National Institute of Environmental Health Sciences

# Partnerships for Environmental Public Health

## Annual Meeting

## PEPH 2020: Past, Present, and Future

**February 12-13, 2020**

Durham Convention Center
301 West Morgan St., Durham, NC 27701

**#PEPH2020**

**www.niehs.nih.gov/conference/PEPH_2020**

National Institute of Environmental Health Sciences

# Partnerships for Environmental Public Health

## PEPH 2020: Past, Present, and Future

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National Institute of
Environmental Health Sciences

# Partnerships for Environmental Public Health

## Annual Meeting

## Agenda

National Institute of Environmental Health Sciences

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## PEPH 2020: Past, Present, and Future

**February 12-13, 2020**
Durham Convention Center
301 West Morgan St., Durham, NC 27701

## Agenda

### Wednesday, February 12, 2020

| | | |
|---|---|---|
| **8:00 a.m.** | **Registration** | *Jr. Ballroom C Foyer* |
| **9:00 a.m.** | **Pre-Meeting Workshops – Round 1** | |
| | • Low-Cost, High Reward: Community-Based Air Quality Monitoring for Environmental Justice (Archer and Wilson)<br>*Topic: Air Sensors* | *Jr. Ballroom D3* |
| | • Vaping Materials, Resources, and Communication (Backus, et al.)<br>*Topic: Vaping* | *Meeting Room 4* |
| | • Using Interactive Maps to Make Invisible Air Pollution Visible for Community Residents (Wong)<br>*Topic: Mapping* | *Meeting Rooms 1/2* |
| | • Assessing and Strengthening Environmental Health Literacy: Approaches From the Field (Hoover and Gray)<br>*Topic: EHL* | *Jr. Ballroom C* |
| | • Youth Engagement in Environmental Citizen Science and Advocacy Training in Rural and Urban Areas (Hahn, et al.)<br>*Topic: Youth CitSci* | *Meeting Room 3* |
| **10:15 a.m.** | **Break** | |
| **10:45 a.m.** | **Pre-Meeting Workshops – Round 2** | |
| | • Translating Sensor Air Pollution and Health Data to Action with Communities, Youth, and Health Care (Roy and Craft)<br>*Topic: Air Sensors* | *Meeting Room 3* |
| | • Building Educators' Capacity to Explore the Health Effects of E-cigarettes With K-12 Students (Haine and Hayward)<br>*Topic: Vaping* | *Meeting Room 4* |
| | • Using Maps to Introduce Environment and Health Data to Youth (Chang and Morton)<br>*Topic: Mapping* | *Jr. Ballroom D3* |
| | • Social Media: An Important Tool for Environmental Public Health Outreach and Engagement (Koester, et al.)<br>*Topic: Social Media* | *Jr. Ballroom C* |
| | • Natural Disaster Response and Recovery as an Environmental Justice Issue (Hughes and Beard)<br>*Topic: DR and EJ* | *Meeting Rooms 1/2* |

**Noon** **Lunch on your own**

**1:00 p.m.** **PEPH2020 Opening Session** *Jr. Ballroom C*

- J. Patrick Mastin, Ph.D., Acting Division Director, Division of Extramural Research and Training (DERT), NIEHS
- Rick Woychik, Ph.D., Acting Director, NIEHS and NTP
- Liam O'Fallon, PEPH Coordinator, NIEHS
- Gwen Collman, Ph.D., Acting Deputy Director, NIEHS

**2:00 p.m.** **Session 1: Research** *Jr. Ballroom C*

*Moderators: Beverly Watkins, Ph.D., New York University and Robin Fuchs-Young, Ph.D., Texas A&M University*

In this opening panel presentation, speakers will set the stage for the variety of research related to the PEPH vision. They will touch upon the importance of community-engaged research approaches to address local concerns and ensure relevant research. They will highlight the value of research to understand and address environmental health disparities. They will touch upon the need for exposure science and the use of new tools and approaches to fully understand what community residents are being exposed to and what it means for their health. Each presenter will briefly discuss the state of the science and posit some ideas, questions, and/or opportunities to stimulate ideas for the breakout sessions.

- Robin Fuchs-Young, Ph.D., Texas A&M University
  *Topic: Environmental Health Disparities*
- Erin Haynes, DrPH, University of Kentucky
  *Topic: Technology*
- Jane Hoppin, Sc.D., North Carolina State University
  *Topic: Exposure Science*
- Beverly Watkins, Ph.D., New York University
  *Topic: Community Engaged Research*

**2:30 p.m.** **Listening Session With Dr. Woychik** *Jr. Ballroom C*

During this listening session, participants are invited to share ideas with Dr. Woychik to inform the next year or so of his tenure as Acting Director of NIEHS.

**3:00 p.m.** **Break and transition to breakout rooms**

**3:30 p.m.** **Breakout Sessions**

The purpose of the breakout is to discuss research opportunities and gaps that can be addressed through the PEPH Network. While such recommendations will be grounded in research being done by participants in the room, the goal is for each breakout to make recommendations that NIEHS can use to inform the PEPH 2030 vision.

- Environmental Health Disparities *Jr. Ballroom D3*
- Technology (Monitoring Devices and GIS) *Meeting Rooms 1/2*
- Exposure Science (Air, Land, and Water) *Meeting Rooms 3/4*
- Community Engaged Research (including CBPR) *Jr. Ballroom C*

**4:15 p.m.** **Poster Session and Sensor Fair**

- Posters 1-28 — *Jr. Ballroom B*
- Posters 29-54 — *Jr. Ballrooms D1/D2*
- Sensors — *Foyer*

**5:45 p.m.** **Adjourn for the day**

**6:00 p.m.** **Walking Tour of Durham (30 minutes)** — *Meet at front door of the Marriott*

## Thursday, February 13, 2020

**7:30 a.m.** **Registration** — *Jr. Ballroom C Foyer*

**8:30 a.m.** **Session 2: Communication** — *Jr. Ballroom C*

*Moderators: Brenda Koester, University of Illinois at Urbana-Champaign and Judith Zelikoff, Ph.D., NYU School of Medicine*

In the Session 2 panel presentation, speakers will discuss and highlight PEPH-related communication efforts. They will touch upon new communication topics that were either not around when PEPH was established or were just in their developmental stages, noting how we have advanced in those areas. They will also emphasize the importance of using culturally appropriate communication approaches to ensure the greatest public health impact. In addition to describing the state of the science, the presenters will offer new ideas, questions, and/or opportunities to stimulate ideas for the breakout sessions.

- Katie Boronow, Silent Spring Institute
  *Topic: Reporting Back*
- Matthew Dellinger, Ph.D., Medical College of Wisconsin
  *Topic: Culturally Appropriate Messaging*
- Kathleen Gray, Ph.D., University of North Carolina at Chapel Hill
  *Topic: Environmental Health Literacy*
- Brenda Koester, University of Illinois at Urbana-Champaign
  *Topic: Social Media and Emerging Approaches*

**9:00 a.m.** **Transition to breakout rooms**

**9:15 a.m.** **Breakout Sessions**

The purpose of the breakout is to discuss communication opportunities and gaps that can be addressed through the PEPH Network. While such recommendations will be grounded in communication efforts being done by participants in the room, the goal is for each breakout to make recommendations that NIEHS can use to inform the PEPH 2030 vision.

- Reporting Back — *Jr. Ballroom C*
- Culturally Appropriate Messaging — *Jr. Ballroom D3*
- Environmental Health Literacy — *Meeting Rooms 1/2*
- Social Media and Emerging Approaches — *Meeting Rooms 3/4*

**10:00 a.m.** **Break**

**10:30 a.m.** **Session 3: Capacity Building** *Jr. Ballroom C*

*Moderators: Benjamin Richmond, University of Arizona; Kathleen Vandiver, Ph.D., Massachusetts Institute of Technology; and Aubrey Thompson, University of California, Davis*

In this panel presentation, speakers will describe the importance of capacity building for all partners in community-engaged research projects and programs. The panelists will touch upon different audiences and aspects of capacity building including community-based organizations, health care professionals, educators, and academics. Prior to the establishment of PEPH, there has been a recognized need for partners to possess the right skills to work together, and while we have made important strides, gaps remain. After briefly discussing the state of the science, the presenters will offer new ideas, questions, and/or opportunities to stimulate ideas for the breakout sessions.

- Dana Haine, University of North Carolina at Chapel Hill
  *Topic: STEM Education*
- Nicholas Newman, DO, University of Cincinnati/Cincinnati Children's
  *Topic: Environmental Health in the Health Care Curriculum*
- Jamie San Andres, Make the Road New York
  *Topic: Organizational Capacity*
- Sacoby Wilson, Ph.D., University of Maryland
  *Topic: Individual Partner Capacity*

**11:00 a.m.** **Transition to breakout rooms**

**11:15 a.m.** **Breakout Sessions**

The purpose of the breakout is to discuss capacity-building opportunities and gaps that can be addressed through the PEPH Network. While such recommendations will be grounded in capacity-building efforts (such as education and training) being done by participants in the room, the goal is for each breakout to make recommendations that NIEHS can use to inform the PEPH 2030 vision.

- STEM Education *Meeting Rooms 1/2*
- Environmental Health in the Health Care Curriculum *Jr. Ballroom D3*
- Organizational Capacity *Jr. Ballroom C*
- Individual Partner Capacity *Meeting Rooms 3/4*

**Noon** **Lunch on your own**

**1:30 p.m.** **Session 4: Evaluation** *Jr. Ballroom C*

*Moderators: Kristi Pettibone, Ph.D., NIEHS and Yoshira Ornelas Van Horne, Ph.D., University of Southern California*

In this panel discussion, panelists will respond to questions posed by the moderators. A key opportunity identified by the extramural community in 2008 was the need for metrics to evaluate the success of community engagement work. Since that time, the PEPH network has contributed to the development and promotion of an evaluation metrics manual, as well as the advancement of more robust evaluation efforts in NIEHS-funded projects. The panelists will discuss successes and challenges of evaluation and offer recommendations for evaluation in the future.

- Diana Hernandez, Ph.D., Columbia University
- Joseph Hoover, Ph.D., Montana State University Billings
- Erin Lebow-Skelley, Emory University
- Esther Min, University of Washington
- Tommy Rock, Ph.D., Navajo Nation

**2:15 p.m.** **Rapid Rotation Discussion**

In this 45-minute rapid rotation discussion, participants are invited to move around the room to a series of flip charts that address a range of evaluation topics, as well as visit the PEPH Timeline board. The purpose of these rapid rotations is to collect ideas and participant responses on a variety of topics to inform the PEPH 2030 vision in the context of evaluation. During this time, there will also be a brief training for attendees who would like a primer on metric development and logic modeling (in Meeting Rooms 3/4).

Flip chart questions will include:

- What are new areas that need metrics?
- What tools or trainings should we develop moving forward?
- How will you incorporate social media into your evaluation efforts?
- What ideas do you have for evaluating translational research activities?
- What other resources or services can NIEHS provide?
- How do you evaluate your data science efforts? Have you and how have you done any assessment of application of FAIR principles?
- How do we facilitate sharing of evaluation practices and findings among grantees?
- Do you have proposed additions to the PEPH Metrics Manual?
- How do you incorporate findings into program improvement?
- How do you incorporate evaluations and evaluators into the program planning process early on? What benefits have you seen from doing this?
- What kinds of activities are evaluated at your program (could help inform future efforts to come up with tools and resources that grantees might need)? What kinds of activities might be evaluated in the next 10 years?

**3:00 p.m.** **Break**

**3:15 p.m.** **Session 5: Future – PEPH2030**
*Moderator: Liam O'Fallon, NIEHS*

The purpose of this final session is to begin pulling together the ideas about PEPH 2030. In the context of the recent Translational Research Framework developed by NIEHS staff, the panelists represent some of the intended audiences that benefit from the research and research translation coming out of NIEHS-funded projects that are a part of the PEPH network. In the first 45 minutes, the panelists will share their ideas about needs and opportunities for their audience.

- Doug Farquhar, J.D., National Conference of State Legislatures
- Maida Galvez, M.D., Icahn School of Medicine at Mount Sinai
- Virginia Guidry, Ph.D., North Carolina Department of Health and Human Services

**4:00 p.m.** **Reporting Back Recommendations**

In the final 45-minutes, we will hear from all the session moderators about the key recommendations that emerged from the breakout sessions. In addition to hearing about them, there will be time for audience engagement and prioritization.

**4:45 p.m.** **Summary**

- Claudia Thompson, Ph.D., NIEHS

**5:00 p.m.** **Adjourn**

National Institute of Environmental Health Sciences

# Partnerships for Environmental Public Health

## Annual Meeting

# Workshop Abstracts

# Workshop Session I:
# Wednesday, February 12, 2020 | 9:00 – 10:15 a.m.

## Low-Cost, High Reward: Community-Based Air Quality Monitoring for Environmental Justice

*Location: Jr. Ballroom D3 at 9:00 a.m.*

Lead Presenter: Jan-Michael Archer, University of Maryland School of Public Health, jan.michael.archer@gmail.com

Co-Presenter: Sacoby Wilson, Maryland Institute for Applied Environmental Health

Format: Small Group Activity

**Learning objectives**

- Learn about the man-made and natural factors affecting good and bad air quality (AQ).
- Recognize the environmental justice and public health effects of particulate matter.
- Understand how AQ is regulated, monitored, and measured.
- Explore the foundations, strengths, and weaknesses of community science AQ monitoring.
- Utilize low-cost air quality monitors (and mobile apps) for stationary and personal AQ monitoring.

**Required materials/Tech**

- A smartphone with either Android or iOS software

**Outcomes/Products**

The discussions and exercises in this workshop will provide participants with a community science air quality monitoring "toolkit" that includes:

- Insights on how to apply community science air quality monitoring in their specific areas.
- A step-by-step framework for developing a community air quality monitoring plan.
- Online resources for comparing low-cost air quality monitors in price and utility.

**Workshop Abstract**

It is a fact that constant exposure to air pollution presents a high cost to human health. On average, low-wealth communities and communities of color are regularly exposed to the highest concentrations of polluted air. Historically, these populations have not had access to data to prove they are suffering from environmental injustices. With the rise of community science and low-cost air quality monitoring sensors, though, EJ communities can now collect their own data and use it to advocate for change. The Community Engagement, Environmental Justice, and Health (CEEJH) Lab combine these tools with community-based participatory research to empower residents of communities of color and low-wealth communities to collect and interpret their own environmental health data. This training will consist of a primer on air quality, air pollution, and environmental justice, as well as interactive demonstrations of the PA-II (manufactured by PurpleAir), Flow (manufactured by Plume Labs), and Airbeam2

(manufactured by HabitatMap). Participants in this workshop will use a variety of low-cost stationary and personal air quality monitors and learn how to apply them in their communities.

# Vaping Materials, Resources, and Communication Workshop

*Location: Meeting Room 4 at 9:00 a.m.*

Lead Presenter: Ann Backus, Harvard Chan-NIEHS Center for Environmental Health, abackus@hsph.harvard.edu

Co-Presenters: Judith Zelikoff, NYU School of Medicine Department of Environmental Medicine – NIEHS Core Center; Kimberly Manning, Region I PEHSU, Boston Children's Hospital; Marissa Hauptman (not in attendance), Region I PEHSU, Boston Children's Hospital

**Learning Objectives**

Participants will examine currently available materials and assess gaps in these materials and resources.

**Required Materials**

- Participants who plan to attend the Vaping Materials/Resources Workshop, should bring hard copies of vaping-related materials and a list of apps and videos they are using or know of for the following audiences: parents, teachers, and health professionals.

**Outcomes/Products**

The goals of this workshop are to

- Discuss materials/resources brought by workshop participants.
- Undertake a gap analysis of materials/resources brought to the workshop.
- Collaboratively create a generic checklist to guide vaping materials development.

**Workshop Abstract**

Electronic nicotine delivery systems (ENDS) come in all shapes and sizes. Some of the names for the different products include Personal Vaporizers, Vape Pens, Vape Boxes, Vapes, Tank Systems, E-Hookah, Hookah Pen, Hookah Stick, Shisha Stick, JUUL, Mechanical Mods, E-Cigars, and E-Pipes. E-Cigarettes can resemble traditional tobacco products like cigarettes, cigars, and pipes; or common gadgets like flashlights, flash drives, pens, fobs, and inhalers. These devices, while delivering similar chemical components, may deliver different amounts of nicotine, and may heat at different temperatures. The chemical compounds in e-cigarette devices vary between brands, and the use of different voltages from device to device can change the chemistry of the aerosol. E-liquid from e-cigarettes and refill packs can contaminate skin, leading to nicotine poisoning.

The number of pre-teens and teens who are vaping is worrying their parents, school personnel, health care providers, and non-profit organizations. Recent reports of serious and potentially fatal lung illnesses and injuries have drawn attention to the issue, even among young users. A variety of entities have stepped in to develop materials, programs, apps, videos, and social media. This workshop will allow participants to examine existing materials and consider where information gaps are.

# Using Interactive Maps to Make Invisible Air Pollution Visible for Community Residents

*Location: Meeting Rooms 1/2 at 9:00 a.m.*

Lead Presenter: Carolyn Wong, Tufts University School of Medicine, Department of Public Health and Community Medicine, carolynwongtwin@gmail.com

Co-Presenter: Doug Brugge, University of Connecticut

Format: Discussion

**Learning Objectives**

- Learn about an interactive map of ultrafine particle concentrations for Boston Chinatown
- Learn how educational methods using the interactive map can be applied to air pollution education for other population groups and communities.

**Required Materials/Tech**

- None

**Outcomes/Products**

- Describe how interactive environmental maps can be used to educate community members about invisible pollution.
- Understand the ways in which knowledge, attitudes, and beliefs can change after engaging in a community-based training that incorporates interactive pollution maps.
- Discuss possible new applications of interactive maps of other pollutants and in other communities and weigh benefits and limitations.
- Share what is learned with research teams.

