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

JUNE 9, 2020

1:00 P.M. – 2:30 P.M.

Via WebEx

Minnesota Department of Health
Environmental Health Tracking and Biomonitoring
PO Box 64882
St. Paul, MN 55164-0882
651-201-5900
health.biomonitoring@state.mn.us
www.health.state.mn.us

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Agenda Overview

DATE: 06/09/2020

Welcome & Introductions

1:00pm

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

Update on MDH COVID-19 Response

1:05pm

Mary Manning, MDH Health Promotion and Chronic Disease Division Director, will give a brief update on the agency's COVID-19 response.

Healthy Kids Minnesota Update

1:15pm

Paul Moyer, Manager of the Environmental Laboratory Section of the MDH Public Health Laboratory, will give an update on planning for the new statewide biomonitoring program Healthy Kids Minnesota. Panel members are invited to ask questions.

Preliminary Results from Healthy Rural and Urban Kids Project 2018

1:25pm

Jessica Nelson will present results from preliminary analyses of Healthy Rural and Urban Kids Project data.

1:50pm Discussion

Questions for the Panel

- Are there additional analyses the Panel recommends?
- What are the Panel's suggestions for analyses and results messaging when the two populations of children are so different from one another?

Public Comments, Audience Questions, New Business

2:25pm

Motion to Adjourn

2:30pm

Healthy Kids Minnesota Update

Healthy Kids Minnesota is our new statewide biomonitoring program that will systematically measure exposures to chemicals of concern in children, with funding through a cooperative agreement with the U.S. Centers for Disease Control and Prevention (CDC). Working in one non-Metro and one Metro region of the state every year, we will partner with Early Childhood Screening (ECS) programs at local public health agencies and school districts to recruit preschool-age children for testing. We will include 250 – 300 children per community in each program cycle. Healthy Kids Minnesota 2020, the first program cycle, will begin in Southeast Minnesota and Minneapolis.

Since the February 2020 EHTB Advisory Panel meeting, we have made good progress on program development, recruitment planning, and laboratory method development.

- We obtained MDH IRB approval for our program protocol and materials on March 11, 2020.
- We have continued phone and in-person meetings and planning with potential recruitment partners in Southeast Minnesota, and Minneapolis Public Schools. We have submitted financial agreements with Fillmore County Public Health and Minneapolis Public Schools for final approval, and are finalizing duties and budget with Mower County Health and Human Services. We are in talks with Rochester Public Schools and are reaching out to smaller school districts in Goodhue County about partnership.
- We began method validation work on the speciated arsenic method, started development of the phthalate metabolite method, and maintained competency and successful proficiency testing status for existing methods that will be used for this project.
- We identified sample containers and developed the sample collection protocol.

So far, the COVID-19 situation has not had a major effect on biomonitoring laboratory capacity and method development. While the COVID-19 response has delayed our ability to focus full attention on laboratory work while most staff are working from home as much as possible, we are essentially on track for our Year 1 outcomes (see Figure 1 with timelines for each lab method under development). However, staff, equipment and other laboratory resources may be diverted to the COVID-19 response at any time; the situation is changing daily.

However, the COVID-19 situation has had a significant impact on our recruitment timeline and planning. Our recruitment partners are local public health agencies and school districts, whose capacity to plan is currently limited. It is unclear when ECS appointments, our vehicle for recruitment of children, will resume. We also have substantially decreased program staff capacity with reassignments to the COVID-19 response. While we had hoped to begin recruitment in May or June of this year, this will not be possible. We hope to begin a shortened period of recruitment in the fall for Healthy Kids Minnesota 2020 before getting back on track with recruitment for Healthy Kids Minnesota 2021 with two new regions of the state (see Figure 2). However, it is not clear if this timeline is realistic. Many uncertainties remain about staff capacity and school district activities this fall that will affect our efforts.

Figure 1. Laboratory Methods Development Timelines

Phthlates in Urine Method Validation - MN Healthy Kids	Dec. 19				Jan. 20				Feb. 20				March 20				April 20				May 20				June 20				July 20				Aug. 20				Sept. 20				Oct. 20				Nov. 20			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Research and choose base method																																															
Develop list of supplies and standards with vendors and pricing																																															
Purchase all necessry supplies																																															
Receiving purchased materials																																															
Perform method development experiments																	COVID-19 Delay																															
Develop a validation plan and route for signatures																																															
Quality Control characterization																																															
Perform method validation																																															
Write SOP																																															
Write method validation report																																															
Route SOP and validation for signatures and approval																																															
Analyze Samples																																															

Speciated Arsenic	Feb. 20				March 20				April 20				May 20				June 20				July 20				Aug. 20				Sept. 20				Oct. 20			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
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Receiving purchased materials																																				
Perform method development experiments																																				
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Quality Control characterization																																				
Perform method validation																																				
Write SOP																																				
Write method validation report																																				
Route SOP and validation for signatures and approval																																				
Analyze Samples																																				
Reporting of all samples																																				

