September Council 2025

Community-Engaged Research for Environmental Health

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National Institute of Environmental Health Sciences

Overview

- Program history & rationale
- Accomplishments
- Request

Acknowledgements

All program, grants management, and review staff.

The many academic and community partners.

NIEHS Commitment to Community-engaged Research:

Research to Action Program

Goal

To support community-engaged research aimed at preventing or reducing exposure to harmful environmental contaminants and improve the health of a community.

- Use multi-disciplinary, collaborative research approaches to investigate the potential health risks of environmental exposures of concern to the community
- Co-develop activities, informed by research, to address the community-identified question/issue
- Three required elements

Expired Funding Opportunity

First Receipt Date: October 2022
Last Receipt Date: June/July 2025

PAR-22-210

Required Element #1: Authentic Community Engagement

- Communities must have a role in identifying the environmental health risks that are of greatest importance to them.
- Community partners receive financial support to conduct the research project in partnership with investigators.
- Investigators collaborate with their community partners in developing effective strategies to mitigate exposures and/or improve health outcomes.

Rationale:
Community leadership and input ensures that research plans, public health strategies, and education efforts reflect community needs and are developed in appropriate formats.

Required Element #2: Research

The objective of this element is to support research that will increase knowledge of how environmental exposures impact health and disease in communities

- **Descriptive studies** to increase understanding of exposure levels, sources or prevalence of exposure-related health conditions among the community
- **Hypothesis-driven studies** to improve understanding of the exposure-health outcome relationship

Research findings should be used to inform a public health action plan

Required Element #3: Public Health Action

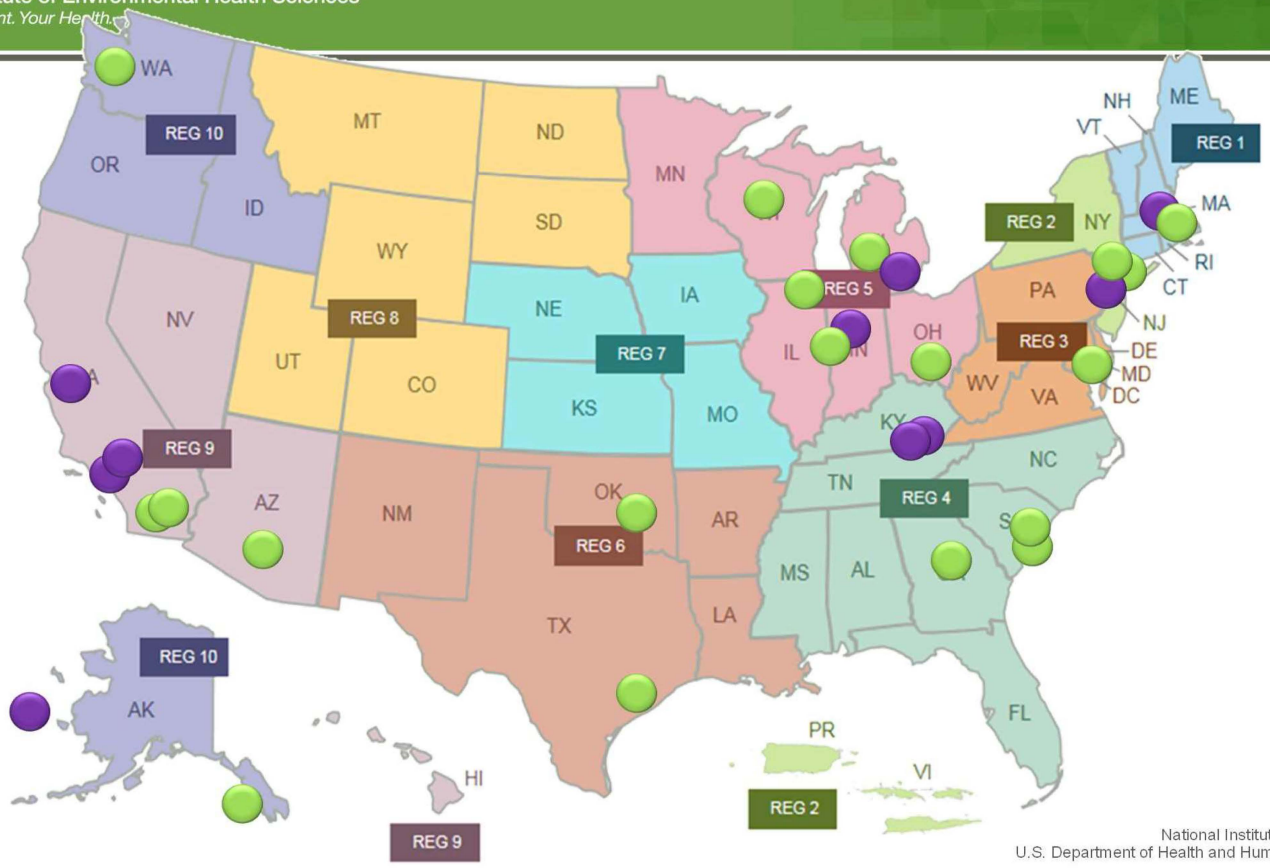
Includes campaigns, programs, and interventions intended to elicit a change in behavior or practice that will help:

- Reduce or eliminate exposures,
- Prevent disease and disability,
- Promote the health of a population

PH action may be targeted at the individual, neighborhood, or community level, or developed as models that have national public health practice application.

Applicants should develop strategies that translate the findings from the research element of the study to action.

Locations (past & present)



Exposures

- Legacy contamination
- Endocrine Disruptors
  - PFAS
  - AFFF firefighting foams
  - PBB
  - PCB
- Trichloroethylene (TCE)
- Contaminants in fish
  - PSP toxins
  - Saxitoxin
  - Persistent bioaccumulative toxics (PBTs)
- Mercury
- Disinfectant by-products
- Outdoor air contaminants
  - Particulate Matter
  - Diesel & Black Carbon
- Indoor air contaminants
  - VOCs
  - Radon
- Urban oil drilling
- WUI exposures
- Social stress

Health Outcomes of Concern

- Cancer
- Reproductive health
- Immune function in kids
- Visual & cognitive function
- Paralytic shellfish poisoning (PSP)
- Endocrine or metabolic disorders
- Earlier menarche
- Increased risk of miscarriages
- Lower estrogen levels (female)
- Urogenital problems (men)
- Respiratory health (children & adults)

Actions

- Testing new tools or practices
  - Powered air-purifying respirators
  - Rapid decontamination
  - Community farming intervention
  - Mobile app
  - Radon equipment library
- Implementing exposure controls
  - Indoor exposure controls
  - Testing mitigation systems
- Communicating findings to raise awareness
  - Report-back, infographics, factsheets
- Developing education & training materials
  - Classroom activities, CME, interactive maps
- Co-developing action plans
  - Youth defined & community prioritized
  - Multi-sectoral interviews to frame possible health protective actions
  - Management plans and hydrological models for water utilities

Select Highlights

Rural MI – PBBs

Tucson, AZ – VOCs

Rural KY – Disinfectant by-products

Los Angeles, CA – WUI fires

Great Lakes Region (WI & MN) – contaminants in fish

New England (NH & MA) – PFAS

Photo: The Michigan PBB Leadership Team

Collaborative Research and Action: Empowering an Exposed Community

Test a method to accelerate the elimination of PBB and other contaminants from the body.

Does a weight loss pill (Orlistat) that blocks fat in foods eaten also reduce blood levels of PBB and other similar chemicals?