**Workshop Abstract**

Environmental health literacy is an emerging field that is incorporating new approaches to convey information about air pollution and its risk to lay populations. Racial and ethnic minorities are disproportionately affected by air pollution and are also at a disadvantage in terms of accessing information and acting to reduce their risk. Specifically, communities of color and linguistic minorities are more likely to live near major roadways and to be exposed to traffic-related air pollution. Maps, both static and interactive, are increasingly being used to convey air pollution information to the public. We developed an interactive map of ultrafine particle concentrations for Boston's Chinatown neighborhood as part of the Community Assessment of Freeway Exposure and Health Study (CAFEH).

Our map was based on a predictive model of ultrafines, created through extensive mobile monitoring in the neighborhood. Predictive variables included wind speed and direction, temperature, and traffic volume. The model was used to assign exposure to ultrafines for Chinatown residents as part of an NIEHS-funded epidemiology study that has been published. The interactive map was presented along with other educational materials to adolescent and adult Chinese immigrants for a pilot study funded by

the National Library of Medicine. Results of the pilot trial were highly encouraging in terms of influencing knowledge, attitudes, and beliefs of participants. The work was recently published in the Journal of Health Communication. This session will be based on the above research and will encourage participants to share their own experiences and ideas for using interactive maps in other contexts. The session will be relevant to the fields of health literacy, cultural competency, and environmental health and will aid participants' engagement of immigrant communities in the communication of complex environmental health information for understanding and action.

# Assessing and Strengthening Environmental Health Literacy: Approaches from the Field

*Location: Jr. Ballroom C at 9:00 a.m.*

Lead Presenter: Anna Hoover, University of Kentucky, Anna.Hoover@uky.edu

Co-Presenter: Kathleen Gray, University of North Carolina at Chapel Hill

Format: Other

**Learning Objectives**

Following this workshop, participants will be able to:

- Define Environmental Health Literacy (EHL).
- Describe the bidirectional connections between research report-back and EHL.
- List three approaches EHL researchers and practitioners use to assess baseline EHL and establish EHL targets.

**Required Materials/Tech**

- Workshop participants may wish to take notes – either by hand or laptop – during break-out discussions.

**Products**

- Workshop organizers and interested participants will generate a journal commentary reporting workshop outcomes.

**Workshop Abstract**

The field of environmental health literacy (EHL) focuses on the knowledge and skills people need to protect their health from potentially harmful environmental exposures. EHL encompasses both the assessment of context-specific knowledge gaps and the creation and dissemination of evidence-based, understandable, and targeted resources and programs that address the information needs of diverse audiences, from health care professionals and policymakers to educators and lay audiences. Using a combination of presentations and facilitated group discussions, session moderators will describe methods, emerging findings, and lessons learned from a suite of studies that address EHL for different contexts, including water contamination and endocrine-disrupting chemicals. The tools and protocols developed and used in these studies will serve as prompts for break-out discussions in which participants will identify critical target audiences, collaborations, and opportunities for further strengthening EHL praxis. Interested workshop participants will be invited to contribute (in accordance with defined authorship guidelines) to a journal commentary describing workshop outcomes; with permission, other workshop participants will be recognized in the manuscript's acknowledgments.

# Youth Engagement in Environmental Citizen Science and Advocacy Training in Rural and Urban Areas

*Location: Meeting Room 3 at 9:00 a.m.*

Lead Presenter: Ellen Hahn, University of Kentucky (UK-CARES), ejhahn00@email.uky.edu

Co-Presenters: Susan Pinney, University of Cincinnati (UC) Center for Environmental Genetics (CEG); Kathryn Cardarelli, UK College of Public Health; Melinda Ickes, UK College of Education; Angela Larck, UC CEG; Craig Wilmhoff, Perry County Central High School

Format: Small Group Activity

**Learning Objectives**

At the end of this workshop, participants will be able to:

- Compare and contrast approaches to engage youth in environmental health promotion, science communication, advocacy, and research.
- Identify critical characteristics of effective youth-engaged approaches to reduce environmental health inequities in rural and urban environments.
- Identify ways to integrate citizen science and advocacy training into ongoing youth engagement efforts.
- Identify resources and inspiration for youth engaged hands-on activities.

**Required Materials/Tech**

- None

**Outcomes/Products**

- Mapping exercise to apply lessons learned to their own work in youth engagement and to begin an action and evaluation plan.
- Program characteristics and hands-on activities used with youth to overcome common barriers and challenges.

matter and radon data. The project on EH in science communication involved EH graduate students, linked to 5th-8th graders at Cincinnati Museum Center's annual Medical Camp to promote EH using hands-on activities. The project on training in policy advocacy involved the Tobacco Ambassador Partnership, which recruited and trained high schoolers and adult mentors to be informed, effective advocates with peers, adults, and policymakers to reduce tobacco smoke exposure.

Workshop participants will select one of the four projects and engage in small group discussions about how to apply similar approaches to youth-related EH promotion, science communication, advocacy or research. We will prompt discussion about the critical characteristics of effective youth-engaged approaches to reduce EH inequities as well as common barriers and challenges.

Youth demonstrate a strong desire and agency to learn about and impact EH issues in their communities by engaging in citizen science and advocacy. Being introduced to citizen science strategies such as photovoice, air quality testing, and report back, as well as science communication and advocacy strategies can impact self-efficacy to participate in EH initiatives. Findings reinforce the need for evaluation, integration into existing educational programming, and experiential and timely learning. Implications for connecting graduate students with youth, working with schools and youth-based organizations, and the need for adult mentors such as teachers, parents, and other engaged adults living in the community.

# Workshop Session II:
# Wednesday, February 12, 2020 | 10:45 a.m. – noon

## Translating Sensor Air Pollution, and Health Data to Action with Communities, Youth, and Healthcare

*Location: Meeting Room 3 at 10:45 a.m.*

Lead Presenter: Ananya Roy, Environmental Defense Fund, aroy@edf.org

Co-Presenter: Elena Craft, Environmental Defense Fund

Format: Small Group Activity

**Learning Objectives**

- Discuss best practices for translating scientific information to inspire action.
- Describe the importance of partnerships and context.
- Design a communications plan with respect to message, audience, messenger, method of delivery, context and target action.

**Required Materials/Tech**

- None

**Outcomes/Products**

- Participants will work through a framework for working with or communicating air pollution sensor-related scientific findings with key community members to inspire action.

**Workshop Abstract**

High-resolution air pollution sensors are rapidly advancing urban exposure, epidemiology and risk science. Microscale measurements pave the way for effective risk communication, mapping exposure and health impacts at the block level which make disparities visible and personal. This workshop will draw case studies from Environmental Defense Fund's (EDF) work to illustrate how scientifically robust air quality and health data have been used to mobilize communities and encourage increased civic engagement to improve air quality (Making the Invisible Visible, Environmental Defense Fund).

The first case study will examine EDF's partnership with the West Oakland Environmental Indicators Project to incorporate hyperlocal traffic-related air pollution and health impacts data into community action plans for implementation of AB617 funding in California. The second will examine and EDF's partnership with the City of Houston to develop the context for health risks and community measurements of benzene and other pollutants following recent industrial events, as well as the development of the Environmental Youth Council to increase student understanding of air quality and human health; promote youth civic engagement; and raise the profile of air quality issues and support of community based organizations in their development of environmental justice action plans through data integration, visualization, and mapping.

We will discuss best practices for translating scientific information to inspire action. This includes methods for developing materials and strategies for communicating the information for target audiences through an outreach plan. We will outline the significance of developing sustained partnerships and working with community partners to interpret and use scientific data in the local context. Workshop participants will learn the practical skills of designing a communications plan with respect to message, audience, messenger, method of delivery, context and target action. Case study presentations will be followed by small group exercises to apply the framework to workshop participants' own work. Small groups will report back and engage in a discussion of opportunities and barriers.

# Building Educators' Capacity to Explore the Health Effects of E-cigarettes with K-12 Students

*Location: Meeting Room 4 at 10:45 a.m.*

Lead Presenter: Dana Haine, University of North Carolina at Chapel Hill, dhaine@unc.edu

Co-Presenter: Lisa Hayward, University of Washington

Format: Small Group Activity

**Learning Objectives**

Participants will be able to:

- Describe the components of vaping liquids and inhaled e-cigarette aerosols.
- Describe the health risks associated with the components of vaping liquids and inhaled e-cigarette aerosols.
- Describe two interactive activities designed to teach middle/high school student groups about the harmful effects of vaping.
- Explain key aspects of developing an activity that incorporates published scientific data.

**Required Materials/Tech**

- Participants are encouraged to bring their laptops to the workshop, although having a laptop is not a requirement as participants will work in small groups.

**Outcomes/Products**

- Participants will receive two interactive activities designed to teach middle/high school students about the harmful effects of vaping.
- Participant feedback will inform future improvements to each activity as well as help workshop facilitators identify additional avenues for dissemination.
- Participation in this workshop will build the capacity of PEPH members to address vaping in their work.

**Workshop Abstract**

Electronic, or e-cigarettes, are devices that deliver nicotine, tetrahydrocannabinol (THC), flavorings, and other additives to users through an inhaled aerosol, in a process known as vaping. According to the Center for Disease Control and Prevention (CDC), an estimated 5 million US middle and high school students reported using e-cigarettes in 2019, an increase of 1.4 million youth over 2018. This trend has raised concern in public health circles about youth addiction to nicotine from e-cigarette use and unknown respiratory effects of e-liquid constituents such as flavorings. In light of the recent outbreak in vaping-related lung illnesses and subsequent deaths, the need to educate youth about the harmful effects of inhaling aerosols from e-cigarettes has become even more urgent. Fortunately, K-12 science and health teachers are well-positioned to engage adolescents in learning about e-cigarettes and the potential health effects of inhaled aerosols. The Community Engagement Cores (CECs) for the UNC Chapel Hill Center for Environmental Health and Susceptibility (CEHS) and for The Center for Exposures, Diseases, Genomics, and Environment (EDGE) at the University of Washington Schools of Medicine and Public Health have been engaging with Center scientists to share emerging science on the respiratory health effects of inhaling aerosols from e-cigarettes with K-12 audiences. In this interactive session, we

will describe and model the implementation of two classroom activities that were developed in 2019, in concert with and piloted by health and science teachers, respectively. First, we will describe a computer-based activity designed for use in a health classroom where students attempt to break out of a virtual escape room while learning about the harmful effects of vaping. Next, we will describe a data interpretation activity developed for high school biology classrooms in which students examine evidence that e-liquids and aerosols impair the respiratory immune system. We also will highlight the process of developing a lesson that incorporates published scientific data.

# Using Maps to Introduce Environment and Health Data to Youth

*Location: Jr. Ballroom D3 at 10:45 a.m.*

Lead Presenter: David Chang, Tracking California, david.chang@trackingcalifornia.org

Co-Presenter: Taylor Morton, WE ACT for Environmental Justice

Format: Small Group Activity

**Learning Objectives**

- Discuss how maps can be used as a visual learning tool to disseminate scientific information (pros and cons, ways they've used maps in their own work).
- Tell a story using maps in hand to question underlying social and environmental conditions.
- Examine how students have interpreted maps through the lens of WE ACT for Environmental Justice and Tracking CA's own work.
- List activities, tools, and mapping applications they themselves can use with youth in their home state.

**Required Materials**

- We encourage participants who may have used maps in their community engagement work to bring them to share with the rest of the group; however, participants do not need to bring any materials to the workshop aside from pen and paper.

**Outcomes/Products**

- Participants will examine maps/data from Tracking CA/NYC and other National Environmental Public Health Tracking sites.
- Participants will list products or multimedia tools that youth can use (story maps, songs, videos, etc.).
- Participants will generate a list of sample activities to take back to their team.

**Workshop Abstract**

Tracking California's mission is to mobilize data to improve public health. Our two core functions include developing and disseminating materials to communicate environmental and health data to a broad range of stakeholders and engaging with stakeholders to increase environmental and health knowledge and capacities. Tracking California is part of a larger network of state tracking programs that collectively make up the National Environmental Public Health Tracking Network, funded by the Centers for Disease Control. Like other programs in this network, Tracking California emphasizes the dissemination of scientific information via our web-based portal that houses a number of interactive maps/data on a wide range of environmental health topics. These maps provide an opportunity for different audiences to look at environmental hazards in their neighborhoods in new and exciting ways. Tracking California will highlight its experiences working with students from the Youth Environmental Health Internship Program in Imperial County to interpret air pollution maps/data. Tracking CA will also highlight its experience working with Oakland International High School students, who pulled information from Tracking California's portal.

WE ACT for Environmental Justice uses maps/data from the NYC Environmental Health Tracking Portal in its Environmental Health and Justice Leadership Training Program. Serving as co-facilitators in this workshop, WE ACT will highlight students' use of maps to further develop individual research projects on environmental justice issues that are present in the communities of Washington Heights and the South Bronx. To assess prior knowledge, WE ACT and Tracking California will facilitate a discussion with participants about how maps have been used successfully or unsuccessfully in different youth settings. The facilitators of the workshop will walk participants through a series of small group activities modeled after the curriculum that WE ACT and Tracking CA have implemented with youth.

# Social Media: An Important Tool for Environmental Public Health Outreach and Engagement

*Location: Jr. Ballroom C at 10:45 a.m.*

Lead Presenter: Brenda Koester, University of Illinois at Urbana-Champaign, bkoester@illinois.edu

Co-Presenters: Nathan Mutic, Emory University; Wendy Gutschow, University of Southern California

Format: Other

**Learning Objectives**

- Understand the value of social media as a tool for communicating environmental/public health content.
- Describe the basic components of a social media strategy.
- Understand the difference between popular social media platforms.
- Define social media objectives.
- Identify two strategies for engaging an audience.
- Recognize the two benefits of utilizing tools for increasing efficiency in dissemination of social media content.
- Describe two ways to measure the reach and impact of social media efforts.

**Required Materials/Tech**

To take full advantage of this workshop, participants should bring:

- A charged laptop or tablet.
- Login information for their organization's social media account(s) (only if social media account(s) are current).
- Content-specific to their research or community engagement work that could be translated and shared on social media (e.g., grant proposal, recent publications, community engagement programs).

**Outcomes/Products**

Participants will:

- Create a draft social media strategy and implementation plan including milestones.
- Identify appropriate social media platforms to reach their target audience(s).
- Create compelling social media content based on their organization's current research or programmatic focus.

**Workshop Abstract**

Social media is emerging as a necessary tool for public and environmental health communication as more Americans utilize the internet and social media to search for health information. According to the Pew Research Centers Social Media Use report, 79% of all United States adults who access the internet use Facebook. Social media users report that social media is an important way that they get science news (33%). This workshop will highlight the value of social media as a tool for community outreach and translation of environmental health-related content. The format will be a blend of lecture and practical individual and small group exercises designed to walk participants through the process of drafting a

social media strategy. Our team of presenters, which includes Brenda Koester (Illinois), Wendy Gutschow (USC), and Nathan Mutic (Emory), will share a case study of how the Children's Environmental Health Research Centers and the Pediatric Environmental Health Specialty Units worked together to increase network capacity for utilizing social media as an outreach tool to disseminate environmental health content. They will share lessons learned and best practices for identifying target audiences, identifying appropriate social media platforms, defining social media objectives, creating strategies for creating compelling content, utilizing tools to increase efficiencies, and monitoring and measuring the reach and impact of an organization's social media efforts. This workshop is appropriate for individuals and organizations with all levels of social media experience and expertise. Participants will be provided with a workbook that we will use throughout the workshop. Upon completion of the workshop, attendees will have a framework for developing a social media strategy and an outline of implementation milestones.

# Natural Disaster Response and Recovery as an Environmental Justice Issue

*Location: Meeting Rooms 1/2 at 10:45 a.m.*

Lead Presenter: Joseph "Chip" Hughes, NIEHS Worker Training Program, hughes3@niehs.nih.gov

Co-Presenter: Sharon Beard, NIEHS Worker Training Program

Format: Small Group Activity

**Learning objectives**

Upon completion, participants will be able to:

- Describe the relationship between natural disasters and environmental justice concerns.
- Recommend the public health actions for improving the protection of disadvantaged communities through disaster response programs.
- Summarize the contents and use of the NIEHS Disaster Response training curriculum.

**Required materials/tech**

- Familiarity with NIEHS Disaster Response training apps: https://tools.niehs.nih.gov/wetp/index.cfm?id=2536
- NIEHS WTP and Hurricane Sandy Response Lessons Learned: https://tools.niehs.nih.gov/wetp/public/hasl_get_blob.cfm?ID=9939#sthash.GPOGbMG4.dpuf
- https://www.niehs.nih.gov/careers/hazmat/training_program_areas/hdpt/index.cfm

**Workshop Abstract**

The EJ and Natural Disasters Subcommittee was created by the EJ IWG to bring Federal officials together to assess the major EJ issues and identify time-sensitive solutions to address natural disaster preparedness, response, and recovery in vulnerable, overburdened, and underserved communities. The Subcommittee has focused on a variety of natural disasters, e.g., major floods, hurricanes, earthquakes, tornadoes, and wildfires, and how to minimize the impact of these disasters on vulnerable populations. Natural disasters can have disastrous consequences and leave lasting damage to these communities. The Subcommittee is working on action items and implementation processes which will help to minimize and even prevent these impacts in the future.

The final product will be a report which defines the best approaches to address EJ concerns in vulnerable, overburdened, and underserved communities related to natural disaster preparedness, response, and recovery, with major EJ IWG findings and recommendations for future improvements in addressing EJ concerns and needs.

