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

October 11, 2016
1:00 p.m. – 4:00 p.m.

The American Lung Association in Minnesota
490 Concordia Avenue
St. Paul, Minnesota
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### 10/11/2016 AGENDA

**Meeting of the Advisory Panel to the Environmental Health Tracking and Biomonitoring Program**

1:00 – 4:00 pm at the American Lung Association in Minnesota
490 Concordia Avenue, St. Paul, MN

<table>
<thead>
<tr>
<th>Time</th>
<th>Agenda Items</th>
<th>Presenters</th>
<th>Description/expected outcome</th>
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<tbody>
<tr>
<td>1:00</td>
<td>Welcome &amp; Introductions</td>
<td>Pat McGovern, Chair</td>
<td>Panel members &amp; audience are invited to introduce themselves.</td>
</tr>
<tr>
<td>1:05</td>
<td>Agenda Overview</td>
<td>Jean Johnson</td>
<td>A brief overview of topics and discussion items, and an announcement of upcoming vacancies on the panel.</td>
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<tr>
<td>1:10</td>
<td>Central Sands Biomonitoring</td>
<td>Jessica Nelson and Char Napurski</td>
<td><strong>Discussion item:</strong> Jessica and Char will present an update of progress and outreach in the Central Sands counties and with White Earth environment and health staff. Panel members are asked to comment on next steps for identifying community partners and funding opportunities.</td>
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<tr>
<td></td>
<td>- Central Sands Update</td>
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<td>- Funding Opportunity Announcement</td>
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<td>- Public Health Lab Update</td>
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| 1:25  | Discussion                                  |                                   | **Questions for the panel:**
- Given the broad area of the Central Sands, how should MDH define the affected “community” for future partnership?
- Do you have recommendations for an academic partner for a funding application? |

<p>| 1:40  | MN FEET Updates                             |                                   | <strong>Information item:</strong> These updates are provided in written form. Panel members are invited to ask questions and comment on these updates.                                                                                      |
|       | - MN FEET                                    |                                   |                                                                                                                                                                                                                           |
|       | - MN FEET Plus                              |                                   |                                                                                                                                                                                                                           |
| 1:45  | Update on PFC                               |                                   | <strong>Informational item:</strong> This update is provided in written form. Panel members are invited to ask questions and comment on this update.                                                                                      |
| 1:50  | Future Vision for MN Biomonitoring         |                                   | <strong>Information item:</strong> These updates are provided in written form. Panel members are invited to ask questions and comment on these updates.                                                                                      |</p>
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<thead>
<tr>
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<tr>
<td>2:00</td>
<td>Refreshments</td>
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<tr>
<td>2:15</td>
<td>Tracking Updates</td>
<td>Lynn Treadwell</td>
<td>Updates to the Data Portal will be featured in this presentation.</td>
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<tr>
<td></td>
<td>• Data Portal Updates</td>
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<td></td>
<td>• CDC Site Visit</td>
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<tr>
<td>2:25</td>
<td>Tracking Traffic Indicators</td>
<td>Jessie Shmool</td>
<td>Jessie Shmool will discuss the importance of new tracking traffic indicators.</td>
</tr>
<tr>
<td>2:35</td>
<td>Discussion</td>
<td></td>
<td>Questions for the Panel:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Who are potential users of traffic indicators?</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Are there other outreach strategies to widen the reach?</td>
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| 2:45  | Publications Summary                | Jean Johnson, Tess Konen, Jessica Nelson | Jean will provide an overview of publications from EHTB work to date, papers in progress and barriers to publishing. Staff will briefly describe 3 current manuscripts in progress.  
|       | • Air & Health (Jean Johnson)       |                                 |                                                                                               |
|       | • Vermiculite (Tess Konen)          |                                 |                                                                                               |
|       | • PFCs (Jessica Nelson)             |                                 |                                                                                               |
| 3:50  | Public Comments and Audience Questions |                                 |                                                                                               |
| 3:55  | New Business                        |                                 |                                                                                                |
| 4:00  | Motion to adjourn                   |                                 |                                                                                                |

**Note to audience:** The panel asks that audience members hold comments and questions on discussion items until a time when the chair will invite questions from the audience. Audience members are asked to identify themselves when they speak, and to please record their names and affiliations on the list at the sign-in table. Meetings are recorded.
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Section Overview: Central Sands Biomonitoring

Staff will present an update on progress and outreach in the Central Sands counties and with White Earth environment and health staff to address community concerns and conduct foundational work recommended by the Advisory Panel at the last meeting. Travel to the Central Sands counties to meet with county health officials and White Earth health and environmental officials took place the end of June, 2016.

A written update on the Public Health Lab’s progress towards developing a pesticide biomonitoring methods is also included in this section.

In this section, we also describe a grant funding opportunity from the National Institute of Environmental Health Sciences (NIEHS) Partnerships for Environmental Public Health (PEPH) Network. Community and academic partnerships are key to successful applications and are the subject of the discussion questions below for the panel.

Panel members are invited to ask questions and provide comment to any topics in this section, and to consider these questions for discussion.

Questions for the panel:

Given the broad area of the Central Sands, how should MDH define the affected “community for future partnership?"

Do you have recommendations for an academic partner for a funding application?
Central Sands Update

In response to community concerns raised about the use of pesticides in north central Minnesota (the “Central Sands” region) and initial work on the topic done by EHTB staff, the Advisory Panel voted on the following recommendation at the June 2016 meeting:

> We recommend that MDH EHTB staff continue to do foundational work SFY 2017 to respond to community concerns about pesticide exposures in the Central Sands region. MDH EHTB staff should continue gathering information about pesticide use in the area and biomonitoring feasibility. Staff should also work to learn about community health concerns and review existing surveillance data. This work on project-planning and partnership-building will be important in pursuing a community-based grant application (e.g. PEPH grant) or other funding options.

Since the June meeting, staff have continued this foundational work.

Trip to Central Sands area

Three EHTB staff traveled to the Central Sands region for two days in late June and had seven meetings with community organizations, including local public health staff, White Earth Tribal staff and advocacy organizations. We were joined by Samantha Lucas-Pipkorn from the Great Lakes Inter-Tribal Epidemiology Center (GLITEC) for some meetings. A summary of these meetings follows.

Meetings with county public health agencies

We met in-person with representatives from five county public health agencies in the affected area, and spoke with one over the phone. The representatives were the county public health directors and/or their staff. Counties included: Becker County, Hubbard County, Morrison County, Todd County, Wadena County and Otter Tail County (by phone).

After providing background on the MN Biomonitoring program, Advisory Panel and community request, we asked the same questions:

- Are you aware of concerns about pesticide exposures in your area? Do you hear specific concerns from constituents?
- What has your agency done to respond to these concerns?
- Would a biomonitoring study help in addressing these concerns?
- Do you have other concerns about environmental exposures in your county, such as exposure to arsenic or mercury? Do you have other concerns about health?
- How would you like to be involved in the future as planning proceeds?

When asked about concerns from the community regarding pesticides, county health representatives did not report hearing many complaints directly from their constituents. Otter Tail County received many calls approximately 10 years ago when potato production was expanding but has not had recent complaints. A representative from Wadena County indicated that she heard more about pesticide concerns from her lake association than her constituents. Hubbard County had not heard concerns from constituents, but had been contacted by Toxic Taters. Representatives from Morrison, Todd and Becker counties all stated they had not heard
anything directly from their constituents, though some wanted to touch base with their commissioners to see if they were aware of concerns.

When asked about other exposure and health concerns, numerous issues were raised. Lead exposure and poor housing conditions were frequently mentioned as a concern, primarily because of older housing stock and lack of income to make repairs. Todd County mentioned allergy and asthma concerns along with pest infestations and high smoking rates. Wadena County emphasized poverty as a major health disparity issue, as did Becker County. Becker County mentioned past concerns regarding arsenic levels in water. Otter Tail mentioned arsenic and nitrates in water. Hubbard County discussed their outreach to pregnant women on mercury in fish. Priority health concerns included developmental disorders/special education rates in kids, obesity, diabetes, asthma, heart disease, mental health and cancer.

Overall impressions of a biomonitoring project to address pesticide exposure concerns in these counties were favorable. There was the general sense that, for rural counties who often feel like they lack attention and data, any new information about their residents is a good thing. The representatives seemed appreciative that we had traveled to meet with them and were exploring the issue. While pesticide exposures do not appear to be a pressing concern among many of their constituents, everyone agreed that a biomonitoring project could provide more information about exposures and raise awareness. Some specifically mentioned the importance of including children and questions about children’s health.

All six counties were interested in being involved as future planning proceeds and receiving updates on progress. While none of them had funding support to offer, they expressed a willingness to be community partners and help in different ways, including letters of support, community education and outreach and project planning. Overall, they seemed optimistic that their county boards would be supportive of these efforts.

Meeting with advocacy groups

We also met with Bob Shimek and Colleen Truskey from the White Earth Land Recovery Project and Amy Mondloch of Toxic Taters. We discussed what questions these groups would want a biomonitoring study to address, their thoughts on the population to be included in such a study and their concerns about community health.

Bob Shimek indicated that his main questions include what people are being exposed to, and at what levels. He is interested in people who live right next to fields and those who live a little further away (one to two miles); he wonders if there would be differences between the two groups. Amy Mondloch responded that drift catchers have detected pesticides up to 10 miles away from fields. Amy asked if the pesticides build up in the body and if those who had lived near the fields longer amounts of time would have higher levels. One area that needs further investigation is determining if there are data sources to determine location of crops/fields and the timing of spraying.

Regarding a potential study population, they agreed that, if an age group had to be chosen, the focus should be on children. They were also interested in including some adults, if possible.
Regarding the health outcomes of concern, they reiterated issues mentioned by the county representatives, including asthma and cancer.

Meeting with White Earth Tribal staff
The trip concluded with a meeting with staff members from White Earth Nation. Staff were from the White Earth public health, environment and public works sections. Bob Shimek and his colleagues attended as well.

The meeting began with a discussion of water sampling and efforts to test wells on the White Earth Reservation through the Minnesota Department of Agriculture Township Testing Program (presented to the Advisory Panel at the February 2016 meeting). White Earth staff also commented that they did some water testing for pesticides in the past. White Earth staff had questions about the Minnesota Department of Agriculture testing program: What happens if a well is elevated for pesticides? Do homeowners get any assistance? MDH staff said they would follow up about these questions.

Discussion then turned to biomonitoring and environment and health concerns. Tribal staff were interested in a potential biomonitoring project, but stressed the need to move cautiously. The next step is to bring the issue to the White Earth Tribal Council, which White Earth public health staff and Bob Shimek agreed to do. Tribal staff also emphasized the need for thoughtful creation of public health messages and community education, including consideration of actions that can be taken at the end of the study. They pointed out unique concerns that will arise in doing biomonitoring in a Tribal community, including issues with sample collection, ownership of data and IRB review. Staff also commented that a project involving Tribal members will be more successful if Tribal staff are included in all steps, and that, if a biomonitoring project is done in the area, efforts should be made to collect as much information as possible, including concerns outside of pesticides. Interest was expressed in a cross-generational comparison, and whether kids and elders have different exposures.

Additional environmental and health concerns mentioned included radon, exposure to lead through hunting practices, indoor air quality and arsenic in water. Poverty and associated health risks, asthma, cancer and developmental disabilities were also mentioned.

Funding Opportunity Announcement (FOA)
The National Institutes of Health (NIH) has issued an FOA entitled “Research to Action: Assessing and Addressing Community Exposures to Environmental Contaminants.” Funding is through the National Institute of Environmental Health Sciences (NIEHS) and the National Institute of Nursing Research (NINR); it is part of the NIEHS “Partnerships for Environmental Public Health” (PEPH) network.