Results

Weight

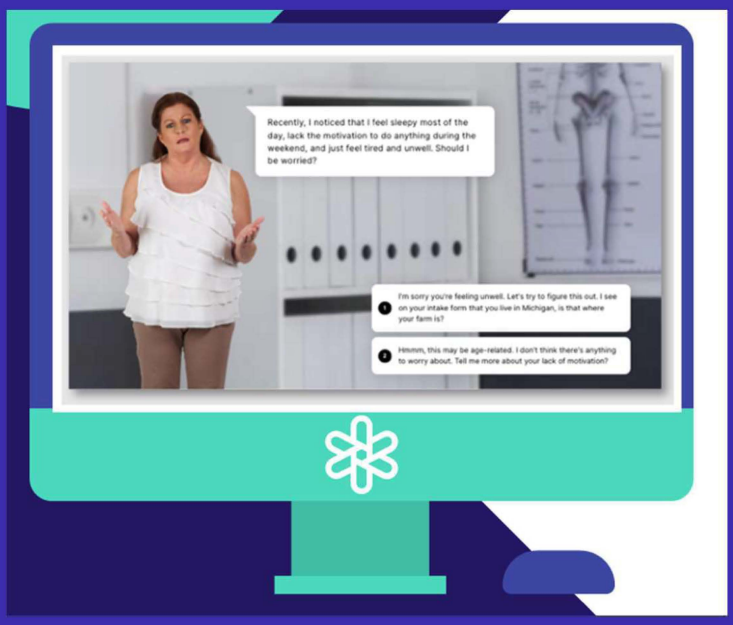
- The study group that took the weight loss pill lost more weight on average
- By Month 6
  - Inactive pill group lost 4.6 lbs.
  - Weight loss pill group lost 9 lbs.
  - 89% completed the 6-month study

Chemical Levels

- No differences in PBB levels between the group that took the inactive pill and the group that took the weight loss pill
- No differences in the PBB levels in these two participant subgroups:
  1. High levels at study enrollment
  2. Lost the most weight

Continuing Medical Education (CME)

"My doctor doesn't know anything about PBB"



- Created an interactive, online CME focused on endocrine-disrupting chemicals
  - PBB was used as the case study
  - Video testimonials from PBB participants included
  - To date: 201 HCPs enrolled
    - 91 nurses & 111 physicians
  - In development: Central Michigan University's Medical School to offer the course to its medical students

Available via the PBB WEBSITE
https://PBBregistry.emory.edu

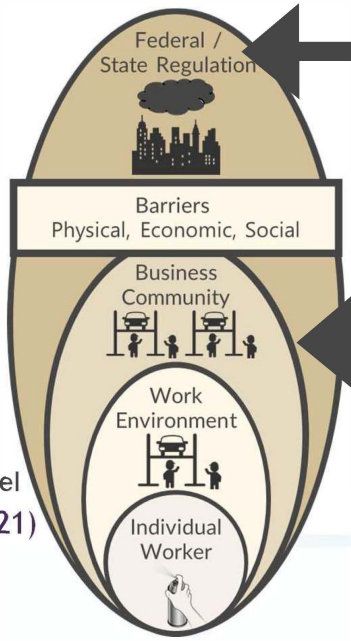
PBB Studies and Resources

FOR HEALTHCARE PROVIDERS

SOLUTIONS FOR A CHANGING WORLD

Testing a community health worker intervention in a cluster randomized trial to reduce worker volatile organic compound exposure in small businesses.

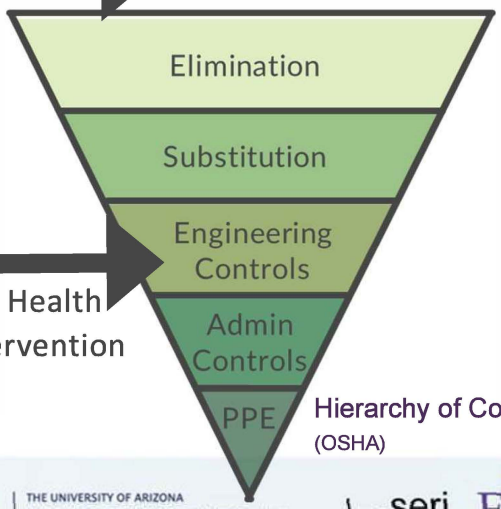
PI: Paloma Beamer



Socio-ecological model
Ingram et al. *JESEE* (2021)

Community Health Worker Intervention

Community Partnerships



Hierarchy of Controls
(OSHA)

