Nineteenth Annual CEET Symposium
Glen Gaulton Auditorium, Biomedical Research Building
Thursday, November 21, 2024

Engaging Communities to Impact Health

Perelman School of Medicine
University of Pennsylvania
CEET
Center of Excellence in Environmental Toxicology

SPONSORS:
National Institute of Environmental Health Sciences
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Center of Excellence in Environmental Toxicology (CEET)

NINETEENTH ANNUAL SYMPOSIUM

Engaging Communities to Impact Health

Glen Gaulton Auditorium & Lobby, Biomedical Research Building
Perelman School of Medicine at the University of Pennsylvania
November 21, 2024

Perelman SCHOOL OF MEDICINE UNIVERSITY of PENNSYLVANIA | CEET CENTER OF EXCELLENCE IN ENVIRONMENTAL TOXICOLOGY

NIH National Institute of Environmental Health Sciences

CONTENTS

Nineteenth Annual Symposium

Engaging Communities to Impact Health

November 21, 2024

7:30AM – 8:30AM REGISTRATION AND CONTINENTAL BREAKFAST

8:30AM – 8:45AM WELCOME & OPENING REMARKS

Trevor M. Penning, PhD
The Thelma Brown and Henry Charles Molinoff Professor of Pharmacology
Director, Center of Excellence in Environmental Toxicology (CEET)

8:45AM – 9:45AM KEYNOTE PRESENTATIONS

"Penn's Vision for Community Engagement and Community-Engaged Research"
Dawn Bonnell, PhD
Senior Vice Provost for Research
Henry Robinson Towne Professor of Engineering and Applied Science

"The Future of Environmental Health Sciences: a Community-Engaged Process"
Trevor K. Archer, PhD
Deputy Director, National Institute of Environmental Health Sciences (NIEHS)
NIH Distinguished Investigator

"Community Needs and Expectations"
Video by Several Community Partners

9:45AM – 10:45AM PANEL DISCUSSION:
Community Partners: Benefits and Challenges
Moderator: Marilyn Howarth, MD - Director,
Community Engagement Core, CEET

Panelists:
Maurice M. Sampson II
Eastern Pennsylvania Director, Clean Water Action

Susan C. Eckert
The Eckert Group; Partnership for Public Health Lancaster

Reverend Leroy Miles, MDiv, MA
Associate Pastor of Sanctification, Enon Tabernacle Baptist Church

Tyrique Glasgow
Founder-Executive Director, Young Chances Foundation

10:45AM – 12:00PM POSTER SESSION

12:00PM – 1:00PM LUNCH

1:00PM – 1:30PM KEYNOTE PRESENTATION

"NIEHS Expectations for Community Engagement"
Liam O'Fallon, MA
Health Science Specialist, National Institute of Environmental Health Sciences (NIEHS)

1:30PM – 2:00PM **Community Engagement in EJ Neighborhoods**
Marilyn Howarth, MD
Director, Community Engagement Core, CEET

2:00PM – 3:15PM MODELS OF COMMUNITY ENGAGEMENT

Moderator: Karen Glanz, PhD, MPH
George A. Weiss University Professor

Carmen E. Guerra, MD, MSCE, FACP
Ruth C. and Raymond G. Perelman Professor of Medicine
Vice Chair of Diversity and Inclusion, Department of Medicine
Associate Director of Diversity and Outreach, Abramson Cancer Center

Cory Bowman
Associate Director, Netter Center for Community Partnerships

Heather Klusaritz, PhD, MSW
Associate Professor of Family Medicine and Community Health
Director of Community Engagement, Penn Center for Public Health

Nicole A. Thomas, MBA
Director, Penn Medicine Center for Health Justice

3:15PM – 3:30PM BREAK

3:30PM – 4:30PM COMMUNITY-ENGAGED COLLABORATION IN ENVIRONMENTAL HEALTH

Four Parallel Breakout Discussions:

- Preterm Birth and Infertility
  Moderator: Sunni Mumford, PhD
- Health Effects of E-cigarettes and Consumer Products
  Moderator: Angela Aherrera, PhD
- Sleep Deprivation and Neurodegeneration
  Moderator: Sigrid Veasey, MD
- Autism Spectrum Disorder
  Moderator: Erica Korb, PhD

4:30PM – 5:00PM REPORT BACK & CLOSING REMARKS

5:00PM – 6:00PM RECEPTION

WELCOME MESSAGE

We are delighted to welcome you to the Nineteenth Annual Symposium of the Center of Excellence in Environmental Toxicology (CEET), the University of Pennsylvania's Environmental Health Sciences Core Center.