More information on the FOA is available here: http://grants.nih.gov/grants/guide/pa-files/PA-16-083.html. The FOA states that it:

...encourages community-engagement projects designed to investigate the potential health risks of environmental exposures of concern to a community and to implement an environmental public health action plan based on research findings. Projects
supported under this program are expected to employ community-engaged research methods to not only conduct research but also to seamlessly translate research findings into public health action. This announcement reflects NIEHS goals in bi-directional communications and in supporting research to address environmental health disparities and environmental justice concerns.

This is the same FOA that MDH and partners applied for in 2009 for a similar biomonitoring study to assess pesticide exposures in the Central Sands region. For that grant application, MDH partnered with the Morrison-Todd-Wadena Community Health Board. The grant application was not successful. Reviewer comments indicated the need to demonstrate a stronger academic partnership.

As mentioned at past Advisory Panel meetings, we currently do not have a funding source for this project. This FOA appears to be a good fit for the project, and staff are beginning the process of developing the grant application. Due dates for 2017 are February 5, June 5 and October 5.

A key component of the FOA is that it use community-engaged research methods to conduct the research and to translate results into public health actions. Thus, an important early step in the process will be to define the “community” with which we will be partnering. To clarify, we define “community partner” as a group who will work with us directly on study planning, implementation and results communication and has a clear role in these activities. There will also be a number of “stakeholders” for this effort, groups with an interest in the activities whom we will meet with and inform about the project, but who do not have a direct role.

**Public Health Lab (PHL) update on pesticide method**

The MDH PHL has been working to implement a method for the determination of pesticides in urine, as described in Davis et al from the Journal of Chromatography B in 2013; “Semi-automated solid phase extraction method for the mass spectrometric quantification of 12 specific metabolites of organophosphorus pesticides, synthetic pyrethroids, and select herbicides in human urine”. The PHL has selected 9 pesticide and herbicide biomarkers from this method (Table 1); the standards for one analyte, cis-3-(2,2-dibromovinyl)-2,2-dimethylcyclopropane carboxylic acid (a biomarker of deltamethrin) were only available via custom synthesis, and was therefore not included in the analysis, and two other metabolites, (indicating exposure to 2,4,5-trichlorophenoxyacetic acid and primiphos-methyl) were not selected for inclusion due to low frequency of detection in NHANES and limited use in Minnesota. Standards are commercially available for the remaining nine metabolites as well as matched stable isotope labeled internal standards.
Table 1: Pesticide Metabolites

<table>
<thead>
<tr>
<th>Analyte:</th>
<th>Parent or Metabolite:</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,5,6-trichloro-2-pyridinol (TCPY)</td>
<td>metabolite of chlorpyrifos &amp; chlorpyrifos-methyl</td>
</tr>
<tr>
<td>2,4-dichlorophenoxy acetic acid (2,4-D)</td>
<td>parent compound</td>
</tr>
<tr>
<td>3-Phenoxybenzoic acid (3-PBA)</td>
<td>metabolite of cyhalothrin, cypermethrin, deltamethrin, fenopropathrin, permethrin &amp; tralomethrin</td>
</tr>
<tr>
<td>4-Fluoro-3-phenoxybenzoic acid (4-F-3-PBA)</td>
<td>metabolite of cyfluthrin</td>
</tr>
<tr>
<td>cis-3-(2,2-Dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid (cis-DCCA)</td>
<td>metabolite of cypermethrin, cyfluthrin &amp; permethrin</td>
</tr>
<tr>
<td>trans-3-(2,2-Dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid (trans-DCCA)</td>
<td>metabolite of cypermethrin, cyfluthrin &amp; permethrin</td>
</tr>
<tr>
<td>4-nitrophenol (4-NP)</td>
<td>metabolite of parathion &amp; methyl parathion</td>
</tr>
<tr>
<td>malathion dicarboxylic acid (MDA)</td>
<td>metabolite of malathion</td>
</tr>
<tr>
<td>2-isopropyl-4-methyl-6-hydroxypyrimidine (IMPY)</td>
<td>metabolite of diazinon</td>
</tr>
</tbody>
</table>

The sample preparation for the method uses an incubation step to enzymatically deconjugate glucuronide and sulfate conjugates; only the free metabolites are quantified. After the deconjugation step, a robotic 96-well plate unit is used to extract the samples. The analysis is performed via high performance liquid chromatography tandem mass spectrometry. One challenge we’ve run into on this method is with the specificity of the chromatography and the mass spectrometry settings; the DCCA metabolites are stereoisomers and therefore have the same mass. Another issue is that several compounds do not have reliable precursor-product ion transitions to use for quantification and identification; the product ions formed are of very low intensity and can have matrix interference. Both issues were addressed in the Davis et al. paper but we had intended to improve upon both of these aspects. Thus far, we have not been successful in making significant changes to this aspect of the method, but work is ongoing.

Questions for the Advisory Panel

Given the broad area of the Central Sands, how should MDH define the affected “community” for future partnership?

Do you have recommendations for an academic partner for a funding application?
Section Overview: MN FEET Updates

This section contains written updates on the status of an ongoing biomonitoring project, the Minnesota Family Environmental Exposure Tracking (MN FEET) for measuring prenatal exposure to mercury, lead and cadmium in newborns and pregnant women. This update reviews current progress on improving recruitment numbers through expansion to Abbott Northwestern Hospital and other changes to improve retention. We also report progress with community outreach, results communication and follow up with elevated cases.

Also included are updates on the status of the sub-study, MN FEET Plus, to compare mercury levels from matched pairs of newborn blood spots with cord blood specimens.

Information Item:
Panel members are invited to ask questions and comment on these updates.
Minnesota Family Environmental Exposure Tracking (MN FEET) Updates

Recruitment

MN FEET has been recruiting women for 14 months. Asian, East African, Latina and White women receiving prenatal care at certain HealthPartners (HP) and West Side Community Health Services clinics are eligible for the study. These women receive a packet of project specific information in the mail. The project partners, HP Institute and SoLaHmo (the community based research side of West Side Community Health Services), follow the mailing with phone calls to each participant. If the woman is interested in the project, a phone survey is conducted by a native speaker of Hmong, Somali, Spanish or English, depending on the participant’s preference.

Once the participant has given verbal consent to continue in the project, her contact information is transferred to MDH. MDH then mails a written consent form to each participant. The consent form is available in the languages listed above. HP Institute follows up with Asian and East African women to determine if they have any questions or concerns after receiving the consent form. SoLaHmo has recently begun following up with the Asian women they have recruited. MDH follows up with all White and Latina women.

After the signed consent form has been received by MDH, the participant’s information is given to the hospital where she will be giving birth. The hospital is notified that she has consented to the study and that cord blood and urine should be collected during delivery. Samples are tested by the MDH Public Health Laboratory (PHL) for mercury, lead and cadmium.

Table 1: MN FEET Recruitment

<table>
<thead>
<tr>
<th></th>
<th>Asian</th>
<th>Latina</th>
<th>East African</th>
<th>White</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phone Survey</td>
<td>94</td>
<td>187</td>
<td>41</td>
<td>164</td>
<td>486</td>
</tr>
<tr>
<td>Consent Returned</td>
<td>69</td>
<td>115</td>
<td>21</td>
<td>147</td>
<td>352</td>
</tr>
<tr>
<td>Samples Collected</td>
<td>39</td>
<td>85</td>
<td>11</td>
<td>98</td>
<td>233</td>
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</table>

Table 1 indicates how MN FEET recruitment is progressing. Recruitment of White and Latina women continues to be very strong, and the number of Asian women is improving. The number of East African women is still lower than the other groups. Due to the time lag between the three steps shown, we expect the numbers to be different from one another. Women are currently being recruited who have due dates of January 2017.

Changes in recruitment

Since the last Advisory Panel meeting, a few key changes in recruitment have been implemented.

1. Abbot Northwestern Hospital has been added as a delivery location after receiving Allina IRB approval. Women may now join the study who are planning to deliver at either Regions
or Abbott Hospitals. This is an important change because it allows recruitment from the HP Riverside clinic, which is widely used by East African women. For the first three recruitment mailings since the change, the number of East African women included has tripled and the number of East African women recruited over the phone by the HP Institute in August was the highest yet (n=6).

2. The protocol for following up with East African and Asian participants has been changed to improve retention. In addition to calling all East African and Asian women a few days after they consent over the phone to see if any questions have come up and to remind them to return their signed consent form, the HP interviewer is now offering to meet East African women at their next clinic visit to sign the consent form and answer any questions. The SoLaHmo interviewer is doing the same for Asian participants they recruit. These changes appear to be improving the numbers of East African and Asian women who return their written consent form and thus can have blood and urine samples collected at their baby’s birth.

Community Outreach

In addition to these changes in recruitment, we are also focusing on additional community outreach in the East African and Asian communities to raise awareness about MN FEET and concerns about mercury, lead and cadmium. This outreach includes:

- Meeting with Somali and other interpreters, physicians and nurses at the HP Riverside Clinic.
- Developing a video with interview footage of Somali leaders discussing the study and the importance of research. We hope the video will be available in October.
- Attending the Empowering Hmong Women Conference at the Wilder Foundation. The presence of MN FEET staff at the conference was well received. People visited the table and asked questions about the study and outreach efforts on mercury. The materials on MN FEET that discussed fish consumption and skin lightening creams were of interest to those that stopped at the table. Connections were made with members of the Empowering Hmong Women board and with an executive producer at the Hmong Television station.
- Planning for a radio interview in Hmong on the Asian American Broadcasting station.
- Developing social media updates that can be used by our colleagues in the East African and Asian communities.
- Meeting with different community leaders and groups to share information about MN FEET, get their input about ways to improve recruitment and continue work to build relationships that will be instrumental in communicating study results in a way that is most helpful and effective in these communities.

Elevated Cases

To date, MN FEET has found five elevated mercury cases, one elevated lead case and one elevated cadmium case. A total of 196 participant results have been analyzed. Five of the seven elevated mercury cases have been in Asian women, with two cases in Latina participants. The elevated lead case was in a Latina woman and the elevated cadmium case in a White woman.
All cases received follow-up contact, which includes answering the participant’s questions, inquiring about sources of exposure, talking about how to reduce exposure and recommending a repeat test through the participant’s physician. For the elevated mercury cases where results indicate inorganic mercury exposure via a skin cream or other source, the MN FEET physician asked whether the participant would be interested in a home visit from their local public health agency to test for mercury.

Since the last Advisory Panel meeting, four new elevated cases have been reported. The first was an elevated cord blood lead case in a Latina participant. The participant was mailed her results and the MDH Blood Lead Program was notified and followed up with the participant. The baby’s blood was retested, and was below the 5 µg/dL concern level. Follow-up with the mother is continuing through her physician.

The second case was an elevated cord blood mercury in an Asian participant. From the participant’s phone survey and through follow-up with the MN FEET study physician, Dr. Mary Winnett, fish consumption was identified as the likely source. Dr. Winnett shared fish consumption advice from the MDH Fish Consumption Advisory Program. The baby has undergone a retest for mercury, and blood levels appear to be declining as expected given the half-life of mercury. Follow-up with the mother is continuing through her physician and the MN FEET physician.

An additional two elevated urine mercury results were identified at the time of this write up. Efforts are underway at this time to connect the women (one Asian and one Latina) with Dr. Winnett to determine a possible source of exposure. More information will be available at the time of the meeting.

**MN FEET Plus**

MN FEET Plus, the sub-study analyzing newborn blood spots for mercury among MN FEET participants, has begun. MDH IRB approval was given on June 22, 2016. Since then, packets have been mailed to MN FEET participants who provided a cord blood sample. Women who do not mail back their consent forms receive a follow-up phone call.

