Minnesota Department of Health Environmental Health Tracking and Biomonitoring Advisory Panel Meeting

OCTOBER 8, 2019

1:00 P.M. – 4:00 P.M.

American Lung Association in Minnesota

490 Concordia Avenue

St. Paul, Minnesota

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Agenda Overview

DATE: 10/08/2019

Welcome & Introductions

1:00pm

Lisa Yost will welcome attendees to the panel meeting. Panel members and audience are invited to introduce themselves.

Agenda Overview

1:05pm

Jessie Shmool will give a brief overview of topics and discussion items.

Preliminary Healthy Kids Results: 1-Nitropyrene

1:10pm

Jessica Nelson will present preliminary results for 1-nitropyrene (1-NP) in Healthy Kids participants. Panel members are invited to ask questions and provide comments.

Health Equity Data in VW Settlement Grant Evaluation

1:40pm

Jessie Shmool will present on evaluation methods and next steps regarding the Volkswagen settlement. Panel members are invited to ask questions and comment.

Radon Project Summary

2:10pm

Tess Konen will summarize a recent analysis of disparities in radon mitigation. Panel members are invited to ask questions and comment.

Refreshments

2:30pm

Biomonitoring Grant Award and Program Expansion

2:45pm

Paul Moyer of the MDH Public Health Laboratory will present on the recent CDC grant and plans for expanding the Biomonitoring program statewide. Jessica Nelson will discuss recruitment and sampling strategy.

Discussion 3:05pm

Questions for the Panel

- What is your guidance for choosing the order of regions/counties?
- What is your guidance for selecting a sampling strategy for participants?

MN Tracking Updates

3:30pm

Lynn Treadwell will discuss web traffic to the Public Health Data Access Portal. Panel members are invited to ask questions and provide comment.

MN FEET and MN FEET Clinic Updates

3:40pm

These updates are provided in written form in the panel book. Panel members are invited to ask questions and comment.

Public Comments & Audience Questions

3:45pm

New Business

3:55pm

Motion to Adjourn

4:00pm

Preliminary Healthy Kids Results: 1-Nitropyrene

Urinary metabolites of 1-NP are emerging biomarkers of exposure to diesel exhaust. They appear to be a more specific measure of exposure than polycyclic aromatic hydrocarbons (PAHs), which are commonly used to assess air pollution exposure but may be confounded by smoking and diet.

Healthy Kids 1-NP analyses were run by the laboratory of Dr. Chris Simpson at the University of Washington. The MDH Public Health Laboratory has separately analyzed urine samples for six PAHs. Results will be available for analysis this fall and presented to the Advisory Panel at a future meeting, along with full Healthy Kids results for metals and pesticides.

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Health Equity Data in VW Settlement Grant Evaluation

As part of the Federal case against VW for emissions-rigging, MN has been allocated $47 million in settlement funds to be used for a) replacing old diesel/heavy-duty vehicles/machines and b) installing electric vehicle charging capacity (up to 15%). The MPCA conducted a statewide stakeholder engagement process around factors to consider in allocating the project funds. Health impacts and environmental justice (EJ) considerations were the highest ranked, followed by cost-effectiveness, statewide reach and other factors. Based on this strong feedback, MPCA and MDH have built on long-standing collaboration on air pollution and health to develop science-based, transparent health equity grant evaluation criteria.

Learn more about MPCA's stakeholder engagement process and results: https://www.pca.state.mn.us/air/volkswagen-settlement-what-weve-heard

See the Beneficiary Plan: https://www.pca.state.mn.us/air/minnesotas-plan

Health criteria methods

Reducing diesel emissions can mitigate air pollution exposures and triggers that can exacerbate health conditions. The Phase 1 health criteria was derived from multiple MDH data sources, covering representative health conditions that can either be worsened by air pollution exposure or make individuals more vulnerable to air pollution exposure. We developed a composite index of relevant health conditions, as there is not one condition or outcome that is truly representative of the wide range of health impacts of air pollution.

Health indicator selection

Using data from across MDH programs, we identified indicators for conditions that can make people vulnerable to air pollution exposure. These conditions include respiratory and cardiovascular diseases, adverse birth outcomes and obesity.

First, we used ongoing surveillance systems to evaluate data quality, completeness and variability. Health conditions vary substantially across zip codes in the Twin Cities metro area, but less so within Greater MN counties. We calculated health criteria scores for each zip code in the 7-county metro region (n=382) and for each county in Greater MN (n=80) based on these differences.

