

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

FEBRUARY 9, 2021

2:00 P.M. – 3:30 P.M.

Via Microsoft Teams

MDH ENVIRONMENTAL HEALTH TRACKING AND BIOMONITORING

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Upon request, this material will be made available in an alternative format such as large print, Braille or audio recording. Printed on recycled paper.

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Agenda Overview

DATE: 2/9/2021

Welcome & New Panel Member Introductions

2:00pm

Chair Lisa Yost will welcome attendees to the meeting. Panel members are invited to introduce themselves, including two newly-appointed members. Lisa will give a brief agenda overview.

Biomonitoring Program Update

2:10pm

Biomonitoring Program Director Jessica Nelson will give a brief update on the status of program activities. Panel members can also refer to the written updates for more detail.

Biomonitoring Laboratory Method Development 101

2:20pm

MDH Public Health Laboratory Chemist Carin Huset will give an overview of how the PHL develops new laboratory methods, currently the main area of focus for the Healthy Kids Minnesota Program. Panel members are invited to ask questions.

Update: COVID-19 in Minnesota

3:10pm

Environmental Epidemiology Supervisor Jessie Shmool will give a brief update on the epidemiology of COVID-19 in Minnesota.

Public Comments, Audience Questions, New Business

3:25pm

Motion to Adjourn

3:30pm

Biomonitoring Program Updates

Healthy Kids Minnesota

Healthy Kids Minnesota is our new statewide biomonitoring program that will systematically measure exposures to chemicals of concern in children, with funding through a cooperative agreement with the U.S. Centers for Disease Control and Prevention (CDC). Working in one non-Metro and one Metro region of the state every year, we will partner with Early Childhood Screening (ECS) programs at local public health agencies and school districts to recruit preschool-age children for testing. The original plan was to include 250 – 300 children per community in each program cycle, though these numbers will likely be adjusted due to limitations related to the ever-changing COVID-19 situation. The first program cycle will begin in Southeast Minnesota and Minneapolis.

As discussed at our October 2020 Advisory Panel meeting, we have decided to delay recruitment by a full year from our original timeline, hoping to start recruiting kids in spring/summer 2021. Staff are currently reconnecting with partners at local public health agencies and school districts to learn how their ECS programs are faring in these times, and to discuss what a partnership might look like this year. MDH continues to have decreased staff capacity due to COVID-19 reassignments, but staff time will be increasing in the near future.

On the positive side, this delay has enabled the MDH Public Health Laboratory (PHL) to make substantial progress on developing the program's new laboratory methods. Dr. Carin Huset will present on these methods and PHL progress as part of this meeting.

Clinical Urine Mercury Testing Projects

Working with United Family Medicine, a community clinic in St. Paul, University of Minnesota Doctor of Nursing Practice (DNP) student Nimo Ahmed has led the implementation of our second urine mercury screening project as part of a Quality Improvement project for her degree. Similar to the previous project at Minnesota Community Care, this project screened prenatal patients for urine mercury and offered follow-up for elevated results. The project ran from March through August 2020. At this meeting, Nimo will present findings along with challenges encountered due to the ongoing COVID-19 situation.

A new project is being planned by DNP student Lily Tamire. This project will be based at Community Health Service Inc., a community clinic in Rochester. Beginning this winter, it will conduct urine mercury screening for a wider range of patients – all adults over age 18 – during a 3-month window, offering follow-up for elevated results.

Presentations/Articles

- *Building a Biomonitoring Alliance*, an article by Kristin Dortch of the CDC in the Fall 2020 Association of Public Health Laboratories (APHL) Lab Matters quarterly magazine, features work of state biomonitoring programs, including Minnesota. Available at: <https://www.aphl.org/aboutAPHL/publications/lab-matters>

- Jessica Nelson presented *Biomonitoring Surveillance: Perspective from Minnesota* at the November 2020 Biomonitoring California Scientific Guidance Panel Meeting, along with staff from Michigan and New Hampshire. Presentations available at: <https://biomonitoring.ca.gov/events/biomonitoring-california-scientific-guidance-panel-meeting-november-2020>
- Michelle Gin (MDH), Michael Xiong (MPCA), and Jessica Nelson presented a *Panel on Mercury and Skin Lightening Products* as part of a December 2020 Community Health Worker (CHW) Peer Networking Training, hosted by WellShare International and the Minnesota CHW Alliance.