The response has been very positive so far: of a total of 90 letters and consent forms mailed, 61 women (68%) have returned their consent forms. The MDH Newborn Screening Program has transferred the first batch of blood spots to the PHL for mercury analysis.
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Section Overview: Update on PFCs

This section contains an update on the EPA Health Advisory for PFOS and PFOA and MDH’s response. The MDH Environmental Health Division is leading the MDH response. MN Biomonitoring staff have participated in developing public information and attended two public availability sessions in the community in September in Cottage Grove and Lake Elmo.

Information Item:
Panel members are invited to ask questions and comment on these updates.
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MDH Response to EPA Health Advisory for PFOS and PFOA

From MDH Environmental Health, August 2016:
The U.S. Environmental Protection Agency recently updated its protective guidance to reflect the latest scientific evidence about the risk posed by PFCs. The new EPA guidance of 70 parts per trillion for PFOS and PFOA offers greater protection for the public than previous, higher values. While the concern for most people is with long-term exposure, there are some concerns for shorter-term exposure involving fetuses and infants; the new EPA value is intended to be protective for all.

MDH staff have been reviewing the studies and methods used by EPA to determine whether our own health-based values for these chemicals need to be lowered and if so, what the values should be. While this review is expected to be completed later this year, our review was far enough along to tell us that it was prudent to notify the public now, rather than at the end of our scientific review, in order to begin taking steps to help affected residents in the Twin Cities East Metro area reduce unnecessary exposures to these PFCs through drinking water.

Eighty homes in southern Washington County will begin receiving bottled water soon because their well water exceeds an updated federal health advisory level for perfluorooctane sulfonate (PFOS) and perfluoro-octanoic acid (PFOA) – two types of man-made pollutants in a category known as perfluorochemicals (PFCs). If they so choose, the residents will receive bottled water until carbon filter systems can be installed in their homes.

MDH sent letters to the 80 Washington County residents whose wells are known to have one or both of the man-made chemicals at levels above the new federal Environmental Protection Agency (EPA) lifetime health advisory level of 70 parts per trillion (ppt) and who were not previously provided water treatment.

In addition, the Minnesota Pollution Control Agency (MPCA) and MDH will continue sampling nearby residential wells to see if they have water with PFCs above 70 ppt and will inform residents of their results. A map of the potentially affected areas can be found on the special page for the PFOS-PFOA advisory on the MDH website. Those residents with well water above the advisory level will be offered bottled water until filters can be installed.

Residents of south Washington County who live in or near areas where groundwater has been contaminated with PFCs will have an opportunity to ask questions about PFCs and discuss this issue one-on-one with staff from the Minnesota Department of Health (MDH), the Minnesota Pollution Control Agency (MPCA) and Washington County at two public meetings Sept. 19 (in Lake Elmo) and Sept. 26 (in Cottage Grove).

For more information, see:
http://www.health.state.mn.us/divs/eh/hazardous/topics/pfcs/current.html
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Section Overview: Future Direction of Biomonitoring

This section contains a rationale and direction for future Biomonitoring studies in Minnesota, looking ahead to the next state biennium (2018-2020). Staff have identified possible future tracks for projects that build on current success, and are consistent with our state statute, our program vision, and our strategic plan for protecting future generations and vulnerable communities in our state.

Staff are interested in sharing these ideas through outreach with program stakeholders including the Minnesota Center for Environmental Advocacy and the Minnesota Pollution Control Agency, for planning future work and to sustain the program.

We invite Advisory Panel member feedback and questions on these ideas. Advisory Panel members are asked to suggest other stakeholder groups, who may be interested or supportive of one or more of these proposed projects, and recommend next steps.

Information Item:
Panel members are invited to ask questions and comment on the information in this section.
Future vision for MN Biomonitoring
As recommended in the MN Biomonitoring Sustainability Plan, staff will soon be conducting meetings with different stakeholder groups to update them on the program’s work and successes, and discuss possible future directions for the next biennium (2018-2020). We summarize here a rationale for supporting ongoing biomonitoring in Minnesota and lay out ideas for future MN Biomonitoring work to be used as a part of these discussions.

Rationale for ongoing biomonitoring
Ongoing biomonitoring at MDH will:

1. **Help meet statewide goals and priorities for advancing health equity.** By measuring chemicals in people’s bodies and showing clearly whether differences in exposure exist between groups, biomonitoring provides critical information for use in advancing health equity. Participants would be recruited from a range of communities including African American, American Indian and rural Central Sands residents. Different classes of chemicals known to impact health would be measured in people, and laboratory capacity expanded with the addition of new lab methods.

2. **Implement state statutes for ongoing program.** An ongoing program would allow MDH to fully implement the law that established the MN Biomonitoring Program in 2007 (Minn. Stat. 144.996, subd.2). Current language in the law would be maintained, including the role of the Advisory Panel in providing recommendations to the Commissioner. The law says that the Commissioner shall:
   - **Implement an ongoing biomonitoring program for surveillance of designated chemicals exposures to pregnant women (prenatal exposure), newborns, and children.**
   - **Select designated chemicals for biomonitoring to include mercury, lead, arsenic and cotinine, and consider the addition of other priority chemicals identified under the Toxic Free Kids Act.**
   - **Select targeted communities for biomonitoring where exposure disparities are known or suspected to exist for targeting actions to promote health equity.**

3. **Capitalize on past investments and successes.** MN Biomonitoring’s past successful projects have built MDH’s epidemiologic and laboratory capacity for biomonitoring, and demonstrated the value of the work. Projects have allowed us to develop key relationships with internal and external partners, including community organizations, local public health agencies and health care organizations. With the MN FEET project, we are learning important information about the challenges in recruiting non-White populations and the additional effort involved. These past projects have positioned MDH to receive grant funding and to conduct useful follow-up studies.

4. **Increase MDH’s preparedness for responding to chemical emergencies or disasters.** Currently the majority of the funding to operate the MDH Public Health Laboratory’s (PHL) biomonitoring unit is awarded through the CDC’s Chemical Laboratory Response Network (LRN-C). The LRN-C funds public health labs to maintain emergency response
methods in the event of a natural or man-made chemical release event. As part of the dual use agreement with the CDC, staff and instruments can be used for other public health work, such as biomonitoring, as long as the lab maintains a state of readiness and fulfills the requirements of the LRN-C program. As federal funds have continued to decrease year after year it becomes even more important to support the PHL’s biomonitoring unit.

5. **Realize MDH vision and strategic plan for biomonitoring.** MN Biomonitoring’s vision for an ongoing biomonitoring program uses systematic, targeted biomonitoring in vulnerable Minnesota communities. This vision is shared by the Advisory Panel and was developed through a strategic planning process involving numerous stakeholder groups. While our pilot and follow-up biomonitoring projects have been successful, the limited scope of the projects and the lack of ongoing funding have not allowed for a fully-realized, broad-based program. Such a program would measure chemicals in people from a more diverse set of communities, including rural as well as urban locations, and communities of color such as African Americans who have not been involved in past projects. Unlike past projects, which have focused on one or two chemicals of concern, this program would measure a wider array of chemicals in participants.

**Biomonitoring project ideas**

These project ideas support the partnership of MDH’s MN Biomonitoring and PHL, along with several other collaborators and community partners, to implement an ongoing state biomonitoring program that is community-based and targets surveillance toward vulnerable communities in accordance with Minnesota Statutes, 144.995-144.998. The primary goals are to work with communities to measure and track exposure trends over time, identify disparities, inform actions and evaluate interventions. Work would be conducted with guidance from a Legislatively-established Advisory Panel of key external stakeholders. Participants would provide informed consent. Projects would be reviewed by the MDH Institutional Review Board. All laboratory analyses would be done by the PHL.

1. **MN FEET – Pregnant women and newborns in urban Minneapolis-St. Paul.** The Advisory Panel has recommended that we extend the timeline of MN FEET in order to reach our recruitment goal of 600 women. This will allow time for recent changes in recruitment strategy to take effect and increase participation among East African and Asian women. It will ensure a sufficient sample size to determine whether disparities in exposure seen in preliminary data analyses are real. It will enable the communication of project results in a culturally sensitive way that is useful to communities. MN FEET is a partnership with SoLaHmo, a community-based research arm of West Side Community Health Services, the HealthPartners Institute and Regions and Abbott-Northwestern Hospitals.

   MN FEET could also be expanded to include up to 200 women from Minnesota ethnic communities that may be at risk of higher exposures, including minority groups such as African Americans and American Indians. Because no prior project has specifically addressed exposure concerns in the Twin Cities African American community, we would
conduct outreach to learn more about this community’s unique concerns and how biomonitoring, along with other data, may help answer important questions.

2. **Central Sands – Rural counties and Tribal community.** This project would allow MDH to respond to requests from community groups and health officials in North Central Minnesota (a region known as the “Central Sands”), which includes portions of the White Earth Reservation and about eight rural counties that are predominantly agricultural, and includes Latino and immigrant farmers. We would work in partnership with county health officials, the White Earth Band and several non-governmental organizations to investigate whether exposures to pesticides are elevated, identify sources of exposure and consider whether proximity to agricultural drift is a factor. The goal of the study would be to inform the community and, with a community grant-funded partnership, identify actions needed to protect public health. The project would build on community engagement and planning work being conducted currently with a recommendation from the Advisory Panel.

   - The project would test urine samples from adults and children selected randomly to represent the community for a suite of pesticides, arsenic and other metals, cotinine and possibly other analytes. The PHL would develop new methods for testing pesticides, increasing lab capacity. Questionnaires and results would be analyzed for identification of sources (e.g. private wells, agricultural drift) in collaboration with staff in the MDH Environmental Health Division and the Minnesota Department of Agriculture. The inclusion of cotinine, a marker of tobacco smoke, would be in collaboration with ClearWay Minnesota and the Minnesota Center for Health Statistics to study second hand smoke exposure.

3. **Urban core population – Environmental justice community to be determined.** This project would be a companion to the Central Sands project described above, providing an important comparison group for understanding racial/ethnic and rural/urban disparities in exposures to pesticides, arsenic and other metals, cotinine and other analytes. The planning phase would include reaching out to Twin Cities environmental justice groups to learn about their priorities regarding environmental exposures, with a particular focus on the African American community.

   - The project would aim to recruit Metro-area children and adult participants from the Minnesota Adult Tobacco Survey (MATS) sample, and would use community input and data from MPCA air monitoring projects to select geographic areas for inclusion. Based on community input and Advisory Panel recommendations, we would conduct the same tests described above, with expansion to include analysis of more chemicals of concern in urban core settings such as polycyclic aromatic hydrocarbons (PAHs) and other markers of exposure to traffic-related air pollution. A community grant would support engagement and partnership to communicate results and inform actions. Air pollution exposures would be analyzed in collaboration with the Minnesota Pollution Control Agency and the MDH Environmental Health Division.
Section Overview: Tracking Update

This section contains several updates from the Minnesota Environmental Public Health Tracking Program (MN Tracking) supported by the CDC National Tracking Network. Updates include the following:

- **MN Public Health Data Access Portal** updates including new content, and the results of new usability testing for informing functionality and content with a user focus. The portal is a product of the MN Tracking Program and provides public access to data and information for over 20 health and environmental topics.

- **Data Utilization Projects** are described. Projects are key requirements of our cooperative agreement with CDC and include collaborative work of MN Tracking epidemiologists with communities conducting Health Impact Assessments, with MDH’s Climate and Health program staff, with MPCA Air and Health Initiative, and with the Great Lakes Intertribal Epidemiology Center.

