SUNDAY, SEPTEMBER 22, 2024	
5:30 pm	**PRE-MEETING Disaster Response Research (DR2) Networking Event** Join your colleagues in the DR2 Network for dinner at the Ramen Utsuke - only a block away from the hotel. Everyone is welcome! **Please RSVP** to dylan.williams@nih.gov by Wednesday, Sept 18, if you plan to attend.
7:00 pm	**PRE-MEETING Community Engagement Core Mix-and-Mingle (optional)** Opportunity to meet new CEC members and re-connect with colleagues from last year. Blackwall Hitch, 700 E. Pratt St., Baltimore, MD 21202

MONDAY, SEPTEMBER 23, 2024	
ALL	
SCIENCE TRACK: Constellation A/B	
COMMUNITY ENGAGEMENT CORES (CEC): Constellation C/D	
BUSINESS ADMINISTRATION (BA): Chesapeake AB	
7:45-8:25 am	**CHECK-IN & BREAKFAST: Foyer – Constellation A**
8:25 - 10:30 am	**OPENING SESSION: Welcome, Keynote Addresses, Q&A** **Location: Constellation A/B** **WELCOME: Marsha Wills-Karp, PhD,** Johns Hopkins School of Public Health (CHARMED) **NIEHS Core Center Directors: Claudia Thompson, PhD** and **Liam O'Fallon, PhD** **PLENARY SESSION A–** *"Just Exposome: Integration of science, community, and policy"*. **Description –** the goal of this session is to give attendees a sense of the overall meeting theme and direction. Identify scientific, community engaged, and translational opportunities for the EHS Core Center Program **KEYNOTE SPEAKERS:** **8:40-9:10 am: Rick Woychik, PhD**, Director National Institute of Environmental Health Science **9:10-9:40 am: Adam Ortiz, PhD,** US Environmental Protection Agency Region III Administrator

	9:40-10:10 am: Jalonne White-Newsome, Ph.D. Senior Director for Environmental Justice, White House Council on Environmental Quality **10:10-10:30 am: Baltimore community-academic partnership:** **Shashawnda Campbell**, South Baltimore Land Trust (CEC Community Co-Lead CHARMED) **Chris Heaney, PhD,** (CEC Lead CHARMED)
10:30-11 am	**BREAK**
11 am-12:30 pm	**SCIENCE & CEC** **PLENARY SESSION B: COMMUNITY EXPOSOMICS** **LOCATION: Constellation A/B** Community-level exposomics broadly considers the built, natural and social environments, and environmental pollution - derived from conventional and community science approaches along with internal markers of exposure that can be measured at the population-level and health measures that can be tracked using population-based monitoring. The goal is to ensure exposomic research is readily translated into actions that benefit community health, especially for Environmental Justice communities. Achieving this goal requires meaningful engagement with and centering expertise of communities and their experiences. An overview of community exposomics and its application to public health, an example of community exposome measurement and a review of community engagement strategies readily available to inform this evolving area of research is presented. The latter includes community needs assessments, community grand rounds, community tours, community mini-grants and community mapping workshops all of which is rooted in meaningful community partnerships and ultimately, investment in community-based solutions. **Co-Chairs:** **Jeanette Stingone, PhD** **J. Christopher States, PhD** **11:00-11:15 am: Jeanette Stingone, PhD,** Columbia University “Community Exposomics: A Population-Centered Approach to Integrate Exposomics with Addressing Public Health” **11:15-11:30 am: Christopher States, PhD,** University of Louisville “Wastewater surveillance: Feasibility Study for Community Metal Exposures” **11:30-11:45 am: Melanie Pearson, PhD,** Emory University **Yvonne Boone**, Southside Environmental Justice Alliance (SEJA) “Using the Exposome to Mobilize Atlanta’s Communities” **11:45 am-12:00 pm: Maida P. Galvez, MD, MPH**, Icahn School of Medicine at Mount Sinai “Opportunities to Advance Community Exposomics through Community Engagement”

	12:00-12:30: Q&A and Panel Discussion
	NIH Updates **Speaker: Claudia Thompson, PhD (NIEHS) and Michelle Campbell, M.B. (NIEHS)**
12:30-1:30 pm	**LUNCH**
1:30-3 pm	**SS#1: INNOVATIVE MULTI-OMICS APPROACHES OF CUMULATIVE EXPOSURE** This session will explore the cutting-edge integration of genomics, proteomics, metabolomics, and other -omics technologies to advance our understanding of environmental impacts on health and safety. **Session Chairs** **Jim Feng, PhD (UNM)** **Lida Chatzi, MD, PhD (USC)** **1:30-1:40 pm: Katherine Manz, PhD (UMich)** "Beyond Targeted Analysis: Leveraging High-Resolution Mass Spectrometry to Unravel the Chemical Exposome" **1:40-1:50 pm: Clementina Mesaros, PhD (UPenn)** "Metabolomics analysis of non-small cell lung cancer (NSCLC) plasma from Pennsylvania reveals geography related metabolic features" **1:50-2:00 pm: Kun Lu, PhD (UNC)** "Mapping Neurodevelopmental Exposome Using High Resolution Mass Spectrometry" **2:00-2:10 pm: Jesse Goodrich, PhD (USC)** "Precision Environmental Health: Integrating Exposures and Omics to Understand Environmental Drivers of Disease" **2:10-2:20 pm: Janine LaSalle, PhD (UC Davis)** "The Importance of the Placenta for Multi-Omics Approaches of Cumulative Exposures" **2:20-3:00 pm: Panel Discussion**
	CEC- Community Tour **1:30PM Meet up:** ***Location:*** *EHSCC Annual Meeting Conference Hotel* Baltimore Hyatt Regency, 300 Light Street, Baltimore, MD 21202 **1:40 pm: Depart Baltimore Hyatt Regency** *On buses: Narrate and provide context for tour.*

	2-2:15 pm: BRESCO/WIN WASTE Incinerator *1801 Annapolis Road, Baltimore, MD 21230* Aging municipal waste incinerator, among the largest in the country and single worst air polluter in Baltimore City. Compostable and recyclable material is burned and then the ash is trucked to the Quarantine Road landfill in Curtis Bay, South Baltimore. **2:25–2:40 pm: Mt. Winans Community, South Baltimore, MD***S. Paca St and Atlantic Ave, Baltimore, MD 21230* Uncovered coal rail cars passing by within 70 ft of residents' homes en route to the coal terminal in Curtis Bay. Site also within a mile from the BRESCO / WIN WASTE incinerator.
	Grant Management Policies & Practices **Speaker: James Williams (NIEHS)**
3-3:30 pm	**Science / BA - BREAK**
	(CEC TOUR CONTINUED) **The Heart of Curtis Bay, South Baltimore, MD** **1600 Hazel St Baltimore, MD 21226** The heart of community-led development without displacement in Curtis Bay. A block of community land trust homes and an environmental justice center are under development - turning blighted vacant into community assets. The Curtis Bay Community Recreation Center sits 1,000 ft from open air CSX coal terminal, in between 2 diesel truck routes, and near 70 facilities of concern in and around Curtis Bay.
3:30-5:30 pm	**SS#2 NEW INFORMATIC APPROACHES TO COMMUNITY-BASED EXPOSOME DISCOVERY** **Integration of multi-dimensional environmental exposure data with omics, health, community, social and psychosocial data** **Session Chairs:** **Jessie Buckley, PhD (UNC)** **Anna Young, PhD (Emory)** **3:30-3:50 pm: Stephanie Eick, PhD (Emory)** "Cumulative impacts of chemicals and psychosocial stressors on perinatal health" **3:50-4:10 pm: Tanya Alderete, PhD (JHU)** "Exploring the Influence of Adverse Environmental Exposures on Health Through Multi-Omics Approaches" **4:10-4:30 pm: Max Aung, PhD (USC)** "Applying a translational framework for PFAS exposures and health effects"

	4:30-4:50 pm: Kelly Bakulski, PhD (UMich) **"**Exposome discovery approaches inform mechanistic and targeted Alzheimer's disease research" **4:50-5:10 pm Alison Paquette, PhD (UW)** "Multi-omic data illuminates the placenta's role as a mediator between prenatal EDC exposure and preterm" **5:10-5:30 pm: Panel Discussion**
	(CEC TOUR CONTINUED) **3:45pm – 4:30 pm** **Curtis Bay Medical Waste Incinerator** **3200 Hawkins Point Rd, Baltimore, MD 21226** **Nation's largest medical waste incinerator and former home of the displaced Hawkins Point community.** **4:30-5:00 pm Transport to Reginald Lewis Museum** **5:00PM-6:00pm Post-visit Community Forum Event (tour debrief, recap and closing remarks)** **NOTE: The community forum is designed to provide opportunities for reflection and discussion about the real-world context and disproportionate impacts of community exposome and cumulative risk themes of this year's EHSCC annual meeting.** **Facilitators: Greg Sawtell, Sacoby Wilson, and Chris Heaney (Co-Leads CHARMED CEC).** **Panelists:** **1. Dr. Rick Woychik,** NIEHS Director **2. Dr. Jalonne White-Newsome,** White House Council on Environmental Quality **3. Dr. Leslie Gillespie-Marthaler,** Director, Environmental Justice**,** Community Health & Environmental Review Division, US Environmental Protection Agency (EPA) Mid-Atlantic Region III **4. Aneca Y. Atkinson,** Maryland Department of Environment, Assistant Secretary for Environmental Justice **5. Shashawnda Campbell,** Environmental Justice Director, South Baltimore Community Land Trust **6. Michael Middleton,** Executive Director, South Baltimore 7 Coalition **7. Carlos Sanchez,** Outreach Specialist, South Baltimore Community Land Trust
	Introduce Business Administrators and Centers **Moderator: Alex Galea (JHU)**

6:00-7:30pm	**6:00-7:30 pm Short Walk/Uber** **Social Reception (appetizers/drinks) at Reginald Lewis Museum, Maryland African American History & Culture (https://www.lewismuseum.org)** **Special Exhibit-**BLACK WOMAN GENIUS: Elizabeth Talford Scott—Tapestries of Generations *830 East Pratt Street, Baltimore, MD 21202*

