with jurisdiction over environment and health by January 15, beginning January 15, 2009, on the status of environmental health tracking activities and related research programs, with recommendations for a comprehensive environmental public health tracking program.

Subd. 2. **Biomonitoring.** The commissioner shall:

(1) conduct biomonitoring of communities on a voluntary basis by collecting and analyzing biospecimens, as appropriate, to assess environmental exposures to designated chemicals;

(2) conduct biomonitoring of pregnant women and minors on a voluntary basis, when scientifically appropriate;

(3) communicate findings to the public, and plan ensuing stages of biomonitoring and disease tracking work to further develop and refine the integrated analysis;

(4) share analytical results with the advisory panel and work with the panel to interpret results, communicate findings to the public, and plan ensuing stages of biomonitoring work; and

(5) submit a biennial report to the chairs and ranking members of the committees with jurisdiction over environment and health by January 15, beginning January 15, 2009, on the status of the biomonitoring program and any recommendations for improvement.

Subd. 3. **Health data.** Data collected under the biomonitoring program are health data under section 13.3805.

#### **144.997 BIOMONITORING PILOT PROGRAM.**

Subdivision 1. **Pilot program.** With advice from the advisory panel, and after the program guidelines in subdivision 4 are developed, the commissioner shall implement a biomonitoring pilot program. The program shall collect one biospecimen from each of the voluntary participants. The biospecimen selected must be the biospecimen that most accurately represents body concentration of the chemical of interest. Each biospecimen from the voluntary participants must be analyzed for one type or class of related chemicals. The commissioner shall determine the chemical or class of chemicals to which community members were most likely exposed. The program shall collect and assess biospecimens in accordance with the following:

(1) 30 voluntary participants from each of three communities that the commissioner identifies as likely to have been exposed to a designated chemical;

(2) 100 voluntary participants from each of two communities:  
 (i) that the commissioner identifies as likely to have been exposed to arsenic; and  
 (ii) that the commissioner identifies as likely to have been exposed to mercury; and  
 (3) 100 voluntary participants from each of two communities that the commissioner identifies as likely to have been exposed to perfluorinated chemicals, including perfluorobutanoic acid.

Subd. 2. **Base program.** (a) By January 15, 2008, the commissioner shall submit a report on the results of the biomonitoring pilot program to the chairs and ranking members of the committees with jurisdiction over health and environment.

(b) Following the conclusion of the pilot program, the commissioner shall:

(1) work with the advisory panel to assess the usefulness of continuing biomonitoring among members of communities assessed during the pilot program and to identify other communities and other designated chemicals to be assessed via biomonitoring;

(2) work with the advisory panel to assess the pilot program, including but not limited to the validity and accuracy of the analytical measurements and adequacy of the guidelines and protocols;

(3) communicate the results of the pilot program to the public; and

(4) after consideration of the findings and recommendations in clauses (1) and (2), and within the appropriations available, develop and implement a base program.

Subd. 3. **Participation.** (a) Participation in the biomonitoring program by providing biospecimens is voluntary and requires written, informed consent. Minors may participate in the program if a written consent is signed by the minor's parent or legal guardian. The written consent must include the information required to be provided under this subdivision to all voluntary participants.

(b) All participants shall be evaluated for the presence of the designated chemical of interest as a component of the biomonitoring process. Participants shall be provided with information and fact sheets about the program's activities and its findings. Individual participants shall, if requested, receive their complete results. Any results provided to participants shall be subject to the Department of Health Institutional Review Board protocols and guidelines. When either physiological or chemical data obtained from a participant indicate a significant known health risk, program staff experienced in communicating biomonitoring results shall consult with the individual and recommend follow-up steps, as appropriate. Program administrators shall receive training in administering the program in an ethical, culturally sensitive, participatory, and community-based manner.