- **Communications** and outreach activities are described and include presentations, social media and training offered by the MN Tracking program staff. The purpose of the Minnesota Environmental Public Health Tracking Program’s (MN Tracking) outreach and communication plan is to increase awareness, use and support of the Minnesota Public Health Data Access portal and resources for public health actions.

Lynn Treadwell, Data Portal and Evaluation Coordinator with the Minnesota Tracking Program, will provide brief updates from the MN Data Portal.

**Information Item:**
Panel members are invited to ask questions and comment on these updates.
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Portal Updates

Data sets evaluated, piloted, developed and updated

MN Tracking maintained and enhanced content on the MN Tracking Network and maintained all data agreements. (https://apps.health.state.mn.us/mndata)

New or updated content includes:

<table>
<thead>
<tr>
<th>MN DATA PORTAL Content Completed June through September 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TOPIC</strong></td>
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<tr>
<td>----------------------------------</td>
</tr>
<tr>
<td>Immunizations</td>
</tr>
<tr>
<td>Drinking Water</td>
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<tr>
<td>Private wells (arsenic)</td>
</tr>
<tr>
<td>Radon</td>
</tr>
<tr>
<td>Cancer</td>
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<tr>
<td>Lyme</td>
</tr>
<tr>
<td>Hospitalizations (asthma, heart attack, CO poisoning, heat-illness, COPD)</td>
</tr>
<tr>
<td>Air quality</td>
</tr>
<tr>
<td>Health insurance</td>
</tr>
<tr>
<td>Biomonitoring</td>
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</tbody>
</table>

CDC data submission

Twice yearly, we are required to submit updated Nationally Consistent Data Measures (NCDMs) to CDC for display on the national Environmental Public Health Tracking portal: http://ephtracking.cdc.gov/showHome.action. This September, MN Tracking submitted revised hospitalization and emergency department (ED) visit data (2006-2014) for asthma, hearts attacks, COPD, heat-related illness, and carbon monoxide poisonings, as well as newly-updated birth defects measures (2006-2013). MN Tracking also submitted radon testing data (2000-2014) for a national pilot to develop new radon NCDMs.

Portal usability study

MN Tracking conducted user experience (usability) testing of the MN Public Health Tracking Portal. The goals of the test were to learn from a user perspective (representative users) whether the website is intuitive to use and the content understandable. Online testing of 12 representative participants was conducted. Participants were asked to complete typical tasks while observers watched, listened and took notes.

Usability testing included:

1. **Navigation**: How do users find the public health data portal; how easy is it to navigate within the portal to find the information? Are the navigation labels helpful?
2. Interactions: Do users find the interactions with maps satisfactory? Are users able to use the data query and data visualization tools successfully?

3. Search: Do users understand the scope of the search? Do users recognize the search includes the entire MDH website and not only the data portal?

4. Presentation: Do users respond positively to the look and feel of the data portal? Do aspects of the presentation adversely affect the user’s experience? Are charts, maps and text legible?

5. Content: Does the substance and style of the content meet the expectations of users? Are any topics and questions not addressed that should be? Is the quantity of information appropriate?

Findings

<table>
<thead>
<tr>
<th>Good</th>
<th>Opportunities</th>
<th>Needs improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Testers value and trust portal content</td>
<td>Glossary functionality hampers usability</td>
<td>Chart colors can be confusing on complex charts</td>
</tr>
<tr>
<td>Glossary text stands out</td>
<td>Some features and content hard to find: Contact Us, FAQs, Glossary</td>
<td>Strikethrough functionality in chart key not understood</td>
</tr>
<tr>
<td>Charts with tabs were ‘liked’</td>
<td>Mixed reviews on content – some understandable; some not so much</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Too few related links to aid navigation to more information</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Header portal name not a link</td>
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</tr>
</tbody>
</table>

Data utilization projects

Health Impact Assessments (HIAs) and custom data requests

MN Tracking Program fulfills custom data requests and provides consultation for Health Impact Assessments, which advance a “health in all policies” approach to policy and planning decisions. Zip code-level health data are the most commonly-requested, and we are working to develop more sub-county indicators. Two HIAs which used MN Tracking data were recently concluded, and a third will wrap-up this Fall. In one example of how Tracking contributed to an HIA, a Bemidji group used HIA to inform a decision about planned highway development. They compared a range of local adverse health outcomes against state averages, and after finding no differences the group decided to focus their health promotion recommendations on other factors, including traffic-related injuries and walkability.
Health Impacts of air pollution in the Twin Cities metro region
MN Tracking is currently working to update an epidemiology analysis examining the association between short-term changes in ambient air quality and adverse cardiovascular health outcomes. The study includes over a decade of hospitalization/ED visit and daily air quality data, and will quantify the fraction of adverse outcomes attributable to air pollution. We aim to finalize study results and prepare and manuscript for publication by Spring 2017.

Communications and Outreach
MN Tracking initiated many communications initiatives between June and October, 2016. These include:

- Participation in the CDC’s #WeTrackThat program
- Successful heat-related illness social media post, prior to a July heat wave
- Radon integrated communications plan, leveraging radon partnerships
### Social media

<table>
<thead>
<tr>
<th>Topics</th>
<th>Promotions dates</th>
<th>FB Paid promo?</th>
<th>Facebook paid reach</th>
<th>Facebook organic reach</th>
<th>Facebook Likes/Loves</th>
<th>Facebook Comments</th>
<th>Facebook shares</th>
<th>Clicks</th>
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<tbody>
<tr>
<td>Q4</td>
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<td></td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>Radon - 2nd leading cause of lung cancer</td>
<td>7/11/16 2:00 PM</td>
<td>yes</td>
<td>69,638</td>
<td>12,245</td>
<td>358</td>
<td>58</td>
<td>166</td>
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<td>yes</td>
<td>28,963</td>
<td>1,273</td>
<td>292</td>
<td>106</td>
<td>247</td>
<td>2,803/697</td>
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<tr>
<td>Air Quality and Heart Health (*MJL) We Track It</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Drinking Water: What's in your drinking water [Twitter only]</td>
<td>7/14/2016 n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
<td></td>
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<tr>
<td>Drinking Water: ground water or surface water [both FB and Twitter]</td>
<td>7/14/2016 No</td>
<td></td>
<td>456</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td>7</td>
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<tr>
<td>Drinking Water drinking water quality by county [Twitter only]</td>
<td>7/15/2016 No</td>
<td></td>
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<tr>
<td>Heat-related illnesses When it's hot outside: we track that [FB and Twitter]</td>
<td>7/15/2016 No</td>
<td></td>
<td>329</td>
<td>4</td>
<td></td>
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</tr>
</tbody>
</table>

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*Radon levels in MN are more than 3x higher than the national average*
Media relations
Media coverage that supported the radon communications effort generated more than 6,500,000 media impressions. This is valued at more than $73,000.

Communications Planning
MN Tracking’s outreach and communication plan aims to increase awareness, use and support of the MN Data Portal and resources for public health actions.

The plan includes building and maintaining relationships with stakeholders, conducting in-person trainings and portal demonstrations that promote use of Tracking Network data; promoting and developing public health action stories that identify effective use of the portal data, utilizing social media and developing communication materials. Finally, MN Tracking’s communication plan incorporates activities that address the state of Minnesota’s initiatives advancing health equity and the Governor’s plain language policy.
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Section Overview: Tracking Traffic Indicators

This section contains information on the progress and importance of new tracking traffic indicators now in development.

More information will be given in a presentation by Jessie Shmool, MN Tracking Program Manager and Epidemiologist, to include a brief overview of proposed indicators.

Discussion questions:

Who are potential users of traffic indicators?
Are there other outreach strategies to widen the reach?
Traffic indicator for MN Data portal

Purpose and rationale

Traffic is an important factor for public health and community design with pressing equity considerations. Local vehicle traffic can drive exposures to air pollution and noise, can impede walkability and physical activity opportunities, and has been linked to traffic-related injuries and fatalities. A recent literature review found sufficient evidence of a causal association between exposure to traffic-related air pollution and asthma exacerbation, and suggestive evidence of a causal association for childhood asthma onset, non-asthma respiratory symptoms, impaired lung function, all-cause mortality, cardiovascular mortality, and cardiovascular morbidity (Health Effects Institute 2010).

Work at the MN Pollution Control Agency (MPCA) finds that vehicle traffic is the primary source of local air pollution in many parts of the state, including the Twin Cities metro area. Environmental injustice in traffic planning and urban development have disproportionately burdened low-income and communities of color with high-volume traffic routes, along with resultant exposures and socioeconomic stressors (e.g., depressed property values). In one Twin Cities study, Pratt et al. (2015) showed that traffic-related air pollution concentrations were higher in areas with majority minority and low-SES populations, compared to areas with majority white, high-SES populations.

Surveillance methods are well-suited to characterize and track trends and disparities in traffic, towards informing public health action through awareness, planning and policy. Surveillance measures for traffic can generally be grouped as indicators of emissions source activity (e.g., vehicle traffic density) or of population exposures (e.g., population living near roadways). Both types of indicators are useful for public health surveillance. Specifically, publicly-available traffic data has high spatial resolution, and can be aggregated to multiple administrative boundaries for comparison with other environmental and health indicators. Likewise, changes to traffic patterns and planning can be leveraged as natural experiments [e.g., 1996 Olympic Games in Atlanta, during which restricted car traffic coincided with a 40% reduction in child asthma ED visits (Friedman et al. 2001)]. Related indicators on the MN Data portal include: air quality, cardiovascular hospitalization and ED visits (heart attacks, COPD, asthma), obesity, diabetes, and population characteristics. Potential applications for local traffic indicators include: Health Impact Assessments, observational research studies, urban planning, and community engagement.

Proposed indicators

MN Tracking is developing new traffic surveillance indicators. At this meeting, Jessie Shmool will present a brief overview of two proposed measures, methods, and preliminary analyses.

Annual vehicle miles traveled (VMT) – The average number of vehicles travelling daily on any given road segment is calculated by MN DOT. We transform this average daily count to total miles-travelled within a given area by multiplying the count by road segment length, and then summing miles travelled by census tract, zip code and county. Multiplying the total daily miles-
travelled by 365 yields annual values that can be tracked across multiple geographies and time periods.

Proximity to high-traffic roadways – Many studies have documented that concentrations of traffic-related pollutants are highest in the near-road environment (Karner et al. 2010). As such, proximity to busy roadways is a commonly-used exposure proxy for traffic-related air pollutants. We considered two similar indicators, one developed by CSTE and the other by CDC, that estimate the population (number and percent) residing in the near-roadway environments (e.g., 300 meter buffer). Using fine-scale census data, we will be able to assess and track population exposures and disparities.

References


Section Overview: EHTB Publications Progress

Advisory Panel members have often noted the importance of publications for communicating about the work of the Biomonitoring and Tracking programs with broader audiences. In response to requests from Panel Members for more information, staff will provide a summary of EHTB work and progress publishing project findings in the peer-reviewed scientific literature to date. Jean Johnson will provide an overview of publications from EHTB work to date, papers in progress, and ideas proposed for future publications. In this section, brief outlines and abstracts are shared. She will also describe and invite discussion about some of the barriers and benefits to publishing our work in state government.

For this presentation, staff will present 3 project paper proposals or drafts now in the works for discussion:

- Impacts of Air Pollution on Health in the Twin Cities (Jean Johnson)
- Libby’s Legacy: Health Outcomes in a Minneapolis Community Exposed to Vermiculite Processing (Tess Konen)
- Longitudinal Biomonitoring of PFASs in a Minnesota Community (Jessica Nelson)

Panel members are invited to ask questions, comment and discuss the questions below:

**Questions for the Panel:**

Are there additional papers Panel Members recommend or significant findings that should be published from EHTB work?

Are there specific journals or audiences recommended?