At CEET, community engagement is at the heart of everything we do. Our work involves collaborative research, education, and advocacy efforts designed to address local environmental concerns. By building strong relationships with community members, local organizations, and stakeholders, we ensure that our initiatives are informed by real-world experiences and needs. This year's symposium will bring together community members, researchers, healthcare professionals, and representatives from the National Institute of Environmental Health Sciences (NIEHS) to meet the challenges that we face in the Philadelphia metropolitan region.

We are excited to present a fantastic lineup of speakers and various opportunities for networking throughout the day. The morning keynote presentations from Dr. Dawn Bonnell, Dr. Trevor Archer, and a video featuring several community partners working with CEET will set the stage for dialogue and discussion. We'll then hear from a dynamic panel of community partners who will speak about the benefits and challenges of working with academic institutions, followed by a poster session that will provide researchers, trainees, and community partners the opportunity to present their work. Our afternoon keynote presentation by Liam O'Fallon will focus on NIEHS expectations for community engagement in environmental health and will be followed by featured talks on models of community engagement, and a roundtable discussion connecting community members and researchers.

We look forward to sharing new perspectives and building collaborations.

Trevor M. Penning, PhD

The Thelma Brown & Henry Charles Molinoff Professor of Pharmacology

Director, CEET

Marilyn Howarth, MD

Director, CEET Community Engagement Core

KEYNOTE SPEAKER

Dawn Bonnell, PhD

Senior Vice Provost
for Research

Henry Robinson Towne
Professor of Engineering and
Applied Science

University of Pennsylvania

Dawn Bonnell is the Senior Vice Provost for Research and the Henry Robinson Towne Professor of Engineering and Applied Science at the University of Pennsylvania. In this capacity Dr. Bonnell shapes policy and advances administrative initiatives for the University's $2 billion research enterprise as well as plays a leadership role in strategic planning for research and administers the development of new research facilities.

She also helps to oversee campus-wide research planning efforts, linkages between the University and industry, and the transfer of technologies from university laboratories to the public sector. In addition, she governs the research activities of Provostial Centers and Institutes, particularly those involving interdisciplinary collaboration.

Dr. Bonnell earned a PhD, MS, and BSE in Materials Science and Engineering from the University of Michigan and studied on a Fulbright Scholarship at the Max Planck Institute in Stuttgart, Germany.

Trevor K. Archer, PhD

Deputy Director, National
Institute of Environmental
Health Sciences (NIEHS)

NIH Distinguished
Investigator

As Deputy Director of NIEHS, Dr. Archer assists the NIEHS and National Toxicology Program Director, Rick Woychik, PhD, in the overall management of the institute. He supports the formulation and implementation of plans and policies that carry out the NIEHS scientific mission and research goals. He also provides strategic leadership for Diversity, Equity, Inclusion and Accessibility programs at NIEHS.

His research career spans more than three decades, two of which were spent in key scientific roles at NIEHS. He is known for expertise in cancer biology, hormone receptors, chromatin function, epigenetics, and stem cells.

Dr. Archer has pioneered efforts to promote diversity, equity, and inclusion at NIEHS and in the greater scientific community. He was instrumental in securing program funding to support the recruitment and retention of under-represented minority trainees. He assisted in establishing the Kenneth Olden Distinguished Lecture series at NIEHS, and he chairs the speaker selection committee for that program. For the NIH UNITE initiative, he co-chairs a committee focused on improving workplace culture.