The small group discussions in this session will be facilitated by EJ IWG members (Beard and Hughes) and will focus on participants' past experience with natural disasters and what they taught us about what needs to be done to better prepare vulnerable communities for future natural disasters. We will explore what capacity building, training, technical assistance or other support can government agencies (Federal, State, Local, Tribal) provide to vulnerable communities in natural disaster preparedness,

response, and/or recovery. Discussions will focus on developing a model capacity building, training, and technical assistance program for vulnerable community natural disaster preparedness, response, and recovery, as well as capture model partnerships and alliances between Federal, State, Local, and Tribal government agencies, and local vulnerable communities to help ensure that EJ perspectives and concerns are incorporated into the disaster response and recovery process for all levels of government.

National Institute of
Environmental Health Sciences

# Partnerships for Environmental Public Health

## Annual Meeting

## Poster Abstracts

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| **3** | Mattingly | Examining Changes in Children's Knowledge of Nutrition and Environmental Pollution Following Camp |
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| **6** | MacKenzie | Assessment of Mixed-Metal Exposures and Immune Dysregulation in Tribal Communities |
| **7** | MacKenzie | "Thinking Zinc": A Community-Based Intervention to Mitigate Health Impacts of Metals Exposure |
| **8** | Gribble | The Southeast Alaska Tribal Ocean Research (SEATOR) Partnership |
| **9** | Avenbuan | The Toxic Legacy of an Industry and its Impact on a Native American Tribe |
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| **15** | Schaider | PFAS-REACH: Research, Education, and Action for Community Health |
| **16** | Conley | Family-centered, Youth-Engaged Citizen Science Approach to Radon Reduction in Rural KY and Urban OH |
| **17** | Pearson | Community Science, Uncertainty and Ambiguity, and Community Support in the Context of the 1973 PBB Contamination in Michigan: Preliminary Themes From an Analysis of Oral Histories |
| **18** | Southerland | Leveraging Mobile Monitoring, Modelling, and Satellite Remote Sensing to Estimate the Health Burden |
| **19** | Haynes | Healthy Air and Healthy Eating: Encouraging a Culture of Health in Elizabeth, NJ. |

| Poster # | Author Last Name | Poster Title |
|---|---|---|
| **20** | Razafy | Disappearing Seas: Reporting on Dust and Children's Respiratory Health in a Changing Climate |
| **21** | Guel | Using Environmental Health & Justice Community Science to Empower Frontline Communities |
| **22** | San Andres | From Research to Action: Implementing CBPAR with Immigrant, Latinx Domestic Cleaners in NY |
| **23** | Awada | E-cigarette Exposure during Development Alters Proteins in the Hypothalamus Associated with Obesity |
| **24** | Negron-Martinez | Shaping Environmental Sustainability for Population Health |
| **25** | Luzynski | Quantifying and Costing the Mental Health Burden of Flooding |
| **26** | Mendoza-Sanchez | Impact of Flooding on Antibiotic-Resistance in Soils From Public Parks |
| **27** | Prochaska | Informing Health Impact Assessments Using a Cumulative Potential Impact Assessment Tool |
| **28** | Thigpen Tart | NIEHS Climate Change and Human Health Literature Portal |
| **29** | Tomsho | Addressing Shortcomings of Data Report-Back Efforts |
| **30** | Koester | Amplifying Children's Environmental Health Research: Development, Implementation, and Evaluation of a Social Media Toolkit and Campaign |
| **31** | Sayarath | Development of Health Communication Strategies in a Children's Environmental Health Center |
| **32** | Arnold | The Role of Youth Advocates in Sharing Research Results: The Hired Child Farmworker Study |
| **33** | Min | Products and Guiding Principles for Communicating Results in the Study Community: HAPI Study |
| **34** | Huntington Moskos | Reducing Radon and Secondhand Smoke Exposure in the Home: Impact of Tailored Report-Back |
| **35** | Charlesworth | Eliminating Health Disparities and Advancing Environmental Justice in 2020 and Beyond |
| **36** | Carrera | Advancing a Critical Literacy Framework for EHL Through Community Driven Technology Design |
| **37** | Richlen | The Woods Hole Center for Oceans and Human Health: Community Engagement and Education |
| **38** | Luukinen | The Duke Furniture Foam Testing Project: A Case Study in Citizen Science & Research Translation |
| **39** | An Han | Metal Air Pollution Partnership Solutions (MAPPS): Community, Academy, Government and Industry Collaboration |

| Poster # | Author Last Name | Poster Title |
|---|---|---|
| **40** | Gray | University Collaboration to Understand PFAS Exposure in NC: Communicating Science to Stakeholders |
| **41** | Koester | What Child Care Providers Know About Environmental Influences on Children's Health |
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| **43** | Croisant | The Bench Tutorials Program: Scientific Research & Design |
| **44** | May | Environmental Health Research Experiences for High School Science Teachers |
| **45** | Straughn | Science Cafes at Novel Locations |
| **46** | Buckholz | Fernald Community's RoadMap to Resolution |
| **47** | Kastleman | Building Capacity to Improve the Development and Communication of Fish Consumption Advisories in NC |
| **48** | Lopez | Duwamish F.I.S.H.: A Participatory Approach to Community Empowerment and Capacity Building |
| **49** | Gutschow | A Day in the Life: A Youth Based Participatory Air Monitoring and Personal Storytelling Program |
| **50** | Korfmacher | Sensor Stories: Engaging High School Students in Local Air Quality Explorations |
| **51** | Lebow-Skelley | Mapping Priorities and Issues in Reporting Environmental Health Data to Communities |
| **52** | Fallone | Developing Home Assessments of Indoor Air Quality Threats in a Cohort of COPD Patients |
| **53** | Korfmacher | Bridging Silos: Collaborating for Environmental Health and Justice in Urban Communities |
| **54** | Pettibone | Mapping the Community in a Translational Research Project |

## 1. Respiratory Health Problems Among Hired Latinx Child Farmworkers in North Carolina

Greg Kearney, East Carolina University, kearneyg@ecu.edu

**Abstract:**
Background: Between 2005 and 2016, the number of hired child farmworkers was estimated at between 30,000 and 79,325 annually. In North Carolina, Latinx children represent the majority of child farmworkers. Agricultural farm work has been described as one of the most dangerous occupations. However, children are still allowed to perform a variety of duties on farms that put them at risk of injuries and even death. Exposure to agricultural dust, pesticides, and other chemicals pose serious respiratory health concerns, especially to children who do farm work. Few studies have investigated respiratory health problems among children that do farm work.

Study Aims:

1) To evaluate the prevalence of self-reported respiratory health problems among a group of Latinx child farmworkers.
2) To evaluate associations between Latinx children with self-reported respiratory health problems, and number of weeks worked in agriculture and having worked in tobacco versus other crops in the past week.

Methods and Measures: This project was part of the CBPR, Hired Child Farmworker Study. In 2017, interviews were conducted with 202 North Carolina, Latinx child farmworkers between 10 to 17 years, employed to do farm work in the past 3 months. Statistical associations between the number of participants that reported respiratory problems and the following variables; gender, age, migrant/seasonal, job characteristics and the amount of work in last three months (weeks). This project received IRB approvals from WF and ECU.

Results: Approximately one-in-six (15.8%) participants indicated that they had a respiratory problem. Almost one-in-five reported respiratory problems with those working fewer weeks versus those working more weeks. Although there is no respiratory comparison group, ethnic minority children, particularly Latinx, represents the highest prevalence of asthma and asthma episodes. The inverse relationship of children working longer weeks and reporting less respiratory problems is interesting. Previous studies have suggested that early childhood exposure among rural children living on farms as having a protective effect on respiratory disorders and allergies. However, more in-depth investigation is needed to properly assess specific respiratory health symptoms, including asthma among this group.

**Contributing Authors:**

- Kearney GD
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- Talton JW
- JC Sandberg
- SA Quandt
- MF Wiggins
- Daniel SS

## 2. EJSCREEN Lead Index is Associated With Childhood Blood Lead Levels in a Midwestern County

Nicholas Newman, University of Cincinnati/Cincinnati Children's, nicholas.newman@cchmc.org

**Abstract:**
Lead is a toxicant with no known threshold for effect. Early life lead exposure is associated with life-long health effects. Childhood blood lead levels have dramatically decreased following the elimination of lead from gasoline, house paint, and other items. Despite these efforts, there are still >500,000 children with blood lead levels =>5mcg/dL, the current CDC reference level, in the United States annually. Cases of lead exposed children tend to be grouped geographically and in children of color. To provide information on appropriate community engagement to prevent or mitigate lead exposure, statistical models that predict children at risk have been developed. US EPA developed the EJSCREEN to identify Environmental Justice Communities, but this model has not been used to predict the prevalence of children with elevated blood lead levels. We assessed the association between the EJSCREEN Lead Index (Version 2018) and the percentage of children with blood lead levels =>5 mcg/dL (Percent EBLL) by zip code in Hamilton County, Ohio using publicly available lead testing data from the Ohio Department of Health Data Warehouse (2017 data).

Results: 52 zip codes in Hamilton County reported lead testing results. A total of 19,719 children were tested (51.2% male), representing 26.6% of high-risk children in Hamilton County; 2.3% of children tested had a blood lead level =>5mcg/dL. The average EJSCREEN Lead Index was 49.2 (range: 3-99). Since neither the EJ SCREEN nor Percent EBLL were normally distributed, a Spearman's Rank Correlation was calculated. Spearman's Rho = 0.61. An EJ SCREEN Lead Index of 80 or higher was associated with an increased odds for >2.5% of children in that zip code having a blood lead level =>5mcg/dL: Conditional maximum likelihood estimate of Odds Ratio: 21.95, 95% CI (4.81, 129.3), p<0.01.

Conclusion: The EJ SCREEN Lead Index is a good predictor of elevated blood lead levels in children in a Midwestern County that has a prevalence of elevated blood lead levels similar to the United States overall.

**Contributing Authors:**

- Carlee Clemons

## 3. Examining Changes in Children's Knowledge of Nutrition and Environmental Pollution Following Camp

Ashley Mattingly, University of Kentucky, arma258@g.uky.edu

**Abstract:**
Background: Early exposure to concepts of environmental pollution can increase children's feelings of environmental stewardship, improve their attitudes towards science, and empower them to become change-makers. The University of Kentucky's Superfund Research Center's Community Engagement Core (SRC-CEC) sought to improve awareness and knowledge of nutrition's protective role against environmental pollution among rural Appalachian youth attending day camp.

Methods: Youth (ages 5-12) attended two different week-long summer camps. Headwaters camp focused on environmental stewardship followed by Farm camp that focused on food and nutrition. During Farm camp one education lesson was delivered that addressed sources of pollution and nutrition's protective effects on health. Both lessons and camps utilized active learning and were physically engaging. Following the conclusion of each camp, structured interviews with campers (n = 50) of both genders were conducted to evaluate knowledge change and acceptability of materials.

Results: Youth generally reported willingness to address pollution issues, particularly water pollution, by not putting harmful substances in waterways. However, participants did not recognize nutrition as potentially protective against environmental pollution exposures. Only older children exhibited simplistic understanding of connections between fruit and vegetable intake and health.

Conclusion: Children recognized that pollution existed in their communities, and displayed simplistic understandings of its detrimental effect to health, but did not recognize the protective role of nutrition. Due to low literacy, qualitative methods of data collection are the preferred model of evaluation to yield informative data in this population. This study established the need for creative nutrition and pollution-centered lessons targeting children.

**Contributing Authors:**

- Annie Koempel
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## 4. Individual Perspectives on Trash Disposal in a Marginalized Community in the Dominican Republic

Nakul Dar, College of William & Mary, ndar@email.wm.edu

**Abstract:**
Access to consistent waste management services is an important part of mitigating exposure to public health risks. Many marginalized communities suffer from a lack of frequent and effective public service provision, including waste management, as a result of ineffective governance. While academic literature has explored the relationship between waste management and public health, as well as marginalization and public services, there is relatively little that considers how community-level perceptions of marginalization affect beliefs and practices regarding waste management. The combination of poverty and governmental neglect results in poor sanitary conditions and leads to negative health outcomes (Hettiarachchi et al. 2018). This study explores a marginalized community in the Dominican Republic known as Esfuerzo de Paraiso. Members of this community have frequently complained about their public trash problem, especially regarding the solid waste in their neighborhood stream that originates from communities at higher altitudes. This issue is largely ignored by the local government and falls upon the shoulders of the Junta de Vecinos, or neighborhood community leaders, to address. Through a retrospective qualitative analysis of interviews conducted in May 2019, this study uses a socio-ecological approach to demonstrate the importance of individual perspectives on the social dynamics between a marginalized community and its government. Many interventions in Latin America led by U.S.-based research teams fail to incorporate the importance of local cultural values in their work. This study has broad-scale implications for future interventions and community-based participatory research projects in Latin America.

**Contributing Authors:**

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## 5. Community-Engaged Research and Translation With Tribal Communities in the Western United States

Joseph Hoover, Montana State University Billings, joseph.hoover@msubillings.edu

**Abstract:**
Two research centers based at the University of New Mexico (UNM) are working with Indigenous communities to confront environmental and environmental health disparity issues stemming from abandoned mines on or near tribal lands. The Metal Exposure and Toxicity Assessment on Tribal Lands in the Southwest (UNM METALS) Superfund Research Center and the Center for Native Environmental Health (EH) Equity Research are dedicated to studying the toxic effects of metal exposure in Tribal communities. Both Centers rely on community input, engagement, and expertise to inform the research process. As a result, we have established community partnerships built on long-term relationships and engagement by academic, community, state, and federal stakeholders. Community members provide input across all research phases, from the design and implementation of field studies, to interpreting and translating the research results. A variety of methods are used by the Centers' community engagement/research translation cores to achieve these goals. Here we present summaries of recent engagement/translation activities including:

a) Supporting abstract and poster presentations by community members at an international research conference.
b) Developing Native artwork to represent complex research topics using Native imagery.
c) Translation and engagement activities to support ongoing investigations of metal-based airborne dust and a tribal healthy homes workshop.

Each activity uses engagement practices to facilitate research, build trust with community members and leaders, build research capacity in partner communities, and translate results among researchers, community members, and other stakeholders. We will also situate these examples in the broader arc of research and engagement activities for each Center using the NIH Translational Research Framework. Based on our experiences, the Translation Research Framework is a practical tool for capturing the trajectory of long-term research projects the support community engaged practices to achieve research objectives.

**Contributing Authors:**

- Sheldwin Yazzie
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## 6. Assessment of Mixed-Metal Exposures and Immune Dysregulation in Tribal Communities

Debra MacKenzie, University of New Mexico, dmackenzie@salud.unm.edu

**Abstract:**
Mining in the United States has left a legacy of >600,000 mine waste sites, many of which in the western U.S. are located on or contiguous to the watersheds of tribal lands. Disparities in exposure to environmental toxicants in tribal communities can be exacerbated by increased community reliance on subsistence lifestyles, with land and water use patterns leading to greater exposures to local contaminants. Mine wastes may contain mixtures of primary mining minerals: uranium, gold, silver, copper and lead, as well as others remaining after processing, including arsenic, mercury, cadmium, and manganese. Our P50 Environmental Health Disparities Center is addressing concerns related to environmental metals exposures in Navajo Nation, Cheyenne River Sioux, and Apsaalooke (Crow) communities. Based on earlier observations, we hypothesized that chronic exposure to metals and metal mixtures from mine waste result in immune system dysregulation manifest by autoimmunity and/or chronic inflammation. To assess mixed-metal exposures, we used a Bayesian Profile Regression (BPR) method to assign participants from the Navajo Birth Cohort Study into exposure clusters based on metals biomonitoring values. We used a spider plot to visualize serum cytokine levels between individuals within exposure clusters and observed that the higher exposure clusters had higher levels of the pro-inflammatory cytokine IFNgamma. BPR clustering analysis using metals as predictors and cytokines as outcomes showed significantly higher INFgamma; levels ($p = .005$) in clusters with higher exposures, with all metals supporting the clustering having a mean in the third or fourth quantile, most notably As(III), As(V), DMA, and MMA. These data suggest that metals and metalloid exposure contribute to establishment of a chronic inflammatory process. Chronic inflammation is associated with cardiovascular disease, cancer, diabetes, chronic kidney disease, and other disorders known to contribute to health disparities in tribal communities. We are in the process of performing similar analyses on samples from the other communities to identify commonalities and distinctions among metal/metalloid exposures and immunologic outcomes. This data will allow us to better understand the health impacts of metals exposures across communities with similar exposure concerns and will inform identification of mitigation strategies that can be targeted to a specific community or applied broadly across multiple communities.

**Contributing Authors:**

- Jennifer Ong
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- Johnnye Lewis

## 7. "Thinking Zinc": A Community-Based Intervention to Mitigate Health Impacts of Metals Exposure

Debra MacKenzie, University of New Mexico, dmackenzie@salud.unm.edu

**Abstract:**
Communities have long expressed concerns about health consequences arising from chronic, ongoing exposures to uranium, arsenic and other metals associated with living in proximity to abandoned uranium mines on Navajo Nation. We and others have demonstrated that certain metals, including arsenic and uranium, bind with zinc finger (ZnF) proteins and disrupt normal functions leading to inhibition of DNA repair as well as immune dysregulation. Importantly, the addition of supplemental zinc in experimental models can reverse the inhibitory effects of arsenic or uranium. Additionally, preliminary findings in an exposed population indicated an inverse relationship between zinc levels and detectable DNA damage suggesting that zinc can reduce known negative cellular effects associated with metal exposures. Biomonitoring of women enrolled in the Navajo Birth Cohort Study showed that nearly two-thirds were deficient in zinc. We are currently conducting a one-armed cohort intervention trial, "Thinking Zinc", as part of our UNM METALS Superfund Center, to test our hypothesis that zinc supplementation, at (but not exceeding) recommended adult dietary levels, can alleviate adverse effects of uranium and mixed metal exposures in this population. We will recruit a total of 100 subjects from two community sites on Navajo Nation. Primary endpoints include urinary and serum metal levels and assessments of biomarkers of cellular changes of immune dysregulation and autoimmunity. Secondary endpoints include DNA damage measurements and DNA repair activity. We will collect two baseline and two post-treatment data points from each individual participant. The outcomes from these studies will be significant in two major ways. Firstly, we will add to our understanding of how metals and metal mixtures of concern to communities alter or impact immune regulation and DNA repair processes. Secondly, we will test whether a mechanism-based intervention will alleviate the adverse cellular effects of metals exposures. Our work to date suggests that supplemental zinc may offer a tractable, culturally acceptable, and translational approach to reduce health risk attributable to uranium and arsenic exposures by restoring the function of proteins involved in DNA repair processes and immune regulation. Promoting more intake of zinc through consumption of common Navajo foods, along with supplementation, may help improve healthy zinc levels in the Navajo population.