TUESDAY, SEPTEMBER 24, 2024	
ALL	
SCIENCE TRACK: Constellation A/B	
COMMUNITY ENGAGEMENT CORES (CEC): Constellation C/D	
BUSINESS ADMINISTRATION (BA): Chesapeake AB	
7:30-8:15 am	**BREAKFAST - FOYER**
8:15 -9:30 am	**NEW INVESTIGATOR SPOTLIGHT** **Co-leads:** **Marc Weisskopf, PhD (Harvard)** **Martha Susiarjo, PhD (Univ. Rochester)** **8:15-8:30 am: Adam Haber, PhD (Harvard)** "Towards Healthy Homes for All: City-wide Mapping of Asthma Exacerbations for Early Identification of Unhealthy Housing" **8:30-8:45 am: Taehyum Roh, PhD (Texas A&M)** "Burden of Arsenic Exposure in Private Well Users in Rural South Texas: A Community-Engaged Biomonitoring Study" **8:45-9:00 am: Alison Ehrlich, PhD (UC Davis)** "The microbiome regulates intestinal immunotoxicity of aryl hydrocarbon receptor ligands" **9:00-9:15 am: Souvarish Sarkar, PhD (U Rochester)** "Building a Multiplex model to study the interaction among genome and exposome mechanistically: A step towards precision medicine in Parkinsonism." **9:15-9:30 am: Hao Wang, PhD (U Michigan)** "Cadmium exposure induces significant gut dysbiosis before the onset of learning and memory deficits"
	Opportunities and approaches for funding community partners

	Publications Speaker: **Shawn Tucker**
9:30-10:30 am	**SCIENCE & CEC** **#2 SENSORS in the COMMUNITY: THE PROMISES AND THE PITFALLS** **Constellation A/B** The increased availability of high-quality affordable air pollution sensors in the past ten years has changed the landscape of conducting community-based air pollution studies. The ability for communities to collect and own their data for the purpose of addressing environmental justice issues has never been greater. These changes have great potential to elevate community voices and provide meaningful agency. However, as with any rapid technological change, there are also challenges associated with these advances that can burden communities in ways that are not obvious. This session will present a balanced view of both the promise and pitfalls of incorporating affordable air pollution sensors into community-led studies. Panelists: **9:30-9:40 am Peter DeCarlo, PhD (JHU)** **9:40-9:50 am Luz Huntington-Moskos, PhD (UL)** **9:50-10:00 am Gary Adamkiewicz, PhD (Harvard)** **10:00-10:10 am Jen Richmond Bryant, PhD (NC State)** **10:10-10:30 am DISCUSSION**
	Professional Development: Work/Life Balance and Conflict Resolution **Speaker: Alex Galea (JHU) and Rose Branstrom (Univ of Michigan)** **Roundtable Moderator: Rozalyn Paupaw (MSSM)**
10:30-11 am	**BREAK-NETWORKING ESI- MATCH-MAKING**
11am-12:30 pm	**SCIENCE & CEC** **#3: FROM DATA TO DECISIONS: TRANSLATING EVIDENCE FOR IMPACT** **Constellation A/B** Discussion of how science has helped to inform cumulative impacts and Environmental Justice policies. What exposome science/research will be needed moving forward and how must science partner with communities to ensure a just exposome? Highlight fundamental research, data, community engagement, and translation. **Co-chairs:** **Ami Zota, PhD (Columbia)** **Carrie Leach, PhD, MPA (Wayne State)** **11:00-11:12am: Rashmi Joglekar, PhD** (UCSF) “How your science can impact federal policy and decision making” **11:12-11:24 am: Irva Hertz-Picciotto, MPH, PhD** (UCD)

	"Partnerships to Translate Science for Policy and Policy makers: the example of Global Plastics" **11:24-11:36 am: Jeni Hebert-Beirne, PhD, MPH** (UIC) "Evidence to Action: Centering Community Leadership in Chicago's Cumulative Impact Assessment" **11:36-11:48 am: Markus Hilpert, PhD** (Columbia)/**Mychal Johnson** (South Bronx Unite) "Examining and Fighting Traffic-related Air Pollution in the South Bronx: An Academic-Community Partnership Eight Years in the Making" **11:48 am-12 pm: Nicholas Schroeck, JD** (WSU) "Working with lawyers and law clinics to advocate for environmental justice." **12-12:30 pm: Discussion**
	Pilot Programs **Speakers:** **Briannie Orellana** **Theresa Donovan** **Rebecca Ruston**
12:30-1:30 pm	**LUNCH** **(CEC-LUNCH with NIEHS Director Rick Woychik, PhD in Constellation C/D)**
1:30 - 3 pm	**SCIENCE & CEC** **#4 EXPOSOMICS IN CLIMATE CHANGE AND DISASTER RESPONSE RESEARCH WITH AND FOR COMMUNITY** **Constellation A/B** **Co-Chairs: Erin Haynes, DrPH (UK), Trevor Penning, PhD (UPENN)** **CEC-Collaborators: Stacy Stanifer (UK), Nicole Errett (U Washington)** **1:30-1:35pm Opening Remarks, Trevor Penning, PhD** **Community Perspective, *Moderated by Erin Haynes, DrPH*** **1:35-1:45pm Philadelphia flooding, *Brenda Whitfield*,** a wife, mother, resident of Eastwick Community for close to fifty years and the Secretary of Eastwick United Community Development Corporation for the good of the community and organization. **1:45-1:55pm East Palestine Train Derailment**, ***Misti Allison, MPH*,** East Palestine resident and advocate for environmental health

	1:55-2:05pm Baltimore Environmental Justice, ***Carlos Sanchez-Gonzales***, Youth Organizer & Outreach Specialist with The South Baltimore Community Land Trust (SBCLT) **2:05-2:20pm Open Discussion with Audience and Panel** **Panel: Brenda Whifield, Misti Allison, Carlos Sanchez-Gonzales, and Nicole Errett** **Scientific perspective, *Moderated by Trevor Penning, PhD*** **2:20-2:25pm Estimating exposures to disaster responders: The GuLF Study of oil spill cleanup workers, *Lawrence Engel, PhD,*** Professor, University of North Carolina at Chapel Hill **2:25-2:30pm Community-Engaged Climate Change and Health Research with SCORCH, *Joe Hoover*, PhD,** SCORCH P20 Univ. Arizona **2:30-2:35pm A Transdisciplinary Vision for Geo-Exposomics in Community-Engaged, Climate Change-related Exposures, Adaptation, and Health Equity Research, *Rima Habre*, ScD,** Univ. Southern California **2:35-2:50pm** Open Discussion with Audience and Panel: ***Lawrence Engel, Joseph Hoover, Rima Habre, and Stacy Stanifer*** **2:50-2:55pm NIH Climate, Disaster and Data Resources, NIEHS** ***Aubrey Miller*, MD, MPH** Deputy Director, Office of Science Coordination and Planning and Evaluation (SCOPE) Co-Chair NIH CCHI Steering Committee **2:55-3:00pm Natural Hazard and Disaster Reconnaissance (RAPID) Facility, *Joe Wartman,* PhD,** Director and Professor, University of Washington **3:00pm Closing *Erin Haynes***
	Administrator Professional Development: Leadership Skills for Research **Speaker: Mary-Louise Healy (JHU)**
3-3:30 pm	**BREAK**
3:30-5 pm	**SCIENCE & CEC** **#5 WORKING TOWARDS ENVIRONMENTAL HEALTH EQUITY AND ENVIRONMENTAL JUSTICE RESEARCH** **Constellation A/B** **Successes-community engaged research-best practices** **Co-Chairs: Paloma Beamer, PhD (Arizona), Sacoby Wilson, PhD (UMD)**

	3:30-3:50 pm: Anjum Hajat, PhD, MPH, (UW)/Joseph Santana (DRCC) "Participatory research in an environmental justice community: Challenges and lessons learned from the Duwamish Air Improvement Study for Youth (DAISY)" **3:50-4:10 pm: Yoshira Ornelas Van Horne, PhD, (Columbia)** "Buying our way out of pollution: Court settlements as a path to environmental reparations" **4:10-4:30 pm: Tamarra James-Todd, PhD, MPH (Harvard)** "Environmental Reproductive Justice: Strategies for Conducting Solution-Oriented Research" **4:30-4:50 pm: Tamara Raquel Solorzano, MPH (UC Davis)** "Monitoring Environmental Contaminants: Utilizing Silicone Wristbands in the Yurok Tribe" **4:50-5pm Q&A**
	Roundtable Discussions **Discussion examples include Center Collaboration, Marketing, Social media, Tracking Tools, etc.** **Moderator: Rachel Richardson (Arizona)**
5– 6:15 pm	**POSTER SESSION (HAPPY HOUR)** **CONSTELLATION E/F** **Co-Chairs** **Marc Weisskopf, PhD (Harvard)** **Martha Susiarjo, PhD (Univ. Rochester)** **PHOTO SHOOT/NETWORKING**
	DINNER ON YOUR OWN

WEDNESDAY, SEPTEMBER 25, 2024	
ALL	
SCIENCE TRACK: Constellation A/B	
COMMUNITY ENGAGEMENT CORES (CEC): Constellation C/D	
BUSINESS ADMINISTRATION (BA): Chesapeake AB	
7:45-8:30 am	**BREAKFAST – FOYER**
8:30-9:30 am	**NIEHS Staff, Center Directors, CEC DIRECTORS, BA** **Discussion of RPPRs and human subjects reporting and new budgeting procedures (Constellation AB)**

