**Welcome and introductions**

Chair Pat McGovern welcomed the attendees and invited the panel members and audience to introduce themselves. Jean Johnson, Director of the Environmental Public Health Tracking and Biomonitoring Program, informed the panel of David DeGroote’s appointment expiring on the first of the year. Although David had reapplied for his seat, the appointing authority was the House of Representatives, and the Secretary of State’s Office had not yet received the House’s choice for the panel. Jean also notified the panel of two articles published in the December 2014 Journal of Environmental Health. Both articles involved the PFC Biomonitoring project and appeared in the Advancement of the Science section of the journal. The first article was entitled Biomonitoring for Perfluorochemicals in a Minnesota Community With Known Drinking Water Contamination, and the second article, “Communicating About Biomonitoring and the Results of a Community-Based Project: A Case Study on One State’s Experience.” The journal is published by the National Environmental Health Association. Pat McGovern led the panel in a congratulatory round of applause for the work that went into the journal articles.

**Blood Spot Project Results Update**

Background materials for this presentation were found on pages 5-8 of the February 10, 2015 Advisory Panel book. Jessica Nelson introduced Addis Teshome, epidemiologist with MN Biomonitoring. Together they presented updates on three MN Biomonitoring projects that were using available specimens from other studies in Minnesota to investigate mercury levels in newborns and pregnant women.

Jessica reviewed the reason for doing the studies as a follow up to the Mercury in Lake Superior Newborns Study. The two main reasons were to assess whether measuring mercury in newborn bloodspots was a reliable way to estimate newborn exposure to mercury, and to explore the extent of newborn exposure to metals in Minnesota. They were essentially validating the question of how did measurements in the bloodspots compare to measurements in other commonly used biomarkers.

The first study, the Pregnancy & Newborns Exposure Study, which was part of the larger University of Minnesota TIDES study, measured a small urban sample (48) of paired newborn bloodspots and cord blood. The second study, the Riverside Newborn Mercury Project, also part of a larger University of Minnesota Riverside Birth Study (RBS), sampled from the same clinical population as the TIDES study and had new results. Finally, there was the National Children’s Study, which had three samples from the mom-baby pairs: the newborn bloodspot, cord blood and maternal blood. When cord blood was tested, it was also tested for lead and cadmium, as well as mercury, something that was not yet available for bloodspots.

The Riverside Newborn Mercury Study, a University of Minnesota study, recruited pregnant women receiving prenatal care and giving birth at Fairview Riverside Hospital from 2008 to 2010. The goal of the study was to
characterize newborn mercury exposures in various Minnesota communities. The women filled out questionnaires and provided specimens specifically for this study. Newborn bloodspot samples (160) were sent to the Minnesota Department of Health Public Health Laboratory for routine metal analysis using ICP-MS. An unexpected finding was that mercury was detected in blanks taken from bloodspot filter paper of 11 samples, or 7%. There was a concern that this was related to a sticker on the filters, but further investigation revealed that this was not the case. 63 samples or about 40% of the samples were below the MDL and so they had been assigned a value equal to MDL/√2.

Addis presented a table comparing the results of newborn blood spot testing and explained that the RBS and TIDES studies were quite similar. Of importance, she noted, was that there were a lower proportion of samples with levels above the 5.8 reference level (1.3%), with no drastically high levels, although the RBS had a relatively limited dataset. Addis continued that the next steps involved analyzing the association with demographic factors and survey responses and exploring combining the RBS data with TIDES data.

Jessica reminded the panel that the Pregnancy and Newborns Exposure Study found that newborn bloodspot mercury levels on average were lower than cord blood levels, with a ratio of 0.85 ±0.4. Split lab experiments revealed that differing lab methods may have accounted for any discrepancy. The findings were limited by a small sample size, particularly those 16 samples with metal detected in spot and cord blood.

Jessica asked Chair Pat McGovern to update the panel on the National Children’s Study status, as she had conducted the Minnesota portion of the study. Pat explained that the study convened an advisory panel to look at recommendations of the study going forward. They decided if they could not agree on a design going forward, they would rechannel the funding to projects involving children’s environmental health, effectively ending the controversial study. Jessica added that the program office was still working with MDH - Environmental Epidemiology; they wanted to be sure that the projects underway could be completed, while they were closing down shop.