How might some of the barriers to publication be addressed?
# EHTB Publications Summary

<table>
<thead>
<tr>
<th>EHTB Topic or Title</th>
<th>Lead Author</th>
<th>Status/Citation</th>
<th>Funding Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Published</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biomonitoring for Perfluorochemicals in a Minnesota Community With Known Drinking Water Contamination</td>
<td>Adrienne Landsteiner, MDH</td>
<td>Journal of Environmental Health, Vol. 77 (5): 14-19 December 2014</td>
<td>State EHTB</td>
</tr>
<tr>
<td><strong>Submitted, In Review</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Asthma Exacerbations and Traffic: Examining Relationships Using Link-Based Traffic Metrics and a Comprehensive Patient Database</td>
<td>Paula Lindgren, MDH</td>
<td>Submitted, In review</td>
<td>EPA-STAR/CDC Tracking/MPCA</td>
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<tr>
<td><strong>In Preparation</strong></td>
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</tr>
<tr>
<td>Libby’s Legacy: Health Outcomes in a Minneapolis Community Exposed to Vermiculite Processing</td>
<td>Tess Konen, MDH</td>
<td>Manuscript prepared, in internal review</td>
<td>CSTE/CDC Tracking</td>
</tr>
<tr>
<td>Longitudinal Biomonitoring of PFASs in a Minnesota Community</td>
<td>Jessica Nelson, MDH</td>
<td>Manuscript in preparation</td>
<td>State EHTB</td>
</tr>
<tr>
<td><strong>Proposed</strong></td>
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</tr>
<tr>
<td>Impact of Air Pollution in the Twin Cities</td>
<td>Jean Johnson</td>
<td>Abstract prepared from State Report</td>
<td>MPCA-Air and Health/CDC Tracking/EPA</td>
</tr>
<tr>
<td>Burden and Economic Impact of Mercury Exposure</td>
<td>Jean Johnson</td>
<td>State Report, Method revision and reanalysis ongoing</td>
<td>CDC Tracking</td>
</tr>
</tbody>
</table>
Summary/Abstract: Published:

**Biomonitoring for Perfluorochemicals in a Minnesota Community with Known Drinking Water Contamination**

Adrienne Landsteiner, MPH, Carin Huset, PhD, Allan Williams, MPH, PhD, Jean Johnson, MPH, PhD

Perfluorochemicals (PFCs) are pervasive and persistent environmental contaminants with uncertain public health implications. Following the discovery of PFC contamination in public and private drinking water supplies in Washington County, Minnesota, the authors conducted a pilot biomonitoring study. Serum samples from 196 residents of two communities were analyzed for seven PFCs. Perfluorooctanoic acid (PFOA), perfluorooctane sulfonate (PFOS), and perfluorohexanesulfonate (PFHxS) were detected in all serum samples collected. Perfluorobutanoic acid (PFBA) and perfluorobutane sulfonate (PFBS) were found in 28% and 3% of the samples, respectively. The geometric mean for PFOA was 15.4 ng/mL (range: 1.6–177 ng/mL), PFOS was 35.9 ng/mL (range: 3.2–448 ng/mL), and PFHxS was 8.4 ng/mL (range 0.32–316 ng/mL). Mean levels for PFOA, PFOS, and PFHxS were higher in males and increased with age. Mean PFC serum levels for three PFCs were significantly elevated when compared to levels found in the U.S. population.

**Quantifying traffic exposure**

Gregory C. Pratt, Kris Parson, Naomi Shinoda, Paula Lindgren, Sara Dunlap, Barbara Yawn, Peter Wollan, Jean Johnson

Living near traffic adversely affects health outcomes. Traffic exposure metrics include distance to high-traffic roads, traffic volume on nearby roads, traffic within buffer distances, measured pollutant concentrations, land-use regression estimates of pollution concentrations, and others. We used Geographic Information System software to explore a new approach using traffic count data and a kernel density calculation to generate a traffic density surface with a resolution of 50 m. The density value in each cell reflects all the traffic on all the roads within the distance specified in the kernel density algorithm. The effect of a given roadway on the raster cell value depends on the amount of traffic on the road segment, its distance from the raster cell, and the form of the algorithm. We used a Gaussian algorithm in which traffic influence became insignificant beyond 300 m. This metric integrates the deleterious effects of traffic rather than focusing on one pollutant. The density surface can be used to impute exposure at any point, and it can be used to quantify integrated exposure along a global positioning system route. The traffic density calculation compares favorably with other metrics for assessing traffic exposure and can be used in a variety of applications.

**Assessing a New Method for Measuring Fetal Exposure to Mercury: Newborn Bloodspots**

**Background:** Measuring mercury in newborn bloodspots to determine fetal exposures is a novel methodology with many advantages. Questions remain, however, about its reliability as an estimate of newborn exposure to mercury.

**Methods:** We studied mercury concentrations in paired bloodspots and cord blood from a convenience sample of 48 Minnesota women and infants.

**Results:** The limit of detection for bloodspots was higher than for cord blood (0.7 and 0.3 μg/L in bloodspots and cord blood, respectively) with the result that mercury was detected in only 38% of newborn bloodspots compared to 62% of cord blood samples. The geometric mean mercury concentration in cord blood was 0.6 μg/L. Mercury concentrations were almost uniformly lower in bloodspots than in cord blood (mean ratio (±SD) = 0.85 ± 0.4), their mean value was significantly less than that for the cord blood (p = 0.02), and the two methods were highly correlated (r = 0.82).

**Conclusion:** These preliminary findings indicate that newborn bloodspot mercury measurements have utility; however, until bloodspot analyses are more sensitive, they are likely to underestimate *in utero* exposure.

**Manuscript in Review:**

**Asthma Exacerbations and Traffic: Examining Relationships Using Link-Based Traffic Metrics and a Comprehensive Patient Database**

**Paula Lindgren, Jean Johnson, Allan Williams, Barbara Yawn, Gregory C. Pratt**

**Background:** The Rochester Epidemiology Project (REP) is a unique community-based medical record data linkage system that provides individual patient address, diagnosis and visit information for all hospitalizations, as well as emergency department, urgent care and outpatient clinic visits for asthma. Proximity to traffic is known to be associated with asthma exacerbations and severity. Our null hypothesis was that there is no association between residential proximity to traffic and asthma exacerbations over eleven years of REP data.

**Methods:** Spatial coordinates of the homes of 19,915 individuals diagnosed with asthma were extracted from the REP database. Three metrics of traffic exposure at residences were calculated from link-based traffic count data. We used exploratory statistics as well as logistic and Poisson regression to examine associations between three traffic metrics at the home address and asthma exacerbations.

**Results:** not shown

**Conclusion:** Over eleven years in a comprehensive county-wide data set of asthma patients, and after controlling for demographic effects, we found evidence that living in proximity to traffic increased the risk of asthma exacerbations.

**Manuscripts Proposed:**

**Estimating the Public Health Impact of Air Pollution in the Twin Cities**

MDH, in collaboration with the Minnesota Pollution Control Agency, has used local air pollution and public health surveillance data to estimate the impacts of criteria pollutants, particulate matter and ozone, on population health, to identify disparities by poverty and race, and to
inform decisions on how to improve health for all residents of the state by reducing air pollution.

Two methods have been used to estimate these impacts:

1. We used the BenMAP tool developed by the EPA, along with local PM2.5, ozone, census and population health data, to calculate public health impacts for a single baseline year, 2008. For each health outcome, the model applies pollution concentration-response functions from the literature to calculate the attributable fraction at the zipcode level and sums the impacts across all zipcodes for area-wide estimates. American Community Survey data were used to categorize zipcodes by percentages in poverty and populations of color for assessment of income and racial impact disparities.

2. We used time series and case-crossover analysis methods to measure the association between average daily ambient PM2.5 levels and daily respiratory and cardiovascular disease hospitalizations and ED visits. The attributable fraction for each outcome was used to calculate the number of air-pollution attributable events across the region for the years 2003-2009. We also examined changes in the attributable fraction over time.

Both methods were effective in demonstrating that improving air quality can have real and measurable health benefits across the Twin Cities region and have been used for supporting initiatives aimed at reducing sources of air pollution.


Prior work: Measuring the Impact of Particulate Matter Reductions by Environmental Health Outcome Indicators (May 2012 report to EPA)

The Disparate Burden and Economic Impact of Mercury Exposure

This paper would update previous work reported in a 2015 state report entitled: The Economic Burden of the Environment on Children’s Health: The Cost of Prenatal Mercury Exposure. This report used national biomonitoring data to estimate that each year nearly 6,000 children born in Minnesota in 2011 and 2012 were potentially impacted by elevated mercury exposure. Based on these numbers, we followed a previously published method for estimating the average IQ points lost for children born with mercury levels exceeding a threshold, and calculated total lifetime earnings lost attributed to elevated mercury. We estimated that prenatal mercury exposure resulted in $32.6 million of lost life time earnings for babies born in the state each year.

In this update we propose to modify the method using a more current publication estimating the relationship between cord blood mercury levels at birth and IQ point loss. We are also reviewing the racial disparities reported in the national biomonitoring data to estimate disparities in Minnesota. This work will complement current biomonitoring work in Minnesota to measure mercury exposure disparities in Latina, Somali, Hmong and White newborns.

Manuscripts In Draft:
Libby's Legacy: Health Outcomes in a Minneapolis Community Exposed to Vermiculite Processing Waste

Tess Konen MPH, Paula Lindgren MS, Allan Williams PhD, Jean E. Johnson PhD

Background: We present results of a follow-up study of the Northeast Minneapolis Community Vermiculite Investigation (NMCVI) cohort to describe the occurrence of asbestos-related disease and mortality in an exposed community. The cohort was established through in-person and telephone interviews with former and current residents (or their next of kin, if deceased) living within a defined study area in close proximity to a vermiculite processing plant. Former workers at the plant and their household members were also interviewed. The Minneapolis plant processed raw vermiculite ore from Libby, Montana from the late 1930’s until 1989. The exposure assessment documented past community and occupational exposure to asbestos-contaminated vermiculite in this cohort through eight exposure pathways, including direct exposure to vermiculite processing waste. A previous study of this cohort found radiographic evidence of pleural abnormalities indicative of asbestos exposure.

Methods: Members of the community and worker/household cohort who were alive in 1988 and consented to record linkage follow-up to assess health outcomes (n=5,848) were included. The cohort was linked to the Minnesota Cancer Surveillance System to identify incident cases of mesothelioma, lung cancer, and all-cancer diagnosed from 1988-2010. Proportional incidence ratios (PIR), by gender and age, were calculated for mesothelioma and lung cancer. To ascertain vital status and cause of death (1988-2011), the cohort was linked to Minnesota vital records and to the National Death Index.

Results: Not shown

Conclusions: We found higher proportions of mesothelioma in our cohort as compared to the statewide rates. The significantly high incidence of mesothelioma in women studied provides evidence of asbestos-related disease which may be due to community exposure to asbestos. This result is consistent with findings of excess mesothelioma deaths in Libby, Montana. The lung cancer PIR is consistent with the high smoking rates in this cohort. However, it is difficult to ascertain whether asbestos exposure contributed to the development of lung cancer.

