Missoula Air Quality Advisory Council
Minutes
October 4, 2022

Members/alternates present: Linda Hedstrom, Kathy Tonnessen, Ethan Walker, Chris Moran, Patricia Senner, Alex Lukinbeal, Taylor Stewart, Cindy Super, Sue Spanke

Members/alternates absent: Beth Berlin, Bert Chessin, Brigid O'Connor, John Ottman

Staff: Sarah Coefield

Public: None

1. **Kathy Tonnessen called the meeting to order**

2. **Excused absences recognized –** Bert Chessin and Brigid O'Connor were excused

3. **Agenda approved with the removal of the consideration of the September minutes.**

4. **Public comment on non-agenda items.**
   None.

5. **Journal presentation.**
   Alex Lukinbeal presented the article, "Multi-decadal change in Western US nighttime vapor pressure deficit" by Andrew M. Chiodi et al. (Geophysical Research Letters, 48, e2021GL092830.)

   Alex said the researchers calculated changes in nighttime vapor pressure deficits (i.e. atmospheric drying power) over the western United States in response to reports that early morning wildfire intensity has been increasing. The researchers found that between the 1980s and 2010s, the overnight vapor pressure deficit increased significantly. Alex said the most profound effect is in thermal belts. He said overnight valley temperatures haven't change a whole lot, but the midslope and ridge temperatures have seen much more extreme temperature increases. Alex said warmer and drier overhead airmasses on ridges and midslopes aren't cooling as fast or efficiently as air in the valleys.

   Alex said climate models didn't see this extreme of a vapor pressure deficit. He said the results of this study confirm why we're seeing larger burning windows. He said fires are burning later into the evenings and waking up earlier in the mornings.

   Kathy Tonnessen said the researchers had some discussion of the pacific decadal oscillation (PDO).

   Alex said they found a strong correlation where if you have a negative PDO, you have warmer and drier summer across the Pacific Northwest and Rockies. He said PDO is traditionally difficult to

correlate with weather phenomena, but the R-squared value was strong.

Kathy asked if we're getting more PDOs than we have historically.

Alex said he doesn't know – he hasn't researched it. He said sub-seasonal forecasting is very difficult. He said climatologists like to latch onto one oscillation, but there are other oscillations out there that throw a monkey wrench in things. He said weather is what you get, and climate is what you expect.

Sue Spanke asked Alex to explain the PDO and how it affects weather.

Alex said when you look at the PDO, it's a very long-term oscillation. He said it would be nice to look back a couple hundred years to have a better data set. He said the PDO is a large-scale oscillation in the ocean. He said with a negative PDO, we tend to get a more amplified pattern where storms are steered father north or south. He said this sets up blocking patterns like the one we're currently experiencing.

Alex said the thing that would have him concerned is overnight temperature increases. He said you won't see it at much in valleys because that's where you get cold pools and inversion, but with more extreme temperatures at higher elevations we are going to have longer burning periods.

Pat Senner asked if there is more humidity in valleys because of irrigation.

Alex said valley temperatures are influenced by human activities. He said in Salt Lake City, the valley humidity is much higher because of irrigation and lawn watering activities. He said the effect is less extreme in Missoula because we already have rivers in the valley.

Chris Moran said this is an excellent article. He said there's been a whole flurry of research on this topic. He said the Missoula Fire Lab showed the actual amount of burning is increasing at nighttime. He said a Nature paper looked at the question globally and found the same thing.

6. **Presentation: "Wildfires and cardiovascular health in Western Montana: Current research strategies and future directions"**
   Ethan Walker gave a presentation to the group about his current research at the University of Montana. The slides from the presentation are available here: https://missoulacounty.sharepoint.com/:b:/g/Hlth/EnvHlth/AQ/EWgXO2uLAMRGv29ys2h-gHUBQPA3hLzE1VjgdsaBvT0RMQ?e=U7bGpa

   Ethan said he wanted to share what he's doing with the community and see if there's any interest in participating from the council members. He said we're all familiar with the importance of air pollution. He said policy has led to reduced human-caused pollution, but wildfire smoke has gotten worse. He said the wildfire season is now 40 days longer in Montana than it was 30 years ago.

   Ethan said he's an epidemiologist and he studies the health effects of pollution exposures. He said we know wildfire smoke is associated with all-cause mortality and cardiovascular and respiratory morbidity and mortality. He said wildfire smoke is hard to study because transient events and exposures are hard to characterize, it's hard to have monitors in the right place at the right time, and

it's hard to know health outcomes. He said some of the big research gaps include exposure characterization at the household level and sub-critical health outcomes.

Ethan said the goals of his research include characterizing how wildfires impact us at the community and household levels developing and evaluating intervention strategies to decrease wildfire smoke exposure and improve health, particularly among vulnerable populations. He said he's part of the university's Center of Public Health Research (CPHR) and he's currently doing a CPHR pilot project. The pilot project is a novel approach to assess wildfire air pollution and cardiovascular health. He said it is a field study with distance-based data collection, and 20 households in Missoula are currently enrolled in the project. He said he used paired Purple Air sensors hooked up to wifi via a hotspot, with one sensor inside and one sensor outside each dwelling in the study. He said participants just had to set up the sensors and turn on the hotspots and the university began receiving real-time data. He said this is easy for participants and allows the researchers to do QA/QC checks remotely.

Ethan said for health outcomes, they mailed participants blood pressure monitors and had them take a weekly activity/health survey and take their blood pressure. He said an automated survey link was emailed to participants each Tuesday.

Ethan said Taylor Stewart did a lot of the work.

Ethan said we can look at how health outcomes are related to PM2.5, indoor vs outdoor PM2.5, and outdoor PM2.5 infiltration. He said Taylor will be studying participants' behavior.