Next, we explored multiple existing health indicators, including population rates of asthma emergency department visits, heart attack hospitalizations, chronic obstructive pulmonary disease (COPD) hospitalizations, diabetes prevalence, premature birth prevalence, lung cancer incidence, and obesity and overweight prevalence. We consulted content experts and conducted quantitative correlation analysis to narrow available data to the indicators that best and most uniquely represent health vulnerability to air pollution exposure. The four health indicators we selected are summarized in Table 1 below. Detailed information about each of the health data sources can be found on the MN Public Health Data Access Portal: https://data.web.health.state.mn.us/web/mndata/.

Table 1. Indicators included in health vulnerability index

Health indicator	Years	Greater MN counties	Metro zip codes
Asthma emergency department visit rate, all-ages, age-adjusted	2011-2015	Included	Included
Heart attack hospitalization rate, among adults over 35, age-adjusted	2011-2015	Included	Included
Premature (< 37 weeks gestation) birth rate, among singleton births	2012-2016	Included	Included
Obesity rate, among adults over 18*	2014-2017	Included	*Not included*
Obese or overweight rate, among children enrolled in the MDH Women, Infant & Children (WIC) Information System*	2014-2016	*Not included*	Included

* Note that data sources for the obese/overweight indicator are different for Metro zip codes versus Grater MN counties, due to data availability and resolution.

Health vulnerability index calculation

After calculating the index using standard public health methods, we examined indicator distributions and explored multiple cut-points to create “high” and “low” vulnerability categories. Due to the positive skew of health indicator distributions, we stratified each indicator at the 75th percentile to better target the areas with highest health vulnerability.

We then assigned each area a score of 0 or 1 depending on whether the health condition was below or above that cut-point, respectively. For example, if the rate of asthma emergency department visits in a given county fell above the overall statewide 75th percentile, then that county would be assigned a score of 1 for the asthma indicator. The score assigned for each of the four indicators were then summed for each geographic area.

The index range is 0 to 4, with higher scores indicating higher health vulnerability to air pollution. For simplicity, we compressed the index to a three-level score to assign the 10 points for health criteria in the overall project scoring (Table 2, below).

Table 2. Health criteria scoring

Health vulnerability index, by geographic area	Health criteria points
All health indicators below the 75th percentile (score 0)	0
One health indicator above the 75th percentile (score 1)	5
Two or more health indicators above the 75th percentile (score 2 to 4)	10

Evaluation and next steps

Phase 1 of grants awards are complete and MDH and MPCA have been collaborating on evaluation of RFP criteria for Phase 2 implementation.

Progress on meeting plan goals and award distribution data are available here: https://www.pca.state.mn.us/air/progress-minnesotas-goals-vw-funds

Jessie Shmool will present evaluation findings and seek input from the panel on potential refinements to the criteria for Phase 2.

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Radon Project Summary

In collaboration with the Minnesota Department of Health Comprehensive Cancer and Indoor Air unit programs, MN Tracking explored disparities in radon mitigation across the 7-county metropolitan area.

We conducted a range of descriptive, spatial, and regression analyses to understand relationships between multiple risk variables and radon mitigation.

These findings will be used for targeted awareness and outreach campaigns in communities that have low radon testing and mitigation. We will provide this information to advocates to bring to the legislature to request funding to address these disparities.

Key findings

Radon mitigation is not evenly spread across the 7-county metropolitan area. There is an 18 fold difference in mitigation rate across the 7-county metropolitan area. In general, there is more radon mitigation in the western and southern tracts and less mitigation in the northern tracts.

We found that median home value and percent of renters were related to mitigation rates in Metro census tracts. As mitigation rate increased, median home value also increased and the percent of renters decreased. Median home value was 1.5 times higher in the highest mitigation rate category compared to the lowest mitigation rate category. The percent of renters was 2.7 times lower in the highest mitigation rate category compared to the lowest mitigation rate category.

Radon testing and mitigation is a health equity issue. Across Minnesota, testing rates are generally *lowest* in areas with more households living poverty. There are three times more people in poverty in the areas with the lowest mitigation as compared to the high mitigation areas. In the areas with the lowest mitigation rate, there was an average of 31% living in poverty and in areas with the highest mitigation rate, there was an average of 10% living in poverty.