9:30-10:30 am	**CAREER DEVELOPMENT PRESENTATIONS** **Centers share innovative approaches to career development.** **Organizers/Moderators:** **Blanca Himes, PhD (UPenn)** **Nicholas Kenyon, MD, MAS (UC Davis)** **Rebecca Simmons, MD (UPenn)** **9:30-9:35 am: Blanca Himes, PhD (UPenn)** **9:35-9:40 am: Nicholas Kenyon, MD, MAS (UC Davis)** **9:40-9:45 am: Jeremy Sarnat, PhD (HERCULES)** **9:45-9:50 am: David Aylor, PhD (CHHE)** **9:50-9:55 am: Lida Chatzi, PhD, MPH (SCEHSC)** **9:55-10:00 am: Almudena Veiga-Lopez DVM, PhD (CACHET)** **10-10:30am: Moderated discussion**
	Best Practices Sharing I **Co-organizers** **Liam O' Fallon** **Chris Heaney** **Sacoby Wilson**
	NIH Follow-Up and Discussion **Moderator: NIH Team and Administrators**
10:30-11:00 am	**BREAK AND HOTEL CHECKOUT**
11:00am-12:00 pm	**NIEHS DIRECTOR AND CENTER DIRECTORS MEETING** **Rick Woychik, PhD**
	CEC Best Practices Sharing II **Co-organizers** **Liam O'Fallin, PhD** **Chris Heaney, PhD** **Sacoby Wilson, PhD**
	Lessons Learned and 2025 Agenda Planning **Moderator: Alex Galea (JHU)**
12-12:45 pm	**BIAS IN RESEARCH METHODS WORKING GROUP** **C-Chairs: Emily Ho, PhD (Oregon State)** **Diana Rohlman, PhD (Oregon State)** **Workshop**

12:45-1:20 pm	**BOXED LUNCH**
1:20-1:45 pm	**DISCUSSION ON EHP: Joel Kauffman, MD, MPH**
	CEC Session III: Reflection & Summary
1:45-2:45 pm	**SCIENCE & CEC** **ON THE HORIZON: MICROPLASTICS SCIENCE TO GLOBAL POLICY** **Constellation A/B** **Co-Chairs: Matt Campen, PhD (UNM)** **Eliseo Castillo, PhD (UNM)** **1:45-1:55 pm: Eliane El Hayek, PhD (UNM)** "Emerging Plastic Contaminants as an Intensifying Threat to Environmental Justice in Underrepresented Communities" **1:55-2:05 pm: Alex Phelan, JD (JHU)** "Global Plastics Governance for Health" **2:05-2:15 pm: Katrina Korfmacher, PhD (Univ. Rochester)** "Bridging the Silos of Environment and Human Health for Microplastics" **2:15-2:45 pm: Panel Discussion**
2:45-3:00pm	**All-CLOSING REMARKS:** **2025 EHSCC MEETING ANNOUNCEMENT** **Claudia Thompson /Liam O'Fallon Comments** **Closing Remarks** **Marsha Wills-Karp CHARMED** **ADJOURN DEPARTURE**

2024 EHSCC Annual Meeting Abstracts

2024 NIEHS EHSCC Poster Presentations

POSTER #1: Hajera Amatullah: “Diesel exhaust particles and wood smoke particles induce long-term proinflammatory cytokine production *via* epigenetic and metabolic reprogramming of monocytes”

POSTER #2: Matthew A. Aubourg: “Community-driven research to investigate community concerns with exposure to coal dust in Curtis Bay, Maryland, USA”

POSTER #3: Elena Austin: “Mobile Monitoring for Advancing Community Air Quality: Characterizing Disparities and Identifying Sources”

POSTER #4: Roger Chen: “Evaluation of the co-influence of heat index, social vulnerability index, and neighborhood factors on crime rate - a case study of Baltimore City”

POSTER #5: Natalia Duque-Wilckens: “Perinatal exposure to polybrominated flame retardants results in lifelong inhibition of mast cell functions”

POSTER #6: Holly Elser: “Wildfire Smoke Raises Dementia Risk More than Other Pollutants”

POSTER #7: Erica Fuhrmeister. “Bioinformatic tools for assessing health risk of antimicrobial resistance within microbiomes”

POSTER #8: Melissa Furlong: “Prenatal and preconception exposure to pesticide mixtures and ADHD in childhood”

POSTER #9: Lance Hallberg: “The Health Assessment of Residents at Risk of Exposures during a Disaster Event (HARRDE) Texas City Cohort Study”

POSTER #10: C. Claire Hallmark: “From Bench to Bedside: The Bench Tutorials Program for Highschooler”

POSTER #11: Kristi L. Hoffman: “Heavy metal exposure correlates with diet and the gut microbiome in a population at high risk of type 2 diabetes”

POSTER #12: Lupolt, Sara N.: “Assessing Strengths, Stressors and Environmental justice in SoutheaStern (ASSESS) Pennsylvania communities (ASSESS PA): A Mixed Methods Community-Based Participatory Research Approach for Characterizing Cumulative Impacts”

POSTER #13: Elizabeth (Libby) S. McClure: “Community-Engaged Epidemiology and Abolitional Possibility: The case of aluminum worker health”

POSTER #14: Mira Miles: “Household Needs Among Wildfire Survivors in the 2017 Northern California Wildfires”

POSTER #15: Lidia Mínguez-Alarcón: “Male urinary phthalate metabolites and serum metabolic signatures in relation to live birth among couples undergoing in vitro fertilization”

POSTER #16: Lauren S. Richardson: “Assessing endocrine-disrupting compounds and their impact on human placental function and fetal neuroinflammation using organ-on-chip platforms”

POSTER #17: Diana Rohlman: “Wildfire Smoke Exposure During Pregnancy: Consensus-building to co-create a community engaged study”

POSTER #18: Jennifer Runkle: “Intergenerational Impact of Climate Change on Mental Health”

POSTER #19: Blake Rushing: “Metabolomic Signatures in Triple Negative Breast Cancer Reveal Novel Mechanisms of Drug Resistance and Chemosensitization”

POSTER #20: Randolph R. Singh: “Advancing Public Health Research through Unconventional Mass Spectrometry-Based Analysis of Targeted and Nontargeted Compounds”

POSTER #21: Stacy R. Stanifer: “RADAR 2.0: Equipping Rural Communities to Combat Lung Cancer through Innovative Radon Mitigation and Risk Communication Strategies”

POSTER #22: Thornell, E: **“**Residential fungal β-(1,3)-D-glucan exposure correlates with increased pulmonary severity in a cohort of midwestern sarcoidosis patients”

POSTER #23: Vishal Midya: “Dysregulation in fetal metal biodynamics precedes depression and anxiety symptoms in late childhood”

POSTER #24: Xin Wang: “Lead Exposure and Incidence of Alzheimer's Disease and Related Dementias in the United States”

POSTER #25: Ray Yeager: “The association between climate change and cardiovascular disease in the Continental United States”

POSTER #26: Anna S. Young: **“**Mapping the Chemical Exposome in the Ovarian Microenvironment”

POSTER #27: Nathan Young: “Poly- and Perfluoroalkyl Substances are Associated with the Composition of Human Milk”

POSTER #28: Siyu Yu: “Examining factors influencing plan integration for community resilience in six US coastal cities using Hierarchical Linear Modeling”

POSTER #29: Xiang Xue: “Glutathione peroxidase 4 suppresses manganese-dependent oxidative stress to reduce colorectal tumorigenesis”

ABSTRACTS

POSTER #1

Diesel exhaust particles and wood smoke particles induce long-term proinflammatory cytokine production *via* epigenetic and metabolic reprogramming of monocytes

Brianna LaFratta[1], Hajera Amatullah[1,2]

[1]Department of Systems Pharmacology and Translational Therapeutics, Perelman School of Medicine, University of Pennsylvania

[2]Center of Excellence in Environmental Toxicology, Perelman School of Medicine, University of Pennsylvania

Background: Immune memory has been historically attributed as a hallmark of the adaptive immune system; however, increasing evidence demonstrates the existence of memory-like features in innate immune cells like monocytes and macrophages. Innate immune memory is a functional adaptation of cells to an environmental challenge where chromatin and metabolic reprogramming results in altered function upon rechallenge. This memory can confer enhanced (*'training'*) or diminished *('tolerance'*) inflammatory responses to subsequent immune challenges. Many studies have now demonstrated innate immune memory confers protective outcomes in infectious diseases and cancer models but the broader contribution of innate immune memory from environmental factors on allergic and chronic immune diseases like asthma remains to be determined. Our main objective was to investigate the role of innate immune memory of environmental exposures, such as diesel exhaust particles (DEP) and wood smoke particles (WSP), in shaping long-term inflammatory signatures in asthma.

Methods: Primary human monocytes were exposed for 24 hours to vehicle, DEP (5ug/mL) or WSP (5ug/mL). After washing and resting for 6 days, the cells were re-challenged to lipopolysaccharide (LPS, 10ng/mL) and house dust mite (HDM, 10ug/mL). The cells and supernatants were collected for gene and protein expression analysis.

Results: Pre-exposure of human monocytes to DEP and WSP increased mRNA and protein expression of pro-inflammatory cytokines interleukin-6 (IL-6), interleukin-12 (IL-12), and tumor necrosis factor-α (TNF), compared with vehicle controls. In addition, extracellular L-lactate and phospho-p38 levels were increased in DEP and WSP pre-exposed monocytes. Finally, pre-treatment of the monocytes with the histone methyltransferase inhibitor 5'-deoxy-5'methyltho adenosine (MTA) reversed the DEP and WSP-induced long-lasting proinflammatory phenotype.

Discussion: Exposure of DEP and WSP imprints long-term immune memory *via* epigenetic changes in primary human monocytes, resulting in increased proinflammatory cytokine production. Future studies will characterize specific epigenetic signatures underlying this memory and *in vivo* consequences of this memory in mouse models of asthma.

POSTER #2

Community-driven research to investigate community concerns with exposure to coal dust in Curtis Bay, Maryland, USA

Authors: Matthew A. Aubourg[1], Gregory G. Sawtell[2,3], Carlos C. Sanchez-Gonzalez[3], Lauren N. Deanes[1], Bonita Salmeron[1], Christopher D. Heaney[1,4,5]

Affiliations:

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[2]Community of Curtis Bay Association, 1630 Filbert Street, Baltimore, Maryland, 21226, United States [3]South Baltimore Community Land Trust, 10 16th Avenue #19762, Baltimore, Maryland, 21225, United States

[4]Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health, 615 North Wolfe Street, Baltimore, Maryland, 21205, United States

[5]Department of International Health, Johns Hopkins Bloomberg School of Public Health, 615 North Wolfe Street, Baltimore, Maryland, 21205, United States

Abstract:

Background. For decades, residents in South Baltimore, Maryland, USA have raised concerns about the accumulation of and health impacts related to black dust at their homes, which they attribute to the operation of a major open-air coal terminal and uncovered coal rail transportation bordering their communities. Despite these and other reports from communities at the fenceline of coal handling, storage, and transport infrastructure, community-level exposure to coal dust originating from coal handling and storage terminals has remained largely unexplored. A 2021 explosion at the coal terminal in Curtis Bay, South Baltimore, alongside ongoing action to achieve national coverage of coal railcars, intensified community action and research to investigate the presence of coal dust in residential areas.