Personal Care Products in Urine (Environmental Phenols)	July 20				Aug. 20				Sept. 20				Oct. 20				Nov. 20				Dec. 20				Jan. 21				Feb. 21				March 21			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
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Flame Retardants in Urine	Oct. 20				Nov. 20				Dec. 20				Jan. 21				Feb. 21				March 21				April 21				May 21				June 21			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
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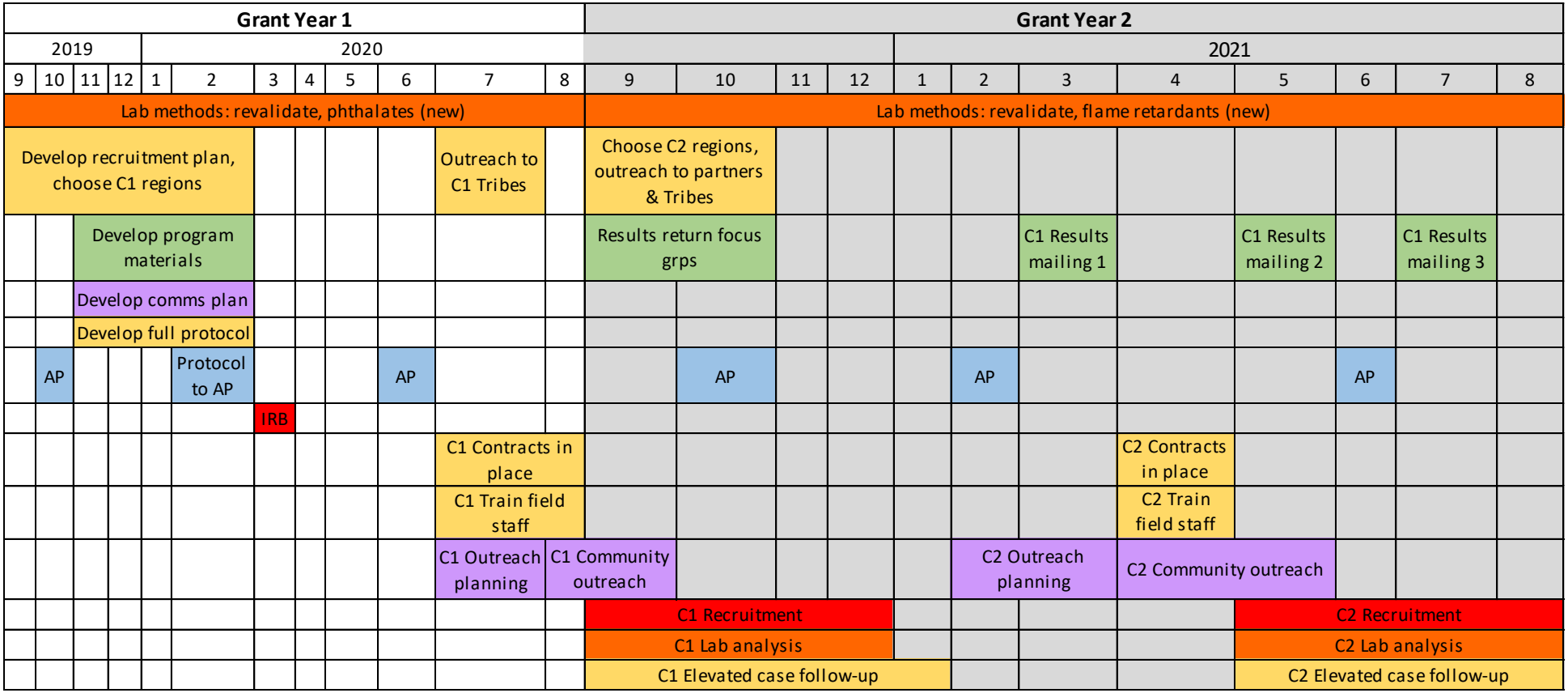
Figure 2. Healthy Kids Minnesota Program Timeline



Preliminary Results – 2018 Healthy Rural and Urban Kids Project

Introduction

The following write-up provides background information and presents preliminary descriptive results for both survey and biomonitoring data from the Healthy Rural and Urban Kids Project. These results, combined with additional analyses that will be presented at the June 9 meeting, are being shared with the Advisory Panel for guidance and input as staff finalize analyses and interpretation of findings, and then work to summarize them for public release.

Overview/Status

The Healthy Rural and Urban Kids Project was conducted in summer 2018 in partnership with Early Childhood Screening programs at Minneapolis Public Schools and Becker, Todd, and Wadena counties. Staff from these programs recruited children from two zip codes in North Minneapolis and from the three North-Central Minnesota counties. In addition, a short interview was conducted with families and children provided a single spot urine sample on the same day as the interview.

Urine samples were collected from 232 children. Samples were analyzed by the MDH Public Health Laboratory (PHL) for 18 analytes and by the University of Washington for 2 analytes (see below). Analysis for one additional pesticide analyte by the MDH PHL is near completion.