Ethan showed a chart of indoor and outdoor particulate matter. He said you can see the trend that particulate matter was pretty high indoors during wildfire season, but it was also high indoors outside of wildfire season. He said those data highlight the importance of indoor PM2.5 throughout the year.

Ethan said he's been developing a partnership with the International Heart Institute. He said if he can enroll their patients, we can get real-time PM2.5 data and data from pacemakers to see how PM2.5 is impacting arrythmias.

Ethan said he's submitting a grant to work with participants to develop interventions. He said we know HEPA portable air cleaners (PACs) work, but what else can we do? How can we affect behavior? He said he wants to create a community advisory board to develop household-level air pollution intervention programs. He said he would like AQAC members to participate if they're interested. He said we can figure out what works best to keep PM2.5 lower in our homes, what will be accepted, and what will be used in our homes. He said the next step is to recruit International Heart Institute patients to use the household interventions in their homes.

Kathy Tonnessen asked if Ethan has considered going outside Missoula (e.g. to Seeley Lake) where air quality issues are more exacerbated to get a greater range in effects and response.

Ethan said they tried to add that variability into the pilot and they want to do more in this larger project.

Kathy asked if Ethan is concerned about Purple Air sensor data not necessarily being accurate.

Ethan said he has Purple Airs that he's been running next to the Boyd Park BAM that he wants to use to make a local correction for the sensors. He said he's applied EPA's correction in the data he showed the group.

Pat Senner said blood pressure is highly variable. She said there are continuous monitors Ethan could try.

Ethan agreed blood pressure is highly variable, but repeated measures within an individual can be key to making it meaningful. He said they asked participants to take their blood pressure at the same time every week and rest before taking the measurement. Ethan said the benefit of looking at the International Heart Institute patients will be that we will catch every arrythmia and variability will be less of an issue.

Sue Spanke asked if the researchers were noting whether or not pilot study participants were cleaning their air.

Ethan said they didn't restrict people who had HEPA filters in their homes because it gives a better look at the community to keep them in the study. He said they did ask that people be nonsmokers so they didn't have to tease out different smoke sources. Ethan said some homes will have more particulate matter than others. He said that type of variability is good because it makes it easer to look at statistics.

Kathy said it sounds like a great study.

Ethan said he submitted his grant proposal today. He said it's an internal grant, so there's a good chance he'll get it. He said budget season will start next spring and that's when he'll start recruiting for the community advisory board. He said the advisory board will be a pretty small time commitment. He said members will talk about what works for them in their homes.

Kathy said it seems like getting someone from MCCHD involved (e.g. Sarah Coefield) would provide a community advisory board member with a feel for air quality and public health.

Sarah said she plans on participating.

Cindy Super said she'll participate, as well.

Ethan said there's a good spectrum of expertise on the council and he'd appreciate their insight and input on the community advisory board.

Cindy said when she talks to landowners about fire and prescribed fire, she wants people to be ready for the smoke. She said if you aren't ready for a prescribed fire, you aren't ready for a wildfire.

Ethan said in the wildfire community in general, there is an assumption the air indoors is good, but you need to monitor the air quality to know what we can do to actually make the indoor air quality safe.

Sarah said it's fun and interesting to see how you can affect your indoor air quality.

Pat Senner said gas burning stoves contribute to poor indoor air quality.

Ethan said yes, and there's a lot more research coming forward looking at indoor air quality.

Linda Hedstrom said she's wondering if there's a thought to making the design of the study more geared toward a model a larger community can adopt or adapt. She said air pollution has a much larger impact on communities of color and other vulnerabilities. She asked if there's an application of Ethan's study to their communities.

Ethan said applying this to other communities is the long-term/ultimate goal. He said he wants the outcomes to be applicable to others across the U.S. who experience wildfire smoke.

Sue said it seems to her, she thinks a hard barrier is to get over not wanting to complain or not just tough things out. She said very people she knows use PACs for smoke.

Ethan said that's something Taylor is wanting to dig into.

Taylor said that's a question she's reflected on. She said she wants to investigate how having access to personal air quality data might change how a person makes decisions.

Kathy said she just went for her annual wellness checkup, and they didn't ask her anything about air quality. She said it seems like it isn't on their checklist. She said the International Heart Institute might be an exemplary organization, but for everyday internal medicine, this is not on their radar.

Ethan said education and messaging across our communities is important. He said this is exactly the type of feedback he's looking for.

Kathy said we don't have any way of knowing which rooms in our home are better for indoor air quality than others. She said it would be nice to have an information sheet laying out how to buy, calibrate, use and interpret data from a Purple Air sensor.

Kathy said the EPA just initiated the Office of Environmental Justice. She said maybe they'd have money to look at different communities. For example, we have a reservation right up the road. She said maybe the new office would be interested in including native populations in these types of projects.

7. **Staff report.**

Sarah Coefield gave the staff report. She said she and Ben Schmidt passed smoke school in September. She said she continued to put out wildfire smoke updates during the late season smoke event. She said she participated in a workshop for DARPA about wildfire and disaster preparedness. She also gave a presentation at Montana Safety Fest about indoor air quality in commercial buildings. She said Ben has been working on complaints and industry stuff. She said she's been finalizing a draft 110(l)

demonstration the county will provide to the EPA to support removing oxygenated fuels as a control measure for carbon monoxide. She said the oxygenated fuels resolution the council saw in September went to the Air Board on September 15th and was approved. She said she sent out notifications about the resolution to gasoline blenders and gas stations. She said essential agriculture and prescribed wildland outdoor burning opened on October 1st.

8. **Public comment**
   None

9. **Select AQAC rep to the Board**
   Sarah Coefield will give the AQAC update to the Air Board at their next meeting.

10. **Announcements, other business**
    None.

11. **Adjourn**