**Contributing Authors:**

- Laurie Hudson
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- Paul Robinson
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## 8. The Southeast Alaska Tribal Ocean Research (SEATOR) Partnership

Matthew Gribble, Emory University, matt.gribble@emory.edu

**Abstract:**
Shellfish such as mussels and clams comprise an important part of the traditional diets of many communities in Southeast Alaska. Unfortunately, naturally occurring algae such as Alexandrium spp. can produce toxins that may compromise the safety of consuming shellfish seasonally in some harvest locations. Identifying specific times and places when and where consumption of wild shellfish would be unsafe is therefore a public health and environmental resource-management challenge for communities for whom subsistence harvest has cultural and nutritional importance. Ensuring seafood safety is an especially salient challenge in the context of a rapidly changing coastal environment including increasing sea surface temperatures. To meet this poisoning-prevention challenge, tribes and communities pooled resources to form the Southeast Alaska Tribal Ocean Research (SEATOR) Partnership. The long-term goal of SEATOR is to ensure that communities in Southeast Alaska have sustainable access to subsistence resources. Using the Sitka Tribe of Alaska Environmental Research Laboratory, SEATOR monitors toxin levels in shellfish and collects and consolidates data on environmental variables that may be important predictors of algal toxin levels, such as sea surface temperature, salinity, and phytoplankton observations. Data from SEATOR are publicly available and encouraged to be used for the development and testing of predictive algorithms that could improve seafood risk assessment in Southeast Alaska. We highlight some of the key variables now available for data analysis, and some summary findings of the program to date. Since it began in 2014, over 1700 shellfish samples have been analyzed for paralytic shellfish toxin (PST) in more than 20 locations. Potentially lethal concentrations of PST (>4,000 microg/ 100 g-1) have been observed in blue mussels (Mytilus trossulus) and butter clams (Saxidomus gigantea). Blue mussels display strong seasonality with spring and fall blooms, however other species such as butter clams, often remain above the FDA threshold for months following blooms of toxic algae. Future advances in big data analytics using SEATOR data for training and testing of predictive algorithms may help reduce the community risk of paralytic shellfish poisoning.

**Contributing Authors:**

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## 9. The Toxic Legacy of an Industry and its Impact on a Native American Tribe

Oyemwenosa Avenbuan, New York University Langone School of Medicine, oa815@nyu.edu

**Abstract:**
In the early 1960s through the late 1970s, millions of gallons of paint sludge and other toxic materials were dumped by a large car manufacturing plant into abandoned mines, forested areas, and nearby homes in Ringwood, NJ. As a result, sections of Ringwood became riddled with toxic metals in their soil, water and air, placing a large environmental burden on the very people who have lived on this land for generations -the Ramapough Lunaape Turtle Clan Nation. Upon community request, samples of soil, water, plants, and fish tissue were collected from community-identified sites by citizen scientists and NYU graduate assistants to evaluate soil metal concentrations from this "remediated" 500-acre Superfund site. Soil samples were collected by digging 3-5 inches deep with a plastic shovel and placed into individual zip lock bags stored at room temperature until analyses. Each dried soil sample was analyzed in duplicate using two independent X-ray florescence (XRF) instruments. Twenty heavy metals, including lead (Pb), arsenic (As) and cadmium (Cd) were analyzed and their levels compared to NJ Direct Contact Soil Standards for dermal, ingestion, and inhalation exposure. Both As and Pb were found in several different soil samples collected around the local Ringwood church at levels exceeding the NJ soil standard of 19 mg/kg and 400mg/kg, respectively. Besides being a carcinogen, ingestion of As has been associated with increased cardiovascular and respiratory diseases. Ingestion of Pb, particularly by children causes decreased neurocognition, hyperactivity, lower IQ scores, and immune suppression. Given the Native American children who continue to play in this area and the Tribes' tradition of growing their own food, this finding is of serious concern for these already-vulnerable Indigenous people.

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**Contributing Authors:**

- Dennis DeFreese
- Thomas McKeon
- Judith Zelikoff

## 10. Comparison of Mutton Consumption in two Navajo Communities

Jani Ingram, Northern Arizona University, jani.ingram@nau.edu

**Abstract:**
Over 500 abandoned uranium mines are located on the Navajo Reservation. Different pathways of environmental uranium exposure have been studied with respect to the Navajo people including water, soil, and plants; however, uranium exposure from traditional Navajo food, specifically mutton (sheep), has not been reported. This study focuses on mutton consumption in two small communities: Cameron, Arizona, located in the southwestern region of the Navajo Nation and Cove, Arizona located in the northeastern region of Navajo Nation. Both communities, 215 miles apart within the boundaries of the Navajo Reservation, have legacy uranium mines near their communities. Thus, the Mutton Consumption Survey study was initiated after community members from both Cameron and Cove expressed concern of uranium exposure in their sheep. Participants were asked 20-questions regarding frequency and cultural values of mutton consumption in Navajo uranium mining communities. Results from Cameron indicate most participants consumed mutton during traditional Navajo ceremonies that may be threatened due to uranium contamination impacts (Rock et. al, 2019). The Cove Survey, in summer 2019, hypothesizes impacts to cultural values (consumption issues, threats to cultural values, spiritual concerns, and public health impacts) will be similar to Cameron. We believe the survey will address traditional food consumption patterns where policies for safe traditional food consumption practices among Indigenous communities may be developed.

**Contributing Authors:**

- Tommy Rock
- Tasha Nez
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## 11. Barrow Pits and Construction & Demolition Landfills Created an American Nightmare

Calvin Avant, Unity in the Family Inc., calavant2905@gmail.com

**Abstract:**
Unity in the Family Ministry, in conjunction with the Deep South Center for Environmental Justice, is conducting an Environmental Justice project funded by the Kellogg Foundation entitled HBCU/CBO Gulf Coast Equity Consortium. The affected communities are quiet African American neighborhoods where most residents own their own homes. In the 1950's, residents used to fish, swim, and hunt and had a clean and peaceful lifestyle. Fast forward to present day and you will find these neighborhoods inundated with thirteen Barrow Pits and Construction & Demolition Landfills. Pits are used for mining dirt and once excavation is completed, they are filled with toxic construction and demolition debris. This destructive behavior has been prevalent for over 25 years. This project utilizes a citizen science approach where the residents are taught to conduct research and collect data concerning environmental justice issues.

1. Continuous monitoring of hydrogen sulfide gas levels. *Outcomes:*
    a. Submit EPA grant for individual monitors and air scrubbers.
    b. Residents will evaluate hydrogen sulfide gas levels individually.
2. Residents create asset map utilizing EJ Screen. *Outcomes:*
    a. Evaluate toxic waste found in the landfills through mapping.
    b. Create a map showing the location and ownership of pit landfills.
    c. Obtain environmental and demographic indicators.
3. Address health hazards and mortality issues triggered by the toxic waste. *Outcomes:*
    a. Conduct water and soil sampling.
    b. Analyze ground and water contaminants in their relationships to health hazards and mortality issues.
    c. Create health profile to make residents aware of heath disparities and mortality issues and how to alleviate them.
4. Address planning and zoning issues in these communities. *Outcomes:*
    a. Conduct workshop with County Planning and Zoning Department.
    b. Public record request to examine planning amendments and ordinances for land development codes.
5. What is the resident's legal remedies? *Outcomes:*
    a. Conduct Legal Action Workshop.
    b. Examine case studies on relocation and restoration.

Goals, priorities issues and community impact are to facilitate activities among residents, utilizing a SWOT analysis related to landfills and barrow pits. Formulating strategies, to address health problems, implement policies, and relocation and restoration plans.

**Contributing Authors:**

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## 12. Lead Contamination is Found in 42% of Residential Soil Sampled in a Cincinnati Urban Neighborhood

Angela Larck, University of Cincinnati, Center for Environmental Genetics, Community Engagement Core, angela.larck@uc.edu

**Abstract:**
Background: In early 2019, University of Cincinnati (UC) Center for Environmental Genetics (CEG), along with the University of Kentucky (UK) Center for Appalachian Research in Environmental Sciences (CARES), developed and pilot tested a citizen science soil collection toolkit for metal analysis to be used by non-scientist community members. As a study in feasibility and demonstration, validation of the toolkit using a broad volunteer sample was the main goal (Phase I). However, metal testing results showed a clear delineation in lead levels between city and non-city properties. UC instituted Phase II of the original study to determine the residential urban prevalence of lead in soil in Cincinnati using strategic systematic sampling.

Methods:

1. Door-to-door recruitment over a defined area of about 4 city blocks.
2. Use of an improved UC/UK pilot-tested citizen science soil collection toolkit incorporating feedback from Phase I volunteer participants.
3. Community engaged (CEnR) collaboration.
4. Announcement of study using community newsletter and street wide google group.
5. Community volunteers assisted with door-to-door recruitment.
6. Held a community participant meeting for dissemination of overall results at a location within the sampling frame.
7. Open communication with the City of Cincinnati Health Department, including two meetings with the Health Commissioner - one to alert the city before study commencement and one to provide a first look at results before wider dissemination.
8. MPH student assisted with recruitment and in-house testing of soil samples.

Results: Lead levels over the EPA Regional Removal Management Level (RML) of 400 ppm were found in 42% of the tested properties' soil. The strategic sampling frame consisted of approximately 142 residential properties. Out of those properties, 56 accepted citizen science soil collection toolkits, and 26 (46% response rate) returned toolkits for testing.

Conclusions: The CEG will continue to disseminate lead contaminated soil findings to a broader audience, including the Ohio Hamilton County Lead and Healthy Homes Collaborative. Sustained open communication with the City of Cincinnati Health Department will continue into the future. Next steps include identifying high lead-risk neighborhoods outside of Cincinnati's urban center and subsequently developing a lead-literacy plan in those areas with low blood lead level testing in children.

**Contributing Authors:**

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## 13. Community Detox- Dirt Cure

Gil Frank, Historic Westside Gardens ATL, Inc., gilfranek@gmail.com

**Abstract:**
Historic Westside Gardens (HWG), a community-based organization in a marginalized community of Atlanta, has a network of 200 home food gardeners. We entered the field of soil contamination and remediation when we responded to an offer of the Hercules Center and the Environment Science Department at Emory University to collaborate with Professor Saikawa. We decided to teach our team to test the soil in the raised bed that we install at no cost for residents in backyards and apartment buildings. Our holistic approach to community development led to our understanding that soil should be healthy when our goal is to provide access to healthy food. We tested the garden and the backyards. Most urban agriculture programs test soil for yield and fertility, and not for contamination. The results showed that though the raised beds are not contaminated, the backyards are. This situation is mostly due to the high turnaround of low wage renters, repeated painting, arson, fires, and renovations. Moreover, during the research with Professor Saikawa's team, we discovered slag, a highly contaminated metalloid compound. This research led our project to a new learning process, practicing "citizen science." The program also greatly contributed to increasing our organization's capacity by adding knowledge about environment health (lead and its effect on children's health) to our agricultural knowledge. The next step was to host the Atlanta Science Festival. Gardeners brought soil samples and tested the slag. The slag contamination level was so high that the EPA decided to undertake a Superfund Rapid Removal Action covering 362 units. This new development led HWG to undertake a communication project to collect samples for testing lead levels in children, develop awareness, and mobilize the community and city council members using the media. Our main concerns are the impact that the EPA's way of proceeding will have on the rejuvenation of the community, how to address community residents' fears for their property value, and, most importantly, how to design a public health intervention which includes community participation in designing an action plan. The exposure by the media solidified the perception of HWG as a caring organization whose mission is to plant home food gardens and educate the families about healthy eating as a vehicle for community resilience, power, and equity. We built a real partnership between a grassroots organization and an academic institution, co-authoring paper and grant applications.

**Contributing Authors:**

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## 14. Community-Engaged Development of a Citizen Science Soil Sampling Toolkit for Metals Analyses

Erin Haynes, University of Kentucky, erin.haynes@uky.edu

**Abstract:**
Rural post-industrial towns along the Ohio River have environmental health issues, particularly around metal exposure. An ongoing manganese study in two Ohio towns, Marietta and East Liverpool, identified that soil manganese was a significant route of exposure for the children. In order to empower and build capacity for local residents to engage in environmental health research, our team undertook development of a citizen science soil sampling toolkit for metals analyses. We have developed a community advisory board which has provided insightful guidance on the development of the sampling protocol and for a community-level questionnaire to gauge resident interest in soil sampling, their perception of exposure and health risks from exposure to metals, and recommendations on how to implement a community-wide soil sampling program. During subsequent meetings, the community advisory board will also provide insight on the report-back strategy at the individual and community-level and recommendations for action. This project was supported by a Robert Wood Johnson Foundation Interdisciplinary Research Leaders program grant.

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## 15. PFAS-REACH: Research, Education, and Action for Community Health

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**Abstract:**
A growing number of U.S. communities have discovered per- and polyfluoroalkyl substances (PFAS) in drinking water. Epidemiological studies have reported negative effects on children's immune systems from exposure to PFAS and suggest that current drinking water guidelines may not be adequately protective. However, no studies have investigated these effects among children exposed to drinking water contaminated by firefighting foams that contain complex mixtures of PFAS. Other important gaps for PFAS-impacted communities include access to context-rich guidance for interpreting blood and water test results, information on health effects, water treatment, and remediation, and guidance for engaging local officials and health professionals.

PFAS-REACH (Research, Education, and Action for Community Health) is helping address these gaps by:

1. Evaluating potential effects of PFAS exposures on the immune systems of young children in two communities that have had PFAS water contamination.
2. Developing an innovative online resource center, called the PFAS Exchange, with data interpretation tools, networking information, and educational materials for affected communities and others.
3. Conducting a social science analysis of affected communities to assess individual, family, and community-level experiences of residents in areas impacted by PFAS-contaminated drinking water.

For the children's health study, we are engaged with two communities where public drinking water wells have been contaminated with PFAS from the use of firefighting foams for training activities. One of these communities is based at the Pease International Tradeport, formerly Pease Air Force Base, in Portsmouth, NH. The other community is in Hyannis, on Cape Cod, Massachusetts. Methods and results from this study will be useful to other PFAS-impacted communities.

Project partners include environmental health researchers, social scientists, and community activists. In addition to our scientific advisory board, we have community advisory boards at each location, which include community members, health professionals, government officials, and water system professionals. This project will provide both actionable results to help protect children's health and the support to help impacted communities reduce their exposures and health risk.

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## 16. Family-centered, Youth-Engaged Citizen Science Approach to Radon Reduction in Rural KY and Urban OH

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**Abstract:**
Academic and community members from the EHSCCs at the University of Kentucky and the University of Cincinnati collaborated to develop and pilot test a family-centered, youth-engaged home radon testing toolkit designed for classroom education. We will describe a citizen science project to empower high school students and their teachers to address environmental concerns about radon exposure in homes in rural Kentucky and urban Ohio. Community members in Kentucky and Ohio have expressed concerns about radon exposure given the increase in fracking, the underlying bedrock geology, high smoking prevalence and secondhand smoke (SHS) exposure, and high rates of lung cancer in the region. Although 85% of lung cancer cases are caused by cigarette smoking and SHS, radon exposure accounts for 10-15% of lung cancer cases. We adapted a home radon testing toolkit designed for classroom education with youth citizen scientists. The radon toolkit includes information about radon, how to test, and how to interpret and report back the findings.

The classroom training included:

1. Human subjects training for youth who were added to the IRB-approved study protocol.
2. Information on the health effects of radon.
3. Review of the citizen science protocol and instructions for deploying the Alpha Energy test kit in their home (location, duration of testing, when to return) to ensure rigorous data collection.
4. Considerations for report-back if home radon levels were high (> 4.0 pCi/L).

After classroom training, youth citizen scientists explained the study to their parents and obtained informed consent. A total of 100 students were trained in human subjects' protection. In Kentucky, 27% returned consent forms and became citizen scientists. Nearly all (80%) of the youth citizen scientists consented a head of household and 68% of homeowners participated by testing for radon or completing surveys. Radon levels in Kentucky ranged from 0.4 to 7.5 pCi/L. Homeowners with high or borderline high radon refused monetary assistance to mitigate or re-test their homes despite reduced costs. We will summarize the Ohio results and lessons learned from both sites.

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## 17. Community Science, Uncertainty and Ambiguity, and Community Support in the Context of the 1973 PBB Contamination in Michigan: Preliminary Themes From an Analysis of Oral Histories

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**Abstract:**
The Michigan Chemical Company (later named Velsicol) closed its doors in 1978 and left behind a toxic legacy of three superfund sites and a residential neighborhood that are still contaminated 40 years later. In 1973, the chemical company was also responsible for the largest agricultural disaster in U.S. history. They shipped brominated flame-retardants (PBB) instead of a nutritional supplement to be mixed into livestock feed. Millions of Michigan residents consumed farm products containing PBB.