KEYNOTE SPEAKER

Liam O'Fallon, MA

Health Science Specialist,
National Institute of
Environmental Health Sciences
(NIEHS)

Liam O'Fallon, M.A., is a Health Specialist in the Division of Extramural Research and Training where he is actively involved in research programs that advance community-engaged approaches as well as communication strategies in the context of environmental public health and health disparities.

O'Fallon leads the Partnerships for Environmental Public Health program at NIEHS, which fosters interactions among projects from different NIEHS funded programs. He directs the Community Engagement Cores that are a part of the network of Environmental Health Sciences Core Centers. He is the program officer for the Research to Action Program that requires projects to use community-engaged research methods to conduct and to translate research findings into public health action. Most recently, he became a project scientist for the NIH Common Fund's Transformative Research to Address Health Disparities and Advance Health Equity program. O'Fallon co-leads the NIEHS Environmental Justice & Environmental Health Disparities Faculty and is an active member of the US Department of Health and Human Services Environmental Justice Working Group.

COMMUNITY PARTNERS FEATURED IN KEYNOTE VIDEO

Jana Curtis

Co-Founder,
Get the Lead Out Riverwards

Reverend Dr. Horace W. Strand

Sr. Chairman,
Chester Environmental Partnership

Jerome Shabazz, MS

Executive Director,
Overbrook Environmental Education Center

PANELISTS

Maurice M. Sampson II

Eastern Pennsylvania
Director,
Clean Water Action

Maurice M. Sampson II has been a grass roots environmental activist dating back to the 70s. He fought to pass local ordinances requiring Environmental Impact Statements for all housing developments (Cherry Hill, NJ - 1971) saving 200 acres from suburban development and to oppose highway bond issues (1973). He also opposed Tocks Island Dam on the upper Delaware (1972-73) and floating nuclear power plants (1975) and supported creation of the New Jersey Pinelands Preservation (1974-77). He founded the Youth Environmental Society (New Brunswick, NJ), a statewide youth environmental organization that networks high school and college environmental organizations through a series of annual workshops and weekend leadership retreats. He is also a sustainable waste management expert with thirty years of experience as an environmental and recycling advocate, bureaucrat and entrepreneur as well as a volunteer Chair for the RecycleNOW Philadelphia Campaign.

Susan C. Eckert

The Eckert Group

Partnership for Public Health

A long-time advocate for children, education, and women's issues, Susan joined United Way of Lancaster County as president in 1987 from the YWCA of Lancaster where she was executive director. Before that, she recruited students to Vassar and Smith Colleges and was a teacher of children with special needs.

She retired in January 2012 from the role of president of United Way of Lancaster County. During her service, more than 140 million dollars was raised to improve lives in Lancaster County and three important collaborative efforts were established -- Success by Six, a focus on early care and education, the Coalition to End Homelessness and an effort to support the public health needs of Lancaster-the Partnership for Public Health.

Following her retirement, Susan established The Eckert Group. Through her consulting practice, she served the Partnership for Public Health (PPH) in an effort to find local solutions to health problems and to improve the public health infrastructure of Lancaster County.

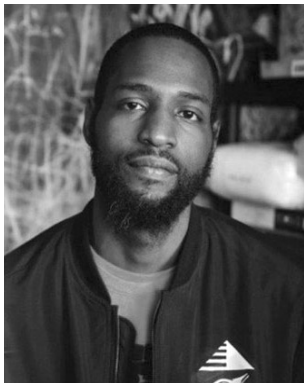
PANELISTS

Reverend Leroy Miles, MDiv, MA

Associate Pastor of Sanctification, Enon Tabernacle Baptist Church

Reverend Leroy Miles is an accomplished Mental Health Counselor, Certified Health Coach, and Community Health Consultant. He has dedicated his career to improving public health, championing for improved health policy and healthcare reform in Philadelphia and beyond.