THE UNIVERSITY OF ARIZONA Mel & Enid Zuckerman College of Public Health

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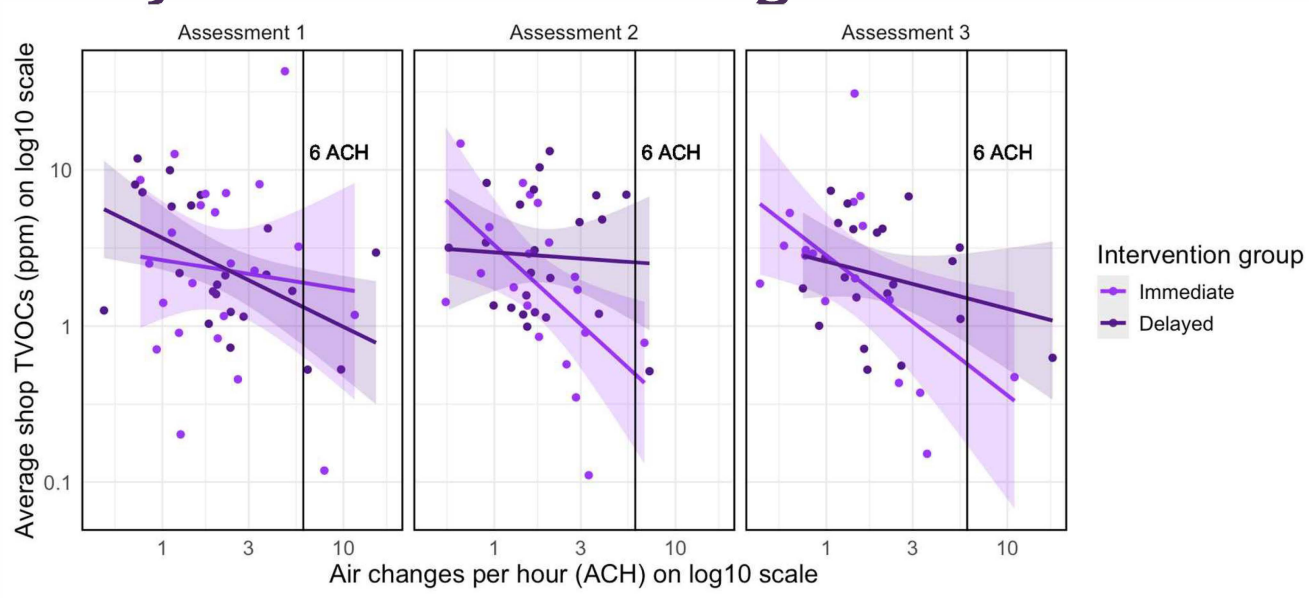
EL RIO HEALTH

Beauty Salon Air Exchange Rates



SOLUCIONES EN UN MUNDO CAMBIANTE

A University-Community Partnership to Reduce Exposure to Drinking Water Disinfection Byproducts

Improving population health through systemic prevention

Community engagement & environmental health communication

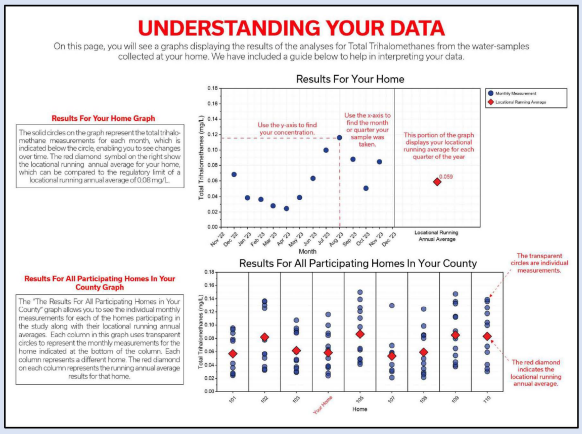
Citizen science-based exposure modeling

Technical resources for utilities

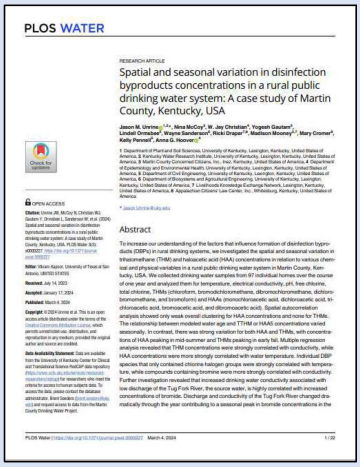
Reduced exposure to disinfection byproducts (DBPs) and associated health effects

Innovation. Rigor. Reproducibility. Ethical Commitment.