The update on the analysis of samples from the National Children’s Study was a confusing one. The lab had completed the analyses of the bloodspots, the cord blood and the maternal blood, but there were some unexpected results, especially for the bloodspots, and a concern that there had been mercury contamination that had occurred in the collection or processing. As MN Biomonitoring was not sure what to make of that, the NCS was providing assistance with investigating whether contamination could have occurred along the way. They had already provided the mothers’ demographic and survey data, and Jessica stated that they were continuing their analysis.

Lastly, Jessica reminded the panel of the current MN FEET project, and how that project would fit into these studies. With input from the panel and the smaller mercury studies, the biomonitoring team had designed MN FEET to help answer some of the same questions. MN FEET’s ancillary study would also add a greater sample size (roughly 300) for bloodspot and cord blood comparison, which was a validation that had been requested nationwide. Since the choice had been made to collect bloodspot samples from the subset of women with higher cord blood levels, we would have a high number of detectable bloodspot samples that would enable this validation to be done. MN FEET’s large sample size (600 cord blood, urine and 300 bloodspots) would also lead to the ability to characterize newborn exposures and the sources of the exposure. Even though it currently had a metro area focus of certain communities, she hoped to expand to non-metro parts of the state in the future. The team had designed the study to look at disparities in exposure in four groups, Hmong, Latina, Somali and White women.

Discussion

The following question was asked of the panel: Does the panel have any recommendations for additional analyses, data interpretation, or next steps? Greg Pratt inquired about the systematic difference between the
bloodspot and blanks, with the mercury in the bloodspot sometimes being lower than the mercury found in the bloodspot blanks. What was the magnitude of the mercury levels in the blanks or the difference between the levels? Jessica responded that in the TIDES Study, they had not seen any mercury levels in the blanks. Betsy Edhlund added that most of the time, the blanks had lower levels of mercury than the bloodspots and that the Riverside study had levels of 0.7-1.4 µg/L mercury in blanks.

Bruce Alexander asked about the adjustments done for the blanks in the sample, how did Jessica design this? Jessica responded that Utah had done this already and that had been the method she was using. Utah had mercury in their blank samples as well, and they had been subtracting them, as there could have been contamination.

Bruce also asked for clarification from Jessica as to whom she was working with to recruit participants for the MN FEET study, as that had been a challenge for the RBS project. Jessica described the design of MN FEET as going through prenatal clinics, working with the research arms of Health Partners and West Side Community Health Services, with five or six prenatal clinics, and they would actually be pulling from their patient lists and doing a combination of a phone call and a letter. To optimize recruitment, we were pairing with a community outreach effort and some provider education, so it seemed the most powerful way for a woman to hear about this would be through their provider. This was a change from our original plan of recruiting directly in the clinics, but that had to be changed due to limited appointment time at the clinic. So now it would be a random sample of patients being sent a letter and then having a follow-up phone call.

Bruce asked whom the community outreach was being done through. Jessica responded that the team had worked with Hmong, Latina, Somali and White women, and the groups we had been talking with were St. Paul Ramsey Public Health, due to their great community outreach to those groups. They had offered to connect us with radio shows and other groups. We had also worked with the research arm of West Side Community Health Services, which was a group of community-based researchers from Somalia, Latina and Hmong communities (SoLaHmo). Pat McGovern added that it sounded as though the team had done a nice job of getting the right groups to the table.

**Biomonitoring Updates**

Carin Huset described the updates to the PFC laboratory method. Since PFNA was a new analyte (it was not included in previous studies), the previous method required revalidation. During this revalidation, she encountered problems with reproducibility and chose to make changes to the method to make it more reproducible, more robust, and higher throughput. The new method (described on page 11 of the February 10, 2015 advisory panel background material book) increases the number of unknown samples that could be analyzed from about 30 to about 60 at a time. Some of the changes she described: previously they had stable isotope labeled internal standards for six of the seven analytes, now they have internal standards for all analytes; they decreased the volume of sample used for the analysis. The new method of sample preparation involves protein precipitation to remove proteins that were causing problems with reproducibility and robustness. When the proteins are precipitated, the sample is a lot simpler to work with. The validation includes pooled quality controls that were measured repeatedly during validation and then pairs (of low and high standards) that are analyzed with each batch of unknowns; this is what the CDC does for their biomonitoring standards and what MDH has done for their CDC- Laboratory Response Network Program. Another change from 2010 is increased options for proficiency testing. There are more analytes available for external proficiency testing; now there are five analytes instead of just two, which gets beyond one of our previous limitations. Carin explained that proficiency testing is when an external company would develop samples, send them to MDH (and other labs) and MDH (and the other labs) send back results for the analysis. The external company analyzes the results of all the participating labs and provides a report back to the
participating labs on their performance. Carin also described the lengthy process of testing the methods for PFCs due to their presence in many consumer products and lab products. We had to make sure there were low levels in background before we could begin. We also had to be sure the results determined by the new method were comparable to results from previous studies (which were originally analyzed with the old method). They pulled samples from the 2008 study; they were comparable within +- 20% (the number used to assess duplicates).