Methods. Using a community-driven approach and youth participatory environmental health education, we investigated the presence of coal dust in the Curtis Bay community through (1) a neighborhood-level distributed multipollutant air sensor network, (2) statistical approaches for air pollution source apportionment, (3) visual monitoring of activities at the coal terminal, and (4) identification of coal dust in settled dust samples using electron microscopy.

Findings and Conclusions. Consistent with longstanding community concerns and lived experience, these various exposure assessment techniques confirmed the presence of coal dust in the black dust residents observe and, in combination with multi-pollutant air sensor source apportionment data, suggested the neighboring coal terminal could be a contributor of local fugitive coal dust air pollution. These findings will contribute to community organizing and outreach efforts, empowerment of local youth, and regulatory change related to the coal transport, handling, and storage infrastructure in South Baltimore and nationwide.

POSTER #3

Mobile Monitoring for Advancing Community Air Quality: Characterizing Disparities and Identifying Sources

Authors: Elena Austin, Ningrui Liu, Magali Blanco, Timothy Larson, Edmund Seto

Background: Mobile monitoring (MM) methods have significantly advanced our understanding of air pollution, enabling fine-scale exposure assessments and source identification critical for community-based research, epidemiology, and intervention evaluations. Our integrated case study leverages MM to address disparities in traffic-related air pollution (TRAP) exposure and to pinpoint fine-scale spatial distributions of emission sources in urban environments.
Methods: This case study leverages two distinct MM campaigns conducted in Seattle, WA, from 2019-2023. These MM campaigns had two purposes: characterizing source impacts on vulnerable communities and developing robust annual estimates of exposure for use in epidemiological investigations. In total, we collected data at over 330 distinct sites, with an average of 28 visits at each site. Specific focus was given to 14 schools with varied proximity to major pollution sources, including highways, flight paths, and industrial sites. Measures collected across these campaigns included size-fractioned UFP concentrations, Black Carbon, PM2.5, and gaseous pollutants such as NO2 and CO.
Results: The results highlighted significant disparities in UFP exposure and particle size distributions. Schools serving higher proportions of Black and Hispanic students or those from lower socio-economic backgrounds were found to be disproportionately closer to major pollution sources. Positive Matrix Factorization (PMF) was used to identify six key emission sources across our study area: aviation, diesel trucks, gasoline cars, oil and wood combustion, and secondary vehicle emissions. This approach not only characterized source-specific contributions but also estimated fuel-based emission factors for traffic-related sources, enhancing our understanding of urban air pollution dynamics.
Discussion: By integrating findings across MM studies, our work highlights the importance of mobile monitoring in capturing fine-spatial environmental inequalities and detailed source-specific pollution profiles. These insights are crucial to better quantifying local exposure disparities, allowing for both epidemiological studies linking specific pollutants to health outcomes and quantifiable estimates of the exposure impacts of emission reduction interventions. This research aligns with NIH and NIEHS priorities, supporting efforts to address health disparities and environmental justice through precision exposure assessment approaches.

POSTER #4

EVALUATION OF THE CO-INFLUENCE OF HEAT INDEX, SOCIAL VULNERABILITY INDEX, AND NEIGHBORHOOD FACTORS ON CRIME RATE - A CASE STUDY OF BALTIMORE CITY

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Abstract
This study investigates the relationship between heat index (HI), socioeconomic vulnerability, and violent crime rates in Baltimore from 2016 to 2022 through a comprehensive analysis using zero-inflated Poisson regression and integral nested Laplace approximation (INLA). relationship between. It establishes significant correlations between crime rates and factors such as unemployment, educational attainment, and social vulnerability. An important finding is the mitigating effect of urban greening on crime, evidenced by the negative correlation between the availability of green space and crime occurrence (RR = 0.656). The spatio-temporal analysis highlighted significant clustering of crime events, indicating the potential for cross-community spillover effects. Although HI is positively associated with crime rates (RR = 1.007 in 2016), its impact is largely masked by the socioeconomic conditions of the city (RR = 4.243 in 2016). During the 2020-2022 COVID pandemic, the impact of HI even showed the opposite correlation (RR= 0.995 in 2020). Even so, the study assumes that, as a public health intervention, reducing HI to the lowest observed level, the estimated number of avoidable crime incidents by 2022 is approximately 6.35 [-6.84 - 19.8]. The city's cooling appears to be minimal. However, even small numbers of preventable crimes, especially those that result in death, highlight the significant value of such interventions.
Keywords: Heat index, socioeconomic vulnerability, violent crimes, Baltimore, zero-inflated Poisson regression, Integrated Nested Laplace Approximation, spatio-temporal analysis, public health intervention.

POSTER #5

Perinatal exposure to polybrominated flame retardants results in lifelong inhibition of mast cell functions.

Natalia Duque-Wilckens lab, Department of Biological Sciences, North Carolina State University

Growing evidence suggests that perinatal exposure to polybrominated diphenyl ethers (PBDEs)—flame retardants banned since the mid-2000s yet still prevalent in the environment and human tissues—increases the risk of developing disorders such as heightened susceptibility to infections, metabolic disturbances, and anxiety. The underlying mechanisms, however, remain unclear. We hypothesized that mast cells (MCs), innate immune cells found throughout all tissues, play a fundamental role. MCs are crucial for numerous physiological processes— including the orchestration of immune responses, fat tissue metabolism, and modulation of behavior—and they can be permanently altered by early life stressors. To explore this hypothesis, we administered female mice marshmallows containing either a vehicle or two human-relevant doses of PBDEs throughout pregnancy and lactation, and subsequently evaluated MC-related responses in their adult offspring. Compared to vehicle, perinatal PBDE increased anxiety-like behaviors and body fat percentage, replicating previous findings. Crucially, it also blunted in vivo allergen-induced hypothermia and histamine release, as well as the expected hypothermic responses to high doses of lipopolysaccharide injections—both of which are MC-dependent. Voltammetry experiments further showed that perinatal PBDE reduced the stimulus-induced release of mediators in isolated peritoneal MCs. To assess whether these effects were mediated by changes at the progenitor level vs. the tissue environment, we next isolated bone marrow and derived MCs in vitro (BMMCs). We found that BMMCs derived from adult mice exposed to PBDE during the perinatal period showed reduced baseline content of β-hexosaminidase and stimulus- induced calcium mobilization, suggesting decreased vesicle content and sensitivity, respectively. These results, combined with previous findings that MC knockout mice exhibit impaired immune responses and increased anxiety compared to wild types, suggest that lifelong MC inhibition could be crucial in mediating perinatal PBDE-induced susceptibilities. Current studies are investigating whether injecting BMMCs derived from healthy mice into PBDE-exposed animals can reverse these effects.

POSTER #6

Wildfire Smoke Raises Dementia Risk More than Other Pollutants
Holly Elser

Exposure to wildfire smoke increases the odds of being diagnosed with dementia even more than exposure to other forms of air pollution, according to a landmark study of more than 1.2 million Californians. The study is the largest and most comprehensive review of the impact of wildfire smoke on brain health to date. The findings have big health implications, particularly in Western states, where wildfires grow larger and more intense due to climate change, said study author **Holly Elser, MD, PhD**, a resident in the department of Neurology.

Los Angeles Times • Medscape • CNN • The Guardian • FOX News • Neurology Live • CBS Sacramento • Bloomberg • Medpage Today

POSTER #7

Bioinformatic tools for assessing health risk of antimicrobial resistance within microbiomes

Erica Fuhrmeister, Assistant Professor, University of Washington

Background: The proliferation of antimicrobial resistance (AMR) is one of the grand challenges of today. Many studies measuring environmental exposures of resistance rely on culture-based methods but not all organisms can be cultured. Metagenomic sequencing is a promising tool to investigate thousands of ARGs at the same time. One of the challenges with effectively using metagenomic data to study AMR is the lack of ability to apply findings to human health. In this study, we developed bioinformatic methods to classify the resistome (collection of all antibiotic resistance elements)-related risk posed to human health.

Methods: We downloaded publicly available pathogen genomes and identified antibiotic resistance genes and mobile elements on plasmids and chromosomes using bioinformatic methods. Based on identified antimicrobial resistance elements in pathogens, we applied a framework for classifying the risk in metagenomes. The highest risk classification was given to ARGs commonly found in pathogens that contribute to clinically resistant infections and were present with mobile elements (transposon, integron etc.). Our risk classification was then applied to gut metagenomes from mothers and children in northwest Ecuador.

Results: Using our risk score, the risk was highest at 1 week and lowest in mothers with a statistically significant decrease over time (Kruskal-Wallis $p<0.001$). Our metric was compared to a conventional approach where the abundance of ARGs was similar in children at all ages and lowest in mothers (Kruskal-Wallis $p<0.001$).

Discussions: The antimicrobial risk was highest in children at 1 week, likely due to the presence of enteric bacteria. This presentation will also include a community engagement component on AMR education in Grade 9-12 science classes in WA State. Through instructor surveys, we identified a key element lacking in existing AMR lessons is a compelling context that engages students in the topic.