All results have been mailed to participants. Families received a letter, tables with their child's results compared to the overall project average, and information sheets with practical tips on ways to reduce exposure to the chemicals. After the results mailing, staff called families whose children's results were notably high: children with 5 or more results above the 95th percentile and/or whose results were "extreme outliers" (defined as 4 times the 95th percentile). The purpose of the call was to discuss the results and answer any questions the family might have.

Background: Analytes measured

Air pollution biomarkers

- 6 metabolites of polycyclic aromatic hydrocarbons (PAHs). Several PAHs are known, probable, and possible carcinogens, and have been associated with adverse respiratory health outcomes, allergic sensitization in children, and developmental effects.
  - 1-hydroxypyrene (**1PYR**) reflects exposure to the parent PAH pyrene. Pyrene can be present in domestic heating sources, particularly wood burning, gasoline fuel exhaust, coal tar and asphalt, cigarette smoke, and grilled foods.
  - 1-hydroxynapthalene (**1NAP**) reflects exposure to the parent PAH naphthalene, found in cigarette smoke, exhaust from fossil fuels, and moth repellant. 1NAP is also a metabolite of the insecticide carbaryl (see below).
  - 2-hydroxynapthalene (**2NAP**) also reflects exposure to naphthalene, but is not a metabolite of carbaryl.
  - 2- and 3-hydroxyfluorene (**2FLUO and 3FLUO**) reflect exposure to the parent PAH fluorene, found in exhaust from vehicle emissions, coal tar, diesel, and cigarette smoke.

  - 3-hydroxyphenanthrene (**3PHEN**) reflects exposure to the parent PAH phenanthrene, found in diesel fuel exhaust, coal tar, and cigarette smoke. In particular, it has been found in particle emissions from natural gas combustion and municipal incinerator waste, and in ambient air near high vehicular traffic and industrial areas.
- 2 metabolites of 1-nitropyrene (1-NP), analyzed by the University of Washington: 6- and 8-hydroxy-1-nitropyrene (**6-OHNP and 8-OHNP)**. These metabolites may be a more specific measure of exposure to diesel exhaust, a key concern about air pollution exposure, than the other PAHs. Diesel exhaust is classified as a human carcinogen and associated with acute and chronic cardiovascular and respiratory disease.

Pesticide biomarkers

- 3 metabolites of organophosphate pesticide (OPs), a group of insecticides largely banned for residential use but still used in agriculture. Some OPs have been associated with cholineterase inhibition leading to neurotoxicity, and some are probable carcinogens.
  - 3,5,6-trichloro-2-pyridinol (**TCPY**) is a metabolite of chlorpyrifos. In Minnesota, chlorpyrifos is commonly used on agricultural crops including soybeans, corn, sugar beets, and wheat.
  - 4-nitrophenol (**4-NP**) is a metabolite of parathion and methyl parathion. Parathion is no longer used in Minnesota, but may be present as a residue on foods bought commercially.
  - 2-isopropyl-4-methyl-6-hydroxypyrimidine (**IMPY**) is a metabolite of diazinon. Diazinon is not heavily used for agriculture in Minnesota; it is primarily used on cattle with some use on vegetables and fruits.
- The parent compound 2,4-dichlorophenoxy acetic acid (**2,4-D**), a widely-used herbicide. Its most common use in Minnesota is on agricultural crops, though it is also approved for use on turf, ornamentals, garden and lawn, industrial, rights of way, and forestry. It is also an active ingredient in many commonly used lawn treatments in residential areas, including Turf Builder, Weed and Feed, Weed Control Plus Lawn Feed, and Weed B Gone. 2,4-D is a possible carcinogen.
- 3 metabolites of synthetic pyrethroids, commonly used insecticides in agricultural and residential settings. Some commonly used brand names comprising synthetic pyrethroids as the active ingredient include Raid, Hot Shot, and other types of bug bombs. Synthetic pyrethroids have been associated with endocrine disruption, and one (permethrin) is a likely carcinogen.
  - 3-phenoxybenzoic acid (**3-PBA**) is a metabolite of several synthetic pyrethroid insecticides, including cyhalothrin, cypermethrin, deltamethrin, fenopropathrin, permethrin, tralomethrin.
  - 4-fluoro-3-phenoxybenzoic acid (**4F3PBA**) is a metabolite of the synthetic pyrethroid cyfluthrin.

  - Trans-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid (**trans-DCCA**) is another metabolite of cypermethrin, cyfluthrin, and permethrin.
- The PAH metabolite 1-NAP is also a metabolite of carbaryl, an insecticide used both in residential and agricultural settings. Carbaryl is sold under the trade name Sevin.

Metal biomarkers. In addition to exposure sources outlined below, all five are detected in air sampling at North Minneapolis sites at higher concentrations than other locations in the Twin Cities.