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Biomonitoring Grant Award and Program Expansion

As shared with the Advisory Panel via email, the MDH application for the CDC "State-Based Public Health Laboratory Biomonitoring Programs" grant was successful. The grant officially began on September 1. This session will provide a high-level overview of the grant, our proposal and anticipated involvement by the Advisory Panel. It will pose questions for discussion and input from the Advisory Panel as we embark on the planning process.

Overview

The Minnesota Department of Health is one of six states awarded the *State-Based Public Health Laboratory Biomonitoring Programs* 5-year cooperative grant from the U.S. Centers for Disease Control and Prevention (CDC). This grant will allow MDH to establish a state-wide biomonitoring program to systematically measure exposures to chemicals of concern in children. Biomonitoring tests chemicals in people, and is an increasingly important tool in environmental public health. State-wide biomonitoring can provide critical information to identify groups at risk for chemical exposure, and to inform and evaluate policies and programs that reduce exposures.

State-wide program

With this funding, the program will expand our successful 2018 Healthy Rural and Urban Kids biomonitoring project that measured chemicals in children from North-Central Minnesota and North Minneapolis to a state-wide effort. We will work with local public health and school district partners to recruit three- to six-year old children with parental consent, and will move recruitment systematically through different regions of the state.

Using CDC methods and technical support, the Public Health Laboratory will test kids' urine for different chemicals that may affect child development, including:

- **metals** found in drinking water, air pollution and some foods and products,
- **pesticides** used in agriculture and to control pests in and around the home,
- **phthalates** found in personal care products, toys and some foods,
- **flame retardants** found in household products like furniture and toys.

Protecting children's health

For the first time, the proposed program will give us a picture of children's exposures to harmful chemicals across the state. We will determine whether chemical levels differ between groups and over time. We will learn if more action is needed to protect preschoolers from chemicals so they are ready to learn and succeed in school. Results will help inform families, address community concerns, and promote policies that reduce childhood exposures and create healthy neighborhoods and homes for kids.

Background

Minnesota has a strong history of state biomonitoring producing actionable results, evaluating exposure-reduction measures, and building confidence with communities. In 2007, the state

legislature passed the Environmental Health Tracking and Biomonitoring law (Minn. Statutes 144.995-998). Our Public Health Laboratory and the Minnesota Biomonitoring program have successfully conducted a number of community projects that have provided important information about exposures in Minnesota communities. However, the public health impact of these efforts has been limited by geographic scope and laboratory capacity. The new funding for a state-wide biomonitoring program will increase our ability to conduct biomonitoring analyses and identify exposure disparities and risk factors, which can be translated to meaningful public health action for all Minnesotans. It will also allow MDH to play a larger role in the growing national network of state and federal partners working to expand biomonitoring.

Advisory Panel involvement in the new grant

One of the requirements for the grant was to "establish and use an advisory panel" and seek input and recommendations from them on biomonitoring activities. A strength of our proposal was the ability to demonstrate the long history and fundamental role of our existing Advisory Panel in program activities.

In our grant submission, we proposed an activity to "Utilize existing Advisory Panel" by:

- Holding three meetings per year, convening sub-committees as necessary
- Seeking recommendations on program design, analysis, interpretation of results and communication strategies (methods and audiences)

Developing sampling/recruitment plan

As implementation of the grant gets underway and planning begins in earnest, one of the first tasks is to establish a detailed recruitment and sampling plan. We will work with state and local stakeholders, including the Advisory Panel, to develop these plans.

Our proposal laid out a broad plan: Each year, using population-based recruitment methods, we will enroll children from one of the seven non-Metro State Community Health Services Advisory Committee (SCHSAC) regions (see Figure 1) and one of the seven Twin Cities Metro counties. Recruitment will rotate to different regions/counties of the state. When the region sampled includes any of Minnesota's 11 Tribal Nations, we will explore Tribal participation using existing MDH-Tribal relationships.