As the Associate Pastor of Pastoral Care and Counseling at Enon, he has successfully bolstered efforts to positively impact the social determinants of health in his own communities — factors that influence where and how people live, learn, work and play and provide context to a person's life. Social determinants can play just as big of a role in affecting health as medications and physical lifestyle changes. His ongoing work addresses recidivism, family stability, food security, and health knowledge and includes leadership over several ministries that offer support to the community around mental health awareness, HIV/AIDS, support groups (anger management, drug, alcohol, and survivors of sexual abuse) and by launching a Doula Ministry program which trained over 40+ birth and postpartum doulas to help reduce the race related disparities in Black Maternal Health.



Tyrique Glasgow

Founder-Executive Director, Young Chances Foundation

Tyrique Glasgow's world is about creating possibilities for children, families, and seniors in Philadelphia. In 2012, he founded the Young Chances Foundation (YCF), an organization established to provide children and community members with opportunities to have fun and safe places to gather, have essential resources to strengthen relationships and increase the quality of life for youth through peer group activities.

YCF has remained steadfast in its commitment to instilling values, promoting worth, changing the negative images prevalent in low-income communities, and providing positive opportunities for the people in its own community to curb violence. With a mission that includes providing and teaching positive leadership skills among youth through their HUSTLE (How U Survive Through Life Everyday) program, YCF Youth Coalition and having established YCF's SP4Kids "SAFE PLACE 4 KIDS" summer camps as a fixture since 2013, this work has been tirelessly implemented to prevent violence from cycling down through the next generation of children.

YCF has gained local and national attention for its work in the community; Tyrique has been recognized by KYW, Philly Magazine, and was a finalist for the 2022 CNN Hero of the Year.

SPEAKERS

Carmen E. Guerra, MD, MSCE, FACP

Ruth C. and Raymond G. Perelman Professor of Medicine

Vice Chair of Diversity and Inclusion, Medicine, Perelman School of Medicine

Associate Director for Diversity and Outreach at the Abramson Cancer Center (ACC)

Dr. Guerra is a general internist trained in epidemiology and a cancer equity researcher. Dr. Guerra's research focuses on reducing disparities in accessing cancer screenings and cancer clinical trials by underserved populations. Dr. Guerra leads ACC's Community Outreach and Engagement (COE). In this role, she leads partnerships with community organizations to design, implement, and evaluate research and interventions to increase the participation of underrepresented populations in cancer screening research and clinical trials at the center.

Dr. Guerra and her team have led dissemination and implementation research of breast and colorectal cancer screening interventions that include the development of patient navigation programs and "pop up" and mobile cancer screening events, which have engaged thousands of underserved, minority residents of Philadelphia and the surrounding region in cancer screenings. These efforts contributed to the increase in colorectal cancer screening and screening mammography rates in Philadelphia.

Cory Bowman

Associate Director, Netter Center for Community Partnerships, University of Pennsylvania

Cory Bowman has been working for Penn's Netter Center for Community Partnerships since its inception in 1992 and its predecessor (the Penn Program for Public Service) since 1991.

Cory helps direct the core functions of Netter, including developing academic partnerships with schools, non-profits, and communities of faith. These partnerships emphasize the integration of the teaching, research, and service missions of the University and engage Penn students, faculty, staff and alumni. He also works with the Penn's Office of the Executive Vice President to help advance Penn's development as a democratic anchor institution.

Cory directs the development of University-Assisted Community Schools (UACS) in Penn's local community of West Philadelphia. In addition, he leads Netter's local and national UACS adaptation and replication program, including serving as director of the UACS National Network and the Regional Training Centers program.

Cory received the Dr. Judith Rodin Community Education Award in recognition for his social justice work advancing education and educational opportunities in Philadelphia.

SPEAKERS

Heather Klusaritz, PhD, MSW

Associate Professor of Family Medicine and Community Health at the Hospital of the University of Pennsylvania

Director of Community Engagement, Penn Center for Public Health

Dr. Klusaritz has expertise in community-engaged research methodologies, health inequities, health policy, and social determinants of health. Dr. Klusaritz is Director of Community Engagement for the Penn Center for Public Health and the Director of Community Health Services for the Penn Medicine Center for Health Equity Advancement. She also serves as the Associate Director of the Center for Community and Population Health in the Department of Family Medicine, where she leads a body of work to assess and respond to community health needs.

