11/15/2022

AMSC Committee Meeting

1. **Introductions:**
   Attendees introduced themselves.
2. **Approval of April 2022 meeting minutes:**
   - Conducted electronically.
3. **Recap of activities since April 2022**
   - Greg Wetherbee still working on the NADP Pollen Study project; putting together all requirements to get study published.
4. **Update from Greg Wetherbee:**
   - Appreciate Jamie and Wisconsin Lab of Hygiene's support for this project;
   - There has been support from many people and organizations: Collaboration from Aerobiology Research Labs in Canada; John Walker has pitched in as well as Eric Uram, Terri Williams, and numerous others. Technical support and coordination were provided by David Gay. Utah State University also involved by providing a monitoring site.
   - Paper has been peer reviewed and revised.
   - Revisions were major. Paper has been approved by Greg's supervisor and is now sitting in director's office for bureau approval. Director turns things around pretty quick. There will be more fixes after this.
   - Paper submitted to Aerobiologia. Hope to publish in next couple of months.
   - No report made available yet. Plan B, if not published in journal, will be to publish as an NADP report.
   - Greg can also provide an executive summary through email.
   - Data used in the paper are available to the public.
5. **Stakeholder updates:**
   - **Council of State and Territorial Epidemiologists (CSTE):** Andy not able to get a hold of Lingwall.
     - Andy's sense is that this group really got this committee going as it was their goal to establish a national network.
     - How to turn their recommendation into a network?
     - Andy Johnson, Chris Lehmann and Norm Anderson put forth reasons for forming science committee. AMSC committee formed based on this.
     - CSTE may not feel that they have much of a role with the monitoring efforts. Andy and Selma will get a hold of them. Andy would like to keep them involved. CSTE has recently gone thru several coordinators.
   - **CDC:** Contact for National CDC: Claudia Brown not in meeting.
     - Arie Manangan is Andy's contact from Maine CDC. Andy has call set up with him.
     - Andy will be in touch with someone else from CDC soon.
   - **CityDep Update:** Greg Wetherbee (The CityDep update was given later in the meeting but is placed here for ease of following the narrative)

- Want to develop a project that all can collaborate on like what was done for aeroallergens and TDEP. USDA/NIFA grant opportunities are being looked at and preparing proposal. Something to help TDEP and in the process can weave in aeroallergens? Greg Beachley has some good ideas. Several NADP sites in urban areas and can start right there.

- **EPA:** Presentation by Mike Kolian and Melissa Puchalski
    - EPA interested in aeroallergens from a climate and air quality perspective;
    - There are missing factors in the pollutant health exposure connection;
    - EPA considering deploying sensors for collection of pollen data for monitoring pollen in a more standard way. This can be done by leveraging the existing structure of CASTNET and associated sites.
    - Plan currently being developed and will involve opportunities for review and feedback.
    - Climate and aeroallergens:
        1. Pollen season duration increasing;
        2. More pollen produced by plants;
        3. Allergenicity is altering;
        4. Shifting geographic habitats of pollen producing plants, rising CO_2 levels, warmer winters, and earlier arrival of spring results in indicators such as:
            Spring: earlier flowering, greater seasonal pollen production in pine and oak trees;
            Summer: Potentially earlier flowering and higher allergen content of weeds and grasses such as timothy;
            Fall: earlier flowering, greater floral numbers, higher pollen production and enhanced allergen content of ragweed pollen which is more pronounced as one moves north.
    - Data Needs: Research, Indicators, and Health Impacts
        1. Limited spatial and temporal coverage. Need continuous hourly daily data; could be an AIRNOW type of situation;
        2. Indicators based on observed trends such as timing of start and end of season, peak, duration, annual, seasonal and integrals of pollen;
        3. Health-relevant metrics using concentration levels/ranges etc.;
        4. Baseline conditions for modeling/projections;
        5. Realtime predictions and forecasts; similar to AIRNOW;
        6. Differences between taxa, need more specificity for pollen types.
    - Seasonality and biological response
        1. Growing season has increased by 2 weeks since 1895 across the 48 states;
        2. There has been an increase in growing degree days (GDD) at 75% of stations;
        3. Implications of Extended growing seasons:
            There are positives and negatives on plant species and agriculture. Ecosystem and societal impacts are related to changes in the timing of plant growth and animal behavior.

- **EPA Continued:** Melissa Puchalski: How to Leverage the CASTNET Network for Deployment of PollenSense (PS)
    - Background of CASTNET
    - Leverage IRA funding to enhance measurements and build monitoring capacity in rural communities;
    - Fill spatial gaps in existing NAB network;
    - Continuous data record to capture weekends, seasonal trends, rural to urban gradients in aeroallergens;
    - Proposal for Deployment of PS at CASTNET sites:
        1. First year – deploy at EPA sponsored sites;
        2. Second Year – deploy at NPS/BLM sites; EJ/tribal community sites;
        3. Publicly accessible data;
        4. Linking of air quality data to aeroallergens.