During the funding period, we will be able to conduct four rounds of sampling, allowing us to reach four Twin Cities counties and four non-Metro regions in total. While we will not reach all regions of the state in the grant's timeframe, we state in the proposal that we will

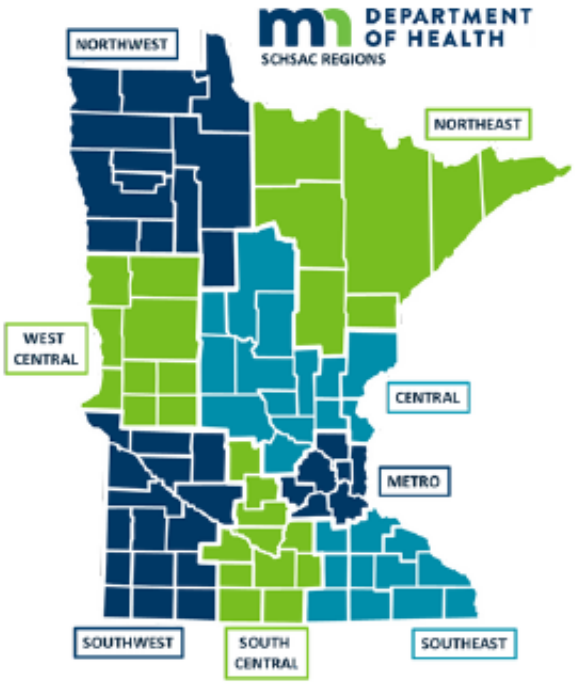

Figure 1. Minnesota SCHSAC Regions

use this foundation to gain state funding for an ongoing program that reaches all regions of the state.

Recruitment of children will follow the Healthy Rural and Urban Kids model of working with local public health and school district partners to recruit children through existing Early Childhood Screening Programs. We plan to have a 6-month window of recruitment for each sampling round, from May through October, beginning our field recruitment in May 2020. We aim to recruit 250 children from each region/county per year, for a total of 500 children per year and 2000 children during the funding period.

We need to make important study design decisions on two levels:

- Choosing the order of regions/counties to include, which will be some combination of logistics (especially given the aggressive timeline for the first year of sampling) and objective criteria. We need to be able to explain our decision to stakeholders who may wonder why a particular region/county was not included. The intent of this program is ultimately statewide surveillance; it is not the goal to focus only on regions/areas with established exposure concerns.
- Determining how to select children from the chosen regions/counties to ensure scientific robustness of our recruitment methods to produce a study population that is at least reflective of the region/county. Some specific questions to address include which counties within the larger non-Metro regions to involve, and how to ensure they are representative of the larger region; and whether to take a random sample of children who come in for their ECS visits or offer participation to all children who come in during the specified timeframe.

Staff are working to gather input on these decisions from the Local Public Health Association of Minnesota and from statistical sampling experts at the CDC. They will discuss options and ask for Advisory Panel feedback on two main questions below.

Questions for the Panel:

What is your guidance for choosing the order of regions/counties?

What is your guidance for selecting a sampling strategy for participants?

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MN Tracking Updates

Life & Breath report released

In June 2019, MDH and MPCA released our *Life & Breath* report quantifying air pollution impacts on health for every Minnesota county. The release was celebrated by both agency Commissioners at a media event in Rochester, MN to highlight findings on population vulnerabilities in rural areas, and especially those with many senior residents. The Mayor of Rochester and Director of Olmstead County Public Health Department also attended. The event was widely covered in the media, resulting in 5,707,808 potential views at total estimated value of $60,833.84.[1]

Star Tribune article: http://www.startribune.com/air-pollution-implicated-in-up-to-4-000-minnesota-deaths-a-year/511151972/

Read the full Life & Breath report: https://www.pca.state.mn.us/air/life-and-breath-report

Full results are available online via interactive maps and charts on MN Tracking portal: https://data.web.health.state.mn.us/web/mndata/healthimpacts

MN Public Health Data Access portal updates

Year-over-year traffic (2017-18 as compared to 2018-19) is up 59% on the MN Public Health Data Access portal. The total number of page views has increased by more than 56,000 and average visitor views have increased to 3.1 pages of content during a single visit. We see these as indications of increasing overall interest in portal content. Most exciting is the number of *new* visitors, which is up by 70%. This number shows the impact of our outreach and search engine optimization, both of which drive traffic to the portal.

Outreach examples

- Regular emails to our subscriber list about seasonal health issues, including pollen, heat and Lyme disease, drive traffic to our portal.
- Every year, MN Tracking participates in "Tracking Week," a social media campaign sponsored by the CDC's National Environmental Public Health Tracking program. Our posts were among the best-performing in the national network of Tracking programs. This further increased the public visibility of portal data.