Carin reported on the current status of 490 samples completed for the GLRI study, and 150 samples analyzed for the PFC3 project.

Geary Olsen asked Carin to go back to the PFOA graph and asked if there were more samples than was shown. Carin responded that they only had been given three samples three times a year. Gary wondered if Carin knew why they did not have samples that had PFOA at levels more similar to what is observed in the general population, because the numbers shown were quite high and it made it too easy to reach the middle. Carin was not sure if they were historical or spiked samples, but she agreed that the levels were high relative to what is observed, and many of the samples needed to be diluted by MDH in order to report the values.

Geary Olsen asked whether PFBA was one of the analytes looked at, but not shown in the external QC. Carin explained that they were in the internal, but not external QC. She added that as far as she could tell, MDH’s Public Health Laboratory was one of the few labs looking for PFBA at this time, and that she had been asked to describe the process to other labs in the country.

Hearing no other questions for Carin, Jean announced that during the refreshment break, she would give an update on progress with our work plan for Sustaining Minnesota Biomonitoring by playing a portion of Jessica Nelson’s interview with Commissioner Ehlinger about MN Biomonitoring on A Public Health Journal.

East Metro Community Cancer Report

Kenneth Adams, Minnesota Cancer Surveillance System, presented a data update to the 2007 East Metro Community Cancer Report. Full background materials can be found on pages 17-38 of the February 10, 2015 Advisory Panel Meeting Book. Kenneth referred the panel to the background and methods on pages 23-26; results in text form on pages 26-29, and specifically, the county level results on pages 30-33, upon which his presentation was focused.

Kenneth gave a tutorial on understanding cancer statistics, including case counts, rates, and age-adjusted rates. The number of individuals with cancer in Minnesota is increasing each year, which is consistent with many peoples’ perception from their daily lives. One reason cancer is becoming more common is that the state’s population is increasing, especially in the suburbs. For example, the combined population of Washington and Dakota Counties grew from 390,000 to 650,000, or 68%, between 1988 and 2012. Epidemiologists often express cancer occurrence in terms of crude rates as a way to account for changes in population size over time, and differences in population size between places. A second reason more cancers are occurring is that the population is aging, and cancer was often a disease of aging. In 1990, a typical adult in Washington or Dakota Counties was 30-35 years old, but in 2010, the typical age has increased to 50-55 years. Epidemiologists age-adjust rates to take account of both the increase in population and the aging of the population; this allows rates to be compared over calendar time. In contrast with cancer counts in Washington and Dakota Counties, age-adjusted cancer rates have been fairly steady over the past 25 years (based on data through 2012).

Kenneth then presented results from new analyses that MCSS has prepared. These new analyses will be compiled into a new report, which will update the 2007 MCSS Report: Cancer Incidence in Dakota and Washington Counties. The new data update replicates the key results of the 2007 report, and adds new results based on data collected by the cancer registry up through 2012. The data update is based on indirect standardization, which is the same standard epidemiologic methodology used in the 2007 report. Kenneth reviewed the statistics and results presented in the report.
The methods used were indirect age standardization for the observed population, county or community. This was the aggregated or the observed number of cases overall, in an area, in our registry for this time period. The reference population or comparison population, for county level analyses, was the State of Minnesota. A key statistic was the number of “expected” cases, which was the number of cases that would be expected if the observed population had the cancer experience of the reference population. This statistic was compared with the observed cases, the number of cases that actually had occurred in the county or community.