- **Arsenic**, a naturally-occurring metal found at higher levels in groundwater in some parts of Minnesota including Western Minnesota. Arsenic is a contaminant of rice and fruit juice, among other food items. Arsenic is a known carcinogen, and has been associated with skin problems, nervous system effects, diabetes, and harm to neurodevelopment in children.
- **Chromium**, a metal used in various industrial processes. The metal chromium (chromium(0)) is used for making steel; chromium(VI) and chromium(III) are used for chrome plating, dyes and pigments, leather tanning, and wood preserving. Chromium III is an essential nutrient; chromium VI is a known carcinogen and reproductive and developmental toxicant.
- **Cobalt**, a metal used for many purposes in manufacturing, including as a hard metal alloy, a drying agent in paints and a component of porcelain enamel. It is also a constituent of vitamin B-12 (cobalamin). Cobalt is an essential nutrient at low doses; it has been associated with lung and heart effects at higher exposures and is a possible carcinogen.
- **Manganese**, another naturally-occurring metal found in groundwater in some parts of the state. At very low levels, manganese is an essential nutrient. Manganese is also a component of dithiocarbamate fungicides including mancozeb. Manganese has been associated with memory, attention, motor skills, and have developmental effects in infants.
- **Nickel**, a metal used to make stainless steel and, in combination with other elements, to form nickel compounds. Nickel has been associated with skin sensitivity/allergy and lung and kidney effects at higher exposures; some nickel compounds are possible carcinogens.

Population demographics

Table 1 shows demographic information for all children overall and by rural and urban status.

Table 1. Demographics

	Overall N (n=232)	Overall %		Rural N (n=128)	Rural %		Urban N (n=104)	Urban %
Age 3	111	48%		85	66%		26	25%
Age 4	75	32%		30	23%		45	43%
Age 5-6	41	18%		13	10%		28	27%
Age missing	5	2%		0			5	5%

	Overall N (n=232)	Overall %		Rural N (n=128)	Rural %		Urban N (n=104)	Urban %
Female	114	49%		60	47%		54	52%
Male	118	51%		68	53%		50	48%
Race/ethnicity* non-Hispanic white	113	49%		106	83%		7	7%
Race/ethnicity* black	62	27%		3	2%		59	57%
Race/ethnicity* Asian	23	10%		1	1%		22	21%
Race/ethnicity* Hispanic	18	8%		9	7%		9	9%
Race/ethnicity* other	12	5%		8	6%		4	4%
Race/ethnicity* refused/DK	4	2%		1	1%		3	3%
Interview language English	211	91%		122	95%		89	86%
Interview language Spanish	10	4%		6	5%		4	4%
Interview language Hmong	6	3%		0			6	6%
Interview language Somali	5	2%		0			5	5%
Maternal education: none, English Language Learner, elementary/middle school, some high school	29	13%		8	6%		21	20%
Maternal education: graduated high school/General Education Development (GED)	60	26%		25	20%		35	34%
Maternal education: some college/technical degree	83	36%		53	41%		30	29%
Maternal education: graduated college/advanced degree	55	24%		42	33%		13	13%
Maternal education: refused/DK/missing	5	2%		0			5	5%
Household income <$25,000	63	27%		14	11%		49	47%
Household income $25-50,000	59	25%		36	28%		23	22%
Household income $50-75,000	35	15%		21	16%		14	13%
Household income >$75,000	54	23%		49	38%		5	5%
Household income refused/DK	21	9%		8	6%		13	13%

	Overall N (n=232)	Overall %		Rural N (n=128)	Rural %		Urban N (n=104)	Urban %
Interview month: June 2018	25	11%		10	8%		15	14%
Interview month: July 2018	52	22%		23	18%		29	28%
Interview month: August 2018	117	50%		85	66%		32	31%
Interview month: Sept/Oct 2018	38	17%		10	8%		28	27%

* Race/ethnicity categories were created by combining two questions: one about race and one about Hispanic ethnicity. The categories are mutually exclusive, and were created to best reflect categories used in the National Health and Nutrition Examination Survey (NHANES).

Survey variables

Tables 2-4 show the distribution of survey variables for all children overall and by rural and urban status. Survey variables are broken down into those related to factors in the home (Table 2), those related to factors outside the home (Table 3), and those related to food consumption (Table 4).

Table 2. Survey variables: in the home

	Overall N (n=232)	Overall %		Rural N (n=128)	Rural %		Urban N (n=104)	Urban %
Live with a smoker	28	12%		11	9%		17	16%
Don't live with a smoker	203	88%		116	91%		87	84%
Live with a smoker: refused	1	0%		1	1%		0	0%
Public water	157	68%		55	43%		102	98%
Private well	70	30%		70	55%		0	
Water source: DK/missing	5	2%		3	3%		2	2%
Home primary drinking water: tap	108	47%		50	39%		58	56%
Home primary drinking water: bottled	51	22%		19	15%		32	31%
Home primary drinking water: softened	43	19%		41	32%		2	2%
Home primary drinking water: treated	28	12%		17	13%		11	11%
Home primary drinking water: other/missing	2	0%		1	1%		1	1%
Cooking fuel: electricity	129	56%		95	74%		34	33%
Cooking fuel: natural gas	87	38%		18	14%		69	66%