[1] Reach and dollar values comes from two sources: TV Eyes and Meltwater. These monitoring services focus on different channels of communication. The totals reflect reach and dollar value of TV segments that air more than once, print, radio (multiple mentions) and views on media websites.

- In June, MN Tracking, in collaboration with the state of Wisconsin Tracking Program, launched an awareness effort on heat vulnerability. A joint analysis with Wisconsin Tracking had revealed that young men ages 15 to 34 were at risk of heat illness, which was something of a departure from conventional wisdom. A news release and social media campaign drew considerable interest, including a retweet from the Governor of Wisconsin. Minnesota Medicine magazine also published an article about the project. MDH created a special web page of resource materials for local public health to use for communication at the local level. In June and July, this was in the top 10 portal pages visited, ranking at number 9.

MN FEET and MN FEET Clinic Updates

Outreach about results from the Minnesota Family Environmental Exposure Tracking (MN FEET) study is ongoing. Staff submitted an article for publication in the Minnesota Physician monthly medical journal. The article focuses on results and implications for health care providers with a particular emphasis on findings about skin lightening products. Staff also presented to and got feedback from the Hmong Health Care Professionals Coalition and continue to look for opportunities to share findings with different audiences, including through diverse media sources.

The first clinical follow-up project that is assessing the effectiveness of routinely screening prenatal patients for urine mercury is underway at two Minnesota Community Care clinics. The project, which is being led by University of Minnesota Doctor of Nursing Practice (DNP) student Andrea Jordan, started in mid-May and will go through mid-October. When urine is routinely collected from prenatal patients, a separate tube is being collected and sent the MDH Public Health Laboratory for urine mercury analysis. As of September 10, 132 urine samples have been analyzed for mercury.

MN Biomonitoring staff are handling follow-up with elevated cases. Three elevated cases (>5 ug/L) have been reported so far. As in MN FEET, MN Biomonitoring physician Dr. Mary Winnett calls the patient, shares her results and answers questions, and asks follow-up questions about possible sources of exposure. Dr. Winnett also offers a home visit by local public health and MPCA partners to check for mercury contamination. All patients have been contacted. One home visit has occurred and a skin lightening product containing mercury was identified and surrendered by the family. A second home visit is being scheduled. For the third case, the patient did not agree to a home visit and is receiving follow-up from her midwives. The results of Dr. Winnett's phone call and the home visit are communicated back to the woman's provider. For all patients, a urine re-test is recommended to be sure levels are dropping once the exposure has been identified and removed.

Additional projects that will take a similar approach with one or more clinics serving an East African population are being planned with the help of Nimo Ahmed, University of Minnesota DNP student; Eileen Weber, Advisory Panel member; and Amira Adawe, Executive Director of The Beautywell Project and long-time community partner.

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Section Overview: Other Information

This section contains documents that may be of interest to panel members.

- 2020 upcoming Advisory Panel meeting dates
- Environmental Health Tracking and Biomonitoring Advisory Panel Statute
- Advisory Panel roster
- Biographical sketches of Advisory Panel members
- Biographical sketches of staff

2020 Upcoming Advisory Panel Meeting Dates

Advisory Panel meetings in 2020:

February 11, 2020

June 9, 2020

October 13, 2020

These meetings will take place from 1-4 pm at

The American Lung Association of Minnesota

490 Concordia Avenue

St Paul, Minnesota

144.998 ENVIRONMENTAL HEALTH TRACKING AND BIOMONITORING ADVISORY PANEL STATUTE

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 specific 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 section 144.995 to 144.998.

Environmental Health Tracking & Biomonitoring Advisory Panel Roster as of October 2019

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VACANT SEAT
MDH appointee

Biographical Sketches of Advisory Panel Members

Kristie Ellickson joined the Minnesota Pollution Control Agency in 2007 after completing her PhD at Rutgers University and postdoctoral work at both Rutgers and the University of Wisconsin-Madison. Prior to her academic pursuits, she was a U.S. Peace Corps volunteer in the country of Panama. As a graduate student and postdoc she conducted research on trace metal speciation and bioavailability in a variety of environmental matrices. Her work at the MPCA includes the incorporation of cumulative risk and impact assessment principles into regulatory risk, the review of human health risk assessments for large permitted facilities, and she has been the lead investigator on an EPA community-scale air toxics grant targeting passive and active air sampling for Polycyclic Aromatic Hydrocarbons in an urban and rural environment.