Subd. 4. **Program guidelines.** (a) The commissioner, in consultation with the advisory panel, shall develop:

(1) protocols or program guidelines that address the science and practice of biomonitoring to be utilized and procedures for changing those protocols to incorporate new and more accurate or efficient technologies as they become available. The commissioner and the advisory panel shall be guided by protocols and guidelines developed by the Centers for Disease Control and Prevention and the National Biomonitoring Program;

(2) guidelines for ensuring the privacy of information; informed consent; follow-up counseling and support; and communicating findings to participants, communities, and the general public. The informed consent used for the program must meet the informed consent protocols developed by the National Institutes of Health;

(3) educational and outreach materials that are culturally appropriate for dissemination to program participants and communities. Priority shall be given to the development of materials specifically designed to ensure that parents are informed about all of the benefits of breastfeeding so that the program does not result in an unjustified fear of toxins in breast milk, which might inadvertently lead parents to avoid breastfeeding. The materials shall communicate relevant scientific findings; data on the accumulation of pollutants to community health; and the required responses by local, state, and other governmental entities in regulating toxicant exposures;

(4) a training program that is culturally sensitive specifically for health care providers, health educators, and other program administrators;

(5) a designation process for state and private laboratories that are qualified to

analyze biospecimens and report the findings; and

(6) a method for informing affected communities and local governments representing those communities concerning biomonitoring activities and for receiving comments from citizens concerning those activities.

(b) The commissioner may enter into contractual agreements with health clinics, community-based organizations, or experts in a particular field to perform any of the activities described under this section.

#### **144.998 ENVIRONMENTAL HEALTH TRACKING AND BIOMONITORING ADVISORY PANEL.**

Subdivision 1. **Creation.** The commissioner shall establish the Environmental Health Tracking and Biomonitoring Advisory Panel. The commissioner shall appoint, from the panel's membership, a chair. The panel shall meet as often as it deems necessary but, at a minimum, on a quarterly basis. Members of the panel shall serve without compensation but shall be reimbursed for travel and other necessary expenses incurred through performance of their duties. Members appointed by the commissioner are appointed for a three-year term and may be reappointed. Legislative appointees serve at the pleasure of the appointing authority.

Subd. 2. **Members.** (a) The commissioner shall appoint eight members, none of whom may be lobbyists registered under chapter 10A, who have backgrounds or training in designing, implementing, and interpreting health tracking and biomonitoring studies or in related fields of science, including epidemiology, biostatistics, environmental health, laboratory sciences, occupational health, industrial hygiene, toxicology, and public health, including:

(1) at least two scientists representative of each of the following:

(i) nongovernmental organizations with a focus on environmental health, environmental justice, children's health, or on specific chronic diseases; and

(ii) statewide business organizations; and

(2) at least one scientist who is a representative of the University of Minnesota.

(b) Two citizen panel members meeting the scientific qualifications in paragraph (a) shall be appointed, one by the speaker of the house and one by the senate majority leader.

(c) In addition, one representative each shall be appointed by the commissioners of the Pollution Control Agency and the Department of Agriculture, and by the commissioner of health to represent the department's Health Promotion and Chronic Disease Division.

Subd. 3. **Duties.** The advisory panel shall make recommendations to the commissioner and the legislature on:

(1) priorities for health tracking;

(2) priorities for biomonitoring that are based on sound science and practice, and that will advance the state of public health in Minnesota;

(3) specific chronic diseases to study under the environmental health tracking system;

(4) specific environmental hazard exposures to study under the environmental health tracking system, with the agreement of at least nine of the advisory panel members;

(5) specific communities and geographic areas on which to focus environmental health tracking and biomonitoring efforts;

(6) specific chemicals to study under the biomonitoring program, with the agreement of at least nine of the advisory panel members; in making these recommendations, the panel may consider the following criteria:

(i) the degree of potential exposure to the public or specific subgroups, including, but not limited to, occupational;

(ii) the likelihood of a chemical being a carcinogen or toxicant based on peer-reviewed health data, the chemical structure, or the toxicology of chemically related compounds;

(iii) the limits of laboratory detection for the chemical, including the ability to detect the chemical at low enough levels that could be expected in the general population;

(iv) exposure or potential exposure to the public or specific subgroups;

(v) the known or suspected health effects resulting from the same level of exposure



based on peer-reviewed scientific studies;

(vi) the need to assess the efficacy of public health actions to reduce exposure to a chemical;

(vii) the availability of a biomonitoring analytical method with adequate accuracy, precision, sensitivity, specificity, and speed;

(viii) the availability of adequate biospecimen samples; or

(ix) other criteria that the panel may agree to; and

(7) other aspects of the design, implementation, and evaluation of the environmental health tracking and biomonitoring system, including, but not limited to:

(i) identifying possible community partners and sources of additional public or private funding;

(ii) developing outreach and educational methods and materials; and

(iii) disseminating environmental health tracking and biomonitoring findings to the public.