Kenneth then reviewed the tables starting on page 30 of the background materials book, clarifying the following definitions for understanding the report update results:

**Cases Observed** was the MCSS registry count of newly diagnosed cancers among Minnesota residents. **Cases Expected** was a modeled estimate of the number of cases that would occur if the observed population (the county or the community) had the same cancer rates as the reference population (e.g., the State of Minnesota). The **Observed-to-Expected Difference** estimated the potential public health impact, and was similar to risk difference; the **Observed-to-Expected Ratio** corresponded to relative risk; the **95% Confidence Interval** was the range of plausible estimates for the observed-to-expected ratio.

The county-level analysis included over 200 separate statistical results. The following steps had been taken to identify or characterize unusually high occurrence of cancer: the initial step was to identify those results that were statistically significant. Further steps were to consider or evaluate the consistency over calendar time and between males and females; the magnitude of estimates, as differences and as ratios; the confidence interval width, the potential variability of the estimates.

The results represented or characterized the overall cancer experience of the observed population over the calendar interval evaluated. The results represented the combined effect of all known and unknown environmental, genetic and biological factors influencing cancer risk, including chance and random variability. They were not specific to any putative environmental exposure. Kenneth felt the results answered the question of whether the cancer experience of the community was unusual in the every-day meaning of the term “unusual”. They also provided information and could educate on the nature of cancer—that it was very common and the occurrence was highly variable over time and place.

Kenneth pointed out that most results are not consistent across calendar periods. An exception was Washington County males, where the number of observed lung cancer cases was less than expected in both calendar periods, and Dakota County females, where the number of observed breast cancer cases was greater than expected in both calendar periods. He also noted that among Minnesota’s 87 counties, the age-adjusted breast cancer rates ranged from 63 to 161 cases per 100,000 annually, from 2003 to 2012. The numbers of new cases were higher than expected for some cancer types and lower than expected for others. Most did not differ. He explained that this was not surprising; cancer rates were known to vary considerably over time and place. Few of the differences were consistent over calendar time or between males and females, and in most, but not all analyses the magnitude of difference was not large. Overall, these results did not suggest that occurrence of cancer in Washington or Dakota Counties was unusually high. A notable exception was breast cancer. More newly diagnosed breast cancer cases were observed in Washington and Dakota Counties than expected. Among 87 counties in Minnesota, Washington County had the 8th highest rate of female breast cancer and Dakota County had the 15th highest rate, over the time period 2003 to 2012.

**Discussion**

Greg Pratt commented that cancer rates vary in time and space and he asked Kenneth how he had calculated the expected rates. Kenneth responded by reviewing the indirect standardization methodology used in the analysis.
Fred Anderson asked whether the report was online, and what the next steps were for publishing. Kenneth replied that he, Alan Bender and Jean Johnson would discuss it. Jean noted that she would like it to be ready when the PFC biomonitoring results were distributed in the spring, so that participants could have their questions answered.

Pat McGovern wondered about the biological plausibility that PFCs cause cancer. Bruce Alexander responded that bladder, pancreas and liver cancers have come up in small studies, and kidney cancer has not really borne out. He added that in the Cottage Grove plant of workers with high exposure, there were no obvious cancer results.

Jill Heins-Nesvold asked how the 8 zip codes had been selected in Washington County. Jean answered that they had been based on the PFC plume, it included every zip code in the plume. Jill added that one additional explanation for the breast cancer result could be that Washington County was the most affluent county in Minnesota. She wondered whether we could look at the percentage of females who had gotten mammograms to see if there was an interesting correlation.

Pat McGovern noted that the community might want more information on known factors associated with breast cancer. The residents may have questions they would want to ask their providers, so the information would need to be put into context. Lisa Yost agreed and wondered whether there would be a follow up or whether we would look further into other risk factors? She questioned whether there was the ability to drill down in the data? Kenneth answered that they could not drill down or explain away; breast cancer was somewhat modifiable. People have been educated to take steps to minimize the cancer risk, such as eating more healthy foods and getting a mammogram. Fred Anderson wondered if we could somehow adjust or account for the confounder of access to care. Margee Brown, Minnesota Cancer Surveillance System, responded that delaying childbearing also would need to be considered.

Jean Johnson asked the panel for the best way to present this information to the public, the key messages.