Farhiya Farah has lived in Minneapolis for 18 years. She received her Bachelor of Science degree from Marymount University, and Masters of Public Health from University of Minnesota where she is also currently completing her PhD. Prior to launching her company, she was employed as a Senior Public Health Practitioner with Minneapolis Health Department where she spearheaded Healthy Homes Strategic Planning for the City of Minneapolis. She is the founder and Principle Consultant of GlobeGlow Consulting and Research that focuses on applied environmental health research (food safety and home environmental assessments), and community based participatory research specializing with Limited English Population. She has provided technical support to a diverse group of partners including state health department, academic institutions, local health departments and community-based organizations. She is an active member of her community, and has volunteered with the City of Minneapolis Department of Health, ECHO Minnesota, and the DHS Barriers to Utilizing Public Health Insurance Study Project Management Team. She is currently a board member of AverageMohamed (counter extremism messaging), and is a core member of the University of Minnesota School of Public Health Somali Initiative.

Tom Hawkinson is the Senor Industrial Hygienist for Wenck Associates in Golden Valley, Minnesota. 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 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 faculty at the Midwest Center for Occupational Health and Safety, which is a NIOSH-sponsored education and resource center at the University of Minnesota's School of Public Health.

Jill Heins Nesvold serves as the Director of 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. She holds a master's degree in health management and a short-course master's degree in business administration. She has published extensively in a variety of public health areas.

Ruby Nguyen is an assistant professor at the University of Minnesota School of Public Health Division of Epidemiology & Community Health. She received her PhD in Epidemiology from Johns Hopkins University. Ruby's research focuses on maternal, child and family health; the etiology of reduced fertility; pregnancy-related morbidity, and infertility and later disease. Currently, Ruby is conducting a longitudinal study examining the role of endocrine disrupting chemicals in child development. From 2016-2017, Ruby was Co-Principal Investigator of a statewide prevalence study investigating violence against Asian women and children.

Geary Olsen is a corporate scientist in the Medical Department of the 3M Company. He obtained a Doctor of Veterinary Medicine degree from the University of Illinois and a Master of Public Health in veterinary public health and 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.

Tracy Sides is a policy analyst with the Public Health Law Center at the Mitchell Hamline School of Law in Saint Paul, Minnesota. She completed her MPH in epidemiology and PhD in environmental health sciences at the University of Minnesota School of Public Health. She has worked for more than 20 years at the interface of public health research and policy at the Minnesota Department of Health, University of Minnesota, and as an executive director of a community-based nonprofit organization in Saint Paul. She has led multidisciplinary policy development and program evaluation initiatives for the World Health Organization and U.S. Department of Homeland Security. Her professional work is focused on the intersection of public policy with environmental and social determinants of health.

Cathy Villas Horns is the Hydrologist Supervisor of the Incident Response Unit (IRU) within the Pesticide and Fertilizer Management Unit of the Minnesota Department of Agriculture. She holds a Master 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. She 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.

Eileen Weber is a nurse attorney and clinical assistant professor at the University of Minnesota School of Nursing. She founded and leads the Upper Midwest Healthcare Legal Partnership Learning Collaborative. She earned her Doctor of Nursing Practice degree in Health Innovation and Leadership in 2014 from the University of Minnesota. She earned her RN diploma from Thomas Jefferson University Hospital in Philadelphia, PA, her BSN summa cum laude from the University of Minnesota, and her JD in the founding class of the University of St. Thomas School of Law in Minneapolis. Her clinical experience and past certifications have largely been in urban critical care and emergency nursing. She has served as vice-president of the Minnesota Nurses Association, earning awards for political action and outstanding service. She represented nursing on the Minnesota Health Care Commission, was a regular editorial writer for the St.

Paul Pioneer Press and an occasional op-ed contributor for the Star Tribune. She founded Friends of Grey Cloud and worked with environmental leaders at the local, regional, state and national levels to protect Lower Grey Cloud Island from harmful development and to conserve the Grey Cloud Sand Dune Prairie. She has extensive experience in legislative lobbying, community activism, and political campaign management. Her scholarly work is focused on the intersection of law, public policy, and interprofessional healthcare practice and education.