Prior work
Three publications already in the literature from this research include:

Longitudinal biomonitoring of perfluoroalkyl substances (PFASs) in an exposed community in Minnesota (Outline)

Jessica Nelson, Christina Rosebush, Carin Huset, Jean Johnson

Introduction
- What are PFASs
- History of contamination in East Metro
- Environmental Health Tracking and Biomonitoring law, East Metro PFC1 Project
- Objectives of longitudinal biomonitoring (East Metro PFC2 and PFC3 Projects)

Methods
- Population
  1) longitudinal group (composed of community water and private well users)
  2) newer residents
- Data collection
- Serum analysis
- Statistical analysis

Results
- Participant characteristics, all groups
- Results in longitudinal group: PFOS, PFOA, PFHxS concentrations
- Results in longitudinal group: PFOS, PFOA, PFHxS change over time
- Results in newer resident group: PFOS, PFOA, PFHxS concentrations compared to NHANES
- Predictors of exposure/regression modeling
  o Total years drinking unfiltered water, length of residence, age, gender, blood donation history, race/ethnicity, income, new carpet, new furniture, non-stick cookware, waterproofing spray, occupation, diet
- Results for other PFASs (PFNA, PFBA, PFBS, PFHxA, PFPeA)

Discussion
- PFAS concentrations in this population, how they compare to NHANES and other populations
- Decrease over time indicates public health intervention was effective
- Small sub-set of longitudinal group did not have decrease, why this might be
- How findings re: predictors of exposure compare to other research
- Complexity of reporting longitudinal results to participants
- Strengths
- Limitations

Conclusion
- Main take-aways
- Importance, value of longitudinal biomonitoring for public health surveillance
Section Overview: Other Information

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

- 2017 Upcoming Advisory Panel Meeting dates
- June 14, 2016 Advisory Panel Meeting Summary
- Advisory Panel Roster
- Biographical Sketches of Advisory Panel Members
- Biographical Sketches of Staff
2017 Upcoming Advisory Panel Meeting dates

The meetings in 2017:

February 14, 2017
June 13, 2017
October 10, 2017

All meetings will take place from 1-4 pm at
The American Lung Association of Minnesota
490 Concordia Avenue
St. Paul, Minnesota
Advisory Panel Meeting Summary
6/14/2016 Meeting
Environmental Health Tracking and Biomonitoring Program

1:00 – 4:00 pm at the American Lung Association in Minnesota
490 Concordia Avenue, St. Paul, MN

Attendees: Alan Bender (via phone), Jill Heins Nesvold, Geary Olsen, Gregory Pratt, Andrea Todd-Harlin, Eileen Weber and Lisa Yost

Regrets: Bruce Alexander, Fred Anderson, Pat McGovern, Steven Pedersen, Cathy Villas-Horns

Staff: Paul Allwood; Betsy Edhlund, Allison Fast, Carin Huset, Jean Johnson, Tess Konen, Mary Manning, Char Napurski, Jessica Nelson, Christy Rosebush, Stefan Saravia, Deanna Scher, Jessie Shmool and Lynn Treadwell

Guests: Raj Mann (MDA), Samantha Lucas-Pipkorn, Great Lakes Inter Tribal Epidemiology Center (GLITEC); Veronica Newcomer, White Earth Band of Ojibwe; Stephanie Porter, Land Stewardship Project; Robert Shimek, White Earth Land Recovery Project; Colleen Trusky, intern at White Earth Land Recovery Project; Allison Wolf, Minnesota Center for Environmental Advocacy

Welcome and Introductions
Jill Heins Nesvold, as Acting Chair, welcomed everyone to the meeting. Attendees and panel members were given time to introduce themselves to the room.

Agenda Overview

Legislative Updates
Paul Allwood provided the legislative updates. Paul mentioned there was a veto of the tax bill. This veto was due to a drafting error. Paul also mentioned that the bonding bill failed to pass. This bonding bill would have provided the Public Health Lab (PHL) with funding to increase infrastructure on water projects.

Changes to the Radon Act were discussed. These changes included the decision to keep all testing and mitigation data private and lower the fees for radon testing. Clarifications related to licensing were detailed. It was determined that stores selling testing devices do not need to be licensed, thus those providing test kits can do so without a license.

Geary Olsen asked if the labs need to be certified. Paul Allwood responded that the labs do not need to be certified, only the contractors doing the radon test will need to be certified.

Tracking Updates

Data Portal Updates
Updates on the data access portal were given by Lynn Treadwell. Lynn provided a brief background on the portal. By using state local and national networks of people and information systems, we are able to monitor trends, disparities and geographic patterns of environmental hazards, exposure to those hazards and the health of the public. This is done to
inform policies, continue planning efforts and engage the community. The data portal is funded by the CDC Environment Public Health Tracking Network grant.

It was noted that there is an upcoming CDC audit of the portal in July, 2016. The CDC conducts audits to ensure that grantees are adhering CDC-defined portal requirements and recommendations. Also, efforts are underway to align the MN Tracking website and the MDH brand. This encompasses not only visual designs but also writing and technical development. Working together with MDH communications staff and program partners, this effort will take place incrementally over the course of FY 17.

Portal work continues to focus on annual content updates and the addition of new topic areas. Portal analytics are used to inform areas of improvement and identify ways to improve less frequented content. Additionally, a user survey was launched to obtain a general idea who was using the portal. This might inform the need for new content topics and is also a valuable reporting metric to share with CDC.

Portal usability and accessibility will be tested. Plans are in process for a group of individuals, familiar with environmental health but unfamiliar with the MN Data portal, to ensure that the MN Data portal is accessible to all who wish to use it.

**Portal traffic summary**

This information showed that traffic to the portal is steady during the weekdays but declines on the weekends. Most of the traffic to the portal appeared to be from new visitors. Previous visitors returning to the portal was not seen as often as traffic from new users. Organic searches drove the most traffic to the portal over the last six months. Referrals – links from partner organization on related topics – represented the most engaged users. Referred users were on the site longer and viewed multiple pages. We believe this is our most highly engaged population and a focus on internal and external link building will continue to grow this group. Social referrals result from social media. Individuals from social referrals appear to spend time on the portal and view multiple pages. We believe more energy should be used to grow this population. These visitors showed the highest interest in asthma and air quality during the time period assessed. County profiles were also highly accessed.

Lynn discussed areas to focus on for improvement. The main focus is to increase portal visibility, awareness and traffic.

**Workforce Training**

Mary Jeanne Levitt presented updates on workforce training of public health students.

Students and Public Health Educators are currently accessing the MN Data Portal. In order to continue the engagement of public health students, outreach has continued with the University of Minnesota over several years. MN Data Portal has also had a presence during new student orientation for School of Public Health graduate students over the past four years. Within the past year, efforts have been made to branch out to other graduate and undergraduate classes. For example, the MDH student worker has connected with UMN epidemiology professors regarding the use of the MN Data Portal during classroom exercises. In addition to engaging UMN faculty and students, efforts have been made to reach other educational institutions. These institutions include private and public academic institutions including libraries as well as on-line universities.
Discussion
Mary Jeanne posed the following question to the panel: What recommendations does the panel have for promoting student/workforce training for increasing the use of Environmental Public Health data?

Eileen Weber mentioned a new dual degree program at UMN which combines public health and nursing. Jill Heins Nesvold suggested UMN School of Pharmacy and undergraduate statistical classes. Kristie Ellickson recommended high school environmental health classes and professional continuing education courses as some options.

PFC Biomonitoring Updates
The PFC Biomonitoring Updates were provided in written form on pages 11-14 of the Advisory Panel book. Panel members were invited to ask questions and comment about these written updates.

Lisa Yost commented that the state levels for PFOA and PFOS are now higher than the new EPA guidelines, with the difference being four fold between the two. Jim Kelly responded that Environmental Health is currently looking at the new EPA data to determine how the data was compiled. Environmental Health did not see the report prior to its release to the public.

Eileen Weber asked if there would be any reason why we wouldn’t adopt the new EPA guidelines. She further clarified that this issue is very near to her since she lives within the plume parameters. She also stated that Senator Sieben mentioned the action plan letter that was mailed to the Commissioner’s office.

Jim Kelly stated that Environmental Health is in the process of creating a response to Senator Sieben’s letter. He explained that Minnesota collects data on all PFCs, not just the ones that the EPA discussed in their report. Jim commented that Minnesota Environmental Health needs to review the EPA data to ensure that there wouldn’t be a heavy focus on some PFCs over others. Environmental Health feels that to automatically adopt the new guidelines could place us at odds with the internal risk assessment that was done since additional PFCs are considered. Environmental Health does not want to underestimate the risk of other PFCs while focusing on PFOA and PFOS.

Paul Allwood commented that the Commissioner’s office appreciated the letter from the senator.

MN FEET Updates
Jessica Nelson provided updates on the Minnesota Family Environmental Exposure Tracking (MN FEET) study. She summarized the recruitment criteria and different stages of the study, and discussed the results that have been analyzed thus far (for more information, please see the June 14, 2016 Advisory Panel book).

Jessica provided updated recruitment numbers. As of June 13, 2016, 334 women had completed the phone survey (59 Asian, 123 Latina, 26 East African and 126 White women). A total of 238 signed consent forms had been returned (from 44 Asian, 68 Latina, 14 East African and 112 White women). Additionally, 157 samples had been collected at Regions Hospital (from 28 Asian, 47 Latina, 6 East African and 76 White women). A discrepancy in the numbers
Jessica commented on the low recruitment rates for the Asian and East African groups and discussed strategies that are in process to improve recruitment. She also discussed the preliminary results and the elevated cases (for more information, please see the June 14, 2016 Advisory Panel book). Since the Advisory Panel book’s publication and mailing an additional elevated case was found by the MDH Public Health Lab (PHL). The newest elevated case was an elevated urine mercury level in a Latina woman. The participant had been notified of her results.

Jessica briefly discussed the status of the MN FEET Plus study. As noted in the June 14, 2016 Advisory Panel book, MN FEET Plus will include MN FEET participants and involves testing newborn bloodspots for mercury. This study was still pending IRB approval at the time of the meeting.

Jessica read the staff recommendation for MN FEET. The recommendation was as follows “We recommend that sufficient funding for MN FEET be continued through SFY 2019 to allow the project to reach its goal of recruiting and collecting samples from 600 women who are Asian, East African, Latina and White, so that study goals of monitoring and reporting disparities in exposure are met, and the communication of results is culturally sensitive and useful to the communities”.

**Discussion**

Gregory Pratt stated that he felt continuity is key with keeping participants engaged. He asked if the interviewer was a native speaker of the participant’s language. Jessica responded that for all interviewer calls from HealthPartners and SoLaHmo, interviewers were native speakers of either Hmong, Somali or Spanish. For calls that MDH does in regards to the written consent form, any calls not conducted in English used interpreters through the Language Line.

Andrea Todd Harlin asked if just the mother was recruited and recommended including the father. Jessica replied that the mother is the main target for recruitment. She added that changes to include adding time for the interviewer to include the father in the conversation, if he is interested, were in progress.

Paul Allwood inquired about the origination of MN FEET Plus. Jessica answered that the Advisory Panel previously recommended the need to continue assessment of the newborn bloodspot biomonitoring methodology to determine whether it is a reliable, effective way to measure newborn mercury exposure in the population. The main MN FEET study was originally going to include asking for consent to test newborn bloodspots, but staff and partners decided to pull this piece out as a separate sub-study for various reasons. MN FEET was designed to collect cord blood at the hospital in part to address the questions being investigated in MN FEET Plus.

Jim Kelly informed the panel that MDH Environmental Health worked with multiple agencies on a recent raid to identify skin creams that contain mercury and other metals.

Jill Heins Nesvold asked about plans for sharing recruitment struggles with other agencies.
Jessica responded that no concrete plans were in place at this stage. She added that study staff
would appreciate feedback on any groups that might be interested. Jessica added that
providing stories at MDH conferences is an option.

Effect of Agricultural Chemicals on North Central Minnesota Communities

Jill Heins Nesvold introduced the topic and invited Lisa Yost to speak on behalf of the sub-
committee that was created to look further into this issue.

