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

OCTOBER 12, 2021

1:00 P.M. – 3:00 P.M.

Via Microsoft Teams

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Contents

Agenda Overview
DATE: 10/12/2021

Welcome & Agenda

1:00pm

Chair Lisa Yost will welcome attendees to the meeting. Panel members are invited to introduce themselves. Lisa will give a brief agenda overview.

Healthy Kids Minnesota: Population sampling methods

1:10pm

Biomonitoring Program Director Jessica Nelson will give an update on the statewide Healthy Kids Minnesota program and discuss issues and trade-offs related to the population sampling approach being used. Panel members are invited to ask questions.

1:25pm Discussion

Questions for the Panel

- What is your feedback on the trade-offs between keeping our current sampling approach or changing strategy? Should we continue as is or pursue a change?

- For the first two years of the program, where we'll use our current approach, how can we minimize the downsides of the approach and emphasize its strengths?

- Going forward, how can we address barriers that we may face in moving toward a probability-based sample?

Healthy Kids Minnesota: Reporting back phthalate results

1:50pm

MDH Environmental Health Epidemiologist Deanna Scher will give an overview of the phthalate metabolites included in the Public Health Laboratory phthalate analyte panel and frame different approaches for reporting results to participants. Panel members are invited to ask questions.

2:10pm Discussion

Questions for the Panel

- Should we attempt to reduce the number of phthalate metabolites we report back to participants?

- What is your feedback on the report-back approaches provided? Are there additional options we have not considered?

Long COVID follow-up

2:35pm

Chronic Disease Environmental Epidemiology Manager and Advisory Panel member, Jay Desai, will give an overview of the long COVID work at MDH. Panel members are invited to ask questions.

Public Comments, Audience Questions, New Business

2:55pm

Motion to Adjourn

3:00pm

# Healthy Kids Minnesota: Population sampling methods

Background

As we have discussed with the Advisory Panel at past meetings, the goal of Healthy Kids Minnesota is to establish a statewide biomonitoring surveillance program to systematically measure chemical exposures in children with a focus on chemicals of concern for child development. To achieve a representative sample of preschool-aged (3-6 year-old) Minnesota children, we are using population-based recruitment methods in partnership with Early Childhood Screening (ECS) programs.

ECS is a universal program in Minnesota; by state law, all children must be screened before entering kindergarten. The process differs across school districts. In some cases, the school district performs the screening directly. In other cases, the school district contracts the work to a local public health agency.

For Healthy Kids Minnesota, we divided the state into a) five non-Metro regions using county boundaries, and b) five Metro regions using school district boundaries (see Figure 1). We will recruit children from one non-Metro region and one Metro region each year. In addition, we will reach out to include any of the 11 Tribal nations in Minnesota within these regions. The first cycle, Healthy Kids Minnesota 2021, has begun in Southeast Minnesota and Minneapolis.