Lisa Yost is a Principal Consultant at RAMBOLL ENVIRON, an international consulting firm. She is in their Health Sciences Group, and is based in St. Paul, Minnesota. She 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, pentachlorphenol (PCP), trichloroethylene (TCE), mercury, and arsenic. Lisa 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. She is also an Adjunct Instructor at the University of Minnesota's School of Public Health.

Biographical Sketches of Staff

Carin Huset has been a research scientist in the Environmental Laboratory section of the MDH Public Health Laboratory since 2007. Carin received her PhD in Chemistry from Oregon State University in 2006 where she studied the fate and transport of perfluerochemicals in aqueous waste systems. In the MDH PHL, Carin provides and coordinates laboratory expertise and information to program partners within MDH and other government entities where studies require measuring biomonitoring specimens or environmental contaminants of emerging concern. In conjunction with these studies, Carin provides biomonitoring and environmental analytical method development in support of multiple analyses.

Tess Konen graduated from the University of Michigan's School of Public Health with a master's degree in Occupational Environmental Epidemiology. She completed her thesis on the effects of heat on hospitalizations in Michigan. She worked with MN Tracking for 2 years as a CSTE Epidemiology Fellow where she was project coordinator for a follow-up study of the Northeast Minneapolis Community Vermiculite Investigation cohort. She currently is an epidemiologist working on birth defects, pesticides, and climate change, and is developing new Disaster Epidemiology tools for MDH-HPCD.

Kate Murray is the communications planner for the MN Biomonitoring and Tracking programs. She has a passion for health literacy, particularly through an equity lens. Kate brings experience in creative and technical writing, multimedia production and community engagement. While earning her Master of Public Health degree in Administration and Policy at the University of Minnesota, she also pursued coursework in mass communications and journalism. Prior to joining MDH in April 2019, she worked as a consultant for the American Cancer Society and Collective Action Lab. She also serves as Communications Chair for the Minnesota Public Health Association.

Jessica Nelson is Program Director and an epidemiologist with MN Biomonitoring. She works on design, coordination and analysis of biomonitoring projects, and has been the Principal Investigator for the Healthy Rural and Urban Kids, MN FEET and PFAS studies. Jessica received her PhD and MPH in Environmental Health from Boston University School of Public Health where her research involved the epidemiologic analysis of biomonitoring data on perfluorochemicals. Jessica was the coordinator of the Boston Consensus Conference on Biomonitoring, a project that gathered input and recommendations on the practice and uses of biomonitoring from a group of Boston-area lay people.

Kathy Raleigh is an epidemiologist for MN Tracking. She completed her PhD in Environmental Health at the University of Minnesota's School of Public Health and her MPH in Environmental and Occupational Health at the University of Arizona. She has worked on a variety of environmental health projects including: pesticide exposure in children, occupational asthma, mercury exposure in women and children, and occupational exposure to PFOA. Prior to coming to MN Tracking, Kathy was working on maternal and child health projects both internationally with USAID and, more recently, at MDH. She will also be working on the coordination and collection of hospital discharge data, including heart disease and asthma surveillance projects for MN Tracking with a focus on health disparities.

Blair Sevcik is an epidemiologist with MN Tracking at the Minnesota Department of Health, where she works on the collection and statistical analysis of public health surveillance data for

MN Tracking. Prior to joining MN Tracking in January 2009, she was a student worker with the MDH Asthma Program. She received her Master of Public Health degree in epidemiology from the University of Minnesota School of Public Health in December 2010.

Jessie Shmool supervises the Environmental Epidemiology Unit at MDH and is the Principal Investigator for the Environmental Public Health Tracking program. Jessie received her MPH from the Mailman School of Public Health at Columbia University and DrPH from the University of Pittsburgh, where her training and research focused on exposure assessment, GIS and spatial statistics, community-engaged research methods, and environmental health disparities. Prior epidemiology studies have examined social susceptibility to air pollution exposure in chronic disease etiology and adverse birth outcomes.

Lynn Treadwell, Minnesota Public Health Data Portal Coordinator, is an experienced digital communications leader with a solid understanding of websites and application development, social media and digital marketing communications in the health and government sectors. Lynn brings over 10 years of experience in developing optimized online user experiences and digital communications to the position. She will provide stewardship to Minnesota's public health data portal focusing on audience understanding and interactive development best practices. Lynn has an AAS in graphic design, attended the School of Journalism at University of Minnesota and has a mini-Master's in Marketing from St. Thomas University.