	Overall N (n=232)	Overall %		Rural N (n=128)	Rural %		Urban N (n=104)	Urban %
Cooking fuel: propane	16	7%		15	12%		1	1%
Candles: did not use last 3 days	194	84%		105	82%		89	86%
Candles: used once last 3 days	17	7%		11	9%		6	6%
Candles: used 2+ times last 3 days	16	7%		10	7%		6	6%
Candles: DK/missing	5	2%		2	2%		3	3%
Incense: did not use last 3 days	198	85%		119	93%		79	76%
Incense: used once last 3 days	14	6%		2	2%		12	12%
Incense: used 2+ times last 3 days	17	8%		6	4%		11	11%
Incense: DK/missing	3	1%		1	1%		2	2%
Home pesticide: did not use last 3 months	178	77%		98	77%		80	77%
Home pesticide: used once last 3 months	32	14%		22	17%		10	10%
Home pesticide: used 2+ times last 3 months	18	8%		7	6%		11	11%
Home pesticide: DK/missing	4	2%		1	1%		3	3%

Table 3. Survey variables: outside the home

	Overall N (n=232)	Overall %		Rural N (n=128)	Rural %		Urban N (n=104)	Urban %
Drive with a smoker	16	7%		6	5%		10	10%
Don’t drive with a smoker	212	91%		119	93%		93	89%
Drive with a smoker: refused/DK/missing	4	2%		3	3%		1	1%
Lawn pesticide: did not use last 3 months	122	53%		50	39%		72	69%
Lawn pesticide: used once last 3 months	55	24%		41	32%		14	13%
Lawn pesticide: used 2+ times last 3 months	44	19%		33	26%		11	11%
Lawn pesticide: DK/missing	11	5%		4	3%		7	7%
Live near (1/4 mi) major road	143	62%		69	54%		74	71%
Don’t live near major road	78	34%		56	44%		22	21%

	Overall N (n=232)	Overall %		Rural N (n=128)	Rural %		Urban N (n=104)	Urban %
Major road: DK/missing	11	4%		3	3%		8	8%
Time in car: <1 hr last 3 days	139	60%		79	62%		60	58%
Time in car: 1-6 hrs last 3 days	88	38%		48	38%		40	38%
Time in car: 6+ hrs last 3 days	2	1%		1	1%		1	1%
Time in car: DK/missing	3	1%		0			3	3%
Time spent outside: 0-1 hrs/day last 3 days	34	15%		8	6%		26	25%
Time spent outside: 2-3 hrs/day last 3 days	91	39%		50	39%		41	39%
Time spent outside: 4+ hrs/day last 3 days	95	41%		66	51%		19	27%
Time spent outside: refused/DK/missing	12	5%		4	3%		8	8%
Live on active farm				25	20%			
Don't live on active farm				103	80%			
Live near (1/4 mi) ag field*				78	61%			
Don't live near ag field				43	34%			
Ag field: DK/missing				7	6%			

* Of those who said they live near an agricultural field, the following crop types were reported: corn (n=40), soybeans (n=22), hay/alfalfa (n=21), potatoes (n=8), wheat (n=7), oats (n=2), turnips/radishes (n=1).

Table 4. Survey variables: food consumption

	Overall N (n=232)	Overall %		Rural N (n=128)	Rural %		Urban N (n=104)	Urban %
Grilled meat: did not eat last 24 hrs	185	80%		103	80%		82	79%
Grilled meat: ate 1 time last 24 hrs	27	12%		16	13%		11	11%
Grilled meat: ate 2+ times last 24 hrs	18	8%		8	6%		10	10%
Grilled meat: refused/DK/missing	2	1%		1	1%		1	1%
Smoked meat: did not eat last 24 hrs	215	93%		122	95%		93	89%
Smoked meat: ate 1+ times last 24 hrs	14	6%		5	4%		9	9%
Smoked meat: refused/DK/missing	3	1%		1	1%		2	2%

	Overall N (n=232)	Overall %		Rural N (n=128)	Rural %		Urban N (n=104)	Urban %
Fruit: ate 0-1 times/day last 3 days	44	19%		23	18%		21	20%
Fruit: ate 2 times/day last 3 days	81	35%		52	41%		29	28%
Fruit: ate 3 times/day last 3 days	70	30%		36	28%		34	33%
Fruit: ate 4+ times/day last 3 days	34	15%		15	12%		19	18%
Fruit: refused/DK/missing	3	1%		2	2%		1	1%
Vegetables: ate 0-1 times/day last 3 days	86	37%		32	25%		54	52%
Vegetables: ate 2 times/day last 3 days	81	35%		56	44%		25	24%
Vegetables: ate 3+ times/day last 3 days	61	26%		38	29%		23	23%
Vegetables: refused/DK/missing	4	2%		2	2%		2	2%
Rice: did not eat last 3 days	108	47%		91	71%		17	16%
Rice: ate 1 time/day last 3 days	87	38%		35	27%		52	50%
Rice: ate 2+ times/day last 3 days	32	14%		1	1%		31	29%
Rice: refused/DK/missing	5	2%		1	1%		4	4%
Seafood: did not eat last 3 days	179	77%		110	86%		69	66%
Seafood: ate 1+ time/day last 3 days	47	20%		17	13%		30	29%
Seafood: refused/DK/missing	6	3%		1	1%		5	5%
Always/mostly eat organic	33	14%		11	9%		22	21%
Sometimes eat organic	93	40%		52	41%		41	39%
Rarely/never eat organic	97	42%		62	48%		35	33%
Eat organic: DK	9	4%		3	2%		6	6%

Biomonitoring results

Tables 5 and 6 show the distribution of urinary analytes. Table 5 displays results for the overall population with comparison values from children of similar ages in the National Health and Nutrition Examination Survey (NHANES). Table 6 displays results for rural and urban children separately. Analytes that were statistically significantly different between rural and urban children, as assessed by a two-sample t-test, are noted in footnotes in Table 6.