Methodology: Oral histories conducted in 2019 with Michigan residents who experienced the contamination were transcribed and de-identified. Using a code book developed using grounded theory, 30 transcripts were coded independently by two research team members. Discrepancies were discussed until there was agreement. NVivo 12 software was used.

Results: We present preliminary results from the above analysis, with a focus on a subset of themes that include community science, uncertainty and ambiguity, and community support, tension and conflict. These themes emerged across interviews and highlight core experiences and actions of members of communities who experienced the PBB contamination from various perspectives as they sought to understand and make sense of the health, economic, environmental and social implications of the contamination.

Conclusion: Insights from the experience of community residents who directly experienced large scale chemical contamination and who work actively to address or navigate in their aftermath are critical to understanding the breadth and depth of human, health, environmental and economic impacts. This understanding is essential to the development of effective and accountable responses to those contaminations in order to protect the health and well-being of the public as well as the environment. Furthermore, these insights inform the development of public policies that regulate the production, use, transport and disposal of chemicals in a manner that minimizes risk of future large scale chemical contamination.

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## 18. Leveraging Mobile Monitoring, Modelling, and Satellite Remote Sensing to Estimate the Health Burden

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**Abstract:**
Estimates of the health impacts associated with ambient air pollution in the United States are typically reported at the state or county level, masking potential heterogeneity in impacts at finer spatial scales. The spatial distribution of air pollution health impacts at finer scales can reveal neighborhoods that may be experiencing greater than average exposure. Estimating air pollution health impacts at the hyper-local scale is now possible with pollutant concentrations derived from satellite remote sensing and mobile monitoring. The Environmental Defense Fund and Google Earth conducted mobile monitoring of black carbon and nitrogen dioxide (NO2) in the Bay Area using Google Street View (GSV) cars outfitted with air pollution monitors. We estimate health impacts at 100m resolution in the Bay Area using epidemiologically derived health impact functions with concentrations measured by mobile monitors and other pollutant concentration datasets. For estimating the health burden from fine particulate matter (PM2.5) we use satellite derived PM2.5 estimates. For NO2, we estimate health burdens using concentrations from GSV mobile monitoring and from a land use regression (LUR) model. We explore how health impacts differed when using mobile monitoring versus satellite and LUR concentration estimates, and when using varying disease rate data. We find using highly resolved baseline disease rates and mobile monitoring concentrations reveals spatial variability is obscured when more coarsely resolved data inputs are used. Both mobile monitoring and LUR modeling capture intra-urban spatial variation in pollutant-attributable health outcomes, though estimates using mobile monitoring concentrations identify a larger magnitude of intra-urban variation. Hyper-local estimates may help decision-makers understand how air pollution affects neighborhoods and populations and where to target interventions to maximize health benefits and reduce disparities.

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## 19. Healthy Air and Healthy Eating: Encouraging a Culture of Health in Elizabeth, NJ.

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**Abstract:**
Environmental health relies heavily on the public perception of where problems exist, how they got there, and potential solutions. Developing new solutions for preventing and addressing these problems is a growing concern in communities disproportionately affected by environmental contaminants. With a population of about 130K, the city of Elizabeth, NJ is unique in its location adjacent to major sources of air pollution such as heavily trafficked highways, a major airport and seaport, oil refineries, and many chemical and manufacturing plants. Air pollutants, specifically particulate matter (PM), have been linked to many adverse health effects including the exacerbation of asthma. Asthma is a major public health concern with greater prevalence and severity in low-income communities of color, such as in Elizabeth. Other factors like access to fresh fruits and vegetables, decreased physical activity, and poor community support may also play a role in the high prevalence of asthma. This project, in collaboration with community partner Groundwork Elizabeth (GWE), is a continuation of efforts to address community concerns about air quality in Elizabeth, which began with truck counts and roadside air monitoring for impacts of truck traffic on air quality. Through the implementation of low-cost air quality sensing (PurpleAir PA-II) at a community garden and other locations in the city, we set out to explore relationships between community gardening activities, air quality, and health. In addition to raising awareness about air quality among residents of the community, this study may form the basis for future interventions for asthma that integrate air quality and gardening activities. Preliminary results demonstrate the sensors' ability to show relative changes in PM concentrations, but with over- or under-estimation of concentrations when compared to regulatory methods. To correct this, we co-located the instruments with a federal equivalent method (FEM) monitor in the field to correct readings from each sensor using linear regression analysis of the data. By integrating air quality monitoring and community gardening, for which available evidence suggests many multi-directional interactions and mechanisms, we aim to form the basis for future community-level health promotion and intervention studies.

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## 20. Disappearing Seas: Reporting on Dust and Children's Respiratory Health in a Changing Climate

Mitiasoa Razafy, University of Southern California Preventive Medicine, razafy@usc.edu

**Abstract:**
Across the southwestern US, particulate matter (PM) in the form of wind-blown dust is emerging as an increasingly prevalent exposure of public health concern. Changing weather patterns, droughts, and competing water demands are dramatically altering the landscape and creating conditions conducive to the production of wind-blown dust. In California, such factors are leading to the rapid shrinking of the Salton Sea, a 350-square mile land-locked "sea" situated near the southeastern rural border region known as the Imperial Valley. A regional water transfer agreement will accelerate the Sea's drying and it is anticipated that large swaths of the lakebed will become exposed, leaving behind highly emissive salt flats containing toxic metals, pesticides, and other contaminants. Through a community-academic partnership with Comite Civico del Valle and local elementary schools, we developed a children's respiratory health survey to assess baseline health conditions in a rural environmental justice community. We observed an overall asthma prevalence of 22.4% and respiratory symptoms and allergies were widely reported, including wheezing (35.3%), allergies (36.1%), bronchitis symptoms (28.6%), and dry cough (33.3%). We also collected PM filters at the local elementary schools to assess the composition of respirable dust. We utilized a community-engaged approach to share our findings with our study participants through bilingual individual and community-level report back materials and infographics. Our research capitalizes on the importance of reporting data back to the community in the pursuit of informing and engaging school and political officials to address local environmental and health concerns.

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## 21. Using Environmental Health & Justice Community Science to Empower Frontline Communities

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**Abstract:**
Air quality in NYC has improved in recent decades, though some air pollutants remain at harmful levels, particularly in low-income communities of color that often suffer from a disproportionate burden of environmental exposures. A barrier to further improving air quality is the limited ability to identify transient sources of air pollution like idling vehicles, uncontrolled construction sites, or trucks driving on non-truck routes. The growing field of "community science" can be used to address these sources of local pollution by empowering community members to lead research that directly affects them and their community. Using a free mobile data collection and visualization platform, Mount Sinai's Community Engagement Core and NYC Department of Health are collaborating with frontline communities to create tailored "My NYC Air" surveys that collect geo-located data on neighborhood sources of air pollution. "My NYC Air" aims to increase community participation in acquiring, interpreting and communicating air quality data, to inform CBOs, researchers, public health officials, and policymakers on air quality issues as identified by communities facing environmental injustices. Our goal is to establish meaningful & sustainable collaborations to enhance the capacity of frontline communities to proactively identify & address local sources of outdoor air pollutants using free community science tools. This collaborative pilot demonstrates how our team created a replicable community science training model that empowers and encourages educators, students, and community members to participate in research to action. Participants will learn how we engaged youth in NYC classrooms to collect and analyze air quality using "My NYC Air" surveys and AirBeam monitoring devices. Community members, teachers, and students became active partners in research by documenting idling vehicles affecting local air quality and informing their peers and decision-makers. The final product of this pilot will include working with CUNY Center for Urban Environmental Reform and Charlie LaGreca to develop a community science guide that uses the characters from the environmental justice comic books, "Mayah's Lot" and "Bina's Plant", to share step by step instructions on how to turn research to action.

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## 22. From Research to Action: Implementing CBPAR with Immigrant, Latinx Domestic Cleaners in NY

Jamie San Andres, Make the Road New York, jamie.san.andres@maketheroadny.org

**Abstract:**
Background: The Safe & Just Cleaners project is a five-year community-based participatory action research (CBPAR) project that seeks to assess and reduce exposure to toxic cleaning products among Latinx domestic cleaners. The project includes a survey, quantitative exposure assessments, and a multi-level campaign to reduce domestic cleaners' exposures. This poster seeks to explore how communities and immigrant, Latinx domestic cleaners can benefit from equitable partnerships with academia when implementing CBPAR principles.

Methods: Data collection consisted of administering a survey. Our survey addresses cleaning products and practices, domestic cleaners' knowledge and attitudes, domestic cleaners' physical and emotional health, and work-place issues such as wage theft.

Results: Make the Road NY, Queens College, and the School of Medicine at Mt. Sinai have developed an equitable relationship. This year we successfully co-developed and implemented our survey with over 260 domestic workers across NYC. After cleaners completed the survey, domestic cleaners were invited to Las Super Cleaners, a group created in February that meets monthly to address domestic workers concerns and aspirations on their own terms. Make the Road NY also assisted cleaners that do not have access to healthcare navigate the healthcare system and expanded their team to include a legal fellow to take on worker's rights cases.

Discussion: We believe it is vital for communities to partner with academia in equitable ways not only because the results of studies can be useful in garnering evidence for campaigns in the future, but because equitable engagement throughout the process of research can allow CBOs to address community concerns in the short term and have a stronger impact in the future. For instance:

1. Make the Road's involvement in the survey development allowed us to include items that reflected issues we knew were impacting workers.
2. Administering the survey shed light on issues that allowed us to intervene in various ways as we learned about them.
3. The cleaners group gave pathway to investing in their leadership development.

When CBOs and participants are engaged consistently and in meaningful ways throughout the research process, it means that workers and communities will be better equipped to use the results of the study when completed. Our plan this year is to evaluate this work and organize workers to lead our meetings and guide our campaign.

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## 23. E-cigarette Exposure During Development Alters Proteins in the Hypothalamus Associated With Obesity

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**Abstract:**
Electronic cigarettes (E-cigs) are battery-powered devices that usually contain vegetable glycerin and propylene glycol as humectants, as well as nicotine and added flavors. E-cig use is dramatically increasing in popularity, particularly with adolescents and young adults. According to the CDC, more than 1 in 4 high school students and about 1 in 14 middle school students had vaped in the past 30 days in 2018. E-cigarette use increased from 11.7% to 20.8% among high school students and from 3.3% to 4.9% among middle school students from 2017 to 2018. Although cigarette smoking during pregnancy has been shown to increase the risk of childhood obesity, little research has been carried out to determine if the same obesity propensity is conferred to the offspring by maternal vaping while pregnant. Preliminary mouse data by our laboratory suggest such a connection. Neural pathways in the hypothalamus are involved in hormonal and nutritional signaling that coordinate glucose homeostasis and weight gain. We hypothesized that prenatal exposure to e-cig aerosols, with and without nicotine, alters transcriptional and inflammatory activity in known metabolic pathways in the hypothalamus that are associated with obesity. For this study, pregnant C57BL/6 mice were exposed daily throughout gestation (3h/day; 5 d/wk for about 3-wk) and postnatally from PND 4-21 to e-cig aerosols with or without nicotine and employing the same exposure conditions used during the gestational exposure. At 1-mo-of-age, the brain was removed from both male and female offspring. Expression of transporters associated with obesity, including Glucose 1,2,3, GLAST, PPAR&#947, AMPA, and GFAP were then analyzed in the hypothalamus of offspring exposed early in life to e-cig aerosols (with or without nicotine) or filtered air by Western blot. Results of this study demonstrated a two-fold increase in glucose transporter expression in the no-nicotine (PG/VG alone) group, and a 2.5-fold increase in the PG/VG plus nicotine group compared to control levels. Given the growing epidemics of both vaping and obesity and the lack of study in this particular scientific area, a better understanding of the link (if any) between these two epidemic waves is critical for protecting the health of two highly vulnerable groups, children and pregnant women.

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## 24. Shaping Environmental Sustainability for Population Health

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**Abstract:**
Our time's global challenges and trends-like those associated with climate change, demographics displacements, growing health inequalities, and increasing burden of diseases-have complex connections to the determinants of health. Information on the burden of disease causes and prevention is fundamental for public health actions, like preparedness and responses for disasters, and recovery resources after the event.For instance, there is an increasing consensus about the effects of the global burden of disease, as it generates substantial healthcare costs, consumes essential resources, and prevents the attainment of optimal health and well-being.The purpose of this research endeavor is to promote a comprehensive understanding of the connections between social, environmental, and economic influences on health. These connections illustrated by pulling from clearly the core curriculum of multidisciplinary areas-as urban design, energy, housing, and economy-as well as in the health system itself. A systematic review of Primary and Secondary data included a variety of issues as global health, natural disasters, and critical pollution impacts on people's health and the ecosystems. Environmental Health challenged by unsustainable consumption patterns and the resulting contaminants that abound in many cities and urban settings around the world. Poverty, inadequate housing, and poor health are usually linked. The house is a primary environmental health context for any individual and especially for more vulnerable groups, such as children, older adults, and those who are sick. Nevertheless, very few countries show strong decoupling of environmental degradation from economic growth, as indicated by a recent 2017 Report of the World Bank. Worth noting, the environmental fraction of the global burden of disease in a 2016 World Health Organization (WHO) report estimated that 12.6 million global deaths, accounting for 23% (95% CI: 13–34%) of all deaths were attributable to the environment. Among the environmental contaminants include heavy metals, noise pollution, light pollution, and urban sprawl. Those findings make a call to adopt from an inter-sectoral and systemic paradigm urgently and on a global scale, the United Nations post-2015 Sustainable Development Goals (SDGs). The SDGs address the social, environmental, and economic factors that influence health and health inequalities, advising how these sectors, in turn, benefit from a healthy population.

## 25. Quantifying and Costing the Mental Health Burden of Flooding

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**Abstract:**
Background: In the United Kingdom, the government agency responsible for assessing the damage caused by natural disasters is the Environment Agency (EA). In 2016, the EA reported that over 10,000 households were affected by the 2013-2014 floods. To quantify the mental health burden of the floods, the UK government commissioned the English National Cohort Study to survey residents living in flooded areas and calculate the odds of developing depression, anxiety, and post-traumatic stress disorder (PTSD).

Objectives: The purpose of this study was to quantify the health outcomes of flooding by converting the results from the English National Cohort Study to quality-adjusted life years (QALYs). The QALYs lost were then used to assign an economic value to the health impacts of the floods and were compared to the EA's current method of costing the health impacts of flooding.

Methods: A literature review identified 18 articles on the health outcomes of flooding and the quantifications of those health outcomes. Then, the English National Cohort Study data was converted to QALYs, and the QALYs were used to derive economic values using a variety of different algorithms. These economic values were compared to the EA's cost estimates. The EA's method of cost estimation was assessed and revised.

Results: Based on the English National Cohort Study data, those living with anxiety, depression, and PTSD lost 0.26-0.34 QALYs over two years as a result of their mental illnesses. The cost of the lost QALYs was over 200 million pounds with all estimation methods. The revised version of the EA methodology yielded a cost estimation of approximately 77 million pounds.

Conclusions: Each of the cost estimates is much higher than the EA's estimate of 25 million pounds. Cross-agency cooperation between risk management, environmental, and health officials may lead to a more accurate representation of the true cost of the mental health burden of flooding.

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## 26. Impact of Flooding on Antibiotic-Resistance in Soils From Public Parks

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**Abstract:**
Contaminated soils with a high abundance and/or diversity of genetic elements that encode for resistance to antibiotics pose an important risk to public health due to potential oral, dermal, and inhalation exposure to these soils. The potential risk to human health from exposure to resistance occurring in the environment is the capture and mobilization of genetic elements between commensal and pathogenic bacteria. Antibiotic-resistance genetic elements are found naturally in soil bacteria. However, flooding events may increase the natural background levels in terms of quantity and/or diversity. On August 26, 2017, the Houston metropolitan area was impacted by catastrophic flooding due to Hurricane Harvey and a number of spills from wastewater treatment plants and sanitary sewer overflows. Here, we report findings of antibiotic-resistance in soils from Houston after the Hurricane Harvey. We collected soil samples 3, 4, 5, and 18 months after the Hurricane, surveyed a diversity of genetic elements, and obtained microbial community composition in those samples. Our main objective was to compare diversity of genetic elements and microbial composition in soils at different times after the Hurricane. Soil samples for this study were collected from public areas in Houston impacted by Hurricane Harvey, particularly public parks. To include a variety of resistance mechanisms, we surveyed a class I integron (Int1) and thirteen specific antibiotic-resistance genes namely: tet(A), tetA(p), tet(B), tet(C), tet(D), tet(E), tet(M), tet(O), tet(W), tet(X), blaCMY-2, sul(I), and sul(II). Flood-impacted soils showed higher diversity of antibiotic-resistance elements compared to non-impacted soils. Additionally, we observed dissemination of ARGE relatively long time after flooding (5 months). The implication is that natural background levels of antibiotic resistance in soil environments change after flooding events and may impact public health during reconstruction after a natural disaster.