Lisa Yost referenced February 9, 2016 meeting when this topic was first presented to the panel
members by Robert Shimek of the White Earth Land Recovery Project. A sub-committee was
created to see how Minnesota Department of Health could address the concerns of the
community. The sub-committee met in April and attempted to look at the following questions:
What should be monitored? How can it be monitored? Is monitoring feasible for all pesticides?
What factors are most useful or meaningful?

Based off of these questions, the following recommendation was created, “We recommend
that MDH EHTB staff continue to do foundational work in SFY 2017 to respond to community
concerns about pesticide exposures in the Central Sands region. MDH EHTB staff should
continue gathering information about pesticide use in the area and biomonitoring feasibility.
Staff should also work with community partners to learn about community health concerns and
review existing surveillance data. This work on project-planning and partnership building will
be important in pursuing a community-based grant application (e.g. PEPH grant) or other
funding options.”

Jill Heins Nesvold asked if anyone had questions about the recommendation. There was no
response so Jill stated that time had been set aside in the event the audience wanted to
address the panel members. This time consisted of 20 minutes and would be divided equally
among those who wished to speak. The two audience members that wanted to present to the
panel were Colleen Truskey and Robert Shimek.

Jean Johnson introduced Jessica Nelson, Carin Huset, and Samantha Lucas-Pipkorn, from Great
Lakes Inter Tribal Epidemiology Center (GLITEC), as the individuals familiar with the background
and to whom questions should be directed. Jessica provided the information on the pesticides,
Carin is working on the lab methods for testing pesticides and Samantha’s role is to provide
outreach to the White Earth community.

Gregory Pratt felt that good records on pesticide use do not exist. He wondered how the data
was collected. He was wondering what was being used, how much it was being used and
where. He also asked what the sources of information were on this topic. Jessica Nelson
referenced Table 1, page 35, of the panel book in her answer. She stated that she pulled data to
determine pesticide use in Central Sands, as its use is different from the rest of the state. She
discussed where data was found, from surveys of farmers in state. She admitted this method
was not perfect but felt it was helpful for this early stage of information gathering.

Raj Mann, Minnesota Department of Agriculture, responded that the dealer was supposed to
give data on what is sold. He also stated that farmers are asked what they used and when they
used it. Raj Mann cautioned that chemicals used in large amounts may not represent the biggest concern. He indicated that some chemicals might be more toxic in smaller amounts.

Jessica Nelson also recapped some of the information in the panel book involving the tables that were included. She also briefly mentioned the ClearWay material contained within the panel book.

Geary Olsen asked the question, of pesticides listed in the table, what metabolites associated with those chemicals are of concern? Carin Huset responded that the information we have on existing metabolites, methods and standards is not complete. She indicated that Table 2 in the advisory panel book indicates some metabolites. However determinations need to be made if the compound can be tested in a biological sample or if it can only be tested in the environment. Jessica Nelson also commented that Table 2 in the panel book indicated if the chemical had a low, medium or high feasibility rating for analysis by the Public Health Lab (PHL).

Paul Allwood asked what the approach has been to date. Carin Huset responded she is looking at information what lab development work has already been done. NHANES methods are not always capturing all chemicals. She stated that is also looking at what the chemicals degrade to in the environment and if there is a method to test the chemical in that medium. Jessica Nelson used chlorothalonil as an example. Chlorothalonil is a big community concern, however, it is low on the MDH feasibility list.

There were no other questions for Jessica, Carin or Samantha. Jill Heins Nesvold turned the floor over to Robert Shimek and Colleen Truskey.

Robert Shimek, Executive Director at White Earth Land Recovery Project, began his comments by thanking the panel members for the opportunity to speak on this topic. He stated that many conversations have occurred regarding pesticides and the challenges to testing those pesticides. Robert also felt that partnering with ClearWay held possibilities for a future project in the Central Sands area.

However, Mr. Shimek cautioned that perhaps conversations should also include prioritizing what might be the most effective way to look at this issue, should resources be limited. He mentioned the irrigation wells in Pine Point Township, a topic that was discussed in the February 9, 2016 meeting. Robert introduced Colleen Truskey, from the Commonwealth of Virginia, who contacted his agency in the hopes of becoming an intern for the summer. He directed Colleen Truskey to the irrigation well issue and had her start gathering data. As of the date of this meeting, she has not completed data collecting for all of the areas they have identified, however, she has gathered information on quite a few regions.

Colleen Truskey, intern at the White Earth Land Recovery Project, used the MDH well index to generate preliminary numbers on the amount of irrigation wells in the Central Sands Region. She started her search with counties in the Central Sands area and then narrowed in on tribal boundaries for the purposes of her presentation today. It was stressed that the well information she was examining were for irrigation wells only, these numbers did not include wells used for residential drinking water. Her initial findings showed that 11 townships within the Central Sands area of Minnesota contained 30 or more wells. Colleen pointed out that each of these townships consisted of approximately 32 square miles.
The data indicated that in Becker County, Osage Township had 41 wells. Also in Becker County, Pine Point had 56 wells. A look at Hubbard County indicated that Todd Township had 39 wells with Hubbard Township having 56 wells. In Wadena County, Wing River Township had 45 wells, Aldrich Township had 72 wells, Thomastown Township had 76 and Wadena Township had 110 wells. In Otter Tail County, Amor Township had 32 wells, Gorman Township had 36 and Perham Township had 52 wells.

Colleen indicated that the next steps would be to finish studying the MDH Well Index information and then to collect data on the age and depth of these wells. She offered her data sets to anyone who would like to request them. Since this meeting, she has continued to add to her knowledge and revise the data she has collected.

Robert Shimek commented that some of the wells were fairly shallow, at a depth of 20 feet, while others were at a range of 50 to 60 feet. He believes that many of these wells fall within the range that is required for residential drinking water wells.

**Discussion**

Gregory Pratt asked Colleen Truskey how she chose to work on this project when she currently resides in Virginia. She responded that she is a senior at the College of William and Mary in Virginia with a major of anthropology and public health. She wanted to look at an indigenous take on the issues of health, food, sovereignty and security.

Gregory also asked if she thought data on acres planted for various crops could be used to supplement the well data. He wondered if the acre data was available. Colleen responded that she had already pulled some aerial views of the townships. She found that crop circles, indicative of agriculture in the area, appear to correspond with the number of irrigation wells also in that area.

**Discussion of Staff/Subcommittee Recommendations and Vote**

Jill Heins Nesvold discussed the voting procedures which are outlined in the panel book. There will be a request for someone to make a motion, for another person to second the motion and then time for clarifications and questions. Kristie Ellickson asked if the voting was for just the panel members, as she will be taking over for Gregory Pratt in the future. The response was that only current panel members could vote on these recommendations today.

**MN FEET**

Jessica Nelson read the recommendation to the panel members. It was also presented on a slide for reference.

Mary Manning asked if the staff is recommending to seek funds from the legislature or to continue to use the funding in place over a longer time frame. Jean Johnson responded that there is a need for some action regarding new funding as the rider that is currently in place will expire at the end of SFY 2017.

Andrea Todd-Harlin inquired if there was a specific number that was needed for funding. Jean responded that a funding figure had not been generated at this point. Jessica responded that it would vary because costs would decrease as the study moved closer to ending.
Gregory Pratt wondered if one source of funding be outside funds. He also wondered what would happen if funds were not obtained. Jean stated that if no additional funding was obtained, the study would have to stop at the end of SFY 2017. This would mean that recruitment would have to stop in the next few months and the goal of testing 600 women would not be reached.

Andrea Todd-Harlin questioned the timing of the funding. She asked if money was needed in the next few months while the legislature was out of session. Jean Johnson agreed that the legislature is not an option for this year.

A question was asked if there was no money in place, could recruitment be stopped until funding was found and then restarted when that funding was available. Jean stated that this fall staff would be working on a legislative report. The report is due in January 2017 and recommendations from the panel would be included. Jean also said that negotiations will be starting soon with the Pollution Control Agency to collaborate with Environmental Health. This recommendation would also be included in those conversations.

Eileen Weber wanted clarification on when the funding would end exactly. Jessica Nelson responded that the funding would cease June 30, 2017. Eileen also commented that with the focus on health equities, raising the number of participants in the MN FEET study was about more than just getting more samples in general but also about health disparities.

Gregory Pratt made the move to accept motion. Eileen Weber seconded the motion. Andrea Todd-Harlin recommended having more info on funding in the future. She felt this would be helpful and thought a ballpark figure would be fine for this purpose. All members present voted in favor of recommendation. There were no votes against nor anyone abstaining from the vote.

Central Sands

Lisa Yost reiterated that the recommendation for the Central Sands region came from the subcommittee that was formed for this purpose.

Jill Heins Nesvold asked for a motion to approve this recommendation.

Raj Mann wanted to clarify that this recommendation was for foundation work that will be done and not for an actual research project. Jill Heins Nesvold responded that was correct. There is no staff currently available to work on this project and without this recommendation there is no way for staff to take this project on. There is a need for staff time to gather foundational information to prepare a competitive proposal. Raj Mann replied that MDA would support this kind of project, however, they would also like to be kept in the loop on the progress and which chemicals were going to be evaluated.

Lisa Yost made the motion to support the recommendation. Gregory Pratt seconded the motion.

Geary Olsen asked the following questions: What does it mean to work with community partners to learn about community health concerns? Who are community partners? Lisa Yost responded referencing panel members to the panel book for more detail. The objective is that any work done addresses the community concerns and actually answering their questions.

Jessica Nelson stated that MDH staff was planning to talk with local public health in counties
and tribal staff. Geary Olsen felt that a lot of the community was still missing. He asked about the Ag community, Ag, Farmers Union and Ag business. Geary felt that MDH was missing agro business following the law as they understand it. How will MDH dialogue with these individuals?

Jill Heins Nesvold asked if Geary wanted to adjust partners to include Ag businesses. Lisa Yost agreed with Geary’s point and felt these groups should also be included in discussions. Deanna Scher suggested to change language in the recommendation to include both stakeholders and community partners.

The recommendation was modified to reflect that change. It now read “We recommend that MDH EHTB staff continue to do foundational work SFY 2017 to respond to community concerns about pesticide exposures in the Central Sands region. MHD EHTB staff should continue gathering information about pesticide use in the area and biomonitoring feasibility. Staff should also work with stakeholders and community partners to learn about community health concerns and review existing surveillance data. This work on project-planning and partnership-building will be important in pursuing a community-based grant application (e.g. PEPH grant) or other funding options.”

Stephanie Porter asked to make a comment. She works for Land Stewardship Project, a grassroots organization that includes farmers. She stated that based off of community outreach interest shown so far, there are indications that some farming groups are also concerned.

Jill Heins Nesvold asked Geary if the amendment to the recommendation addressed his concerns. Geary Olsen further discussed definitions of stakeholder versus community partner. He used the economic viability issue as an example of what he considered stakeholders, such as commercial farms.

Lisa Yost responded that stakeholders may not have health related concerns regarding pesticides, however, they might benefit from understanding that others have health concerns. MDH would not be able to assist with non-health related concerns.

Geary Olsen believed that a cross-sectional representation was needed to get broad understanding and avoid potential bias. Gregory Pratt responded those with concerns may not be a cross-sectional representation of the population, while others in the cross section may not have concerns. All concerns should be listed to whether cross-sectional or not.

Eileen Weber suggested that less is more and that community partners and stakeholders are taken out of recommendation with the minutes of the meeting reflecting that stakeholders and community partners include a broad range of people. Geary agreed with that amended version because there was the assumption that multiple groups would be approached.