Geary Olsen noted that a study had been done for the plume in Washington County, for issues revolving around eight communities. 3M and the University of Minnesota published occupational cohort, cancer incidence and mortality data for the plant and they found no association with breast cancer in 800 women. The C8 Science Panel out of Washington found that breast cancer was not an issue. IARC found possible for testicular and kidney cancers. Geary recommended that we needed to understand the Dakota and Washington County mortality rates before we released the information to the public. Bruce Alexander commented that if you were to go to the community to say that there was higher breast cancer in Oakdale; they would think it was because of the PFCs, so we would have to put it in context of information on PFCs and breast cancer.

Jean Johnson asked Fred Anderson if the county had information on risk factor data, such as delayed childbearing or access to care? Fred thought that the planners had some information. He added that there were also other health cluster concerns in Washington County, such as brain cancer in Stillwater; various cancers in a mining area; if there might be a contextual component, then we would need to be ready to discuss future concerns.

Pat McGovern asked whether Jean wanted any input from the panel on the message as it was being written. Bruce suggested we talk to the breast cancer prevention program at MDH. Prostate cancer might be another one. He added that Kenneth’s initial graphs showing population over time were important.

Lisa Yost wondered if we were attempting to link with exposure from biomonitoring? Jean Johnson answered that were not. Geary Olsen added that C8 study looked at multiple exposures of PFCs in a fluoropolymer plant, included a known kidney cancer toxicant (PTFE) and found no excess kidney cancer in 3M plant.
Greg Pratt referred to the graph with the counties—those with the highest breast cancer rates—did we know anything about those counties? Kenneth answered that they are rural with smaller populations.

Jill Heins-Nesvold said that the population doubling had been a good point. The population in and out was changing and the population brought in and took out cancers with them. Kenneth Adams added that cancer followed where the person moved. Jean Johnson said that in the past, in St. Louis Park, MDH looked at whether the Jewish population could have had an influence on the breast cancer rates, due to known higher rates in Jewish women. She also mentioned looking at the smoking prevalence to put the lung cancer findings into context.

Fred commented that this was really helpful from a Washington County perspective. Many departments get questions when reports come out, so programs will need some talking points. Kenneth offered, if anyone requested, to provide the zip code results.

**Tracking Updates**

Matthew Montesano gave a portal demonstration of the new Interactive Asthma Hospitalization map, part of a new interactive portal system. Matthew explained that it was mobile compatible, which affected about 20% of the traffic to the portal. He described the new system as integrated with an intuitive interface, there was county and zip code data on the same page, and that it was more efficient to build, maintain and improve. It was a simplified design, using the principle that if you had to explain something, it was not very good. Other updates could be found on pages 43-47 of the February 10, 2015 Advisory Panel background book.

Geary Olsen asked if there had been an example of data on the portal leading to a request of the Minnesota Department of Health to do a cluster investigation, with MDH subsequently agreeing to do so? Matthew added that he did not know of anything directly coming from someone searching and then contacting the department. It does happen when the media highlights an issue.

Greg Pratt asked if Matthew knew a breakdown of how people were getting to the portal. Lisa Yost wondered how easy it was for people to have direct contact with the program about something they saw on the portal. Matthew replied that they received about one to two emails per month. Bruce Alexander suggested that the asthma hospitalization rates by zip code would benefit from adding the time period to the legend. Dan Tranter asked how many unique visitors the portal had per year. Mathew responded that unique visits were not tracked anymore; google changed their analytics to sessions, so 3000 sessions per month was about 2000 users per month. Jean Johnson added that they now had a new audience of portal users; 2/3 of the portal users were academics due to recent outreach.
East Metro PFC3 Biomonitoring Project Update

Christina Rosebush presented an update on the progress of the PFC3 Biomonitoring project. Background materials were found on pages 47-51 of the February 10, 2015 Advisory Panel meeting book.

She reviewed the key questions the study had been designed to ask:

- Had PFC levels continued to decline in long-term East Metro residents?
- In new Oakdale residents, were PFC levels comparable to U.S. general population?
- Was there an association between length of residence in Oakdale since October 2006 and PFC levels?

Christina gave an update on recruitment, which began in February of 2014 and was completed in January of 2015. There were three study groups recruited, the Original Cohort group, New Residents and New Renters.

There were recruitment delays, Christina explained, due to the two-step process for recruiting the New Residents. First, a household survey was sent to identify eligible individuals, then participants were randomly selected and invited to participate. Additionally, a New Renters sample was added in August, first identifying the sampling frame through Washington County Housing and Redevelopment Authority, then repeating the two-step process of a household survey and individual recruitment.