Biomonitoring Laboratory Method Development 101

Carin Huset, Chemist with the Minnesota Department of Health Public Health Lab, will present general information on analytical methods development for biomonitoring and use some of the methods that are currently under development as examples in the presentation. **The information included below is intended to accompany the presentation for reference purposes (there are many acronyms); it does not need to be reviewed before the meeting.**

Pesticides

This group includes specific metabolites of organophosphate pesticides, pyrethroid metabolites and an herbicide. Most of these pesticides are currently in use and are excreted in urine.

Acronym	Chemical Name	Parent or Metabolite	Major Uses
TCPY	3,5,6-trichloro-2-pyridinol	metabolite of chlorpyrifos & chlorpyrifos-methyl	Insecticide, crops (corn, soybeans, wheat), non-structural wood treatment, mosquito control
PNP	4-nitrophenol	metabolite of parathion, methyl parathion*	Insecticide (corn, cotton, soybeans, wheat)
IMPY	2-isopropyl-4-methyl-6-hydroxypyrimidine	metabolite of diazinon	Pest control (orchards, vegetables)
2,4-D	2,4-dichlorophenoxy acetic acid	Parent	Herbicide, broadleaf weeds (food crops and turf)
3-PBA	3-Phenoxybenzoic acid	metabolite of cyhalothrin, cypermethrin, deltamethrin, fenopropathrin, permethrin, tralomethrin	Insecticides (mosquitos & ticks), medication (lice & scabies), agricultural uses (corn, soybeans, wheat, vegetables)
4-F-3-PBA	4-Fluoro-3-phenoxybenzoic acid	metabolite of cyfluthrin	See 3-PBA, above
cis-DCCA	cis-3-(2,2-Dichlorovinyl)-2,2-	metabolite of cypermethrin, cyfluthrin & permethrin	See 3-PBA, above

	dimethylcyclopropane carboxylic acid		
trans-DCCA	trans-3-(2,2-Dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid	metabolite of cypermethrin, cyfluthrin & permethrin	See 3-PBA, above

* Methyl parathion not currently in use

Environmental phenols

This group includes chemicals used in personal care products and consumer products. There is frequent exposure to these chemicals in daily life and they are excreted in urine.

Analyte	Acronym	Uses & exposures
Benzophenone-3	BP3	UV stabilizer, used in polymer coatings, active ingredient in sunscreens
Bisphenol A	BPA	polycarbonate plastics, thermal paper, PVC plastics, impact resistant plastics, canned food linings
Bisphenol F	BPF	analog to BPA; used in similar applications to BPA, including dental materials
Bisphenol S	BPS	analog to BPA; used in similar applications to BPA and also epoxy glues & as a corrosion inhibitor
2,4-Dichlorophenol	DCP24	synthetic intermediate, and degradant; formed in chlorination processes (water treatment & wood pulp); is volatile
2,5-Dichlorophenol	DCP25	metabolite of 1,4-dichlorobenzene (moth balls, deodorizers, fumigant, dyes & resins, is volatile)
Triclocarban	TCC	antibacterial agent, now phased out; former use: soaps and lotions, medical devices
Methyl Paraben	MEPB	esters of <i>para</i> -hydroxybenzoic acid; used as preservatives in cosmetics & personal care products (shampoo, shaving products, skin cleansers, lotions); used as antimicrobials to prevent food spoilage (baked goods, beverages, syrup, jams and preserves)
Ethyl paraben	ETPB	See MEPB, above

Propyl paraben	PRPB	See MEPB, above
Butyl paraben	BuPB	See MEPB, above

Phthalates and plasticizers

Low molecular weight phthalates

This group includes chemicals used in food packaging, pharmaceuticals, herbal preparations, nutritional supplements, insect repellants, nail polish, deodorant, hair spray, fragrance, printing ink. Low molecular weight phthalates are excreted primarily as monoesters.