Subd. 4. **Liability.** No member of the panel shall be held civilly or criminally liable for an act or omission by that person if the act or omission was in good faith and within the scope of the member's responsibilities under sections 144.995 to 144.998.

#### **INFORMATION SHARING.**

On or before August 1, 2007, the commissioner of health, the Pollution Control Agency, and the University of Minnesota are requested to jointly develop and sign a memorandum of understanding declaring their intent to share new and existing environmental hazard, exposure, and health outcome data, within applicable data privacy laws, and to cooperate and communicate effectively to ensure sufficient clarity and understanding of the data by divisions and offices within both departments. The signed memorandum of understanding shall be reported to the chairs and ranking members of the senate and house of representatives committees having jurisdiction over judiciary, environment, and health and human services.

*Effective date: July 1, 2007*

This document contains Minnesota Statutes, sections 144.995 to 144.998, as these sections were adopted in Minnesota Session Laws 2007, chapter 57, article 1, sections 143 to 146. The appropriation related to these statutes is in chapter 57, article 1, section 3, subdivision 4. The paragraph about information sharing is in chapter 57, article 1, section 169. The following is a link to chapter 57: <http://ros.leg.mn/bin/getpub.php?type=law&year=2007&sn=0&num=57>

#### **Laws of Minnesota 2011 First Special Session Chapter 2.**

Bill for an Act. SF 3, Sec.3. Pollution Control Agency, Subd.4 Land

**Cite as: Laws of Minnesota 2011 First Special Session Chapter 2.**

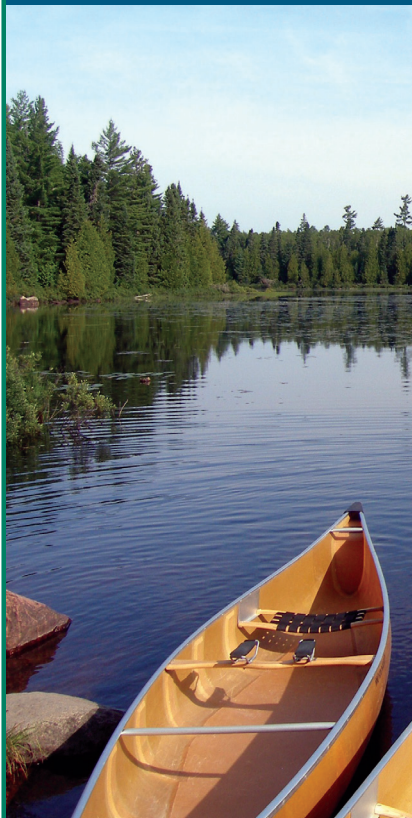
**\$268,000 the first year and \$268,000 the second year are for transfer to the Department of Health to complete the environmental health tracking and biomonitoring analysis related to perfluorochemicals and mercury monitoring in Lake Superior and disseminate the results. This is a onetime appropriation**

# APPENDIX C:

## CDC's National Environmental Public Health Tracking Network

### MINNESOTA

#### *Keeping Track, Promoting Health*



*"CDC's National Environmental Public Health Tracking Network is the most important accomplishment of the past decade."*

**Thomas A. Burke, Ph.D., M.P.H.**

Associate Dean for Public Health Practice and Training  
Professor, Department of Health Policy and Management  
Johns Hopkins Bloomberg School of Public Health

For decades, the United States has faced a fundamental gap in understanding how environmental contaminants affect people's health. The Centers for Disease Control and Prevention (CDC) is working to close this gap by improving surveillance through the National Environmental Public Health Tracking Network (Tracking Network). The Tracking Network is a dynamic Web-based tool that, for the first time, provides health and environment data in one easy to find location.

Policy makers and public health officials can use the Tracking Network to make critical decisions about where to target environmental public health resources and interventions. Health practitioners and researchers can use the Tracking Network to learn more about health conditions related to the environment, and improve treatment plans. Anyone can use the Tracking Network to find out how the environment may be affecting them, their family's or community's health.