POSTER #8

Prenatal and preconception exposure to pesticide mixtures and ADHD in childhood

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BACKGROUND: Prenatal exposure to organophosphate (OP), pyrethroid, and carbamate pesticides have been associated with ADHD behaviors in the United States, while studies of OPs in Europe have reported null associations. Exposure metrics are limited to class biomarkers rather than specific pesticides, and studies of mixture effects are limited. Here, we evaluate associations of pre-conception and prenatal exposure to mixtures of specific pesticides with ADHD

METHODS: We linked 2008-2016 Arizona Medicaid records to birth certificates and the Arizona Pesticide Use Registry, and used a validated algorithm to identify 36,229 children with ADHD and 993,169 controls. We defined exposure as living within 500 meters of a pesticide application during a 90-day pre-conception window, each trimester, and across the entire pre-conception/pregnancy window. We used logistic regression, and hierarchical Bayesian Kernel Machine Probit Regression (BKMPR), controlling for sex, birth year, race/ethnicity, marital status, county, education, season, and any pesticide exposure. RESULTS: In frequentist single models of any prenatal exposure, two OPs (chlorpyrifos and bensulide), two pyrethroids (zeta-cypermethrin and cyfluthrin), one carbamate (oxamyl), and carbamates as a class were positively associated with ADHD. In trimester-specific frequentist models, oxydemeton-methyl during pre-conception (OR 2.86, 95% CI 1.74, 4.72), and acephate during the second trimester (OR 1.39, 95% CI 1.17, 1.64), were associated with ADHD. In hierarchical BKMPR models for all of pregnancy, oxydemeton-methyl, zeta-cypermethrin, acephate, and cyfluthrin were associated with ADHD. All four of these pesticides are banned in the EU. The BKMPR posterior inclusion probabilities (PIPs) for the classes were all >0.5, with OPs the highest (1.0), then pyrethroids (0.82), then carbamates (0.58).

DISCUSSION: BKMPR allowed us to account for correlations among pesticides and identified four specific pesticides that may be associated with ADHD. These pesticides are banned in the EU and may explain discrepancies in US and European findings.

POSTER #9

The Health Assessment of Residents at Risk of Exposures during a Disaster Event (HARRDE) Texas City Cohort Study

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Background
Increased concerns regarding public health disasters have spurred governmental agencies to prioritize public health emergency preparedness to improve public health and medical responses. Texas City is a port city located on the Gulf of Mexico that contains petroleum-refining and petrochemical-manufacturing facilities. As a result, this region is especially vulnerable to both natural disasters, such as hurricanes and floods, and industrial accidents, such as oil spills and explosions.

Objectives/Goals
The objective of this study is to establish protocols for the development of a registry to answer questions about the health effects that might be caused by exposures in the event of a natural or manmade disaster. This study created a database of baseline biomarkers for local populations at risk for environmental disasters to better understand the short and long-term health impacts and to facilitate responses to these disasters.

Methods
This was a prospective cohort study surveying people in Texas City, TX to establish baseline biometric data. Demographic data including occupational and environmental exposures was gathered via an intake survey. Biometric data including body mass index, blood pressure, spirometry, pulse oximetry, and visual acuity was collected and measured three times each to account for any variance in readings. Hair, saliva and cheek cells, urine, and blood samples were collected to conduct laboratory analyses for additional data. A full physical exam was conducted to validate any symptoms identified on the intake survey.

Results

We created a registry of 69 participants, collected a vast array of biological samples, and gathered comprehensive health data across three consecutive days. Participants were recruited by phone or through UTMB daily announcements within 2-weeks of the study start date. Upon completion, the study yielded 497 primary specimens and a total of 4,419 available specimens.

Discussion/Significance of Impact
Once baseline biometric data is established for this population, local public health departments can monitor any changes that occur secondary to environmental disasters to better understand the implications on vulnerable populations. In the future, observed trends can be used to create more effective public health responses to disasters to improve outcomes for these populations. This study is limited by the small subsection of Texas City residents who were able to attend the biometric screening

sessions. Additional studies need to be conducted with an increased scope and larger demographic and geographic variety to establish a more comprehensive biometric database.

Future Impact

The data in this study will be reported in a database for baseline biometric data for local populations, which can then be utilized in responses to future environmental health disasters. All collected biological specimens will be preserved in a biorepository for later use in the event of a natural or manmade disaster.

POSTER #10

From Bench to Bedside: The Bench Tutorials Program for Highschoolers

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Background:

The Bench Tutorials Program, established in 1997, is a renowned advanced biomedical training program for qualified Galveston Independent School District (GISD) high school students. Participants spend a year working alongside scientists at Center and UTMB laboratories, earning full Texas Education Agency credit.

Due to recent changes in the UT System regarding youth employment regulations, the Bench Tutorials program in collaboration with Ball High School (BHS) was temporarily suspended in 2022. To address this, the program partnered with Baylor College of Medicine's Biotechnology Research Incubator for Teachers (BCM-BRITE) 2024 summer intensive program.

Objectives/Goals:

To provide dedicated and academically talented high school students the unique opportunity to participate in cutting-edge scientific research. This program is geared towards high school students who are considering future studies in scientific research and allows them to gain experience in a rigorous program that closely mirrors graduate education. The Bench program pairs high school students with a UTMB graduate student or post-doctoral fellow with guidance from a faculty advisor based on the student's scientific interests.

Methods:

The Bench Tutorials course is open to all Ball High students. Each student is paired with a UTMB graduate or postdoctoral student mentor based on their scientific interests. BHS students dedicate at least four hours per week to supervised instruction and research, totaling approximately 40 hours per semester. The course is a rigorous 5.0-credit course modeled after college-level coursework, with regular meetings between students and their mentors for lab work. Successful completion of the course, including participation in the end-of-year symposium, is considered an advanced measurement. Students are required to present their research twice a year at symposiums.

Results/Anticipated Results:

The Bench Program remains the model advanced biomedical training program for qualified GISD high school students. Since its inception, it has successfully enrolled over 480 high school and UTMB students, many of whom have pursued science-related fields in college. This upcoming academic year,

we anticipate enrolling approximately 25 students in the program,based on the 19 mentor applications we've received.

The BCM-BRITE program is a valuable resource for empowering secondary school teachers to cultivate the next generation of critical thinkers and problem solvers. Given the program's hiatus, UTMB partnered with BCM-BRITE to offer BHS teachers the opportunity to participate this summer and help build curricula for the Bench program.

Discussion/Significance of Impact:

The Bench Program offers students a unique opportunity to collaborate closely with UTMB's renowned research scientists. This rigorous program provides high school students considering scientific research careers with valuable hands-on experience that closely resembles graduate- level studies. The program's demanding nature requires students to effectively manage their time between schoolwork, extracurricular activities, and lab hours. Additionally, students must demonstrate a strong capacity for independent learning in the field of scientific research.

Future Impact:

The Bench Program is actively collaborating with UTMB Visiting Education Programs for Minors to ensure compliance with all relevant labor regulations. These efforts have paved the way for the program's reinstatement for the upcoming academic year.

POSTER #11

Heavy metal exposure correlates with diet and the gut microbiome in a population at high risk of type 2 diabetes.

Grace O. Adeniyi-Ipadeola, Margaret C. Weiss, Brian P. Jackson, Robert M. Sargis, Craig L. Hanis, & Kristi L. Hoffman

Background: Toxic and essential metal/metalloids (hereafter "metals") modulate cardiometabolic disease risk, with toxic metal exposures disproportionately impacting communities of color. Recent data from Starr County, TX, found higher urinary concentrations of arsenic, molybdenum, and copper linked to poorer pancreatic function and insulin sensitivity, suggesting these metals may alter diabetes risk in this majority Mexican-American population. Toxic metal exposure is also associated with dysbiosis of the gut microbiome—itself a predictor of type 2 diabetes. Here, we investigated relationships among toxic and essential metals, diet, and the gut microbiota in the Starr County Prevention Microbiome Study, a prospective study following individuals for incident diabetes/hyperglycemia.

Methods: Using biospecimens collected at baseline, we performed 16Sv4 rDNA sequencing of stool samples to profile the gut microbiota in 586 adults. Metal exposure was determined by ICP-mass spectrometry of spot urine samples, and dietary intake was assessed by a food frequency questionnaire validated in this population.

Results: We observed significant differences in gut microbiome diversity and composition by concentration quantiles of select metals, including cesium, cobalt, aluminum, and arsenic. Urinary metal concentrations were also linked to diet, with some metals positively correlated to healthy dietary components like fruit or vegetable consumption (e.g., arsenic and cesium), while others were associated with markers of poor diet quality (e.g., copper and added sugar intake). Finally, as expected, healthier dietary patterns were associated with increased microbial diversity and the abundance of beneficial bacteria. Our ongoing studies will determine if specific diet and metal-associated microbiome profiles predict development of diabetes/hyperglycemia and whether these relationships are mirrored in microbiota at distant mucosal sites.

Discussion: Our preliminary data highlight the gut microbiome as a potential modulator of metal exposures and lay the foundation for future mechanistic insights on the relationship between environmental toxicant exposure and diabetes risk.

POSTER #12

Assessing Strengths, Stressors and Environmental justice in SoutheaStern (ASSESS) Pennsylvania communities (ASSESS PA): A Mixed Methods Community-Based Participatory Research Approach for Characterizing Cumulative Impacts

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Community organizers in Southern Delaware County, PA expressed a desire to characterize the cumulative burden of environmental, health, and social conditions in their neighborhoods to inform subsequent efforts to protect public health. To address this need, our team of academic and community co-investigators, in a collaborative, mixed-methods effort, developed and implemented an online community health survey and conducted focus groups to characterize residents' health concerns and the strengths, burdens, and needs of fenceline communities in Southern Delaware County. Between June 2023 and February 2024, 143 residents responded to the community health survey, and 22 residents participated in focus groups (n=6). The survey included questions on chemical exposures, sources of pollution, financial stressors, healthcare, medical conditions, and priorities for policymakers. The focus group discussions were built on survey responses to probe deeper into key physical, mental, and environmental health concerns and priorities. We collaboratively analyzed survey results quantitatively (e.g., descriptive statistics, Mann-Whitney U tests to examine potential differences by factors such as race/ethnicity) and focus group transcripts using a framework approach (e.g., inductive and deductive coding). Focus group participants identified intersecting environmental stressors (e.g., noise, air quality) and overarching inequities in their community. Key findings from the survey and focus groups underscore the importance of expanding health consideration beyond clinical disease endpoints to include health symptoms (e.g., nosebleeds), well-being, and quality of life factors (e.g., observation of odors). Our work demonstrates that cumulative impact assessments using CBPR methods are key to identifying and addressing the full range of community concerns.

POSTER #13

Community-Engaged Epidemiology and Abolitional Possibility: The case of aluminum worker health

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Background
This collaborative project addresses the possibilities and limits of occupational epidemiology in supporting struggles for environmental justice through a case study of aluminium smelting. We focus on illness and toxic exposure among Black workers and their families in Badin, North Carolina, a primary aluminum smelting plant site for Alcoa, in operation from 1915 to 2007.