She continued that the participation from the New Resident groups (49%) was, as expected, lower than the response from the Original Cohort (89%). They had not participated previously and many were unaware of PFC history in the East Metro.

Age was significantly different among the 3 groups: Original Cohort, New Residents, and New Renters. Within the New Residents group, Renters were slightly older—one of the HRA properties was a Senior Living facility. Length of residence was significantly longer for The Original Cohort, which was expected because eligibility for these groups was based on residence (<1/2005 for Original Cohort).

Christina noted that race/ethnicity was significantly different among the 3 groups. Looking only at New Residents and New Renters, there was still a significant difference in Race/ethnicity. Most of the Non-white New Renters were Black/African-American or African. Among all New Residents, the other Non-White groups were White/Hispanic and Asian.

Christina continued that Income was significantly different among the three groups. It was also significantly different when looking just at New Residents and Renters. HRA records were used to identify Renters, and there were income requirements for renting through the HRA. Income requirements varied by HRA property.

The analysis plan for the Original Cohort, Christina explained, would be to compare their results to the NHANES 2011-12 data and compare the percent change for PFOS, PFDA and PFHxS since the 2008 and 2010 Minnesota Department of Health PFC projects. For New Residents, she would compare the levels to NHANES data from 2011-2012 and also analyze the association between length of residence since the water treatment intervention and their PFC levels.

Regarding half-lives of these chemicals, Christina mentioned plans to do an elimination rate calculation to check that it was consistent with published ½ lives. It would not be a true half-life because we did not have control over all sources of exposure. At some of the low PFC levels seen even in the Original Cohort, other sources of exposure might be significant (unlike occupational studies where PFC levels were so high that other sources were not as significant).

Christina noted some possibilities for the new renter analysis. Since the new renters were limited by a small sample size of 19, she proposed to test PFC levels in New Residents versus New Renters. If there were no differences found, they could be grouped together in analysis. Alternatively, all the results could be presented...
separately due to significant demographic differences. Another possibility would be to take the six Renters identified through the Oakdale water billing records (now part of the New Residents) and add them to the New Renters group for sensitivity analysis.

Christina posed the following questions for the panel:

- Given that we only had a small number of Renters, should New Renters be grouped with New Residents for analysis?
- Did the Panel have other comments/recommendations for the analysis plan?

Discussion

Bruce Alexander asked what the real question was, Renters or socioeconomic status? Christina explained that the Original Cohort had excluded Renters, so that was why they had been added. Geary Olsen commented that MN Biomonitoring could not analyze Renters; there were only 4 males in the group and they could become identifiable. He was not sure how to get around it, other than to not group them by gender and collapse them into a non-gender group. He added that 19 people was a small sample size regardless. Bruce Alexander added that you could argue that because we have included Renters, representative of a New Resident group, that could lead to an argument to look at them combined. You could look at it by income and race in one group. Geary Olsen commented that New Residents and New Renters all were on municipal water in Oakdale, so the only difference was demographics. The one exposure in common was Oakdale water, so collapsing them together made sense. Bruce wondered if Christina had specific information on non-respondents, to which Christina replied that she did not. Greg Pratt proposed looking at the significant differences and lumping them together if there were none. The question he would ask was what if there were differences in two groups for some PFCs. Do the power calculation to see what difference could be detected with 19, if that was enough.

Christina reviewed the power calculation; GM differences between 1-2 ug/mL could be detected, but the question of what difference was clinically significant remains. What would we do if we saw significant differences? Was there an argument to keep the groups separate? Lisa Yost asked what the main question was--that now that everyone was on the same water supply, was it the difference between Renters and homeowners--or compared to NHANES. She suggested combining the groups and looking at PFC differences by income.

Jeanne Ayers discussed the fact the original study had not brought in the racial inequity piece – the Renter population was added as a strategy to get to a more diverse sample. The income/race analysis was an important one—it was not about renting or not, but to get at the socioeconomic factors. For Advancing Health Equity—if everything was done based on home ownership, people are left out. Only 20-25% of people in minority groups are homeowners. Christina clarified that this was not a sample of all renters in Oakdale; it was just renters from a few properties. She added that it was more difficult to reach out to renters. Jeanne Ayers replied that it was not as pure a design, not perfect, but its intentionality was improved.