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## 27. Informing Health Impact Assessments Using a Cumulative Potential Impact Assessment Tool

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**Abstract:**
Health impact assessments provide researchers, community stakeholders, and policymakers with information for making evidence-based and data driven decisions aimed at improving public health, creating healthy environments, and mitigating potential negative impacts on health. Potential sources of positive and negative health impacts often occur in tandem, creating a mixture of exposures from both environmental and social determinants of health. Accounting for the cumulative potential health impacts of these multiple sources of exposures in a health impact assessment can provide stakeholders with valuable information about the likely impacts of their decisions and could guide decisionmakers towards decisions with the highest likelihood for health improvement. The Neighborhood Potential Health Impact Score (NPHIS) tool accounts for multiple sources of exposures that potentially impact health. Sources of risk are combined into a single impact score. Recognizing that not all exposures are equal, the tool takes into account the relative strength of evidence available, the quality of data indicators and data sources available, and the severity of risk due to exposure to a given score component. Further, the tool accounts for local context by integrating stakeholder input into the scoring process. The NPHIS process provides stakeholders critical insight on the relative potential health impacts of a specific area compared to others within a defined community. In addition, potential intervention strategies can be simulated by the tool. This is accomplished by systematically inflating or deflating individual components of the scoring process in order to model changes and then observing changes in cumulative potential health impact. This information further informs stakeholders about which strategies may be most impactful and which strategies may not make much difference in terms of overall potential health impacts. This poster will describe the NPHIS tool and the types of questions it can potentially address. We then will discuss its application in two community-based settings and one statewide application in Texas. We will conclude with examples demonstrating how the tool can be translated into other settings.

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## 28. NIEHS Climate Change and Human Health Literature Portal

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**Abstract:**
Support for research on the impacts of climate change on human health is increasing rapidly as people's direct experience with events such as extreme heat, hurricanes, wildfires, and effects on agriculture also increases. There also is a growing need for research on the health impacts of climate actions including mitigation and adaptation. To facilitate the timeliness and effectiveness of such research, which is critically needed to understand, predict, and prevent climate impacts on health, the National Institute of Environmental Health Sciences has developed the Climate Change and Human Health Literature Portal [https://tools.niehs.nih.gov/cchhl/index.cfm]. This free, online tool combines searches of the biomedical, environmental, climate, and disaster sciences using PubMed, Google Scholar, and Web of Science to create a bibliographic database of global peer-reviewed research and high-level gray literature. Each unique reference has been tagged by subject matter experts for reference type, exposure, health impact, geographic feature, predictive modeling, and cross-cutting issues such as economics, policy, vulnerable populations, and co-benefits of climate actions. An intuitive user interface includes filters to help users focus their search and quickly find the most relevant results. The majority of references link to a publicly available source, and search result lists can be downloaded and shared through email and social media platforms. References date from 2007-2018 and are continually being added as new science becomes available. This poster will describe the features of the Literature Portal and how it may be used to conduct environmental health research, inform policy decisions, support community planning efforts, build capacity among medical and public health practitioners, and educate students at all levels.

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## 29. Addressing Shortcomings of Data Report-Back Efforts

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**Abstract:**
As a component of an indoor residential air quality study, we are communicating monitoring results back to participants. The study contains two stages, with the first round of data report-backs occurring in Chelsea, Massachusetts in 2018, and the second round of report-backs occurring in Dorchester, Massachusetts in the spring of 2020. An evaluation of the data report-back process in Chelsea indicated several short-comings in our report-back effort. Namely, less than half of the participants engaged in our data report-back process, and those who did engage tended to have lower measured in-home pollutant concentrations, higher formal education attainment, and were older than those who did not engage. These gaps in participation and reach of our report-back effort may have the unintended impact of sustaining existing environmental health disparities through unequal comprehension of indoor air exposures and concentrations. In preparing for the report-back effort in Dorchester, we have included formative research to improve our understanding of the participants' lived experiences and perceptions of home environmental hazards. We will couple those efforts with a process evaluation to determine how well we reach and engage participants, whether our messages are appropriately distributed, communicated, and accessible, and whether our data report-back effort has an impact on participants' exposure-reduction behaviors.

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## 30. Amplifying Children's Environmental Health Research: Development, Implementation, and Evaluation of a Social Media Toolkit and Campaign

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**Abstract:**
Introduction: The Children's Environmental Health Research Centers (Centers) and Pediatric Environmental Health Specialty Units (PEHSUs) focus on environmental influences on children's health. A hallmark feature of the Centers and PEHSUs network is an emphasis on outreach and research translation. Regardless of this shared focus, no network wide coordinated outreach effort has been made in the shared history of the two programs. Social media is an increasingly important tool for outreach and communication in public health. According to the Pew Research Centers Social Media Use report, 79% of all US adults who access the internet use Facebook (68% of all users). Social media users say social media is an important way they get science news (33%). Despite these trends, adoption and use of social media by the network of CEHCs for outreach and research translation has been uneven.

Methods: The Centers/PEHSU Social Media Workgroup was formed in October 2017 to create network capacity for utilizing social media as an outreach tool, to increase engagement between members across the network, and to increase reach and engagement of collective social media efforts. A social media outreach campaign/toolkit was developed and piloted that included quality control vetting and research translation best practices. We provided a one-day workshop for training as well as a series of webinars. We surveyed Centers/PEHSU staff on current and planned social media use and the effectiveness and accessibility of the pilot outreach campaign/toolkit and accompanying training.

Results: Centers/PEHSU staff reported that they were seeking out information about social media best practices and wanted to increase their engagement on social media platforms. They also reported that the campaign/toolkit was relevant to their work, easy to use, and that they planned to continue to use the content. Centers/PEHSU network social media initiation and engagement use increased.

Conclusion: We demonstrated the feasibility of a network wide coordinated approach to utilizing social media for dissemination of public health content. This work documents strong interest among Centers and PEHSUs to enhance their capacity to disseminate content on social media. We have also demonstrated feasibility of collecting reach and engagement data from Centers and PEHSUs. Further research should explore measuring reach and intended audience engagement of social media messaging by environmental health networks.

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## 31. Development of Health Communication Strategies in a Children's Environmental Health Center

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**Abstract:**
The New Hampshire Birth Cohort Study (NHBCS) is an ongoing cohort study of mothers and children that was established in 2009. The study is investigating hypotheses that early life exposures to environmental contaminants are associated with adverse birth outcomes and the development of chronic illnesses in later life. Through participation in the Children's Centers for Environment Health (CEHC) and the Partnerships for Environmental Public Health (PEPH), our Center's Community Outreach and Research Translation Core (COTC) leveraged resources and technical support to launch a communications program highlighted below.

2009: Return of Study Results to Individual Participants: Resources were limited to return of water testing results to study participants.

2010-2011: Formation of a Community Outreach and Translation Core: The NHBCS becomes a CEHC. Resources from the program supported development of infrastructure with the formation of a COTC.

2012-2013: Focus Groups: Our COTC conducted focus groups with NHBCS participants to inform our communication strategies, targeting their understanding of test results and informational resources.

2014-2015: Development of Annual Newsletters: Based on feedback from focus groups, we developed a newsletter for participants. We began outreach to our legislators with briefings outlining the need for safer regulations for food and water to reduce exposure to arsenic.

2016-2017: Implementation of Social Media: To implement social media, we leveraged the expertise of a Social Media Workgroup through the CEHC network.

2018- 2019: Evaluation of Return of Study Results to Individual Participants and Other Strategies: We evaluated the impact of well water arsenic test results on maternal use of tap water. A poster of the findings was presented at the PEHP 2018 Meeting and was published in STOTEN. Based on recommendations of the 2018 Social Media Workshop sponsored by the CEHC and PEPH, we refined our social media efforts, and redesigned our newsletter and participant-facing website. Due in part to our research communication strategies, NH became the second state to lower the MCL for arsenic in public drinking water systems from 10 ppb to 5 ppb.

2020 and Beyond: Continued support is needed to enhance communication strategies: This can be achieved by

1) Further involving participants in the development of communication materials/methods.
2) Continuing social media.
3) Developing leadership and expertise in in this area.

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## 32. The Role of Youth Advocates in Sharing Research Results: The Hired Child Farmworker Study

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**Abstract:**
This poster outlines ongoing processes for reporting research results to multiple Community-Based Participatory Research (CBPR) stakeholders. This CBPR program examines the health and safety of hired Latinx child farmworkers in North Carolina. The study is a partnership between Wake Forest School of Medicine and East Carolina University investigators, and a farmworker advocacy organization, Student Action with Farmworkers (SAF). Farmworker youth from SAF's Levante Leadership Institute serve as the study's youth advisory board, and two members of the Levante program are youth co-investigators. Working with academic investigators, youth co-investigators report ongoing study results to the Levante advisory board using the leadership skills they acquire through the program. During workshop sessions, the Levante advisory board receives preliminary results and advises academic investigators. The final year of the study (2020) is devoted to dissemination of results. Levante members will develop theater- and arts-based materials to disseminate study results to diverse audiences including rural communities, other Latinx youth groups, and policymakers.

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## 33. Products and Guiding Principles for Communicating Results in the Study Community: HAPI Study

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**Abstract:**
The Home Air in Agriculture - Pediatric Intervention Trial (HAPI) is a study in the rural, agricultural lower Yakima Valley in Washington State. The study's overall goal is to improve indoor air quality in the homes of Latino immigrant children with asthma in this community. The project randomized children to receive either asthma education alongside use of HEPA air cleaners or education alone. Project collaborators include the University of Washington and Yakima Valley community organizations, specifically Yakima Valley Farm Workers Clinic and the Northwest Communities Education Center/ Radio KDNA. The dissemination and outreach team is comprised of staff from all partner organizations, engaged in a 11-month planning effort. Venues of dissemination include health fair tabling, in-person presentations, and radio broadcast. The team identified multiple audiences in addition to the general regional community, including HAPI participants, Yakama Nation air quality team, El Proyecto Bienestar (local community advisory board), clinical staff and asthma educators at the Yakima Valley Farm Workers Clinic, and the local public health and air pollution regulatory agencies. The team prepared study result products including infographics, PowerPoint presentations, 60-second informational messages, and a radionovela on Radio KDNA. The infographics topics focused on describing the partnership, study design, participant characteristics, commonly identified asthma triggers in homes, effectiveness of the intervention, and actions to reduce asthma triggers and symptoms. We employed several guiding principles:

1) Involve all partners in the creation and dissemination of information about the partnership and project findings in forms that all partners can understand and use
2) Establish and follow procedures for co-dissemination
3) When feasible, have at least one academic and one community/field staff co-presenting and co-authoring
4) Allow adequate time for planning before disseminating results.

Dissemination of study results and outreach efforts in the community are core components of community-engaged research. This requires investment of staff time and resources to ensure high quality and meaningful return of results and to ensure study insights are translated effectively to participating communities. Such efforts also foster trust and environmental health literacy which may pave the way for future impactful research opportunities.

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## 34. Reducing Radon and Secondhand Smoke Exposure in the Home: Impact of Tailored Report-Back

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**Abstract:**
Purpose and Background/Significance: Report back is the active sharing of research findings with study participants. One goal of report back is to prompt behavior change. Theory-driven research on the process of report back for environmental risk reduction is limited. The purpose is to evaluate the impact of a tailored report back process with participants who had high radon and/or air nicotine levels in their homes.

Methods: One-group, pre-post observational study with 87 participants in the parent study (N = 515) who were randomized to the treatment group, completed baseline testing, and had elevated radon and/or air nicotine. Each received report back tailored to their test results. Data were collected at baseline and at 3, 9, and 15 months after the report back intervention was delivered. Stage-tailored, environmental report back included:

1) Stage of action assessment.
2) Brief problem solving.
3) Evidence-based risk reduction information.

Outcomes were radon and air nicotine test values at baseline and 15 months, as well as stage of action scores for radon mitigation or instituting a smoke-free (SF) home policy among those with elevated baseline tests. Radon values were log-transformed due to skewness; stage of action scores ranged from 1 (unaware) to 5 (maintenance of change). Repeated measures mixed modeling evaluated changes over time.

Results: Among those with high baseline radon, there was a decline in observed radon by 15 months (geometric means: 7.7 and 3.5, respectively; $p<.001$). There was a decrease in air nicotine among those with high values at baseline (3.8 and 2.1 for baseline and 15 months), albeit not significant ($p=.18$). The radon mitigation action model revealed means of 2.0, 2.4, 2.7, and 2.7 at the four timepoints; baseline and 3 months were significantly lower than 9 and 15 months ($p<.03$ for all comparisons). For establishing a SF home, action scores were 2.7, 3.4, 3.7, and 3.0 for baseline, 3, 9, and 15 months, respectively. Stage of action was higher at 3 and 9 months compared to baseline ($p<.001$ for both). The only other significant difference was for the decline between 9 and 15 months ($p=.002$).

Conclusions: Tailored report back of research findings reduced radon exposure and promoted health behavior change necessary to remediate environmental exposures, particularly related to radon mitigation. A report back booster session may be necessary to provide more intense feedback for those with high levels of exposure.

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## 35. Eliminating Health Disparities and Advancing Environmental Justice in 2020 and Beyond

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**Abstract:**
Background: Ubiquitous exposure to pollution and toxic environmental chemicals threatens our health, with the burden and consequences disproportionately borne by poor communities and communities of color. Such chemical exposures contribute to health disparities including risks of pre-term birth, childhood asthma, neurodevelopmental disorders, and cancer. There is a need to produce and translate environmental health science into improved, timely decision making that will support equitable approaches to prevent exposure to toxic chemicals with a focus on vulnerable populations.

Methods: Through a network of partnerships, PRHE has spent a decade creating and implementing a strategy to transform environmental science into clinical education and improved public policy by:

1) Conducting and communicating rigorous science.
2) Developing and scaling innovative, evidence-based tools to make decisions in clinical and policy arenas.
3) Partnering with scientist and health professional leaders in promoting better policy.

Results:
2009: Developed the Navigation Guide, which set a new quality standard for evidence integration and use in environmental health decisions.
2014: Launched the UCSF Environmental Health Initiative, a network of over 140 scientists and other public health professionals committed to identifying and preventing harmful environmental exposures and integrating environmental health in medical education.
2015: Collaborated with the International Federation of Obstetrics and Gynecologists (FIGO) to publish a ground-breaking opinion on the reproductive health impacts of exposure to toxic environmental chemicals.
2017: Documented prevalence of PBDEs in the general population and their effect on children's intelligence.
2018: Developed high-resolution screening method to scan 700 chemicals in pregnant women's blood.
2019: Established an official Reproductive and Developmental Environmental Health workgroup within FIGO, an important platform for engagement.

Conclusion: PRHE's strategy shows how chemicals can undermine health, and how evidence-based actions are necessary to prevent environmental harms. This work is an essential basis for equitable science-based decisions across all environmental health issues, including air pollution, toxic chemicals, building materials, and others. This scientific foundation is needed to support clinical and policy decisions that prevent toxic exposures, improve health, and ultimately eliminate health disparities.

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## 36. Advancing a Critical Literacy Framework for EHL Through Community Driven Technology Design

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**Abstract:**
The public health crisis in Flint, Michigan, which began in 2014 with the switch of drinking water systems from the Detroit system to the City of Flint, reinvigorated a national conversation about lead in drinking water. The significance of the Flint Water Crisis, we assert, was not the severity of lead exposure but the mobilization by Flint residents. Further, in navigating the events of the Flint water crisis, Flint residents worked to learn about environmental health risks as well as developed various long-term adaptive strategies for coping with unknown contaminants in water. Environmental health literacy (EHL) models are derived from critical health literacy, which emphasizes building on foundational literacy skills in moving towards collective action around public health. Finn and O'Fallon (2017) argue a move towards increasing critical thinking skills through incorporating Bloom's Taxonomy will serve to advance the field, but we argue that a return to Paolo Freire's (2000) critical literacy model is necessary in the context of addressing equity issues under environmental justice challenges. We use a community based participatory research approach that emphasizes listening, dialogues, and action in the development of a critical EHL model. In the first stage of research, listening, in December 2018 and March 2019, we conducted four (n=10 each) focus groups to hear Flint residents' perspectives on what EHL around water quality and access means to them. During November and December 2019, we conducted four (n=78 total) water workshops with Flint residents to assess the value of publicly available water testing kits for promotion of EHL and to investigate a water education curriculum as an intervention in promoting EHL around water testing tools. Results from test kits were compared with results from two laboratories to demonstrate the precision and efficacy of the home test kits. Results from the water testing workshops were compiled and shared with resident participants in dialogue sessions in January 2020. The purpose of the dialogue sessions, in addition to returning the results from the workshops, was to engage in dialogue towards action in mobilizing environmental health literacy to protect public health in Flint. Through these sessions, residents provided foundational input into the development of a mobile application to be collectively designed in 2020 to augment publicly available water testing kits and share information across the community.

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## 37. The Woods Hole Center for Oceans and Human Health: Community Engagement and Education

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**Abstract:**
The Woods Hole Center for Oceans and Human Health (WHCOHH) comprises an integrated set of research projects that address harmful algal bloom (HAB) dynamics and mechanisms of HAB toxin effects. The mission of the WHCOHH is to protect public health through enhanced understanding of how oceanic and environmental processes including climatic variation affect the population dynamics of toxin producing organisms, and the risks from exposure to their potent neurotoxins. The Center's organization includes three research projects as well as a Community Engagement Core (CEC), which serves to strengthen public and stakeholder knowledge about HABs and their impacts, foster collaboration among stakeholders and bi-directional dialogue with WHCOHH researchers, and improve awareness of HAB issues in public health communities. CEC efforts are organized according to an "educate, alert, inform, involve" framework developed jointly by the four OHH Centers to combine efforts and increase impact of the CECs. Activities during the first year of this program include the development of interactive web-based mapping tools to enable stakeholders to access, visualize, and interpret current and historical data generated by WHCOHH investigators and other HAB researchers, monitoring programs, and community groups. In addition, WHCOHH research is highlighted in a K-12 activity focused on Paralytic Shellfish Poisoning and its impacts on shellfish resources in New England, and how data on HAB cells and resting cysts are collected and used by researchers to predict bloom magnitude. This activity includes modifications for visually impaired students and conforms to Next Generation Science Standards and Ocean Literacy Principles. These efforts will be expanded in subsequent project years with the active participation of the Project PIs and investigators, and as well as continued engagement with a variety of stakeholders and communities in the Northeast.