The building blocks of the national network are state and local health departments around the country that are funded to build local tracking systems. These systems supply data to the National Tracking Network and address local environmental public health concerns. The tracking programs use their networks every day to improve the health of their communities.

### Why Tracking Matters in Minnesota

From the Iron Range in the northeast to the Twin Cities to the farmlands of southern Minnesota, every community in Minnesota has environmental health issues. Environmental public health tracking gathers data about both the environment and health into a Web site. The data help environmental health experts determine if people have been exposed to chemicals in the environment. Public health agencies can use the data to educate citizens and inform policy makers about environmental health risks.

In 2007, state law created the Minnesota Environmental Health Tracking and Biomonitoring program. Biomonitoring gathers information about the chemicals people have been exposed to and the amounts of those chemicals in their bodies. In 2009, the Minnesota began receiving funding from CDC to create a statewide Environmental Public Health Tracking Network as part of the National Tracking Network. Minnesota's tracking program is using the funding to help state and local programs work together to develop data and measurements similar to tracking data across the nation. In 2011, Minnesota launched their network which makes environmental hazards and health effect data available to the public.

National Center for Environmental Health  
Division of Environmental Hazards and Health Effects



## TRACKING IN ACTION

	The Problem	Tracking in Action	Improved Public Health
<b>Tracking the impact of a statewide carbon monoxide (CO) alarm law</b>	<p>Each year, accidental CO poisonings result in several deaths and hospitalizations in Minnesota. The highest number of CO poisonings occurs during the winter months. Minnesota took an important step to prevent CO poisonings when the state passed a law that requires CO alarms in all single-family homes and multi-dwelling units. The law was put into effect from 2007 to 2009. However, with no system to track CO poisonings, the Minnesota Department of Health could not know whether the law helped lower the number of CO poisonings in the state.</p>	<p>Minnesota's Tracking Program worked with the National Tracking Network to gather data and create ways to measure CO poisonings in the state. The programs put this information into a tracking report that local newspapers used to inform readers about CO poisoning prevention.</p> <p>Minnesota's Tracking Program and the state Behavioral Risk Factor Surveillance System (BRFSS) are working together to collect data on the number of Minnesota homes that have CO alarms. Using data from years before and after the CO alarm law, the tracking program can follow changes in the use of CO alarms and the impact on CO poisonings and exposures.</p>	<p>The CO alarm law and the system for tracking CO poisonings are examples of the way tracking data can have an effect on state and local policy.</p> <p>Minnesota state and local health agencies will use CO tracking and BRFSS data to measure the effectiveness of the state CO alarm law. Indoor air and healthy homes programs will also use tracking data to determine the effectiveness of activities to improve public health.</p>
<b>Understanding the relationship between climate change and public health</b>	<p>The global climate is changing, causing rising temperatures, melting ice and snow, rising sea levels, and climate uncertainty. However, it is hard to measure the changes in climate regionally and locally. State and local health departments need help to understand climate change better and prepare for its possible health impacts.</p> <p>Minnesota is in a unique geographic position at the transition between the eastern forests and drier Great Plains. In this region, diseases carried by ticks and other insects or animals are common and influenced by changes in temperature and humidity. Minnesota is also located in a region where people are likely to suffer more from extreme heat.</p>	<p>Minnesota's tracking staff worked with CDC and other states in the National Tracking Network to gather data about and find ways to measure illnesses and deaths caused by heat. Minnesota's Tracking Program is using data from hospital stays and death certificates to track health outcomes of extreme heat, such as deaths, heat exhaustion, and heat stroke.</p>	<p>Minnesota's Tracking Program is working with state and local health programs to help them to prepare for the health effects of climate change using climate and health data along with sound science.</p> <p>Data provided by Minnesota's climate change tracking program will help public health officials to develop effective strategies to prepare for the health effects of climate change.</p>

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[www.cdc.gov](http://www.cdc.gov)

National Environmental Public Health Tracking Network  
[www.cdc.gov/ephtracking](http://www.cdc.gov/ephtracking)  
 Minnesota Environmental Public Health Tracking Program  
<http://www.health.state.mn.us/tracking/>







**Environmental Health Tracking and Biomonitoring:  
Connecting Environment, Exposure, and Public Health**

Minnesota Department of Health Report to the Legislature 2013  
January 2013

For more information, contact:

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