- Drinking water disinfection byproducts are the most widespread drinking water quality issue in the US.
- Consistent associations between DBP exposure and urinary tract cancers are well established.
- Epidemiological studies of non-cancer health effects of DBPs, particularly adverse birth outcomes, have been hampered by lack of high-resolution data on spatiotemporal variation in exposure.
- Participation of well-trained citizen-scientists facilitates collection of exposure data simultaneously and at high resolution across extensive rural drinking water networks.
- This study is one of the first of its kind to utilize this approach, helping us better understand how seasonal and spatial variation in exposure could be connected to chronic non-cancer health effects.



Report back materials were developed through an iterative, stakeholder-driven process.


PLOS WATER

RESEARCH ARTICLE

Spatial and seasonal variation in disinfection byproducts concentrations in a rural public drinking water system: A case study of Martin County, Kentucky, USA

Abstract

The study has linked low source water discharge with increased bromide concentrations, providing key insights into seasonal factors driving DBP exposure risks in rural drinking water systems (Unrine et al, 2024).

University of Kentucky

Firefighter Exposure & Health Effects Collaborative Research

"Wildland-Urban Interface Fire Exposures, Effects, and Interventions: A Collaborative Research-to-Action Partnership with Firefighters"

- The January 2025 LA area conflagrations started in the wildland-urban interface (WUI) and extended into urban areas, with incineration of entire structures, vehicles, and other materials
- The fire service asked the research team to evaluate exposures and health risks
- Collected urine samples and wristbands to measure exposures during the fires
- Followed-up or enrolled >600 LA area firefighters after the fires (January-March), including firefighters who responded to the fires and a comparison group without conflagration response
- Some firefighters had provided blood samples prior to the fires, enabling measurement of pre-post exposure changes in biomarkers of cancer and other disease risk

Palisades Fire (courtesy of Oxnard Fire Department)

Initial Results

Completed analyses and report-backs

- First report-back in March described changes in serum PFAS from before to after the urban conflagrations
  - Serum PFOS ↑ 17% and PFNA ↑ 9% in ~40 firefighters responding to the fire, with similar increases in a small comparison group not responding to the fires
- Pre-post conflagration serum proteins measured in 42 firefighters responding to the fires
  - Sixty proteins changed significantly consistent with oxidative stress, immune, & inflammatory responses
  - Aggregate results reported back

This rapid response would not have been possible without the ongoing R2A project.

Next Steps

Analyses in progress and planned

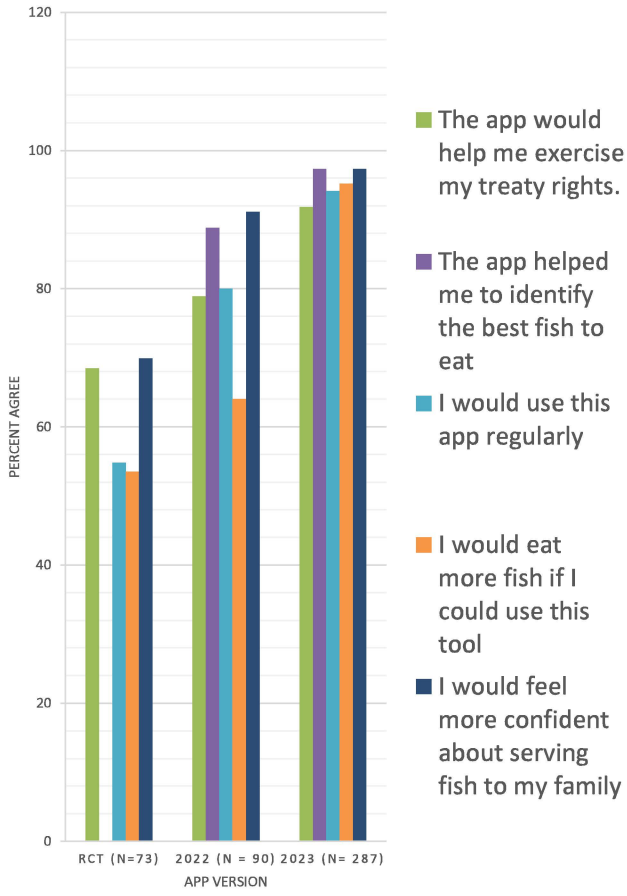
- Wristbands worn during conflagration and urine for polycyclic aromatic hydrocarbon metabolites
- Urinary metabolomics/oxidative stress measures
- Blood epigenetic analyses -- MicroRNA analysis soon