Parent Compound	Monoester Metabolite, <i>Oxidized Metabolite</i>
Dimethyl phthalate (DMP)	Monomethyl Phthalate (MMP)
Diethyl phthalate (DEP)	Monoethyl Phthalate (MEP)
Diisopropyl Phthalate (DiPP)	Monoisopropyl Phthalate (MiPP)
Dibutyl phthalate (DnBP)	Mono-n-Butyl Phthalate (MnBP), <i>Mono-3-Hydroxybutyl Phthalate (MHBP)</i>
Diisobutyl phthalate (DiBP)	Mono-Isobutyl Phthalate (MiBP), <i>Mono-2-Hydroxy-Isobutyl Phthalate (MHiBP)</i>
Butyl benzyl phthalate (BBzP)	Monobenzyl Phthalate (MBzP)

High molecular weight phthalates

This group includes chemicals used in food packaging, PVC materials, flooring, furniture upholstery, packaging film, medical tubing, blood storage bags, fragrance, leather. High molecular weight phthalates are excreted as monoester metabolites and oxidized metabolites.

Parent Compound	Monoester Metabolite, <i>Oxidized Metabolite</i>
Di-n-Pentyl Phthalate (DPP)	Mono-n-Pentyl Phthalate (MPP)
Di-n-Hexyl Phthalate (DnHP)	Mono-Hexyl Phthalate (MHxP)
Dicyclohexyl phthalate (DCHP)	Monocyclohexyl Phthalate (MCHP)
DiisoHeptyl Phthalate (DiHP)	Mono-2-Heptyl Phthalate (MHPP)
Di(2-ethylhexyl) phthalate (DEHP)	Mono-2-Ethylhexyl Phthalate (MEHP), <i>Mono (2-Ethyl-5-Hydroxyhexyl) Phthalate (MEHHP), Mono-</i>

	<i>(2-Ethyl-5-Carboxypentyl) Phthalate (MECPP), Mono-2-(Carboxymethyl) Hexyl Phthalate (MCMHP), (2-Ethyl-5-Oxohexyl) Phthalate (MEOHP)</i>
Di-n-octyl phthalate (DnOP)	Mono-n-Octyl Phthalate (MOP), <i>mono-(7-hydroxy-n-octyl) phthalate) (MHOP), Mono (3-Carboxypropyl) Phthalate (MCP), mono-(7-oxo-n-octyl) phthalate) (MOOP)</i>
Di-n-nonyl phthalate; Bis-(3,5,5-TriMethyl-1-Hexyl) Phthalate (DNP)	Mono-(3,5,5-TriMethyl-1-Hexyl) Phthalate (MNP)
Diisononyl phthalate (DiNP)	Mono-Isononyl Phthalate (MiNP), <i>mono (hydroxyisononyl) phthalate (MHiNP), mono-carboxyisooctyl phthalate (MCOP), Monooxoisonyl Phthalate (MONP)</i>
Diisodecyl phthalate (DiDP)	<i>mono-carboxy-isononyl phthalate) (MCNP), mono (hydroxyisodecyl) phthalate (MHiDP), Mono(oxo-isodecyl)phthalate (MOiDP)</i>
Diethyl terephthalate; Bis(2-ethylhexyl) benzene-1,4-dicarboxylate (DOTP, DEHTP)	<i>mono(2-ethylhexyl) terephthalate (MEHTP), mono(2-ethyl-5-hydroxyhexyl) terephthalate (MEHHTP), mono(2-ethyl-5-carboxypentyl) terephthalate (MECPTP)</i>
1,2-cyclohexane dicarboxylic acid diisononyl ester (DINCH)	<i>cyclohexane 1,2-dicarboxylic monoisononyl ester (MINCH), Cyclohexane-1,2-dicarboxylic Acid-Mono(Hydroxy-Isononyl) Ester (MHNCH), Cyclohexane-1,2-dicarboxylic Acid-Mono(Carboxyooctyl)Ester (MCOCH), cyclohexane-1,2-dicarboxylic mono oxoisonyl ester (MONCH)</i>

MN Tracking Program Updates

MN Public Health Data Access Portal updates recently launched

- [Childhood lead exposure data update](#)
- [Immunizations: new query](#)
- [Childhood immunizations data update](#)
- [Adolescent Immunizations data update](#)
- [Medicaid Dental Services – Oral Health](#)
- [Heart attack data update](#)
- [Pesticide poison hospitalizations, ED visits and poison calls](#)

MN Data Portal Traffic

Calendar year 2020 compared to 2019

	2020	2019
Visits (sessions)	152,995	123,740
Pageviews	254,225	236,815
New visitors	109,975	77,313
Return visitors	43,020	46,427

Takeaways on 2020 portal traffic

- We are acquiring more overall traffic (visitors) with an increase year over year of 20%.
- Pageviews are up slightly.
- We are acquiring more new visitors (42% increase), in part due to COVID-19-related traffic from the MDH website.