Figure 1. Healthy Kids Minnesota regions
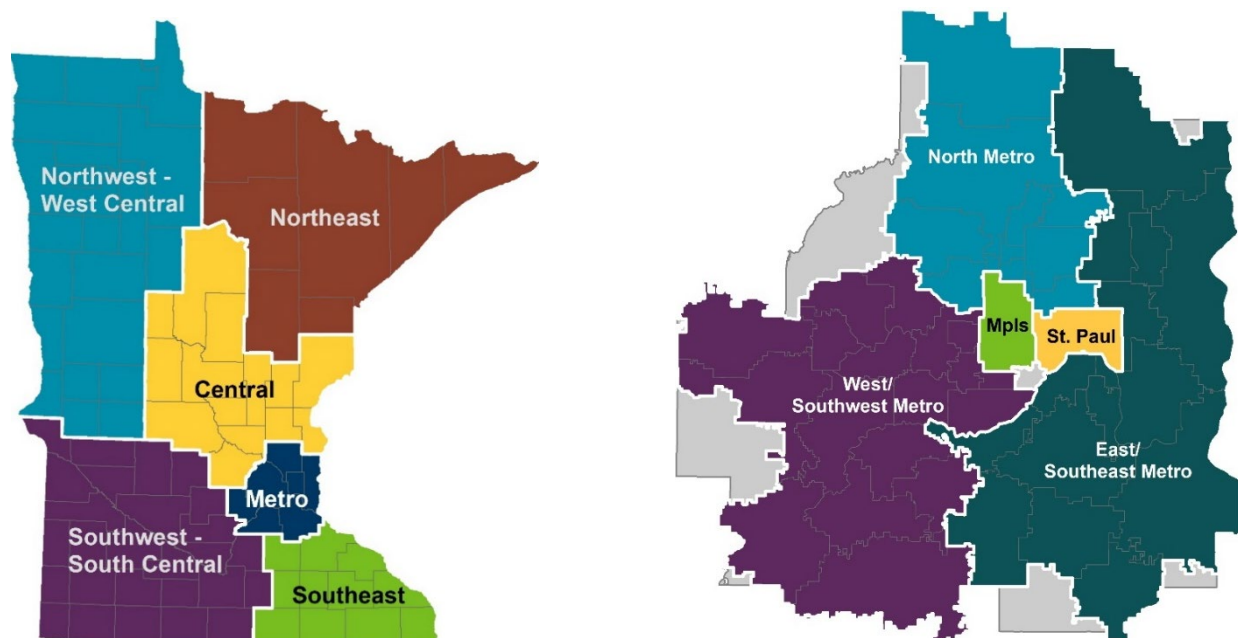
Current sampling methodology

We have described the methodology as 3-stage population sampling:

1. **Primary sampling** unit is the region; we will reach all 5 regions over 5 years

2. **Secondary sampling** unit is a subset of counties or school districts within the region

3. **Tertiary sampling** unit is the subset of kids who come in for their ECS screening

The second stage – sampling a subset of counties/school districts in each region to be representative of the entire region – is crucial. The approach differs between non-Metro and Metro regions.

For non-Metro regions (groups of 7-27 counties), we are trying when possible to partner with county public health agencies that assist school districts in their area with ECS for the sake of efficiency (i.e. we can contract with a local public health agency who provides support for multiple school districts in their area rather than each school district individually). We articulated a three-tiered approach to sample counties/school districts in non-Metro regions:

1. Large population centers (population > 40,000): Sample these with certainty.

2. Mid-size population centers (population 15,000-40,000): Sample 1-2 of these.

3. Rural parts of counties: Sample two of these.

To select the specific potential partners (1-5 counties/school districts in the region), we will reach out to local public health and school districts to learn more about how ECS works in their area and gauge interest in partnering. We will determine which sites to select using random sampling when possible, but also considering the following factors: geographic coverage of the region, area demographics, interest by local agency/school district, and potential to advance health equity goals.

For Metro regions (groups of 1-18 school districts), two of them – Minneapolis and St. Paul – are comprised of only one school district. For the regions made up of more than one school district, we will select 2-3 school districts with whom to partner, using the same approach outlined above – using random sampling when possible, but also considering geographic coverage, partner interest, etc.

Experience in Heathy Kids Minnesota 2021

Healthy Kids Minnesota 2021 has been our first chance to put this methodology into practice. With the caveat that everything this year has been complicated by the ongoing COVID-19 situation, our experience is instructive.

- Our non-Metro region is Southeast Minnesota, an 11-county region. While we considered the factors listed above when reaching out to potential partners, there ultimately was not a random element in how we selected partners to approach. Population size and geographic coverage were key considerations, but perhaps most important was local interest and ability to partner. Because the Healthy Kids Minnesota model is so reliant on partners to do recruitment and sample collection (with financial compensation), their interest and willingness/ability to partner is imperative for the program to succeed. Particularly in this

COVID year, not all agencies we approached had the staff/time capacity to be involved. In the end, we have only been able to develop partnerships with two sites in the region, Fillmore County and Rochester Public Schools/Olmsted County (see Healthy Kids Minnesota Program updates, below).

▪ Our Metro region is Minneapolis, a 1-school district region. The sampling is more straightforward here, though we have realized some complexities, including the fact that Minneapolis Public Schools does ECS at 2 office locations, different community locations, and in schools. We are not able to reach kids at all of these locations for logistical reasons.