Lisa Yost wondered whether participants were compensated, to which Christina responded that they received a $25 gift card. Bruce Alexander asked what the comparison would be in the results that would be returned to participants, to which Christina answered NHANES.

Geary Olsen asked what percent of the NHANES sample could have been from Washington County. Christina said we do have estimates regarding the inclusion of Washington County residents in NHANES 2011-12 that she could compile for the next panel meeting.

Jean Johnson asked, based on the new information the panel had just seen, whether the team had answered the rental/race disparity question. Jeanne Ayers referred to the first question the panel had been asked;
(Given that we only had a small number of Renters, should New Renters be grouped with New Residents for analysis?) and believed we should combine the group for analysis and look at demographic differences rather than use a separate “renter” group.

Melanie Ferris questioned how much work was done within MDH to communicate consistently in getting results to a larger community. She wondered if MDH could coordinate information to the same common residents, packaging the communications that come from multiple sections of the Minnesota Department of Health. She was concerned about the broader questions the community residents might have beyond PFCs. Jim Kelly said the Minnesota Department of Health already worked together to have consistent information on PFC technical issues, but more work could be done on the content for breast cancer, or they could consider other programs. Jean Johnson added that MDH works with MPCA on air pollution and health.

**Ongoing PFC Study in the East Metro**

Jean Johnson asked the panel whether they would recommend any additional PFC biomonitoring in the East Metro area in the future, given that results of PFC3 were not yet available. Hearing no recommendation, she then asked if they would recommend PFC biomonitoring in another community. There was no recommendation.

**Future Meeting Topics**

Pat McGovern invited the panel members to recommend topics for exploration and discussion at future meetings. Jill Heins Nesvold mentioned ambient air quality study with cancer and also other endpoints as cancer would be only one result. Jean Johnson stated that the report on respiratory/heart disease and air in communities should be ready by June.

Pat McGovern added that she was interested in the focus of health equity and how it might apply to this group, other than the example we discussed at today’s meeting. An example would be the air pollution exposure and health outcomes, in terms of health disparities. Greg Pratt noted that he was interested in this topic as well. He added that he has a paper on inequities in risk from air pollution exposure, looking at modeled risks for The International Society of Exposure Science and would be willing to talk to the group about his work. Jean Johnson referenced the work of Julian Marshall, an interesting study being done at the University of Minnesota. Jeanne Ayers added that Greg Pratt’s work on disparity in air pollution exposure or exposure work in general could be used to raise questions or could point the group to generate areas that advance health equity and need additional study.

Geary Olsen said pharmacokinetics was the intermediary that was being forgotten if you only study biomonitoring and health effects. Regardless of the compound being studied, the underlying pharmacokinetics of anything being measured is very important. He continued that in order to understand health effects, we need to go through pharmacokinetics first to see the underlying reasons why we might see associations between biomonitoring and health. He added that he had some presenters in mind.

Bruce Alexander would be interested in reviewing the story of the MDH AND University of Minnesota NE Minneapolis community vermiculite study. Greg Pratt added the University of Minnesota NE Minnesota mining study.

Pat McGovern asked whether biomonitoring could compliment a Deanna Scher study of well water testing in Dakota County, maybe looking at other metals. She thought there might be implications for biomonitoring to complement that work. She also mentioned that Jill Prescott was interested in manganese as well. Jim Kelly responded that he has had discussions with Dakota County in order to understand what was in ground water
and what messaging residents get regarding water testing that could help influence them to get testing or take action when they received results. He offered to come back to the group when he was further along. He added that 20% of the Minnesota population was on private well water that was not regulated.

Cathy Villas Horns suggested that the Minnesota Department of Agriculture had private well sampling projects and was interested in nitrates. There was a study of tens of thousands of wells and she offered to report about the proposed plans. Jeanne Ayers commented that there was a political divide on agricultural use of nitrates and health risk and that better scientific information was needed.

Jean Johnson added that Minneapolis was monitoring Polycyclic aromatic hydrocarbons (PAHs), Greg Pratt thought that the sampling would be completed in June, then there would be a lab analysis, so he could share a video about the efforts.

New Business

There was no new business.

Audience Questions

There were no audience questions.

Adjournment

The meeting was adjourned at 4:00 pm. The next Advisory Panel meeting will be held on June 9, 2015 from 1:00–4:00 p.m. at the American Lung Association in Minnesota.