The recommendation now read: “We recommend that MDH EHTB staff continue to do foundational work SFY 2017 to respond to community concerns about pesticide exposures in the Central Sands region. MDH EHTB staff should continue gathering information about pesticide use in the area and biomonitoring feasibility. Staff should also work to learn about community health concerns and review existing surveillance data. This work on project-planning and partnership-building will be important in pursuing a community-based grant application (e.g. PEPH grant) or other funding options.”
Andrea Todd-Harlin said she felt more comfortable with the 1st amendment to the recommendation language but conceded that the majority supported the second amendment to the recommendation.

Jill Heins Nesvold thought sub-committees intentions were that any health concerns should be given weight, not just those who were most vocal but from a variety of groups and agencies. Geary felt that Ag needs to be included as they will be a big part of any movement forward and community partners may not reflect that group.

Alan Bender felt it was important to have a consensus on the recommendation and to move forward with gathering foundational information.

When asked, Andrea Todd-Harlin felt her concerns were addressed with the last sentence in recommendation.

Lisa Yost questioned sentence “Staff should also work to learn about community health concerns and review existing surveillance data” as she felt it was repetitive. Eileen Weber responded that she felt the sentence detailed the objectives and was necessary to the recommendation.

Jill Heins Nesvold asked for a vote on the recommendation as it stood after the two amendments. All panel members present voted in favor of recommendation. There were no votes against and no one abstained.

New Business

There was no new business to discuss. Jean Johnson asked for recommendations on topics of interest for the next panel meeting.

Jean proposed to have a status update in October on the topics discussed today. Jill Heins Nesvold requested that enough discussion time for updates be included on the agenda.

Geary Olsen felt that work is completed on various studies but no publications to date have resulted from the work. He would like discussion time included to determine where resources should be directed in order to get research published.

Lisa Yost felt that, in regards to Central Sands, more thought should be given about the ground water and drinking water issue. She explained by saying that more information is needed to either include it as part of the issue or rule it out. Raj Mann stated that Agriculture is currently looking at that data.

The meeting was adjourned.
Environmental Health Tracking & Biomonitoring Advisory Panel
Roster
As of October 2016

Bruce Alexander, PhD
School of Public Health
University of Minnesota
Environmental Health Sciences Division
MMC 807 Mayo
420 Delaware Street SE
Minneapolis, Minnesota 55455
612-625-7934
balex@umn.edu
At-large representative

VACANT SEAT
At-large representative

Alan Bender, DVM, PhD
Minnesota Department of Health
Health Promotion & Chronic Disease Division
85 East 7th Place
PO Box 64882
Saint Paul, MN 55164-0882
651-201-5882
alan.bender@state.mn.us
MDH appointee

Kristie Ellickson, PhD
Minnesota Pollution Control Agency
Environmental Analysis & Outcomes Division
520 Lafayette Road
St. Paul, MN 55155-4194
651-757-2336
kristie.ellickson@state.mn.us
MPCA appointee

Thomas Hawkinson, MS, CIH, CSP
Toro Company
8111 Lyndale Avenue S
Bloomington, MN 55420
952-887-8080
tom.hawkinson@toro.com
Statewide business organization representative

Jill Heins Nesvold, MS
American Lung Association of Minnesota
490 Concordia Avenue
St. Paul, Minnesota 55103
651-223-9578
jill.heins@alamn.org
Nongovernmental organization representative

Pat McGovern, PhD, MPH
School of Public Health
University of Minnesota
Environmental Health Sciences Division
MMC Mayo 807
420 Delaware St SE
Minneapolis MN 55455
612-625-7429
pmcg@umn.edu
University of Minnesota representative
Geary Olsen, DVM, PhD
3M Medical Department
Corporate Occupational Medicine
MS 220-6W-08
St. Paul, Minnesota 55144-1000
651-737-8569
gwolsen@mnm.com
Statewide business organization representative

VACANT SEAT
Minnesota Senate appointee

Andrea Todd-Harlin, MSc
Medical Research Advisors
1491 McCarthy Road
Eagan, MN 55121
651-341-3444
andrea@andreatoddharlin.com
Minnesota House of Representatives appointee

Cathy Villas-Horns, MS, PG
Minnesota Dept. of Agriculture
Pesticide & Fertilizer Management Division
625 Robert Street North
St. Paul, Minnesota 55155-2538
651-201-6697
cathy.villas-horns@state.mn.us
MDA appointee

Eileen Weber, DNP, JD, PHN, BSN, RN
School of Nursing
University of Minnesota
10623 Nyberg Ave S
Hastings, MN 55033
651-276-1730
weber058@umn.edu
Nongovernmental organization representative

Lisa Yost, MPH, DABT
RAMBOLL ENVIRON
333 West Wacker Drive, Suite 2700
Chicago, IL 60606
Local office
479 Iglehart
St. Paul, Minnesota 55103
Phone: 651-225-1592
Cell: 651-470-9284
lyost@environcorp.com
At-large representative
Biographical sketches of advisory panel members

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

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

Kristie Ellickson joined the Minnesota Pollution Control Agency in 2007 after completing her Ph.D. 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 post doc 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 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.

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

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

Pat McGovern directs the occupational and environmental health nursing specialty area offered by the Division of Environmental and Occupational Health Sciences (EnHS) at the University of Minnesota’s School of Public Health. She also directs the occupational health services research and policy specialty that is jointly offered by EnHS and the Division of Health Policy and Management. Her teaching and research interests address occupational and environmental health policy issues; in particular, exposures impacting women’s and children’s
health. Pat received her Ph.D in Health Services Research and Policy; her M.P.H. in Public Health Nursing with a focus in occupational health nursing; and her B.S. in Nursing at the University of Minnesota.

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

Andrea Todd-Harlin is an epidemiologist with 15 years experience in both the public and private sectors. She holds a Master of Science in Environmental Epidemiology & Policy from the London School of Hygiene and Tropical Medicine and a Bachelors of Science in Health & Wellness from the University of Minnesota. Andrea began her career at the Minnesota Department of Health in the Chronic Disease and Environmental Epidemiology section where she worked on grants researching serious traumatic work-related injury and childhood asthma. She then moved into applied practice serving as the Director of Research and Education at the private medical practice, Sports and Orthopaedic Specialists. Andrea has also served as adjunct faculty at St. Catherine University and Argosy University teaching microbiology, biostatistics and epidemiology and risk management. She currently operates her own medical research consulting firm, Medical Research Advisors.

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. Cathy 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. Cathy has worked on complex sites with Minnesota Department of Health and MPCA staff, and continues to work with interagency committees on contaminant issues. She previously worked as a senior hydrogeologist within the IRU, and as a hydrogeologist at the Minnesota Pollution Control Agency and an environmental consulting firm.

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

Wendy Brunner, PhD, serves as surveillance epidemiologist for the MDH Asthma Program since 2002, and joined Minnesota’s Environmental Public Health Tracking and Biomonitoring Program (MN Tracking) program on a part-time basis in fall 2009. Previously, she worked on occupational respiratory disease studies for MDH. She has a master’s degree in Science and Technology Studies from Rensselaer Polytechnic Institute and a master’s degree in Environmental and Occupational Health from the University of Minnesota. She received her doctorate in the Division of Epidemiology and Community Health at the University of Minnesota.

Betsy Edhlund, PhD, is a research scientist in the Environmental Section of the Public Health Laboratory at the Minnesota Department of Health. She works in the metals laboratory developing methods and analyzing samples for both biomonitoring programs and emergency response. Betsy received her PhD in chemistry from the University of Minnesota where her research focused on the photochemistry of natural waters.

Carin Huset, PhD, 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.

Jean Johnson, PhD, MS, is Program Director/Principal Investigator for MN Tracking. Dr. Johnson received her Ph.D. and M.S. degrees from the University of Minnesota, School of Public Health in Environmental Health and has 25 years of experience working with the State of Minnesota in the environmental health field. As an environmental epidemiologist at MDH, her work has focused on special investigations of population exposure and health, including studies of chronic diseases related to air pollution and asbestos exposure, and exposure to drinking water contaminants. She is currently an adjunct faculty member at the University of Minnesota School of Public Health.

Tess Konen, MPH, graduated from the University of Michigan’s School of Public Health with a master’s 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.

Mary Jeanne Levitt, MBC, is the communications coordinator with MN Tracking. She has a Master’s in Business Communications and has worked for over 20 years in both the public and non-profit sector in project management of research and training grants, communications and marketing strategies, focus groups and evaluations of educational needs of public health professionals. She serves on three institutional review boards, which specialize in academic research, oncology research, and overall clinical research.
Paula Lindgren, MS, received her Masters of Science degree in Biostatistics from the University of Minnesota. She works for the Minnesota Department of Health as a biostatistician, and provides statistical and technical support MN Tracking for data reports, publications, web-based portal dissemination, and presentations in the Chronic Disease and Environmental Epidemiology section. Ms. Lindgren has also received training in the area of GIS for chronic disease mapping and analysis. In addition to her work for MN Tracking, she works for various programs within Chronic Disease and Environmental Epidemiology including the Asthma program, Center for Occupation Health and Safety, Minnesota Cancer Surveillance System, and Cancer Control section.

Charlotte Napurski, MPH, is the study coordinator for the Minnesota Family Environmental Exposure Tracking (MN FEET) project. She received her Masters in Public Health from Capella University in March 2012. Previously, Charlotte worked at the University of Minnesota for nine years. She supported studies in the areas of pediatric nephrology and pediatric cardiology; however, the majority of her time focused on the adult and pediatric cancer survivor program projects. Presently, Charlotte is coordinating the day to day operations of the MN FEET project with an emphasis on collaborating with the partner clinics involved in the project, the MDH Institutional Review Board and monitoring recruitment activities.

Jessica Nelson, PhD, is an epidemiologist with MN Tracking, working primarily on design, coordination, and analysis of biomonitoring projects. Jessica received her PhD and MPH in Environmental Health from the 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.

Christina Rosebush, MPH, is an epidemiologist with MN Tracking. Her work includes the development and coordination of biomonitoring projects that assess perfluorochemicals (PFCs) and mercury in Minnesota communities. She also works on collection and statistical analysis of public health surveillance data for MN Tracking, with a focus on behavioral risk factors. Christina received her Master’s degree in epidemiology from the University of Minnesota’s School of Public Health, completing research in PFC biomonitoring for the Minnesota Department of Health in partial fulfillment of her degree.

Deanna Scher is an epidemiologist in the Environmental Health Division at MDH. She is the principal investigator of the Fond du Lac Community Biomonitoring Study, a five-year project funded by ATSDR that ended in September 2015. She currently works on a wide variety of issues at MDH including contaminants in private wells, pesticide exposure, and risk communications. Deanna received her Ph.D. in Environmental Health Sciences from the University of Minnesota, School of Public Health, where her research involved methods to integrate biomonitoring and biological plausibility into pesticide risk assessment and epidemiology.

Blair Sevcik, MPH, 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 University of Minnesota School of Public Health in December 2010.

**Jessie Shmool, MPH, DrPH**, started in 2016 as an epidemiologist and program manager with MN Tracking. 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 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 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.

**Allan N. Williams, MPH, PhD**, is an environmental and occupational epidemiologist in the Chronic Disease and Environmental Epidemiology Section at the Minnesota Department of Health. He is the supervisor for the MDH Center for Occupational Health and Safety. For over 25 years, he has worked on issues relating to environmental and occupational cancer, cancer clusters, work-related respiratory diseases, and the surveillance and prevention of work-related injuries among adolescents. He has served as the PI on two NIOSH R01 grants, as a co-investigator on four other federally-funded studies in environmental or occupational health, and is an adjunct faculty member in the University of Minnesota’s School of Public Health. He received an MA in Biology from Indiana University, an MPH in Environmental Health and Epidemiology from the University of Minnesota, and a PhD in Environmental and Occupational Health from the University of Minnesota.