Feedback received on population sampling methods

We developed the method laid out above with the input of an MDH survey methodologist. In an ongoing effort to refine our strategy and make the approach as scientifically robust as possible, and because we had questions about appropriate weighting and adjustments to make during statistical analysis, we were able to connect with statistical sampling experts from the Centers for Disease Control and Prevention (CDC) with the help of our CDC project officer. We had a meeting with an impressive group of experts, most from the National Center for Health Statistics, which does sample design for the National Health and Nutrition Examination Survey (NHANES) in June 2021. We gave an overview of our approach and were able to ask key questions and get their feedback.

Key take-aways for consideration as we plan for Healthy Kids Minnesota 2022 and beyond are:

▪ This sampling methodology does not fit into the paradigm of probability sampling. Randomness is key to making representative inferences, and we do not have this for the second stage of sampling (selecting a subset of counties/school districts to represent the region). For this to be probability-based, all counties/kids need to have some chance of being included in the study (a non-zero probability). Some areas can be sampled with certainty, but all need to have a chance.

▪ This approach is population-based, i.e. representative of a population being sampled, but only for the specific areas we are sampling (i.e. Minneapolis, Rochester, Fillmore County), not the larger regions. We are only sampling at the third stage, the level of kids who come in for their ECS screening. The expert group agreed that the model has a lot of strengths at this stage: a good sampling frame based on a universal screening program, high participation rates based on past experiences, and low barriers to participation. It will be possible to generalize our results to the subpopulations sampled, and we may be able to compare the subpopulations to counties or groups of counties and say we would expect to see similar findings for the larger population. But, as our approach stands now, we will not be able to generalize our subset of recruitment sites to the larger region, nor combine the regions into a true statewide estimate.

▪ When we asked what they would call this recruitment approach, there was no obvious answer. We settled on calling it a hybrid population-based approach, which they commented has some precedent (such as multi-site studies) and they expect will be used increasingly in the future as challenges with true probability-based sampling grow.

Trade-offs between changing approach and keep current strategy

We are faced with the fundamental question of how to balance the ideal of a probability-based sampling design and the benefits it offers in terms of wider representativeness with the logistical reality of a program that relies on key partnerships to be successful.

We could pursue a strategy of exploring changes to the methodology that incorporate a random element at the second stage of sampling and get us closer to a probability-based design. (This strategy would require the input of an expert in statistical sampling.) For example, one idea is to sample on the basis of school district – the unit by which ECS programs are implemented – and not county. We would randomly choose school districts to approach within a region (with some sampling with certainty and consideration of population tiers). We likely still would include local public health in the effort, as past experience has shown they are more receptive to the program and can be great connectors to contacts at local school districts. This could take a fair amount of time and effort to pursue, and there undoubtedly would be some locations who are unable to or uninterested in participating. We would not be able to implement this new approach for Healthy Kids Minnesota 2022, so it would start with the third cycle of recruitment in 2023.

Or, we could keep our current approach and accept the limitations of a non-probability-based design. By doing this, we would recognize the strong benefits that our model based on partnerships with local public/school districts offers, and that the results will still be important and generalizable, albeit to a smaller population. We would know we have considered other options and decided the trade-off makes sense in light of the program design and our financial/staffing capacity constraints. A critical point would be to work on how we message and describe the sample, exploring ways to compare to surrounding counties that may enable a wider extrapolation.

Questions for panel

- What is your feedback on the trade-offs between keeping our current sampling approach or changing strategy? Should we continue as is or pursue a change?

- For the first two years of the program, where we'll use our current approach, how can we minimize the downsides of the approach and emphasize its strengths?

- Going forward, how can we address barriers that we may face in moving toward a probability-based sample?

Healthy Kids Minnesota: Reporting back phthalate results

Deanna Scher is an epidemiologist in the Environmental Health Division at the Minnesota Department of Health (MDH). Since joining MDH in 2007, Dr. Scher has worked on a variety of studies to assess exposures to, and health impacts from environmental contaminants, particularly among at-risk and vulnerable populations. She is a state-appointed member of the MDH Institutional Review Board and the Minnesota Department of Agriculture's Pesticide Management Plan Committee. She also currently serves as chair of the EPA Children's Health Protection Advisory Committee. Deanna received her Ph.D. in Environmental Health Sciences from the University of Minnesota, School of Public Health.