Methods
We conducted two quantitative analyses—one documenting disparities in work exposure trajectories, and one comparing mortality rates among workers to those in the general population. Supplementing these conventional epidemiological methods, we developed a third approach in collaboration with community members: an open-ended household survey designed to gather qualitative data regarding former workers' job histories, medical histories, and concerns related to toxic exposures and discrimination at the smelting plant. This approach was conceived in response to residents' questions about disparate health outcomes of toxic exposure in the workplace.

Results
The current occupational epidemiology literature published about aluminum smelting does not reflect concerns voiced by community collaborators regarding the extent of harm caused by occupational exposure to toxins, nor does it include analyses of race or gender disparities due to discriminate labor divisions.

Discussion
We argue that despite the discipline's history of efforts to address health inequities, published epidemiology literature on aluminium smelting functions as a white methodology in collusion with racial capitalism. We illustrate how such a method may both broaden the scientific knowledge base and support organizing towards developing an abolitional approach to epidemiology.

POSTER #14

Household Needs Among Wildfire Survivors in the 2017 Northern California Wildfires

Authors: Mitchell Snyder, Mira Miles, Irva Hertz-Picciotto, Kathryn Conlon

Abstract:
Wildfires are impacting communities globally, with California wildfires often breaking records of size and destructiveness. Knowing how communities are affected by these wildfires is vital to understanding recovery. A household survey was made publicly available for communities affected by the October 2017 Northern California wildfires approximately four to nine months post-fire, which asked an adult household member to report on their households' greatest need both: one week post-fire and at the time of survey. A total of 1,461 households responded to these questions. Households reported many types of needs, including responses that did not directly name needs but rather described how their households had been affected, which we classified as impacts. Reported needs were defined as physical or psychological requirements for a person's wellbeing, and impacts, as the physical or psychological effects on a person's wellbeing. Two coders established reliability and identified four major themes for needs: Physical, Health, Air, and Information, each representing an array of more specific needs or impacts. Physical needs (e.g. housing, food) were the most common (cited by more than 50% during the fires and about a third at the time of survey). The need for clean air was strong during the fires, but not months later, at the time of survey. In contrast, health needs were reported by one in four households during the fires and mental health needs were more prevalent at the time of the survey than during the fires. Understanding the needs and impacts that arise during wildfires, their diversity and duration, and how they change over time is crucial to identifying types of assistance that are most needed during recovery efforts and when they are needed. We discuss the value of identifying these impacts and needs in support of preventive and responsive recovery support for wildfire survivor communities.

POSTER #15

Male urinary phthalate metabolites and serum metabolic signatures in relation to live birth among couples undergoing in vitro fertilization

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Abstract

Background: Phthalate exposure in men and women is ubiquitous and has been linked to reduced fertility. We have previously demonstrated associations between male exposure to selected phthalates and poorer reproductive outcomes among couples attending a fertility center. However, the potential biological mechanisms explaining these associations remain unclear.

Methods: We evaluated 115 couples undergoing in vitro fertilization and participating in the Environment and Reproductive Health (EARTH) Study (2004-2017). During the monitoring phase of controlled ovarian stimulation, men provided a serum and urine sample on the same day. The serum was analyzed for metabolomics using liquid chromatography coupled with high-resolution mass spectrometry and two chromatography columns. The urine sample was analyzed for 11 phthalate metabolites using targeted approaches. Couples were then prospectively followed to ascertain various IVF outcomes. We used multivariable generalized linear models to identified serum metabolic features associated with urinary phthalate metabolite concentrations and live birth, followed by enriched pathway analysis. We then used a meet-in-the-middle approach to identify overlapping pathways and features.

Results: Pathway enrichment analysis revealed 50 pathways in the C18 column and 28 pathways in the HILIC column that were significantly associated with at least one of the 11 urinary phthalate metabolites or molar sum of di-2-ethylhexyl phthalate metabolites. Overall, we observed that phthalate metabolites were mostly associated with pathways involved in lipid, amino acid, carbohydrate and vitamin metabolisms among these men. Two overlapping metabolites were confirmed with level-1 or level-2 evidence. Serum lauroylcarnitine and sucrose were negatively and positively associated with urinary MEHP and MEP concentrations, respectively, and both were positively associated with the probability of live birth.

Discussion: Our study provides further insight into the serum metabolites and metabolomics pathways that may underlie the observed negative associations between male phthalate exposures and clinical fertility endpoints such as IVF success rates.

POSTER #16

Assessing endocrine-disrupting compounds and their impact on human placental function and fetal neuroinflammation using organ-on-chip platforms

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Background: The placenta provides xenobiotic/toxicant protection and nutrient transport during pregnancy. However, low levels of toxicants, toxicant-derived metabolites, or endocrine factors can cross the placenta, reach the fetus, and potentially induce neuroinflammation. The adverse effects of endocrine-disrupting compounds (EDCs) (flame retardants; polybrominated diphenyl ethers [PBDE]-47/-99) on placenta function and its downstream effects on fetal neuroinflammation are missing due to limitations in human *in-vitro* models. Here, we evaluated the physiologically disrupting mechanisms of EDCs using a 2nd-trimester placenta villous organ-on-chip (2TPLA-OOC) and a fetal blood-brain-barrier organ-on-chip (FB-OOC).

Methods: The 2TPLA-OOC mimics the placental villous connected to the maternal/fetal vasculature utilizing human immortalized gestational cells (placental vessel endothelium, decidua, cytotrophoblasts, syncytiotrophoblasts, placenta stroma with macrophages, fetal endothelium, fetal circulation). PBDE-47/-99 (150 ng/mL; 50:50 ratio) or control media was added to the placenta vessel. The effects on placental cells' antioxidant capacity, cytokine/hormone production, and glucose transport were evaluated after 3-days. FB-OOC is comprised of human brain microvessel endothelium, vascular pericytes, and a triculture of neurons:astrocytes:microglia (5:2:1). Direct PBDE treatment or supernatant from the fetal circulatory chamber of the PBDE+2TPLA-OOC was added to the FB-OOC endothelium. Glial activation, cell cytotoxicity, and pro-inflammatory cytokines were determined after 3-days.

Results: Placental and FB cells maintained respective morphology, cell-specific markers, secreted endocrine factors (β-hCG, progesterone, prolactin, VEGF, and glutamate), and viability. PBDE suppressed antioxidant capacity and β-hCG, progesterone, and prolactin production in maternal and fetal cell types. Treatment induced a maternal pro-inflammatory but a fetal anti-inflammatory response. Localized placenta dysfunction did not affect glucose transport compared to controls. Within the FB-OOC, PBDE and PBDE+2TPLA-OOC supernatant treatment induced endothelium cytotoxicity and significant upregulation of neuronal glutamate, but not neuroinflammation.

Discussion: EDCs in maternal biological compartments associated with adverse pregnancy outcomes neither disrupt placental function nor induce fetal neuroinflammation. However, PBDE-induced glutamate dysregulation at the FB needs further evaluation.

POSTER #17

Wildfire Smoke Exposure During Pregnancy: Consensus-building to co-create a community engaged study

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Background: Relative to Oregon, Klamath County experiences worse air quality due to wildfire smoke. Further, residents experience increased rates of infant mortality and low birthweight. Klamath County Public Health (KCPH) raised concerns that wildfire smoke is a contributor to poor infant health. In response, a multidisciplinary team was formed to develop and test a community-engaged research (CEnR) pilot project. The goal was to capture community and individual-level exposures to wildfire smoke contaminants, paired with perinatal health outcomes.

Methods: Through partnerships and outreach we identified 24 individuals, representing 13 academic, public health, and community organizations that met five times over three months to develop a study design. We quickly identified challenges when merging disciplines that included toxicology, perinatal health, public health, community engagement, air quality, and chemistry.

Results: To address these challenges, we facilitated structured meetings, tailored surveys, and iterative feedback, thereby building consensus on a study design to capture exposure and health information from pregnant individuals experiencing wildfire smoke. In a relatively short time, our approach enabled us to integrate diverse knowledge and perspectives into a scientific design that was aligned with KCPH's interests and appropriate for the study population. Our design included the use of environmental, residential, and personal samplers, combined with health surveys with a small cohort of pregnant individuals during wildfire season.

Discussion: Throughout, our community partners and KCPH reviewed and approved all proposed activities to ensure community voice was reflected throughout the process. The resultant study was trialed in Klamath County, with KCPH.

POSTER #18

Intergenerational Impact of Climate Change on Mental Health

Compared to past generations, current and future generations will be exposed to more frequent climate-induced extreme weather events, including but not limited to heatwaves, flooding, and wildfire events. Today, a child born in 2020 is expected to experience a 4-to-7-fold increase in extreme events over their lifetime compared to a child born in 1960. Emerging epidemiologic evidence has linked preconception and early childhood exposure to extreme climate events with significant mental health consequences. These mental health impacts include increased risks of anxiety, depression, PTSD, and other stress-related disorders in mothers and their children. The psychological stress from experiencing or anticipating extreme weather events, such as hurricanes, floods, and heatwaves, can exacerbate existing mental health conditions or contribute to the development of new ones. For example, our research has shown that pregnant women exposed to extreme heat or flooding stressors may experience heightened levels of anxiety and depression, which can affect fetal development and lead to longer-term mental health concerns in children. Children exposed to these extreme events early in life are also at risk of developing a mental health condition. The objective of this study is to examine the specific periods (prenatal, infancy, childhood, adolescence) during the life course when individuals are more vulnerable to the mental health effects of climate change-related exposures (extreme heat, flooding, wildfires). Results will fill a critical gap in understanding how early life exposure to climate threats shape mental health risks in youth.