Table 5. Biomonitoring results in overall population (n=232) with NHANES comparison

	% detect	Geometric mean (GM) (μg/L)	GM 95% Confidence Interval (CI)	95th percentile	NHANES GM* (μg/L)	NHANES GM 95% CI	NHANES 95th percentile
Arsenic	75%	4.2	3.7 – 4.8	23	4.1	3.6 – 4.6	22
Chromium	26%	**	**	0.73	N/A	N/A	N/A
Cobalt	94%	0.37	0.33 – 0.41	1.1	0.43	0.40 – 0.46	1.6
Manganese	19%	**	**	1.4	**	**	0.37
Nickel	88%	1.1	0.93 – 1.2	5.1	N/A	N/A	N/A
1-PYR	82%	0.081	0.075 – 0.087	0.29	0.13	0.12 – 0.15	0.54
1-NAP	98%	0.48	0.41 – 0.56	4.3	0.80	0.69 – 0.92	5.1
2-NAP	100%	4.0	3.4 – 4.6	25	3.0	2.6 – 3.6	19
2-FLU	100%	0.12	0.11 – 0.14	0.72	0.12	0.11 – 0.13	0.55
3-FLU	96%	0.045	0.039 – 0.051	0.21	0.058	0.052 – 0.064	0.27
3-PHEN	96%	0.061	0.053 – 0.071	0.44	0.055	0.048 – 0.063	0.29
6-OHNP	81%	0.0001	0.00008 – 0.00012	0.001	N/A	N/A	N/A
8-OHNP	95%	0.00012	0.00010 – 00.00013	0.0007	N/A	N/A	N/A
TCPY	95%	0.87	0.75 – 1.0	4.7	1.1	0.90 – 1.4	5.7
4-NP	97%	0.57	0.50 – 0.64	3.2	0.51	0.43 – 0.60	2.9
IMPY	25%	**	**	0.5	**	**	0.4
2,4-D	89%	0.36	0.31 – 0.42	2.4	0.39	0.33 – 0.45	1.6
3PBA	87%	0.39	0.33 – 0.46	2.7	0.55	0.39 – 0.77	8.5
4F3PBA	4%	**	**	0.07	**	**	**
transDCCA	47%	**	**	1.9	**	**	8.6

* NHANES comparison population varies by chemical class: for metals, children age 3-5 from NHANES 2015-2016; for PAHs, children age 6-11 from NHANES 2013-2014; for pesticides, children age 6-11 from NHANES 2009-2010.

** GM not calculated because detection frequency was less than 50%.

Table 6. Biomonitoring results in rural and urban kids

	Rural kids: % detect (n=128)	Rural kids: Geometric mean (μg/L)	Rural kids: 95th percentile		Urban kids: % detect (n=104)	Urban kids: Geometric mean (μg/L)	Urban kids: 95th percentile
Arsenic	73%	3.8	17.8		77%	4.8	30.4
Chromium	24%	**	0.6		29%	**	1.1

	Rural kids: % detect (n=128)	Rural kids: Geometric mean (μg/L)	Rural kids: 95th percentile		Urban kids: % detect (n=104)	Urban kids: Geometric mean (μg/L)	Urban kids: 95th percentile
Cobalt	94%	0.36	1.0		95%	0.38	1.7
Manganese	20%	**	1.6		18%	**	1.1
Nickel	89%	1.1	5.2		88%	1.0	3.8
1-PYR	77%	0.075	0.24		88%	0.089[a]	0.33
1-NAP	98%	0.50	0.35		97%	0.44	0.80
2-NAP	100%	3.1	15.0		100%	5.5 [a]	55.2
2-FLU	100%	0.12	0.70		100%	0.13	0.72
3-FLU	95%	0.040	0.21		97%	0.051	0.21
3-PHEN	93%	0.045	0.27		99%	0.090 [a]	0.49
6-OHNP	81%	0.0001	0.001		80%	0.0001	0.0007
8-OHNP	98%	0.00012	0.0008		92%	0.00011	0.0005
TCPY	94%	0.90	4.8		96%	0.83	4.6
4-NP	96%	0.52	2.0		98%	0.63	3.9
IMPY	21%	**	0.5		29%	**	0.6
2,4-D	94%	0.43	2.4		84%	0.29[b]	1.9
3PBA	90%	0.44	3.1		83%	0.33	1.5
4F3PBA	4%	**	0.07		5%	**	0.07
transDCCA	52%	0.36	2.1		40%	**	1.6

** GM not calculated because detection frequency was less than 50%.

[a] GMs for urban children are statistically significantly higher than those for rural children ($p < 0.05$).