Phthalate results reporting

Phthalates are a class of manufactured chemicals commonly used to increase the flexibility of plastics and in a wide array of consumer products. They produce a variety of effects in laboratory animals; however, their adverse effects on the development of the male reproductive system are of particular concern.

The current phthalate analyte panel in Healthy Kids Minnesota encompasses 35 metabolites of phthalates or phthalate substitutes (Table 1). This metabolite list reflects exposure to 17 parent phthalates or phthalate substitutes.

Table 1. Phthalate analyte panel (n=35)*

Low Molecular Weight Phthalates	
Parent Compound	**Metabolite (Analyte)**
Dimethyl phthalate (DMP)	Monomethyl phthalate (MMP)
Diethyl phthalate (DEP)	Monoethyl phthalate (MEP)
Diisopropyl phthalate (DiPP)	Monoisopropyl phthalate (MiPP)
Dibutyl phthalate (DnBP)	Monobutyl phthalate (MnBP)
	Mono-(3-hydroxybutyl) phthalate (MHBP)
Diisobutyl phthalate (DiBP)	Monoisobutyl phthalate (MiBP)
	Mono-(2-hydroxyisobutyl) phthalate (MHiBP)
Butyl benzyl phthalate (BBzP)	Monobenzyl phthalate (MBzP)
High Molecular Weight Phthalates	
Parent Compound	**Metabolite (Analyte)**
Di-n-pentyl phthalate (DPP)	Monopentyl phthalate (MPP)
Di-n-hexyl phthalate (DnHP)	Monohexyl 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)
	Mono-(2-ethyl-5-hydroxyhexyl) phthalate (MEHHP)
	Mono-(2-ethyl-5-carboxypentyl) phthalate (MECPP)

	Mono-(2-carboxymethylhexyl) phthalate (MCMHP)
	Mono-(2-ethyl-5-oxohexyl) phthalate (MEOHP)
Di-n-octyl phthalate (DnOP)	Monooctyl phthalate (MOP)
	Mono (3-carboxypropyl) phthalate (MCPP)
Di-n-nonyl phthalate; Bis-(3,5,5-triMethyl-1-hexyl) phthalate (DNP)	Mono-(3,5,5-trimethyl-1-hexyl) phthalate (MNP)
Diiosononyl phthalate (DiNP)	Monoisononyl phthalate (MiNP)
	Mono-(4-methyl-7-hydroxyoctyl) phthalate (MHiNP)
	Mono-(4-methyl-7-carboxyheptyl) phthalate (MCOP)
	Mono-(8-carboxyisooctyl) phthalate (MCiOP)
	Mono-(4-methyl-7-oxooctyl) phthalate (MONP)
Diisodecyl phthalate (DiDP)	Mono-(7-carboxy-2,7-dimethylheptyl) phthalate (MCNP)
	Mono-(6-hydroxy-2-propylheptyl) phthalate (MHiDP)
	Mono-(6-oxo-2-propylheptyl) phthalate (MOiDP)
Dioctyl terephthalate; Bis(2-ethylhexyl) benzene-1,4-dicarboxylate (DOTP, DEHTP)	Mono-(2-ethyhexyl) terephthalate (MEHTP)
	Mono-(2-ethyl-5-hydroxyhexyl) terephthalate (MEHHTP)
	Mono-(2-ethyl-5-carboxypentyl) terephthalate (MECPTP)
1,2-cyclohexane dicarboxylic acid diisononyl ester (DINCH)	Cyclohexane 1,2-dicarboxylic-monoisononyl ester (MINCH)
	Cyclohexane-1,2-dicarboxylic acid-monohydroxyisononyl ester (MHNCH)
	Cyclohexane-1,2-dicarboxylic acid-monocarboxyoctyl ester (MCOCH)
	Cyclohexane-1,2-dicarboxylic-monooxoisononyl ester (MONCH)

* Note: Phthalate nomenclature is not standardized

This list is larger than other phthalate biomonitoring efforts to-date, including the National Health and Nutrition Examination Survey (NHANES, the nationwide health survey that includes biomonitoring and is conducted by the U.S. Centers for Disease Control and Prevention) and other state biomonitoring programs. We expect that most of the metabolites will have detectible concentrations in Healthy Kids Minnesota participants based on documented widespread exposure to multiple phthalates, including low percentages of non-detects in children in NHANES.