    - Stakeholder Input:

        1. AMSC, CDC, HHS, climate and agricultural researchers, modelers. Can be worked into EPA climate indicator report;

        2. Quarterly calls to interface researchers and data users to address scientific questions and data needs, improvement of identification algorithms and quality assessments. This could perhaps be coordinated through the AMSC?
        3. What would be the best way to aggregate data to share with local communities impacted by aeroallergens. High, medium, low days?
        4. EPA focus will be on changing seasonal patterns and correlation with air quality (e.g. ozone, nitrate)
        5. Kolian spoke with Claudia Brown at CDC to discuss how to aim this network to present a health perspective.

Ensuing Discussion:

Andy Johnson: AMSC support will be 100%. Good cross-section of members that would provide good support.

Jamie Schauer: Exciting that so much has changed in last few years. Biggest challenge will be how to merge and harmonize all this data from the different networks? Many stakeholders with everybody doing something completely different. Someone needs to take leadership of this part. Worried about the disparity. Does not want any of the data to disappear. How to integrate it all is an overwhelming challenge.

Rick Haeuber: Reminds him of ambient mercury monitoring with AMNET. Took a bunch of meetings for AMNET to have SOPS and harmonize. Thinks the coalescing should happen within NADP.

Greg W: Agree completely. Eric Uram got NAB data off the web. NAB gold standard, maybe it is, maybe not. But data very hard to get out of NAB. In his opinion, we should use NAB to QA pollen sense data. PS monitors should be right next to NAB sites. Get parties to collaborate on how to bring it all together. PS collecting their data in one database and will give it to you when asked. As AI gets smarter the whole record can be made better. So which record to store, refresh, distribute, etc. is something to decide. As far as making health assessments (low, medium, high

levels), PS has PollenWise app on phone to see pollen levels but nearest site could be 500 km away. They use biofeedback from public. The high, low, medium level classifications are decided by PS. EPA does not make health determinations for the public. Instrument is now more compact and more affordable.

Ross: Need to measure flow. Need permanent logger. Differential flow pressure gauges, etc. Can plug them right in and get running in no time. They have tape cartridges now.

Greg: Noah Fierer has looked at pollen off IMPROVE filters. If we can get WSLH the tapes, we can train AI a lot better. Additional investment needs to happen. Makes QA possible if we have tapes and help pull data together. We need an "Eric Uram" FT data manager to pull all this data together.

Melissa: Proposal will have QA/QC methods, collocated sites for precision. etc. All can go into a proposal to run funding through.

Andy: AMSC has always wanted NADP to run this as a network. Have it all housed at NADP. NADP seems well suited for this and can hire people for this type of work. We need this kind of impetus from EPA to get this whole thing rolling. We don't need to reinvent the wheel from scratch. Noah will be asked to do presentation at April meeting. Canada has been doing this for a long time and we can learn from them.

Jamie: Important to divide this into 3 buckets. 1) Data management is critical and compilation needs to be considered now, 2) QA needs to be optimized, 3) Instrument specs. Get people to adopt the QA. Short term goal is to think about data management and QA. NAB may be the gold standard, but if nobody wants to use the data, then it becomes irrelevant. PS probably good enough to move forward. We need to move forward now with leadership. Do not wait until next year.

Greg: Does not see who could take on this data management role other than NADP. Unless EPA can run it through their monitoring networks. EPA High-Volume samplers can also be used for collocating with PS. Have to start somewhere, and database will be critical. Can get data from PS. Probably cannot get the AI program(s) for data reprocessing.

David Gay: Work out a deal with PS and control the progression of the instrument, etc.

Greg: Emory University and this study show that they have a way to go with grass and weed pollen and those are the most allergenic. Trying to improve AI for these species is very important.

Jamie: To EPA: What are you going to do with Emory data, other projects are going to move forward as well. But still need SOPs, repository. CASTNET is great, but it is a rural network. What about urban data, etc. Need a national network to pull it all together.

Mike K: EPA also has a lot of upcoming grant funding for monitoring for state and local tribes. NADP has to be involved with long term data management to help EPA. There are ways to coalesce the masses.

Greg: CASTNET is regionally representative air quality for rural communities, but not urban. This is why NAB is in urban centers. But lots of underserved communities with no pollen data still. Awesome to put PS at CASTNET sites, but gap will still be urban areas. Opportunity for growth here in that there will be the urban component to work out. NAB uses yesterday's pollen count to predict today's pollen count. PS is actual real-time data; what was read 10 minutes ago.

Andy: What spatial scale is a site representative of? Microscale site, middle, neighborhood, regional and urban scales? etc. We don't know this. A denser network will help flush this out.

Greg: What can we do with this data? What is the range of applicability, etc.?

Andy: All these aspects we are discussing here today are the mission of this committee.

Greg: WSLH's Alexandra Kois is going to get certified to ID pollen. Learned a lot over the course of the study. WSLH has developed expertise already. ARL-Canada can do QC and reanalysis of samples. All the pieces are there.

Jamie: Put together a white paper to put in front of executive committee. Don't wait.

Greg: Appreciates this type of action. What if we approach Landon and get a year's worth of data from all their sites? What type of database would be required? What other data would we want? Maybe we just work with it to see how we could manage it. Get our arms around it. We are in a good position to do this. Landon will give us the data as he understands that we need to grow this.