[b] GMs for urban children are statistically significantly lower than those for rural children ($p < 0.05$).

Next steps

Preliminary analyses of univariate and multivariate associations between survey variables and biomonitoring results will be presented at the June Advisory Panel meeting.

Future analyses to be conducted include:

- Relationship between updated GIS variables (presented at June 2019 Advisory Panel meeting) and biomonitoring/survey variables
- Relationship between area-level air monitoring for metals and PAHs conducted by the Minnesota Pollution Control Agency (MPCA) and biomonitoring results
- Analysis of biomonitoring results for ETU, a metabolite of mancozeb (a fungicide used on potatoes), when lab data available

- Adjustment of models for creatinine, a measure of urine dilution

Once analyses and results interpretation are complete, they will be summarized in a Community Report along with public health messaging about the chemicals included in the project. The Report will be mailed to all participants, shared with partners, and released more broadly to the communities and the public.

Questions for the Panel

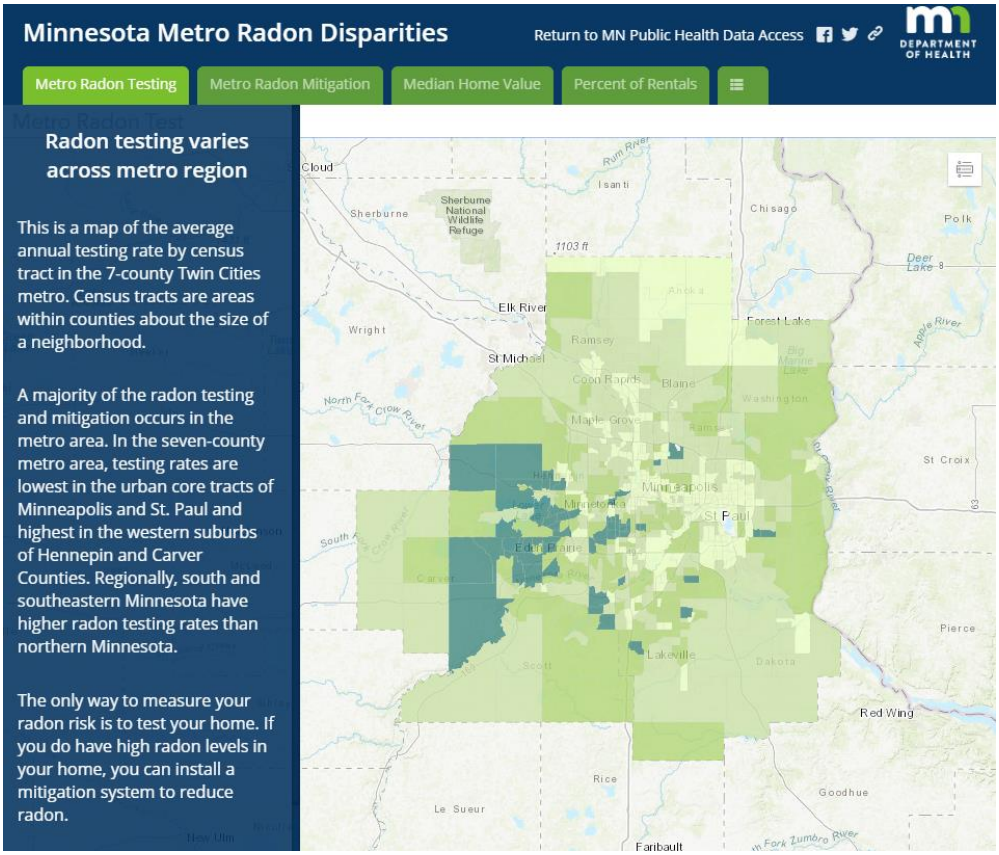
- Are there additional analyses the Panel recommends?
- What are the Panel's suggestions for analyses and results messaging when the two populations of children are so different from one another?

MN Tracking Program Updates

Since October 2019 (when Tracking Program last provided written updates to Advisory Panel), we have added content and features to the data portal.