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## 38. The Duke Furniture Foam Testing Project: A Case Study in Citizen Science & Research Translation

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**Abstract:**
Research on environmental health has a unique imperative to leverage science communication because effectively doing so impacts population and environmental health. The Duke Superfund Analytical Chemistry Core and RTC administer the Duke Furniture Foam Testing Project (http://foam.pratt.duke.edu), a free service that screens samples of polyurethane foam for the presence of 9 common flame retardants. A variety of chemical flame retardants have been detected in common household items such as couches, mattresses, car seats, and baby products. Scientific evidence suggests that exposure to these chemicals occurs indoors and may cause adverse health effects. Because manufacturers are not required to disclose the specific flame retardant used in a product, public access to such information is limited without laboratory testing. The RTC accepts foam samples from the public, which are analyzed for 9 common flame retardants. Subsequently, RTC interprets and disseminates analytical results for each submitted foam sample, serves as an informational resource for individuals, and develops outreach and public education materials. The RTC evaluated the effectiveness of our outreach and education activities, based on a mental models approach, in support of the Foam Testing Project through a survey of all participants from the last 4 years. Survey questions measured behavior change, and knowledge of exposure and health risks and flame-retardant regulations. Response rates were 45% (n=100) for the pilot and 45.5% for the full study (n=1,000). Analysis of survey data will help RTC characterize our target audience and more effectively and accessibly convey scientific information in our outreach materials. The project has guided the development of other RTC initiatives, and advanced RTC goals of increasing environmental health literacy among impacted populations and cultivating skilled science communicators.

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## 39. Metal Air Pollution Partnership Solutions (MAPPS): Community, Academy, Government and Industry Collaboration

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**Abstract:**
There are over 150 metal recycling facilities in Houston, some of which operate near underserved communities. To address residents' concerns about air emissions from metal recycling facilities and possible adverse health effects, we established a unique partnership among academic, governmental, environmental advocacy and industrial stakeholders in four environmental justice (EJ) neighborhoods and launched the Metal Air Pollution Partnership Solutions (MAPPS) project. Applying a community-based participatory research approach, we cultivated trust in relationships among partners and worked towards establishing equitable processes in decision making throughout the project period. Working with partners, we translated residential air monitoring and risk assessment results, along with community survey findings about environmental health to develop and implement a public health action plan to improve air quality and health in communities near metal recycling facilities. The research findings and action plan were published in layperson reports and presented at community forums and meetings. The highlighted project outcomes include:

1) A community-driven and evidence-based action plan for improving environmental health.
2) Strengthened collaborations and expanded resource sharing among partners.
3) Improved communication between industry and residents and residents and the Houston Health Department to address localized issues.

Currently, we are in the process of evaluating the success of the action plan. Engaging a diverse group of partners, including residents and industry members, is challenging. However, our experience provides evidence of the importance of the involvement of residents and industry from impacted neighborhoods, in addition to academics and governmental and advocacy group members, to create a shared vision and work towards achieving sustainable outcomes that improve environmental health in EJ neighborhoods.

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## 40. University Collaboration to Understand PFAS Exposure in NC: Communicating Science to Stakeholders

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**Abstract:**
Per- and polyfluoroalkyl substances (PFAS) have been manufactured and used around the world since the 1940s, and evidence suggests that PFA exposure can impact human health. In the US, PFAS have been identified in water systems that serve more than 16 million people across 33 states, and water supplies for 6 million residents have been found to exceed the USEPA's lifetime health advisory for two types of PFAS: PFOS and PFOA. In North Carolina (NC), researchers have identified PFAS in the Cape Fear River basin, also at levels exceeding USEPA's lifetime health advisory. Because PFAS are not removed by conventional water treatment, levels in source water are the same as levels at the tap. To understand the extent of PFA contamination across the state, the NC General Assembly funded a research study, referred to as the NC PFAS Testing (PFAST) Network, primarily focused on documenting the presence of PFAS in public water supplies across the state. The study also included air sampling, ground water modeling, research on novel treatment / disposal options, and the potential health effects of PFAS. With multiple institutions and >25 researchers participating, effective science communication is essential yet challenging. Impacted communities and stakeholders are concerned and want timely information, but the complexity of scientific methods and the way scientific research progresses can make communications difficult, especially for issues that involve uncertainty and risk. To address these complexities, the PFAST communications team brings together experienced science communicators and educators to employ a range of proven methods for stimulating dialogue and increasing awareness. Moreover, the PFAST communications team is comprised of representatives from three NIEHS-funded centers: The Duke Superfund Research Center, the NC State Center for Human Health and the Environment, and the UNC-Chapel Hill Center for Environmental Health and Susceptibility. The PFAST communications initiative has two overarching goals:

a) Increase awareness of the PFAST study and its findings among NC policymakers, the media and lay publics.
b) Create opportunities for dialogue about the study among diverse groups, including study scientists, key stakeholders, and lay publics.

We have accomplished these goals through interactive stakeholder engagement, ranging from research symposia and public science events to science communication training for investigators.

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## 41. What Child Care Providers Know About Environmental Influences on Children's Health

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**Abstract:**
The goal of the Children's Environmental Health Research Center (CEHC) at Illinois is to study the impact of endocrine disrupting chemicals (EDC) on children's neurological and reproductive development and function. The focus of the Community Outreach and Translation Core (COTC) of the CEHC is to provide information to childcare providers, policy makers, and the general public about reasonable actions that can be taken to reduce children's environmental exposures that could be harmful to their health. Childcare providers are particularly important to target as in the United States most children under 5 years of age spend a significant amount of their waking hours in non-parental childcare. Recent analyses have indicated that endocrine-disrupting chemicals are present in childcare but the knowledge of their risks by childcare providers may be non-existent or nascent. To date, the focus of environmental health in childcare has been on more immediate safety (e.g. choking). To address this gap, we surveyed 784 home- and center-based Illinois childcare providers to better understand the environmental health literacy of childcare providers. We assessed providers' conceptualization and baseline knowledge of children's environmental health, understanding of environmental toxins and their effects on children, and the health behaviors they engage in to protect children's environmental health. We found that a majority of providers had a low level of understanding of what sources of exposures in the childcare environment might be and that they did not consider environmental exposures to pose a significant risk to children. Childcare providers' definitions of “environment” and “children's environmental health” may differ from those of researchers. Future efforts should focus on raising awareness and knowledge of environmental health issues for childcare providers before addressing building skills and self-efficacy.

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## 42. Aligning Personal Exposure Reports With a new Mental Model for Endocrine Disrupting Chemicals

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**Abstract:**
Purpose: Endocrine disrupting chemicals (EDCs) in everyday environments and consumer products can interfere with the body's natural hormone signaling. Examples include some pesticides, fragrances, flame retardants, and ingredients in plastics and personal care products. To make personal and public decisions about EDCs, people need a functional understanding about these chemicals, including where they come from, how they enter the body and affect health, and ways to reduce exposure. Personal exposure reports for participants in EDC biomonitoring studies are one platform for communicating this information. This project elicited expert insight to define goals for public understanding about EDCs, and then evaluated whether messaging in our previous personal exposure reports aligns with those goals.

Methods: We conducted three focus groups with researchers and community leaders (n = 39) from the Breast Cancer and Environment Research Program and Partnerships for Environmental Public Health networks who conduct research or outreach about EDCs. Focus groups were organized around what people need to know to have environmental health literacy about EDCs. Focus group transcripts were coded in Dedoose. Using a mental model approach, we constructed an influence diagram for EDCs and distilled focus group discussion into main messages that people need to know to make decisions about EDCs. We reviewed personal exposure reports generated by the Digital Exposure Repot-Back Interface (DERBI) for concordant messages and identified gaps in messaging.

Results: We identified key concepts in an action-oriented understanding of EDCs, and we found that DERBI reports address many of these concepts. Concepts include:

- People encounter EDCs every day in their food, products, and work and home environments.
- EDCs can affect nearly all the systems of the body, and exposures pose greater risk to health during periods when the body is developing.
- Individual action can lower some personal exposure to EDCs, and advocacy can change public policy that protects everyone.

In line with the recommendations of EDC researchers and community partners, information in DERBI is tailored to the exposure situation of the community and takes a precautionary approach toward exposure reduction. However, reports do not address how chemicals are currently regulated in the US, which is a key node influencing personal choices and public engagement related to EDCs and a target for our future communications.

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## 43. The Bench Tutorials Program: Scientific Research & Design

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**Abstract:**
The Bench Tutorials Program, also known as "Bench" and Scientific Research & Design, is an independent study course in biomedical research in which high school students earn one-year of full science credit and gives University of Texas Medical Branch (UTMB) mentors a full year of teaching experience. The goal is to enhance the rigor of high school science education and build the pipeline of tomorrow's biomedical researchers. The Program was founded by the Community Engagement Core of the UTMB Sealy Center for Environmental Health and Medicine (SCEHM) and is now a partner of the NIEHS-funded Gulf Coast Center for Precision Environmental Health. Bench operates in concert with the Galveston Independent School District. The program is supported by SCEHM, the Dr. Leon Bromberg Charitable Trust Fund, and the Rob Brasier Memorial Fund. Bench is a unique opportunity limited to Ball High School senior students and UTMB graduate students and post-doctoral fellows. Participants are afforded the ability to work on cutting edge biomedical research projects, while mentors receive a full year of teaching experience that might otherwise not be available to them. Moreover, while the high school students are highly motivated, their lack of research experience places extra demands on the mentoring and serves to better prepare the mentors for future teaching opportunities. Each Ball High School student is paired with a UTMB graduate student or post-doctoral fellow mentor with guidance from a faculty advisor through a matching process. High school seniors spend approximately four hours per week in supervised instruction and research from a participating laboratory in addition to their classroom experience at their High School. Each mentor designs a research project relating to the larger research framework within the laboratory, forecasting completion by the year's end. Evaluation of student performance is based on attendance, homework, and presentation of their research project both during the midterm and at year's end at mini science symposia. Additionally, many of the Bench students present their work at local, regional and state science fairs as well as additional opportunities that arise during their mentorship. Since its inception, more than 400 students and mentors have participated in the Bench program.

**Contributing Authors:**

- Chantele Singleton, MS, MBA
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## 44. Environmental Health Research Experiences for High School Science Teachers

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**Abstract:**
In 2017, through a collaborative effort between faculty from the College of Education and Department of Biological Sciences at NC State University, and community engagement practitioners at the Center for Human Health and the Environment (CHHE), we were awarded a five-year grant to provide professional development in environmental health sciences (EHS) to local high school science teachers. The innovative program is designed to enhance teachers' research skills and self-efficacy in order to support novel science teaching strategies in their classrooms. Each year, eight teachers from high-poverty schools are selected from a pool of applicants and matched with CHHE mentor scientists for the program. By involving CHHE, a NIEHS-funded Core Center, in this program, there are many opportunities for ongoing collaboration among the program's teachers, their high school students, EHS researchers, their graduate students, and community engagement professionals. Over the course of eight weeks, teachers have authentic EHS laboratory research experiences, gain practical understandings of the links between environmental stressors and human health, participate in workshops on ethical scientific conduct and research dissemination, and engage in collaborative lesson plan development. In addition, teachers receive support to attend relevant conferences or meetings, and materials to conduct lessons during the school year based on the methods and experiments they learned over the summer. By supporting teachers' ability to use novel instructional strategies related to EHS, more students from underserved, high-poverty classrooms will acquire STEM and EHS content knowledge and will develop STEM and EHS motivation and domain identification. This is particularly important, given the under-representation of people of color in EHS higher education programs and careers. To date, two cohorts of teachers have completed the program, and the application process has begun for the Summer 2020 group. Researches from the College of Education have been using qualitative research methods to assess impacts on teachers and their students. This poster will present highlights from the first two years of the program, including first-hand accounts from participating teachers on how the program has impacted their teaching, EHS self-efficacy, and their students' EHS learning.

**Contributing Authors:**

- Margareta Thomson
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## 45. Science Cafes at Novel Locations

Victoria Straughn, University of Cincinnati, Center for Environmental Genetics, straugvl@uc.edu

**Abstract:**
Background: The Environmental Health Science Cafe (EHSC) engages the community in discussions about environmental science issues in an informal and casual setting. Science cafes are effective avenues to communicate scientific findings to the public and create dialogues with researchers on a topic of interest to the public. In 2019, the University of Cincinnati (UC) Center for Environmental Genetics (CEG) Community Engagement Core (CEC) conducted four Science Cafes at novel locations. Lead Contamination in Urban Soil was presented by Nicholas Newman, D.O., MS, FAAP, CEC Co-Leader. A CEC citizen science project on soil testing kits discovered high lead levels in some yards, and residents with urban gardens were concerned. The EHSC, was held at a public library in the small city of Norwood. Interested community and local officials attended, asking over 20 questions about how the contaminations may have occurred and about remediation.

1. Sunlight and Sunscreens: Zalfa Abdel-Malek, PhD, CEG member and melanoma researcher, discussed skin effects of excess sunlight exposure. Katie Santanello, MPH graduate student then demonstrated the correct way to apply sunscreen to the face. This EHSC was conducted poolside at Coney Island's Sunlite Pool, with a football-field size pool area. The aim was to increase understanding of UVA and UVB blocking agents and risks and benefits of sunscreen products.
2. Mold: Tiina Reponen, PhD, CEG member, conducted an EHSC for the residents of Northside, a small community recently plagued with sewer backups and basement flooding due to storm sewer runoffs. Residents were deeply concerned about mold exposures and harmful health effects.
3. Dark Waters and PFOA: The movie Dark Waters follows Cincinnati attorney Robert Bilott's legal battle against DuPont over the release of PFOA into Parkersburg, West Virginia's water supply, affecting 70,000 townspeople and hundreds of livestock. Releases into the Ohio River reached the Cincinnati drinking water. Immediately after theater showings, CEG PFOA researchers were available in the lobby to answer questions about the exposure and health effects.

Conclusion: Science cafes can impact an individual's understanding of environmental health information and decode language that makes it difficult to follow. By using non-academic language, less PowerPoints, and holding sessions in areas familiar to the members of the community, more are likely to achieve greater health literacy.

**Contributing Authors:**

- Angela N. Larck
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## 46. Fernald Community's RoadMap to Resolution

Jeanette Buckholz, University of Cincinnati, buckhojm@ucmail.uc.edu

**Abstract:**
Background: In the early 1950's, the US Atomic Energy Commission built a uranium processing plant near Fernald, Ohio, known as a Feed Material Production Center (FMPC). This facility converted uranium ore to highly refined uranium metal rods, which were shipped to other US sites to be used in nuclear weapons production. Uranium compounds were released into the atmosphere and groundwater and resulted in community member exposure to soluble and insoluble forms of uranium, radon, and various other organic and inorganic chemicals. Members of the University of Cincinnati (UC) Center for Environmental Genetics (CEG) have had a long relationship with the Fernald Community Alliance. The Fernald Community Alliance (FCA) is comprised of community members, regulators, and Fernald workers, all who were involved in the clean-up of the site. A mission of the Fernald Community Alliance (FCA) is to provide a vehicle to educate other groups about how productive relationships evolved between government, regulators and community members. These relationships led to successfully solving complex environmental, public health, community planning and resource development challenges. The FCA's mission includes highlighting lessons learned at the site and sharing them with community groups, corporations, and government officials to help them build respect for each other and solve environmental problems. There are very few educational resources for community organizations, governmental agencies and/or companies to help them improve two-way communication while addressing an environmental hazard.

Methods: The FCA, in partnership with the CEG Community Engagement Core, is developing online materials to help other sites and companies involved in hazardous waste clean-up to improve bi-directional communications with surrounding community members. The "lessons learned" models for these online modules will come from the Fernald site and two other hazardous waste sites and will be shared through a website, digital training materials, workshop support, written materials and focused team-building exercises. The FCA will be supported by a multi-disciplinary team from the CEG and UC faculty, including experts in education, journalism, history, media production and communication. We will assist with the development of digital modules to include an online evaluation survey; results tabulated every 6 months will guide revision and development of new modules and other methods of communication.

**Contributing Authors:**

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## 47. Building Capacity to Improve the Development and Communication of Fish Consumption Advisories in NC

Catherine Kastleman, Duke University Superfund Research Center, ck205@duke.edu

**Abstract:**
This poster describes the process and results of a collaboration between researchers from the Duke University Superfund Research Center (Duke), UNC-Chapel Hill Institute for the Environment (UNC), and NC State University Center for Human Health and the Environment (NCSU), who convened the NC Fish Forum in 2019 to discuss challenges and opportunities related to the development and communication of fish consumption advisories (FCAs) in NC. Fishing is a beloved pastime for many and an important source of local food and food security. Almost one in ten NC waterbodies, however, are impaired by chemical contaminants or a quality issue like turbidity. Some contaminants (e.g. mercury) end up in fish, causing public health concerns. While FCAs suggest consumption limits for specific fish, waterways, and population groups (pregnant women, children, etc.), research shows that FCAs are often communicated in ways that are inaccessible to target populations. In NC, the Department of Environmental Quality (NCDEQ) collects fish for testing, and the Division of Public Health (DPH) uses this data in human health risk assessments for specific waterways. DPH communicates FCAs to local health departments, and local agencies notify the public through signage and outreach. Researchers from UNC, NCSU, and Duke have been working with these actors in various capacities over the last decade to better understand perceptions of FCAs and to improve public compliance. In March 2019, the three universities gathered interested parties at the NC Fish Forum to explore current issues in, and future directions for, the FCA process. Stakeholder discussions at the forum reinforced that public perception and understanding of FCAs are persistent obstacles to effective communication. Participants also agreed that improving communication between FCA agencies may help to protect vulnerable populations but noted that this will require resolving tensions between messages from public health and recreational fishing agencies. To create more effective advisories, participants recommended addressing critical resource constraints in the FCA development process and increasing collaboration and communication across agencies. They also recommended that academic partners convene key stakeholders regularly in order to build capacity and awareness on this topic. The group developed a workshop summary report and plans to conduct additional outreach and collaborative activities in the future.