Providing families of participants with results on 35 different phthalate metabolites may not be the most useful or meaningful approach, particularly in a results packet that also contains results from other analyte panels. While the ethics of informed consent and participant report-back dictate that we must report results to participants for all phthalates for which we test and will do statistical analysis, we have explored ways to simplify report-back to participants given the large size of the phthalate analyte panel. _We are looking for feedback from panel members on the following options:_
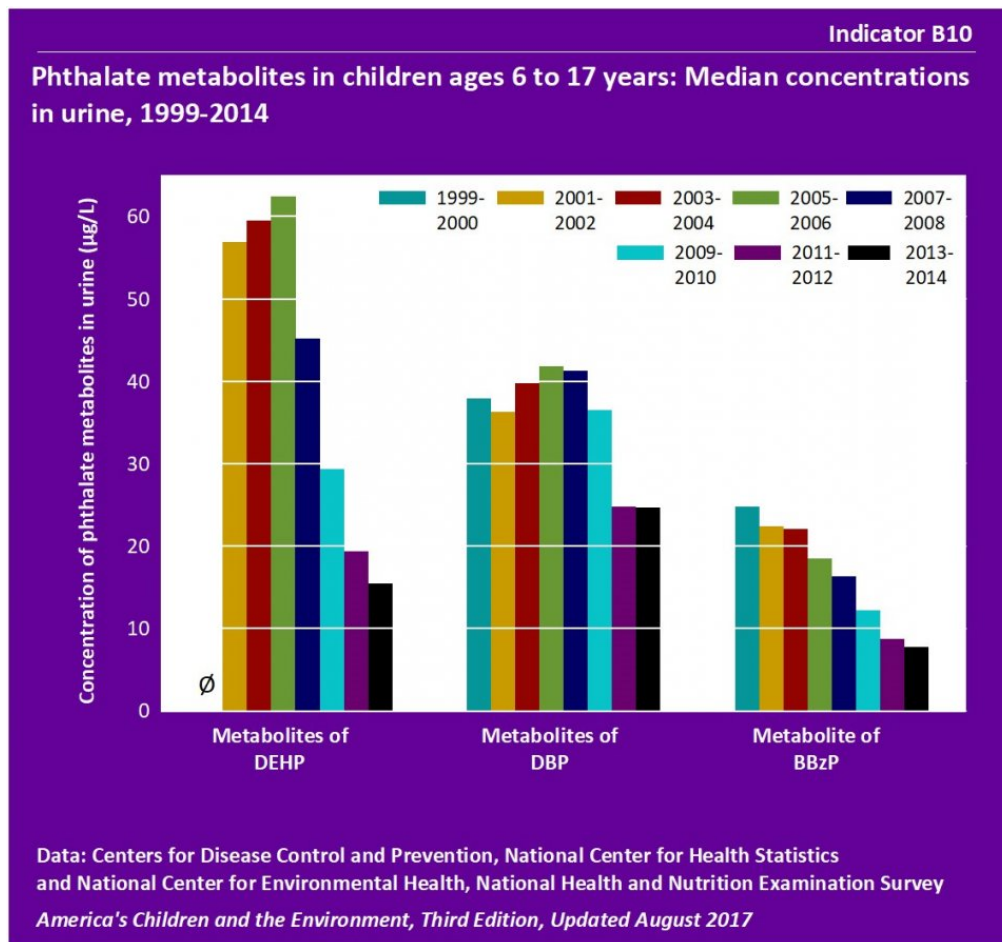
Table 2. Phthalate report-back options