Section Overview: Other Information

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

- 2021 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

2021 Upcoming Advisory Panel Meeting Dates

Advisory Panel meetings in 2021:

June 8, 2021

October 12, 2021

Unless otherwise announced, 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 January 2021

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Biographical Sketches of Advisory Panel Members

Jay Desai is the Manager of the Chronic Disease and Environmental Epidemiology Section within the Division of Health Promotion and Chronic Disease at MDH. The Section includes the Environmental Epidemiology, the Minnesota Cancer Reporting System, and the Sickle Cell Data Collection program. It also includes the Long-Term Surveillance of Chronic Disease and Disabilities Annex, a program designed for response and recovery in emergency situations such as the COVID-19 epidemic. Jay received his Epidemiology doctorate from the University of Minnesota, is a chronic disease epidemiologist, and has worked in academic research and public health practice at the University of Minnesota, HealthPartners Institute, and the Minnesota Department of Health since 1993. He has a strong interest in diabetes, diabetes prevention, obesity, cardiovascular disease, chronic kidney disease, gout, cancer prevention, sickle cell disease, their underlying behavioral risk factors, and social determinants of health. He is also interested in implementation science and health equity. At MDH Jay spent 16 years as the epidemiologist for the Minnesota Diabetes Program. At HPI he worked on primary care clinical decision support; using EMR's for diabetes, cardiovascular disease, and obesity surveillance; diabetes prevention in low income individuals, and HPV vaccination in underserved communities. Jay is also a standing member of the NIH Healthcare and Health Disparities study section.

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 Senior 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.

Sarah Kleinschmidt is an epidemiologist with more than 20 years of experience in population-based epidemiologic research and infectious disease clinical trials. She joined the 3M Company in 2016 and serves as an epidemiologist within the Corporate Occupational Medicine Department where she evaluates the health experience of employee groups. Prior to joining 3M, Dr. Kleinschmidt was an occupational epidemiologist for DuPont in Wilmington, DE and taught epidemiology at the University of Delaware as an Adjunct Instructor. She has also held research positions at the University of Iowa, Illinois Department of Public Health, and Southern Illinois University School of Medicine. She earned a B.S. and M.S. in biology from the University of Illinois at Springfield, and a M.S. and Ph.D. in epidemiology from the University of Iowa with specialized training in both infectious disease and occupational epidemiology.

Zeke McKinney is a board-certified Occupational and Environmental Medicine (OEM) physician who works at the HealthPartners Clinic in St. Louis Park, MN. He is additionally board-certified in Public Health & General Preventive Medicine, Clinical Informatics, and Lifestyle Medicine. He completed all of his medical training here in Minnesota. His professional interests are in preventing work-related illness/injury, improving data-driven decision-making in clinical contexts, environmental toxicology, health equity, environmental justice, public safety medicine, managing complex impairment/disability, and increasing the health literacy of patients and communities. He practices clinical occupational and environmental medicine in the Twin Cities, and he is one of few clinicians in Minnesota who evaluates work and community-related environmental toxicologic exposures. He is the Minnesota physician contact for the Pediatric Environmental Health Specialty Units (PEHSU), a national resource for environmental medical information in partnership with ATSDR and CDC.

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.

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, pentachlorophenol (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 perfluorochemicals 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.

Madison Kircher is a CSTE Applied Epidemiology fellow with the Minnesota Department of Health where she works closely with the MN Tracking and Climate & Health Programs. She received her Master of Public Health degree from the University of Wisconsin Madison in May 2020. During her graduate studies, her research focused on the relationship between trauma and substance harm with the Wisconsin Department of Health Services. Through the fellowship, she is currently working on projects related to environmental health and climate change in Minnesota.

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.

Jennifer Plum is the Program Manager for MN biomonitoring. She studied Community Health Promotion while earning her MPH from the University of Minnesota. Prior to joining MDH in

December 2019, Jennifer worked with WellShare International, Little Earth of United Tribes, and the U of M Department of Epidemiology and Community Health. She has also been a part of the Health Equity Leadership Network. Jennifer is passionate about health equity, health literacy and community engagement. She is working to connect environmental epidemiology and biomonitoring efforts to community members while coordinating biomonitoring activities.

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.