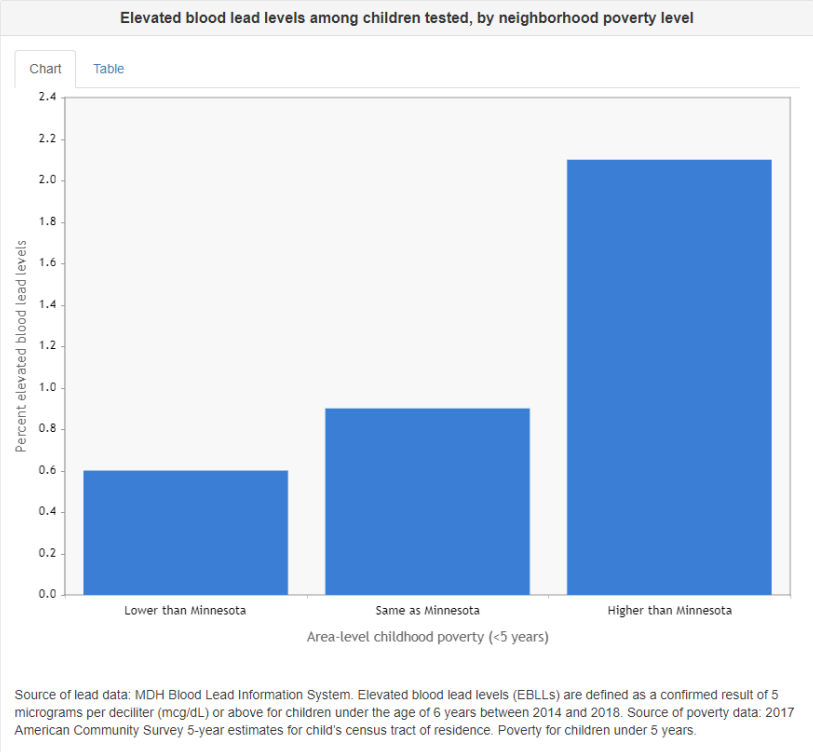
Story Map on radon mitigation disparities

Now available at Minnesota Metro Mitigation Disparities or go to https://data.web.health.state.mn.us/radon and navigate to maps.



Launched health equity charts

New health equity project shows inequities in childhood asthma and lead exposure by poverty level compared to the statewide average, with plans to expand indicators in partnership with data stewards and MDH Center for Health Equity. Go to https://data.web.health.state.mn.us/web/mndata/equity



Other highlights

- Updated school immunization maps down to individual school level in partnership with Vaccine Preventable Disease data steward. Go to https://data.web.health.state.mn.us/web/mndata/immunization_school and navigate to maps.
- Poverty maps are now available by census tract (https://mndatamaps.web.health.state.mn.us/interactive/povertytract.html) using American Community Survey data, supporting health equity project. We also added information on how the neighborhood compares to the statewide average.

Climate related environmental health concerns

Central content source for all climate related portal topics. While we will all feel some impacts of climate change, it's important to understand that it will increase certain health risks. Climate change will disproportionately impact many of the communities that already experience health inequities, or systemic differences in health status that are preventable and unfair. In order to make our communities stronger, more resilient, in the face of climate change, we must focus on reducing health inequities.

COVID-19 Response by Biomonitoring and Tracking Staff

As of May 29, three quarters (6 of 8) of Environmental Health Tracking & Biomonitoring (EHTB) staff have been reassigned to the COVID response, as well as two administrative support staff.

- Kate Murray has been reassigned full time as Assistant Lead for the Cross-Cutting Issues & Communities Branch of the Incident Command System. She is working with partners from across communities, local public health, MDH, and other State agencies to coordinate response efforts related to housing, schools and childcare, people with disabilities, and Greater Minnesota.
- Jessie Shmool has been reassigned full time as the co-lead of the Data and Forecasting Team, coordinating data analyses and responding to external data requests on COVID testing, cases, and syndromic surveillance.
- Jen Plum has been reassigned full time to COVID case investigation, conducting initial calls to positive cases to ascertain potential contacts, and spends much of that time as room lead for case investigators.
- Jessica Nelson has been reassigned to COVID case investigation as well.
- Kathy Raleigh has been reassigned part time to the Data and Forecasting Team, performing data management and analysis for COVID response. She is also volunteering on the public hotline.
- Lynn Treadwell has been reassigned part time to the public hotline, answering questions from the general public.
- Patti Stoika and Sarah Martin provide administrative support for EHTB and have both been reassigned full time to COVID response.

At this time the impact to Environmental Laboratory (ENV) biomonitoring staff has been relatively minimal. Lisa Strong from the Biomonitoring and Emerging Contaminants Unit has been temporarily reassigned 100% of her time to a role in the Public Health Laboratory Division (PHL) logistic branch of emergency response.

Laboratory staff have been identified as potential surge capacity and replacement analysts for the Infectious Disease and Newborn Screen Sections within PHL. Sample Receiving Unit staff within ENV have been assisting in the COVID-19 response in part by helping prepare specimen collection swabbing kits for distribution to high priority collection sites.

The national COVID-19 response has also impacted our CDC state biomonitoring program partners with most of them having been rotated into a response role supporting CDC activities. These reassignments have been of a fixed nature and our primary contact, Kristin Dortch, who attended the February Advisory Panel meeting, will be back in her biomonitoring role beginning in June. The COVID-19 crisis has impacted the level of technical support we can currently receive from CDC. We had plans to have MDH chemists travel to CDC for onsite method training and technology transfer, however the imposed travel restrictions and visitation policies at CDC have postponed these opportunities. These circumstances will likely cause some delays in method development, though the full impact is not known at this time.

2020 Upcoming Advisory Panel Meeting Dates

Advisory Panel meetings in 2020:

October 13, 2020

This meeting will take place from 1-4 pm at

The American Lung Association of Minnesota

490 Concordia Avenue

St Paul, Minnesota