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POSTER #19

Metabolomic Signatures in Triple Negative Breast Cancer Reveal Novel Mechanisms of Drug Resistance and Chemosensitization

Rushing, Blake

Triple-negative breast cancer (TNBC) is a highly aggressive cancer subtype characterized by limited treatment options and the frequent development of drug resistance. This study investigated the metabolic adaptations associated with doxorubicin resistance in TNBC and explores the potential of dietary compounds as chemosensitizers to enhance treatment efficacy. We generated doxorubicin-resistant TNBC cell lines and characterized them using untargeted metabolomics. Through this, we identified significant alterations in key metabolic pathways between sensitive and resistant cells, including arginine and proline metabolism, glutathione metabolism, and beta-alanine metabolism. The resistant cell lines also exhibited notable changes in acylcarnitine metabolism, with decreases in short- and medium-chain acylcarnitines and increases in long-chain acylcarnitines compared to the parental cell line. Matched normal and malignant tissues from 37 TNBC patients were then analyzed by untargeted and targeted metabolomics to determine if these metabolic signatures could be replicated in patient samples. Analyses revealed that elevation of long chain acylcarnitines were prominent metabolic features of malignant tissues compared to normal breast tissue, particularly those from patients that responded poorly to chemotherapies. We then investigated the effects of polyphenols and omega-3 polyunsaturated fatty acids (PUFAs) that are known to chemosensitize TNBC cells towards chemotherapeutic agents to determine if sensitizing agents target metabolic pathways that define resistant TNBC. We found that different chemosensitizing compounds targeted different metabolic pathways including one-carbon metabolism, glutamine metabolism, and acylcarnitines. This diversity of metabolic targets of chemosensitizers suggest that they could be combined to target complementary metabolic processes to further enhance chemotherapeutic efficacy and reverse multi-drug resistance in TNBC. Overall, this study provides critical insights into the metabolic reprogramming associated with drug resistance in TNBC and highlights the potential of dietary polyphenols and omega-3 PUFAs as effective chemosensitizers. These findings also demonstrate the utility of using metabolic signatures to stratify tumors based on drug response or other significant clinical features.

POSTER #20

Advancing Public Health Research through Unconventional Mass Spectrometry-Based Analysis of Targeted and Nontargeted Compounds

Presenter: Randolph R. Singh (Assistant Professor of Environmental Health Sciences, Mailman School of Public Health, Columbia University)

Background: High resolution mass spectrometry (HRMS)-based non-target analysis is gaining momentum due to its ability to provide information which can be useful in the identification of unknown organic chemicals in different types of matrices. This approach allows us to study the relationship between exposure to chemical mixtures and human disease and supports efforts in unraveling the complexity of the chemical exposome. The chemical exposome covers the diverse chemical exposures people experience throughout the life course as we interact with our environment. However, conventional gas chromatography (GC) coupled with HRMS, typically used for the detection of bioaccumulative chemicals, suffers from several challenges like in-source fragmentation and the uncertainty of observing the mass of the intact molecule.
Methods: To overcome these challenges and facilitate the identification of unknown bioaccumulative chemicals we employed GC separation coupled with a time-of-flight mass spectrometer equipped with ion mobility spectrometry and an atmospheric pressure chemical ionization (APCI) source instead of using conventional electron ionization. The amenability of the method for exposomics was tested on French bivalves (oysters and mussels) collected from 25 different locations by looking for polyhalogenated chemicals and polycyclic aromatic hydrocarbons (PAHs).

Results and Discussion: Using open cheminformatic tools we exploited isotopologue patterns, isotope ratios, Kendrick mass defect (Cl scale), and collisional cross section (CCS), in order to annotate 157 halogenated features (confidence level: number of features, level 1: 54, level 2: 47, level 3: 50, and level 4: 6). Grouping the features into 11 compound classes was facilitated by a KMD vs CCS plot which showed co-clustering of potentially structurally-related compounds. Different types of PAHs, in addition to those prescribed for monitoring by the US EPA, were detected and in several cases can be directly linked to emissions from oil refineries and forest fires.

POSTER #21

RADAR 2.0: Equipping Rural Communities to Combat Lung Cancer through Innovative Radon Mitigation and Risk Communication Strategies

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Each year in the U.S., there are over 220,000 new cases of lung cancer, and Kentucky (KY) leads the nation in this environmentally-induced disease. Nationally, lung cancer is the leading cause of cancer mortality, yet the disease remains highly preventable by eliminating exposure to tobacco smoke and radon. KY's high radon potential and high smoking rates create the perfect storm for the overrepresentation of lung cancer cases. As rural communities lead the nation in lung cancer incidence and mortality, there is urgency to lower radon exposure in rural areas. *Radon on the RADAR (Residents Acting to Detect and Alleviate Radon) 1.0* (PI-Hahn; R01 ES030380) sought to increase access to home radon testing and affordable radon mitigation in rural communities using a geohealth methodology applying a citizen science approach. The study identified and trained community residents of four rural Kentucky counties to test for radon and increase radon awareness within their community. Citizen scientists helped design and market a public library lending program and form radon coalitions in their communities. Home radon testing increased 150% after the lending program was implemented in the four study counties. Despite the increase in testing*, RADAR 1.0* has uncovered disparities in access to and affordability of radon mitigation, and low testing and mitigation rates despite access to radon detectors in public libraries, and geologic impacts on home radon exposure that warrant further investigation to reduce exposure to the deadly gas in rural areas. To address these disparities, *RADAR 2.0* seeks to strengthen partnerships with citizen scientists, public libraries, and local radon coalitions to increase access to affordable radon mitigation, develop effective radon risk communication messaging, automate report-back using a novel website platform, and translate geologic and residential data to builders and policymakers to educate and inform radon resistant new construction policy.

POSTER #22

Residential fungal β-(1,3)-D-glucan exposure correlates with increased pulmonary severity in a cohort of midwestern sarcoidosis patients.

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ABSTRACT
Background: Sarcoidosis is a systemic granulomatous inflammatory disease typically affecting the lungs. Presentation can range from mild resolving disease to severe end-stage progressive organ (heart/lung) fibrotic disease. While genetics increases disease risk, environmental antigens have long been suggested to play a role in incidence and outcomes. Pulmonary-specific disease risk, for example, is increased in people exposed to organic aerosol. **Methods:** Two-week residential sampling was carried out using electrostatic dust collectors (EDC) to collect residential fungal and bacterial cell wall material, assessed by Glucatell® (β-(1,3)-D-glucan, BDG), and kinetic chromogenic Limulus amebocyte lysate assay (endotoxin); participants with pulmonary sarcoidosis, n=59; participants without sarcoidosis, n=25. Sarcoidosis pulmonary severity was assessed by clinical pre-bronchodilator lung function, and significant fibrosis by clinical chest CT. Serum biomarkers were assessed by multiplex (Luminex xMAP). Surveys were deployed to determine bioaerosol source and disease severity risk-factors. **Results:** Residential bioaerosol concentrations were significantly greater in homes of participants with sarcoidosis than controls. Disease severity (Wasfi score, visual analogue scale) was greater in participants with significant pulmonary fibrosis (identified by chest CT). Lung function was also decreased in these participants. Because participants with fibrosis were more likely to own houseplants, we compared lung function to number of plants owned, and found an inverse association for % predicted FVC and FEV_1 and plant number (p=0.05, p=0.02). Residential BDG inversely correlated with FVC in patients with fibrosis, but not in those without (p=0.02 vs. p=0.82). Eight chemokines and cytokines correlated with BDG exposure in non-fibrotic participants (6CKine, IL-9, IL-17F, IL-21, IL-28A, I-309, MIP-1β, TARC), while only two did in those with fibrosis (eotaxin-3, M-CSF), likely indicative of immune dysfunction/anergy in fibrotic disease. **Discussion:** In patients with severe pulmonary sarcoidosis, fungal exposure likely increases disease severity.

POSTER #23

Dysregulation in fetal metal biodynamics precedes depression and anxiety symptoms in late childhood

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Background: Exposure to metals has been associated with childhood depression and anxiety risk, although insights on how disruption to fetal metal homeostasis affects such symptoms later in childhood have not been studied before. We aimed to study whether dysregulation in fetal metal biodynamics can predict childhood depression and anxiety symptoms.
Methods: We leveraged data on 393 children in a well-characterized longitudinal pediatric birth cohort in Mexico City. We used novel extant tooth-matrix-based biomarkers on 17 metals that directly measured weekly fetal uptake until birth to create measures for metal biodynamics as a biomarker of homeostatic regulation. Children's Depression Inventory (CDI) and Behavior Assessment System for Children (BASC-2) were administered to 8-12-year-olds. We introduced a metric named "consistency score" that captures the rhythmicity of metal biodynamics as a novel biomarker of altered metal homeostasis. The consistency features were identified using a two-staged machine-learning model with CDI as the outcome and were validated using the BASC-2 scores. All regression models were adjusted for covariates and corresponding average metal signals in pregnancy.
Results: We identified a major predictive feature: children with greater consistency in either lithium or magnesium biodynamics during pregnancy have 73% lesser odds of worse depression symptoms (based on CDI) than children with reduced consistency in both lithium and magnesium dynamics (OR[95%CI]:0.27[0.15,0.49], $p<10^{-6}$). We validated this result using both depression and anxiety symptoms based on the BASC-2 scores. Similar to CDI, children with greater consistency in either lithium or magnesium biodynamics during pregnancy were more likely to have lower BASC-2 depression and anxiety scores ($p<10^{-6}$ & $p<0.02$, respectively).
Discussion: These findings suggest that disruption to lithium-magnesium biodynamics may precede the emergence of late childhood depression and anxiety symptoms by almost a decade, and quantitative biochemical measures of prenatal metal biodynamics may distinguish children with high susceptibility.

POSTER #24

Lead Exposure and Incidence of Alzheimer's Disease and Related Dementias in the United States

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EHSCC Center: Michigan Center on Lifestage Environmental Exposures and Disease (M-LEEaD)

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Background: We investigated the association between lead exposure and the incidence of Alzheimer's disease (AD) and related dementias (ADRD) in two large prospective cohorts.

Methods: We used baseline exposure data from NHANES-III (1988-1994) and continuous NHANES (1999-2016), linked to AD and ADRD Medicare claims and the National Death Index, with follow-up up to 30 years. Lead exposure variables included measured blood lead concentrations and estimated tibia and patella lead concentrations using machine-learning prediction algorithms. Survey-weighted Cox proportional hazards models were used to compute hazard ratios (HRs) and 95% confidence intervals (CIs).