Reporting option	# of results to report	Pros	Cons	Comments
Report all individual analytes	35	Provides maximum information on results to family. Makes clear which analytes will be included in our statistical analysis.	Overwhelming and hard for family to interpret and find meaning.	Data visualization techniques could be used to help reader make sense of the data in the results packet.
Report back (and test for) only NHANES analytes	19-21	General population comparison available for each analyte.	Still a long list to report back. NHANES list will likely change over time, may not capture changes in chemical use.	NHANES currently tests for 19 phthalate metabolites but has included two additional analytes in years past.
Report back by sum of parent phthalate	17 (8 summed parents and 9 single parents)	Easier for participants to research their results, as info is based on the parents. There is precedent for grouping by parent (see example/ figure below).	The sum is simply a grouping option. It does not reflect the exposure concentration of the parent.	Some metabolites originate from more than one parent; grouping would be based on "major" parent. Footnotes can list the metabolites included in the sums.
Report sums for low molecular weight (MW) and high MW phthalates	2 larger groupings (could choose certain key metabolites to include)	Since MW dictates how the parent phthalate is used (see comments), this option is the most applicable to the accompanying info in the results packet on exposure sources and exposure reduction advice.	Biggest loss of information on individual phthalate levels, though could choose key analytes to include. MW is not an intuitive/easy concept.	Low MW phthalates are used as solvents in personal and cosmetic care products. High MW phthalates are used to make plastic more flexible (e.g., PVC polymers) in auto interiors, vinyl flooring, home furnishings, toys,

				carpet backing, footwear, etc.

Grouping example: Sum metabolites by parent phthalate

The U.S. Environmental Protection Agency's (EPA's) America's Children and the Environment report brings together information from a variety of sources to provide national indicators on the environment and children's health (https://www.epa.gov/americaschildrenenvironment). Phthalate concentrations in children's urine (using data from NHANES) are one indicator. The concentrations in the figure below show the report's approach of using the sum of metabolites by parent phthalate as indicators: MBP and MIB (metabolites of DBP), MBzP (metabolite of BBzP), and the sum of MEHP, MEOHP, and MEHHP (metabolites of DEHP).

Figure 1. Phthalate metabolites in children ages 6-7 years, from America's Children and the Environment Report 3rd Edition

Questions for panel

- Should we attempt to reduce the number of phthalate metabolites we report back to participants?

- What is your feedback on the report-back approaches provided? Are there additional options we have not considered?

Long COVID follow-up

There is emerging evidence that some people have post-acute Sars-Cov-2 (PASC) symptoms that can last months after their infection (i.e. COVID long-haulers). These can range from mild symptoms to acute respiratory failure, acute kidney failure, vascular inflammation, cognitive impairment, and chronic fatigue syndrome. Complications can require a long recovery. Minnesotans with existing chronic conditions and those suffering from health inequities could be especially affected by these long-term health impacts.

MDH Long-term Surveillance Plan

In response, MDH Incident Command Structure (ICS) the Long-Term Surveillance (LTS) of Chronic Disease and Injury plan, which will collect and analyze data on the long-term health impacts related to PASC that may occur in the coming months or years.

The LTS plan is an existing part of MDH's emergency response and disaster preparedness planning. It was developed as part of Minnesota's All-Hazard Response and Recovery Plan. This plan and emergency response annex was by, including annual preparedness exercises and capacity building.

Over the last ten years, Environmental Public Health Tracking has developed and led annual preparedness scenarios and exercises have been conducted, in coordination with MDH Emergency Preparedness and Response, to encourage early planning for assessing chronic disease impacts. The COVID-19 activation by ICS is the first for an infectious disease.

The LTS plan fills a critical gap in the COVID pandemic emergency response and recovery by using data to answer questions and concerns about PASC symptoms and complications.

With better data to track trends, patterns, and disparities, MDH can:

- Inform Minnesota PASC survivors, health care providers, public health practice, and policy-making to mitigate the long-term risks and complications of PASC

- Prepare our health systems for a wave of patients with chronic PASC symptoms

- Engage effectively with partners at the local, state, and national levels on PASC programs and studies to promote health and well-being

Scope of work

The LTS plan is now operational at MDH and will provide planning and coordination to establish long-term surveillance investigations of PASC symptoms and complications with colleagues throughout MDH along with external partners.