Palisades Fire aftermath (courtesy of UA research team)

National Institute of Environmental Health Sciences
Your Environment. Your Health.

Gigiigooinaan (Our Fish): A New Advisory t Promote Anishinaabe Health and Wellness

- This project is transforming fish consumption advice for Native American tribal communities living in and around the Great Lakes.
- Partnership with the Anishinaabe communities to test the effectiveness of an interactive, culturally-tailored mobile application.
- Continued to eat fish yet most people remained within limits for contaminants.
- Increasing confidence in using the app.



The PFAS Exchange

An online resource center for PFAS-impacted communities

PFAS-REACH
PFAS Research, Education, and Action for Community Health

COMPONENTS

- "What's My Exposure" tool for interpreting PFAS water and blood test results in real time
- Interactive GIS map with known and suspected contamination sites and state-level resources
- 13 fact sheets on exposure, health effects, regulations, blood testing, and medical monitoring
- Continuing medical education (CME) course and other resources for clinicians

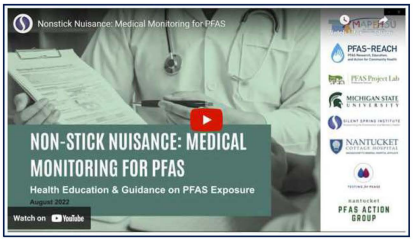
Scan to visit the Exchange ▶

ANALYTICS

- Up to 7,700 monthly visitors
- 1,400 views of CME video on YouTube
- Over 700 users completed interactive quiz

IMPACT

- Cited by 2022 National Academies report as model for clinical guidance
- Recommended by state agencies and medical orgs
- Highlighted in Washington Post and PBS News



The Washington Post
Democracy Dies in Darkness

What do I do once I have test results?

The test results may be a bit confusing to read at first glance. There are thousands of PFAS and "the acronyms have acronyms," Remucal said.

You can enter the test results into a tool created by the PFAS Exchange, which will compare the findings to federal and state guidelines.

Moving Forward

Program Continuation

Request: Continue with minor edits

- The tenets of Research to Action have been the cornerstone of community-engaged research at NIEHS
- The continuation will:
  - Emphasize the research approach to achieve optimal environmental health for all
  - Maintain the three required elements
- NIEHS plans to:
  - Continue engagement with NIMHD
  - Work with NHLBI and NICHD
  - Offer an annual technical assistance meeting for interested applicants

Proposed renewal alignment with NIEHS Strategic Plan

Research Areas of Emphasis: Exposomics, Precision Environmental Health, Environmental Health Disparities, and Protecting Health From the Impacts of Extreme Weather and Disasters.

Capacity and Infrastructure Areas: Human Studies and Community-Engaged Research and Communication and Dissemination.

Conclusion: Value of this community-engaged research

- Builds Trust
- Inspires next generation
- Raises environmental health literacy
- Informs health protective practices
- Builds capacity of ALL partners
- Advances environmental health research

What it takes to do it well

- Time
- Listening
- Respect
- Authenticity

Thank you & Discussion

Concept Discussants:

Drs. Hood and Hornbuckle