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## 48. Duwamish F.I.S.H.: A Participatory Approach to Community Empowerment and Capacity Building

Paulina Lopez, Duwamish River Cleanup Coalition/TAG, paulina@duwamishcleanup.org

**Abstract:**
The UW Superfund Research Program (SRP) has formed a long-standing community partnership with the Duwamish River Cleanup Coalition (DRCC), the EPA's Community Advisory Group for the Lower Duwamish Waterway (LDW) Superfund Site, and Just Health Action (JHA), a Washington State health equity organization, to develop educational strategies and interventions related to fish consumption at the LDW Site. People who consume fish from the Duwamish River have higher exposure to chemical contamination and most are from native and immigrant communities, contributing to health disparities among these populations in the area. Building on a Health Impact Assessment (HIA) conducted by DRCC, JHA, and the UW in 2013, the SRP has sought to apply its expertise in fish contamination and advisories to advancing the HIA's subsistence fishing recommendations. Several of these are also reflected in the EPA's 2014 Environmental Justice Analysis of the LDW Record of Decision and 2016 Community Involvement Plan for the site. Community-driven recommendations in the HIA included:

1. Interventions should emphasize positive alternatives, such as identifying, encouraging, and providing options for safe and healthful fishing.
2. All efforts to provide information, communicate advisories, and promote safe and healthful alternatives should be culturally appropriate and designed to help individuals make informed choices.
3. All efforts should engage and empower members of the fishing populations so they can participate meaningfully in all stages of any prospective interventions.

UW SRP, DRCC and JHA have been developing tools and strategies over the past five years for implementing the HIA recommendations. We are now launching the next phase of the project. Incorporating recommendations from the community-based partners, we will:

1. Disseminate a recently completed series of videos, produced in partnership with local agencies, through existing community networks.
2. Develop wrap-around curriculum to further empower fishing communities with the information they need to make health-protective choices.

Other approaches for serving diverse immigrant groups, urban native, and low-income communities are also in development, with a focus on culturally appropriate and informed educational and empowerment strategies. The poster will map the background of the FISH project, highlight strategies and outcomes to date, recommend new research directions, and project future challenges as the project expands.

**Contributing Authors:**

- James Rasmussen
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- Tom Burbacher

## 49. A Day in the Life: A Youth Based Participatory Air Monitoring and Personal Storytelling Program

Wendy Gutschow, University of Southern California, wgutscho@usc.edu

**Abstract:**
In the face of environmental injustice, communities are increasingly asking to collect their own pollution data. In collaboration with three community-based organizations, the University of Southern California developed a participatory air monitoring and digital storytelling program called A Day in the Life. This four part program implemented in Los Angeles, California aimed to build the capacity of youth leaders to understand the sources of air pollution and its relationship to health, develop technical skills with respect to air monitoring and storytelling, facilitate critical conversations to assess air monitoring results, and communicate the results back to their communities through personal narratives. We will describe the first wave of participants where high school youth of color collected over 520 hours of PM2.5 data using the Air Beam. Participatory air pollution monitoring activities can help increase environmental health literacy, raise awareness, inform policymakers, and contribute to decisions to improve public health. We share the curricula developed and lessons learned for engaging youth in personal air pollution monitoring.

**Contributing Authors:**

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## 50. Sensor Stories: Engaging High School Students in Local Air Quality Explorations

Katrina Korfmacher, University of Rochester, katrina_korfmacher@urmc.rochester.edu

**Abstract:**
Particle pollution impairs air quality and can cause significant health problems, especially among vulnerable populations. As our understanding of the health impacts that result from either acute or chronic exposure to air pollution increases, interest in local air quality grows. With the advent of low-cost personal air quality sensors, educators are opting to engage students in investigating local air quality issues by monitoring local air quality data to identify sources of air pollution and consider patterns of exposure. Thus, access to affordable and relevant technology is inspiring educators to integrate air quality-related citizen science opportunities into formal and informal educational settings. By way of background, this poster will describe the Air Sensor Stories Workshop Project, a recent collaborative project among four National Institute of Environmental Health Sciences (NIEHS) Environmental Health Science Core Centers (University of Rochester, University of North Carolina-Chapel Hill, University of Texas Medical Branch and Columbia University) and their community partner, WE ACT for Environmental Justice, to develop interactive educational materials tailored to community audiences. The poster will focus on efforts to adapt this project to empower youth to create their own sensor stories by providing a hands-on experience to learn about and monitor personal exposure to particle pollution. It will highlight how Women for a Healthy Environment in Pittsburgh developed a 5-lesson interactive/place-based instructional unit that is being piloted this fall with schools located in environmental justice communities in Pittsburgh. We will describe the benefits and challenges of incorporating air sensors into an educational setting to inform others' efforts.

**Contributing Authors:**

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## 51. Mapping Priorities and Issues in Reporting Environmental Health Data to Communities

Erin Lebow-Skelley, Emory University, elebows@emory.edu

**Abstract:**
Environmental health researchers collect environmental exposure data from individuals and communities. Reporting these exposure results back to research participants is recommended by the National Academies of Sciences, Engineering, and Medicine, and yet its implementation still faces challenges and debate. As such, the 2018 Partnerships for Environmental Public Health (PEPH) Annual Meeting focused on reporting back research results, allowing its network of grantees and community members space to further explore the topic. As part of this meeting, we hosted a Group Concept Mapping workshop to identify issues and priorities in reporting back environmental health research results. Twenty-nine attendees participated in the workshop, which asked participants to brainstorm responses to "What are some specific issues that are relevant to reporting back research results to individuals or the larger community?" Participants then individually grouped the brainstormed statements by similarity and rated each statement. Using Concept System Global MAX software, we created visual maps of the responses using nonmetric multidimensional scaling and hierarchical cluster analysis. The resulting two-dimensional concept map provides a visual and spatial depiction of five issue areas relevant to reporting back research results: Institutional Review and Oversight, Community Knowledge and Concerns, Effective Communication Strategies, Uncertainty, and Empowering Action. Group Concept Mapping helped to identify these five distinct themes within a very complex topic that may help to prioritize areas of action for the PEPH and the broader environmental health community. Concept map results and recommendations will be presented to build the capacity of the PEPH community to improve the practice of reporting back and effectively communicating research results.

**Contributing Authors:**

- Melanie Pearson
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## 52. Developing Home Assessments of Indoor Air Quality Threats in a Cohort of COPD Patients

Caitlin Fallone, University of Rochester, Cait_Fallone@urmc.rochester.edu

**Abstract:**
Assessing home hazards can contribute to environmental health engagement, action, and research. Many "healthy home" programs have developed and implemented home assessments to meet their unique needs and goals. At the University of Rochester Medical Center, pulmonologist Dr. Daniel Croft collaborated with the Community Engagement Core (CEC) of the Environmental Health Sciences Center (EHSC) and the community group Rochester Safe and Efficient Homes Initiative (RSEHI) to complete home assessments as part of an ongoing study on indoor air quality and health of COPD patients (the "Cleaning Indoor Air to Reduce Acute Exacerbations of COPD (CARE) study"). Pilot funding from the EHSC allowed the CEC to develop, test, and evaluate home assessment tools for use in future projects. This project developed and compared two short home assessments: a 10 question self-administered "screening" survey and a 50-item home "assessment tool" administered by trained staff (a community partner and CEC Program manager). Participants received a Healthy Home Kit, educational materials, and an Action Report appropriate to their particular needs. The project assessed:

1. Whether the "screening survey" and "assessment tool" results rate overall home health similarly.
2. The inter-rater reliability using the home assessment tool (comparing the results obtained by two separate assessors in co-conducted visits).
3. The costs, logistical issues, and impacts of each assessment to inform future home assessment research and outreach programs.

Initial results suggest that the 10 question screening survey ranks overall housing quality similarly to the 50 question assessment tool. However, the 50 question home assessments conducted by staff discovered many hazards not perceived or reported by participants. The tool opened the door for tailored education, resources, tools, and referrals. Inter-rater reliability was good with modest training and community partners were able to conduct the assessments effectively. Home assessments took around 1.5 hours to complete, enabling us to project costs for wider implementation of these tools. Participants were enthusiastic about the information and resources. This suggests that even short (10 question) assessments can help people improve home health conditions and may increase, recruitment, participant engagement, and retention in home-based studies.

**Contributing Authors:**

- Katrina Korfmacher, PhD
- Elizabeth McDade
- Dr. Daniel Croft

## 53. Bridging Silos: Collaborating for Environmental Health and Justice in Urban Communities

Katrina Korfmacher, University of Rochester, katrina_korfmacher@urmc.rochester.edu

**Abstract:**
Multiple environmental factors contribute to the health inequities experienced by vulnerable populations in the U.S. These environmental health injustices persist despite well-developed systems for both public health and environmental protection. This poster will highlight the challenges, innovations, and lessons learned about spanning boundaries between science and decision making, government and community, and environment and public health at the local level, with a focus on cases involving lead in housing, unhealthy built environments, and air pollution.

Low-income and marginalized urban communities often suffer disproportionate exposure to environmental hazards, leaving residents vulnerable to associated health problems. Community groups, academics, environmental justice advocates, government agencies, and others have worked to address these issues, building coalitions at the local level to change the policies and systems that create environmental health inequities.

This poster examines ways that communities can collaborate across systems and sectors to address environmental health disparities. It highlights in-depth case studies of three long term efforts to address chronic environmental health issues: childhood lead poisoning in Rochester, New York; unhealthy built environments in Duluth, Minnesota; and pollution related to commercial ports and international trade in Southern California. All three efforts were locally initiated, driven by local stakeholders, and each addressed issues long known to the community by reframing an old problem in a new way. These local efforts leveraged diverse resources to impact community change by focusing on inequities in environmental health, bringing diverse kinds of knowledge to bear, and forging new connections among existing community, academic, and government groups.

This poster presents a framework to promote health equity through innovative local collaboration to promote environmental health and justice. The framework can be applied to other communities and issues to inform local efforts to address longstanding environmental issues and promote health equity.

**Contributing Authors:**
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## 54. Mapping the Community in a Translational Research Project

Kristi Pettibone, NIEHS, kristianna.pettibone@nih.gov

**Abstract:**
NIEHS published a Translational Research Framework in 2018. Grantees from the Environmental Health Sciences Core Centers Program, the Children's Environmental Health Centers, and the Superfund Research Program and others have used the framework to map out a wide variety of environmental health translational stories. While grantees can easily see how the framework provides a way to track the evolution of an idea through the translational research process, to reflect the lengthy timeframe in which this might happen, and to acknowledge the non-linear path the research might take, some grantees have expressed concern that the framework does not adequately provide a way to illustrate the efforts of a wide variety of partners and collaborators. This poster will map out a translational research story from the University of Pennsylvania that includes significant involvement from several community groups and will include a section where poster authors comment on how well the framework reflects the contributions of community partners and academic researchers. Poster authors will also provide suggestions for changes or adaptions to the framework to enable it to better reflect community partner efforts. We also will provide space on the poster for meeting participants to reflect and provide their own comments and suggestions.

**Contributing Authors:**

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National Institute of Environmental Health Sciences

# Partnerships for Environmental Public Health

## Annual Meeting

# Sensor Abstracts

| Sensor # | Author Last Name | Sensor Title |
|---|---|---|
| **Sensor #1** | Zelikoff | Demonstration and Discussion of Electronic Nicotine Delivery Devices and of a Vaping Chamber |
| **Sensor #2** | Vandiver | Characterizing Environmental Health and CYP 450 Protein Variability |
| **Sensor #3** | Fallone | Evaluating Environmental Health Science Kits in Promoting Environmental Health Literacy |

## Sensor #1. Demonstration and Discussion of Electronic Nicotine Delivery Devices and of a Vaping Chamber

Judith Zelikoff, New York University School of Medicine, judith.zelikoff@nyumc.org

**Abstract:**
Electronic nicotine delivery systems (ENDS) come in all shapes and sizes. Some of the names for the different products include personal vaporizers, Vape Pens, Vape Boxes, Vapes, Tank systems, E-Hookah, Hookah Pen, Hookah Stick, Shisha Stick, JUUL, Mechanical Mods, E-Cigars, and E-Pipes. E-Cigarettes can resemble traditional tobacco products like cigarettes, cigars, pipes, or common gadgets like flashlights, flash drives, pens, fobs, and inhalers. These devices, while delivering similar components, can deliver different amounts of nicotine, as well as heat at different temperatures, and use different voltages, which can change product chemistry. The chemical compounds in e-cigarette devices can also vary across brands. E-liquid from e-cigarettes and refill packs can contaminate skin, leading to nicotine poisoning. We will have a collection of these nicotine delivery devices for participants to handle. Judy Zelikoff will discuss their differences, use, and hazards. We will also have a self-contained vaping chamber with sensors that measure particulates and formaldehyde in vaping aerosols. This vaping chamber demonstration will offer participants a chance to confirm that vaping aerosols are not just water/steam. Many of those who vape are not aware that there are hazardous, toxic particles and chemicals in the vape stream. If the chamber cannot be used because of NIEHS or building policy, we will show a video describing how it is used. We will also have handouts for DIYers who want to build a chamber for use in community education settings. Kim Manning will demonstrate the vaping chamber.

The goals of this device's demonstration are to:

1. Display and discuss the different types of ENDS currently on the market, and how each works; discuss methods for protecting youth, families, parents, and students from these products.
2. Demonstrate the use of an e-cigarette "tool-kit" (available through the American Academy of Pediatricians) and how it can be implemented to inform clinicians, particularly pediatricians and ob-gyn, patients, students and parents about e-cigarettes.
3. Demonstrate a vaping chamber that generates e-cigarette aerosols and uses sensors to measure particulates and formaldehyde in vaping aerosol emissions.

**Contributing Authors:**

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## Sensor #2. Characterizing Environmental Health and CYP 450 Protein Variability

Kathleen Vandiver, MIT CEHS, kathymv@mit.edu

**Abstract:**
Funded by an NIEHS 2018 Supplement, the MIT Community Outreach Education and Engagement Core (COE2C) designed a unique module for teaching key environmental health concepts. This educational method combines a "learning by doing" hands-on approach with case-based examples to serve health professionals' curricular needs. The protein modeling materials required for the module are available in the MIT Edgerton Center Protein Sets (http://edgerton.mit.edu/DNA-proteins-sets). This new curriculum will be forthcoming in a publication, an instructional booklet titled "Genes and Health," designed to improve environmental health literacy. In the lessons, participants build model enzymes that represent CYP 450 proteins. The CYP proteins are found in the human liver and they are responsible for breaking down toxic chemicals to be eliminated from the body. Individuals whose enzymes do not bind and break down a chemical will accumulate these toxic substances and they will potentially suffer the ill effect. However, with the models, participants will be able to predict which CYP protein variants will make an individual more susceptible to the toxic compound being tested. To discover whether individuals from different representative genetic groups are vulnerable to the toxic compounds, participants try out specific substrates in the active site of the model CYP Protein. This activity provides a-ha moments of discovery depending on whether the substrate is bound by the enzyme or not. Additionally, the case study provides a memorable and informative story line, raising the participant's interest in the health outcome for the individual in question. Overall, three different cases are presented and responses to five substrates explored. The learning objectives include elucidation of the steric mechanism producing drug-drug interactions, insights into nicotine addiction susceptibility, the carcinogenic activation of benzo[a]pyrene, and how aflatoxin, a fungal toxin, binds in the active site. The genetic variants of CYP proteins modeled in these individual case studies are composites derived from published DNA sequences for human CYP proteins and include data from mid-western Native American Tribes, and two groups of Caucasians. The poster will be accompanied by samples from the teaching module described above. Everyone is invited to stop by and learn more about genetic susceptibility with the models. Support provided by core center grant P30-ES00210

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## Sensor #3. Evaluating Environmental Health Science Kits in Promoting Environmental Health Literacy

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**Abstract:**
Environmental Health Literacy (EHL) is an emerging framework for enhancing people's understanding of environmental health issues. EHL scholars are working to develop metrics to assess environmental health literacy. This pilot project aimed to develop, implement, and assess metrics for the EHL impacts of Science Take-Out (STO) Community Environmental Health (CEH) kits. Previously, at the University of Rochester Environmental Health Science Center, the Community Engagement Core (CEC) collaborated with STO to develop hands-on science kits that provide an engaging way for the general public to learn about topics in environmental health science. We created eight different kits on topics including lead, healthy homes, water quality, and pesticides (www.sciencetakeout.com/ceh-kits/). These kits were piloted and evaluated by multiple community engagement programs, however, their impact on the environmental health literacy of participants was not assessed. This project aimed to develop and test assessment tools to determine how the kits impact EHL compared with "traditional" outreach approaches like unidirectional presentations. This pilot project developed and tested an approach to evaluating EHL of a Community Environmental Health kit on Skin Cancer and Sun Safety by:

1. We developed assessment tools (pre- and post-test surveys) to evaluate the impact of the kit on EHL.
2. We developed a "traditional" (non-kit-based) educational presentation for the kit. This presentation conveyed the same information as the CEH kit which was being assessed.
3. We conducted community workshops with 192 participants: half using only the "traditional" presentation and half using the CEH kit. We analyzed the assessment tool data to compare the impact of the "traditional" presentation vs. the CEH kits on EHL.

Initial findings suggested no difference in the learning of "factual" material between the two modes of outreach (science kit vs. presentation) but that the kits increased "higher order" EHL skills (i.e. capacity and intent to take action). This poster will present initial assessment tool data from the pilot, formative evaluation of the assessment tool, and recommendations for future development of EHL metrics.

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National Institute of Environmental Health Sciences

# Partnerships for Environmental Public Health

## Annual Meeting

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