Jamie: Committee should get a motion out. Get a proposal out within 6 months to a year. Describe what a national repository looks like. Worried that opportunities could be disappear.

Greg: What if we approach Landon and ask for one years' worth of data from all their sites to see how we get our arms around this, what kind of database is required, how would we manage it? Posing this question to Chris Rogers via CASTNET. Chris thinks it is workable.

Jamie: Work out a path to the future in the next 6 months to a year.

Andy Johnson's Motion: Move that AMSC will work with EPA vendors (WOOD) and other stakeholders to explore and propose a data management system for aeroallergen monitoring data.

Greg Wetherbee seconded Andy's motion. Motion approved unanimously.

Melissa: Has a type of proposal for the PS deployment that can be used as a start.

Jamie: Still pushing for more of a vision.

David Gay: Get a pile of data in the door thru Wood, pathway to deliver to EPA, and then how does EPA deal with it?

Jamie: Need to be sensitive to the NAB issue and other current researchers. Make sure data are there and then whoever can do whatever they want with the data.

Presentation (Andy Johnson): The Pollen Monitoring Landscape in Maine

- The presentation will try to answer the following questions:
    Why is expanded monitoring an important need?
    Why is improved access to data important?
    What role can NADP play in all of this?
    What role can ME CDC/DEP play in all of this?
- National View:
    - Presently, aeroallergen monitoring is geographically and spatially limited and dependent on small number of collectors who are often self-funded and do not report data to a centralized network;
    - A national monitoring network could address the issue of determining the minimum number of sites needed to achieve optimal spatial resolution for meeting DQO's;
    - A robust data set is required to validate existing models that fill gaps in the observed data and to forecast potential impacts of climate change on aeroallergens. Also, this data set could be used to improve the accuracy of models that use alternative indicators for tracking aeroallergens and exposure based on satellite imagery, temperature and precipitation data, phenology tracking as well as health data (via over- the -counter antihistamine sales and insurance claims).
- NAB pollen sites: 60-80 sites. No NAB sites in New England except 1 in CT. No representatives for ME. Maine gets some results from PA!!
- Bottom Line: There is a need for coordinated, cross-disciplinary effort to collect, catalogue and analyze pollen and mold for:
    - Improved diagnosis and treatment of allergic patients;
    - Public heath tracking;
    - Research on effects of climate on aeroallergens and health;
    - Development of evidence-based interventions; and
    - Dissemination of key findings.
- Why is improved access important?
    - Identification of pollen season onset;
    - Despite growing numbers of people with allergic respiratory disease reliable and geographically-specific pollen and mold data are often unavailable;
    - Data can be used for other purposes;
    - Valuable in tracking EPA-identified climate trends.
- How do we get more pollen data?
    - Pollen summits hosted annually by CSTE and National CDC. One held in Portland, ME in 2015;
    - Can use NADP infrastructure for centralized operations, QA/QC, and publicly accessible database, hence AMSC;

- The mission and charges of the AMSC within NADP align with the current need for a centralized network for aeroallergen monitoring;
- AMSC sponsored a monitoring study methods comparison study with two specific goals:
1. To develop a method for counting pollen using the NADP/NTN network precipitation samples, and
2. To compare the results of the NADP/NTN pollen measurements in precipitation to concentrations determined with traditional and automated pollen count measurements.
    - Sampling occurred from March 2021 through October 2021;
    - Paper titled "Initial Comparison of Pollen Counts in Precipitation and Ambient Air Samples to Traditional and Artificial Intelligence Counting Methods for a National Pollen Monitoring Network" has been submitted to Aerobiologia.
- The State of Maine Picture:
    - Maine Climate Council report calls for pollen monitoring at four different locations to start in 2020;
    - ME CDC successful in securing about 10K in funding for pollen monitoring activities through their Building Resilience Against Climate Effects (BRACE) Climate and Health grant;
    - Monthly planning sessions (2021-2022) between Maine CDC and DEP to convene a series of meetings for Pollen Monitoring Network Advisory Group;
    - Interagency MOU between Maine CDC and DEP completed 10/2022;
    - Inaugural meeting of Maine Pollen Monitoring Advisory Group was held on 11/1/2022;
    - Topics discussed at this meeting included monitoring site locations, monitoring season, level of detail needed in the data, potential uses of data, how to communicate findings both internally and externally.

Ensuing Discussion:
Greg W: Other states have not been discussed much. ME is moving ahead. Why is ME going ahead?
Andy: Rebecca Lincoln, Andy's Maine colleague, is tied into other states and the national scene. She took initiative and got grant money. Andy emphasized that this was a climate driven need and Rebecca brought the health aspect in. Andy has spoken to NESCAUM. They have a monitoring assessment committee. Andy has spoken to them about AMSC and NADP and given presentations.
Greg W: There should be a row of NAB sites in Texas. Landon has a transect of PS right down that same corridor. Can maybe focus here for calibration and collocation.
Andy: Also have a connection in Iowa, Dan Dalan.

Motion to Adjourn by Andy Johnson, seconded by Greg Wetherbee.

Meeting adjourned.