The main focus will be long-term monitoring of Minnesotans who had a confirmed Sars-Cov-2 infection to better understand PASC symptoms and complications that are impacting their daily life activities.

LTS aims to better understand:

- Who is at highest risk of experiencing PASC symptoms

- What preventive steps or treatment can best resolve long-term PASC complications

- Potential disparities related to race, ethnicity, age, gender, rurality or urbanicity, and other factors of social vulnerability

MDH recently allocated funding for this work as part of two years of funding from CDC to support equitable public health response and recovery.

Healthy Kids Minnesota: Program and laboratory updates

Program Updates

Healthy Kids Minnesota is our new biomonitoring program that will systematically measure exposures to chemicals of concern in preschool-aged kids across the state. With funding from the U.S. Centers for Disease Control and Prevention (CDC), we will start in Minneapolis and Southeast Minnesota, and rotate our regions of focus in a 5-year cycle to include one non-Metro and one Metro region per year. Updates since the last Advisory Panel meeting in June 2021 are included below.

Partnerships established

We have finalized financial agreements and other logistics with recruitment partners at Early Childhood Screening (ECS) programs at school districts and local public health agencies for Healthy Kids Minnesota 2021. Partners will approach families who come in for their child's already-scheduled screening appointment with information about the program, conduct informed consent for families interested in participating, administer a survey, help families collect a urine sample from the child, and provide families with a $40 gift card to thank them for their time. Our partners are:

- Minneapolis Public Schools (MPS): in addition to recruitment and sample collection, our financial agreement includes time to conduct focus groups/community feedback sessions to gather qualitative information on how to best share biomonitoring results with families

- Fillmore County Public Health: local public health staff assist with screening for 6 school districts in the county

- Olmsted County Public Health and Rochester Public Schools: Olmsted County staff will work onsite at the Rochester Public Schools ECS program to recruit families

While we had hoped for 1-2 additional partners/recruitment sites in Southeast Minnesota, the ongoing COVID-19 situation has made it difficult to establish new partnerships. In one county in Southeast Minnesota, COVID-19 has changed the way county public health interfaces with the school district for ECS, making a partnership not feasible this year. We are also still working on using government-to-government channels to reach out to the Prairie Island Indian Community, the one Tribal nation in the Southeast region, though this has also been delayed due to COVID-19.

Training and Program Launch

Training has been conducted with two out of three partner sites, and the third is planned. Three MN Biomonitoring staff conducted in-person training with MPS ECS staff on July 17, and virtual project training with Filmore County ECS staff on September 23. Trainings covered all aspects of the recruitment process and study logistics, including the informed consent process, survey administration, data privacy, and sample collection and storage. All recruiters will complete Protecting Human Research Participants training through the National Institutes of Health website.

MPS ECS staff started recruitment on August 17, and all aspects of the recruitment process are going well. At the time of this report, MPS has recruited 34 kids with a response rate of 62%. Fillmore County started recruiting at a screening event on October 5, and recruited 6 kids. Olmsted County/Rochester Public Schools have had to push back training and start date to early November due to the recent COVID-19 surge.

REDCap Database

A secured Healthy Kids Minnesota REDCap database was designed to collect consent information, signatures, refusals, ineligibilities, exposure survey responses, gift card tracking, laboratory results, and follow-up for elevated cases. The REDCap database reduces administrative burden on MN Biomonitoring and ECS staff because it captures all aspects of the recruitment data in one secured database. The database provides a unique opportunity to collect consistent data across Healthy Kids Minnesota project sites and enhances capabilities to evaluate relationships between program measures and outcomes.

Evaluation and Continuous Quality Improvement

Evaluation activities ensure that Healthy Kids Minnesota is accomplishing it goals and provide information to guide program management and planning. ECS staff who attended trainings were asked to provide feedback on the training received. The feedback helped the MN Biomonitoring team understand how to improve materials and delivery of subsequent trainings. MN Biomonitoring and ECS staff will collaborate to monitor and improve the quality of recruitment processes and sample collection protocols on an ongoing basis. Using REDCap, we will assess and track recruitment and sample collection progress, identify areas where process and quality improvements are needed, and ensure that actions are taken to improve program outcomes.