Results: In continuous NHANES, among 9,339 participants (mean age=62.4 years) at risk for ADRD, 636 developed AD and 1,379 developed ADRD (mean follow-up=8.7 years). Comparing the highest to the lowest lead quartiles, the HR for AD was 4.36 (95% CI: 2.15-8.83) for patella lead and 2.71 (95% CI: 1.21-6.00) for tibia lead, and the HR for ADRD was 2.52 (95% CI: 1.54-4.13) for patella lead and 2.27 (95% CI: 1.33-3.85) for tibia lead after adjustment for confounders. In NHANES-III, among 7,072 participants (mean age=52.0 years) at risk for ADRD, 790 developed AD and 1,618 developed ADRD (mean follow-up=21 years). We observed positive but weaker associations of bone lead concentrations with AD and ADRD in NHANES-III.

Conclusion/Discussion: Higher estimated bone lead concentrations were associated with a greater risk of developing AD and ADRD, highlighting lead as a critical environmental risk factor for AD and ADRD. These findings emphasize the importance of including cumulative lead exposure in AD and ADRD prevention and management strategies. The findings and conclusions in this abstract are those of the author(s) and do not necessarily represent the views of the Research Data Center, the National Center for Health Statistics, or the Centers for Disease Control and Prevention.

POSTER #25

The association between climate change and cardiovascular disease in the Continental United States

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Associations between climate change and chronic diseases are not well understood. Numerous pathways could link our changing climate to chronic diseases that include: extreme heat, air pollution, and allergen exposure; mental health; ecosystem and biodiversity collapse; alteration of time-activity patterns; economic loss; and communicable disease manifestations to chronic conditions. The sum effect of these pathways has potentially profound implications for global health.

We compiled 22 climate metrics (temperature, humidity, wind, sunlight, etc.) for the years 1970 through 2022 from the Copernicus Climate Service in the Continental United States at the climate division scale. We calculated long-term climate anomalies of each metric from the baseline decadal mean of 1970-1980 compared with the decadal mean of 2012-2022. We linked anomalies with tract-level prevalence of coronary heart disease (CHD) and stroke from the Centers for Disease Control. With adjusted linear models with random effects at the county level, we tested cross-sectional associations between the extent of climate anomalies and prevalence of CHD and stroke. We then concurrently evaluated all independent metrics in a single model to evaluate associations with a holistic assessment of climate change.

We found that the extent of anomalies of most metrics were significantly associated with higher rates of CHD and Stroke, but some were negatively associated. Heat index, temperature, and humidity anomalies had the largest associations. With all independent climate metrics compiled into a single model to account for concurrent changes, climate change was associated with 4.25% higher prevalence of CHD and 29.06% higher prevalence of those who have had a stroke.

These results indicate large place-based associations between the extent of climate change and cardiovascular disease. While the analysis could not evaluate causation, future research is critically needed to evaluate the potential causative influence of climate change on chronic diseases.

POSTER #26

Mapping the Chemical Exposome in the Ovarian Microenvironment

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Abstract

Background: Over 15% of couples experience infertility. Many endocrine-disrupting chemicals (EDCs) are reproductive toxicants that impair ovarian function and female fertility. However, most past research has been limited to a small number of known chemicals, largely measured in blood or urine. Our objective was to examine associations between the complex chemical exposome in follicular fluid — a more toxicologically relevant target tissue — and indicators of female fertility.

Methods: This study, funded by a HERCULES Center NIEHS P30 pilot grant, was the first exposomic analysis of follicular fluid using untargeted high-resolution mass spectrometry (HRMS) with both gas and liquid chromatography. The follicular fluid samples were collected from 84 female patients undergoing oocyte retrieval for assisted reproduction at a fertility center in Atlanta (2018–2020) and were measured for untargeted environmental chemicals and endogenous metabolites.

Results: We detected 123,638 untargeted features across the follicular fluid samples, with 76,957 found in ≥25% of samples. Over 500 features could be confidently identified, including per- and polyfluoroalkyl substances, pesticides, phthalates, phenols, and organophosphate esters, and at least 40,000 more could be tentatively annotated. In preliminary analyses, 4,879 features were significantly associated with a fewer number of oocytes retrieved (p<0.04 under a false discovery rate of 20%), based on single-chemical, quasi-poisson regression models, adjusted for age, smoking, and race/ethnicity.

Discussion: Our preliminary results demonstrate that environmental chemicals can be readily detected in the microenvironment surrounding oocytes and underscore the complex relationships between the follicular fluid exposome and ovarian function. We are currently conducting further analyses using advanced statistical mixture models to investigate the associations between chemical mixture exposures, underlying metabolic pathways, and a suite of fertility outcomes.

POSTER #27

Poly- and Perfluoroalkyl Substances are Associated with the Composition of Human

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RATIONALE: The World Health Organization recommends exclusively breast-feeding infants during the first six months of life to support healthy infant growth and development. Recent studies have also found that harmful environmental chemicals such as poly- and perfluoroalkyl substances (PFAS) are present in human milk. Given the importance of the human milk metabolome for infant development, there is an imperative need to understand the impact of PFAS chemicals on the composition of human milk.
GOAL/HYPOTHESIS: This study aims to assess the relationship between levels of human milk PFAS at 1-month postpartum with the human milk metabolome across the first 6 months postpartum. We hypothesized that there would be widespread associations with PFAS chemicals across a variety of biologically relevant metabolites in the human milk metabolome.

FINDINGS/CONCLUSIONS: At 1-moth postpartum, levels of human milk PFAS chemicals were significantly associated with levels of 321 human milk metabolites across four separate chromatography columns ($p<0.05$, out of N = 480 total metabolites). Of the 321 significant ($p<0.05$) metabolites, 109 remained statistically significant after testing for multiple comparisons with an FDR<0.2, including 47 lipids/lipid-like molecules, 8 nucleosides/nucleotides, 33 organic acids, 6 organic oxygen compounds, 10 organoheterocyclic compounds, and 5 organic nitrogen compounds. Furthermore, levels of human milk PFAS at 1-month postpartum were also associated with levels of 196 human milk metabolites across the 6-month postpartum period ($p<0.05$, out of N = 480 total metabolites). Of these 196 significant ($p<0.05$) metabolites, 24 remained statistically significant after testing for multiple comparisons with an FDR<0.2, including 12 lipids/lipid-like molecules, 1 nucleotide/nucleoside, 10 organic acids, and 1 organoheterocyclic compound. Many of these metabolites (such as taurine, glycerate, and 4-pyroxidate) have important biological implications associated with various disease states in neonates, and which may also function as indicators of early life obesity. These findings provide preliminary evidence that exposure to PFAS chemicals may impact the human milk metabolome and may thereby disrupt healthy infant development.

Keywords: Human milk, PFAS, Metabolites, Omics

POSTER #28

Examining factors influencing plan integration for community resilience in six US coastal cities using Hierarchical Linear Modeling

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Abstract: Flooding poses a grave threat to property and the safety of human communities. Urban planning efforts and guidance can have an important influence on the vulnerability of development in hazardous areas. This study is the first to use Hierarchical Linear Modeling (HLM) to investigate the influence of local planning capacity and other contextual factors on the integration of hazard mitigation policies and building of resilience across community 'networks of plans' in six US coastal cities. Descriptive statistics are used to compare mean scores for plan integration at the communitywide scale across the six cities. Hierarchical Linear Modeling is used to evaluate the independent effects of district-level factors (income, physical vulnerability), and city-level factors (percent renters, local planner capacity, previous hazard experience) on plan integration scores at the scale of Planning Policy Districts. Findings indicate significant variation across cities regarding plan integration to enhance resilience. Communities with larger proportions of renters and lower socioeconomic status are shown to be less likely to incorporate hazard mitigation policies in local plans, controlling for community planning capacity. We also find evidence that communities with prior hazard experience are more likely to have resilience-focused plans, even in physically vulnerable neighborhoods which, in the absence of recent hazards, are actually less likely to receive positive policy attention. The study concludes by discussing the results and offering recommendations to inform more effective approaches as practitioners reevaluate their plans and work to foster more coordinated mitigation efforts across local networks of plans. Building community resilience is closely tied to the integration of hazard mitigation throughout the network of plans that guides development. Policies should be working together and in the same direction to limit development in areas with high physical vulnerability, and to emphasize resilience throughout a community.

POSTER #29

Glutathione peroxidase 4 suppresses manganese-dependent oxidative stress to reduce colorectal tumorigenesis.

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ABSTRACT
Background: Colorectal Cancer (CRC) is a major global health issue, annually causing 1.8 million new cases and approximately 862,000 deaths worldwide. Despite treatment advances, resistance remains a challenge. Ferroptosis, an iron-driven cell death mechanism involving glutathione peroxidase 4 (GPX4), is a promising target in CRC.

Methods: Using a genetic mouse model, we deleted GPX4 in colon epithelial cells to investigate its role in CRC. We assessed tumor burden, oxidized glutathione levels, and GPX4's impact on DSS-induced colitis severity and CRC formation under varying diets. Mechanistically, we examined manganese (Mn)-dependent superoxide dismutase (MnSOD) and tested tempol, a superoxide dismutase mimetic, for treating GPX4 deficiency-induced CRC. Human CRC tissues were analyzed for Mn levels compared to adjacent normal tissues.

Results: GPX4 deletion increased tumor burden but reduced oxidized glutathione levels in our CRC mouse model. Surprisingly, GPX4 deficiency did not worsen DSS-induced colitis under varying iron diets but increased susceptibility under a vitamin E-deficient diet. High Mn diets exacerbated colitis severity, while low Mn diets reduced both colitis severity and CRC formation in GPX4-deficient and wildtype mice. Human CRC tissues showed elevated Mn levels compared to normal tissues, suggesting Mn's potential role in CRC pathogenesis.

Discussion: Mn, typically considered non-carcinogenic, is a common water contaminant that often accompanies other trace metals. Recent studies link Mn ingestion, especially in combination with metals like arsenic and iron, to increased cancer risks. This study highlights GPX4's critical role in inhibiting CRC through Mn-dependent oxidative stress regulation. It underscores GPX4's interaction with environmental dietary factors and the complexity of CRC development. Elevated Mn levels in human CRC tissues suggest Mn as a potential therapeutic target in CRC treatment beyond metals traditionally classified as carcinogens. These findings offer insights into personalized therapeutic strategies targeting Mn-dependent pathways in CRC, addressing significant environmental health challenges.

Keywords: Mn, Colorectal cancer, Oxidative stress, Experimental Colitis, Cell Death.