Free Private Well Testing

In partnership with MDH Environmental Health and Olmsted County's Southeastern Minnesota Water Analysis Laboratory (SEMWAL), we will be able to offer free private well testing kits to any families approached to participate in Healthy Kids Minnesota in Fillmore County and Rochester Public Schools. SEWAL will measure lead, manganese, arsenic, nitrate-nitrogen, nitrite-nitrogen, chloride, sulfate, fluoride, total coliform, and E. coli. in water. For Healthy Kids Minnesota participants, private well results will be linked with the child's biomonitoring results. Funding for the water testing comes from the Clean Water Fund through MDH.

Communications/outreach

In late October, we will do a communications splash about the launch of the program. This will be in coordination with our partners, and will involve a news release, social media, and local community outreach.

Laboratory updates

The MDH Public Health Laboratory began receiving Healthy Kids Minnesota urine samples in August. Samples are analyzed for urine mercury and trace metals soon after arrival.

Other laboratory methods are in various stages of completion and development:

- The method for specific gravity is complete and waiting for final approval. Specific gravity measurements help account for fluctuations in urine sample dilution to help standardize analyte results.

- The environmental phenols method validation is complete, with successful proficiency training (PT) participation completed last spring.

- Staff are finishing the validation of the phthalates method. The next step will be to participate in a CLIA compliant proficiency test.

- Method development for the flame retardant metabolites analysis is underway.

- Staff will soon begin on updates to the existing pesticides method. These updates will help improve the performance of the method.

- A new LC/MS/MS instrument to help with polycyclic aromatic hydrocarbon (PAH) analysis has been installed. This instrument will allow an updated method for PAH analyses are scheduled for winter

Other updates

National Biomonitoring Meeting

Registration for the 2022 National Biomonitoring Meeting, to be held virtually January 24-26 2022, is now open. The theme is "A Systems Approach for State Biomonitoring Programs." Advisory Panel members would be welcome to attend this free conference. Staff from Minnesota had three abstracts accepted for the meeting:

- Multi-sector approach to addressing mercury exposure through skin lightening products using biomonitoring

- Identifying exposure differences in kids: Results from Healthy Rural and Urban Kids 2018

- Challenges and lessons learned on per-and-polyfluoroalkyl substances (PFAS) method development: serum, plasma, breastmilk

Healthy Rural and Urban Kids 2018 results sharing

Staff are working hard to finalize analysis of the Healthy Rural and Urban Kids 2018 results and summarize them in a Community Report to share with participants, communities, and the public. We plan to share results in early 2022, mailing to participants and distributing widely to communities before the January 24, 2022 National Biomonitoring Meeting.

Section Overview: Other Information

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

- 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

Upcoming Advisory Panel Meeting Dates

Advisory Panel meetings in 2022:

February 8, 2022

June 14, 2022

October 11, 2022

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 October 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 Senor Industrial Hygienist for Stantec Consulting Services Inc. (formerly 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 National Director of Lung Health for the American Lung Association. Her responsibilities include program oversight and evaluation related to asthma, chronic obstructive lung disease (COPD), influenza, and quality improvement. 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.

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

Sheila Amenumey is currently the Biomonitoring Epidemiologist at MDH. Sheila collaborates with the Biomonitoring Program Director and key stakeholders leading the various biomonitoring projects including Healthy Kids Minnesota, the statewide project focused on children's environmental health. She completed her MPH in Maternal and Child Health and PhD in Water Resources Science (Water Quality Hydrology Emphasis) at the University of Minnesota. Prior to her work with the biomonitoring program, Sheila worked with the Maternal and Child Health Section at MDH. Her role as the Maternal and Child Health Epidemiologist involved leading and collaborating with external partners in conducting program evaluation across multiple federal adolescent health grants, and assisting them in monitoring program outcomes and achievement of their health and education goals for the youth they serve. Before coming to MDH, Sheila conducted water quality research at the University of Minnesota to determine the impact of agriculture on water quality.

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, currently on a temporary leave of absence as a Supervisor in the MDH COVID response section. 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.