Her research interests focus on access to health care for historically marginalized populations, the design of health systems to eliminate disparities in health access and outcomes, and the inclusion of community voice and priorities in research agendas. Currently, she is a Co-Investigator on and leads the Community Engagement Cores for three NIH awards and three HRSA Primary Care and Public Health Workforce awards. Dr. Klusaritz has done extensive work on population health initiatives to address opioid use disorder and leads health system transformation efforts to screen for and address health related social needs.

Nicole A. Thomas, MBA

Director, Penn Medicine Center for Health Justice
Co-Director REACH Initiative
Co-Director Penn Community Scholars Program

Nicole is an enthusiastic strategist, trainer, and entrepreneur with over 25 years of experience in the higher education, small business, and workforce development sectors. A Philadelphia native, she specializes in community-academic partnerships, strategic planning, organizational development, and high-impact communications. Nicole is the Director of the Penn Medicine Center for Health Justice (CHJ) and the Urban Health Lab @ CHJ. The Center for Health Justice has a vision to enable health through racial, economic, and environmental justice for Black, Brown, and all people and neighborhoods harmed by structural inequity. The Urban Health Lab's mission is "rooted in the power of community, we leverage research and action to dismantle structural racism and catalyze healthier, safer, and greener neighborhoods".

She is co-founder and co-director of the Penn Community Scholars Program and the REACH Initiative (Research and Equity in Academic-Community Partnerships for Health) at the University of Pennsylvania. In 2011, Nicole founded and led a Philadelphia-based consulting company that offers training, communications, organizational development, and community-engagement strategies and tools to academic institutions, nonprofit organizations, and corporate entities.

MISSION AND VISION STATEMENT

The Center of Excellence in Environmental Toxicology (CEET) is a school-based center housed in the Perelman School of Medicine at the University of Pennsylvania. As the spectrum of environmental health science is broad, ranging from toxicology, chemistry, environmental science, environmental disease, epidemiology, public health, and policy, its more than 90 members come from 8 Schools (23 Departments), the Children's Hospital of Philadelphia and 4 Neighboring Universities. CEET is Penn's designated Environmental Health Science Core Center (EHSCC) funded by the National Institute of Environmental Health Sciences (NIEHS).

The CEET elucidates the mechanistic links between environmental exposures and human disease and translates its findings into action to improve the health of vulnerable individuals, and local, national and global communities.

The CEET mission is achieved by both its community-based research model and by its emphasis in thematic areas. The Community Engagement Core (CEC) identifies community-based environmental health problems that are then framed by our Translational Research Support Core (TRSC) into research questions that can be answered by CEET investigators. Findings are then translated back to the community using a "community-first communication model." An emerging theme is precision public health in which community exposomes can be used to identify sub-populations most vulnerable to air pollution, lung cancer incidence and lead poisoning.

Our flexible thematic areas: Air Pollution & Lung Health; Environmental Exposures & Cancer; Windows-of-Susceptibility; and Environmental Neuroscience address immediate concerns that affect our region. Each of these thematic areas embrace exposure assessment (the exposome) and climate change and translates its findings to affected communities. In each of these areas, the CEC works with communities impacted by relevant exposures.

The CEET enables its investigators to conduct biomarker work of exposure and effect using its Biomolecular Mass Spectrometry Core, which uses sophisticated liquid chromatography mass spectrometry methods. CEET investigators have access to an Environmental Health Informatics Core so that large, siloed databases in exposomics, genomics, proteomics, metabolomics and chemoinformatics can be merged as predictors of response and disease onset. The Core is also positioned to take these large data sets and use machine learning and AI to predict responses to toxicants. The TRSC of the CEET provides assistance with a broad range of transdisciplinary services including human subject study design, exposure biology laboratories with access to biospecimens via the Penn Biobank, and biostatistical support.

The CEC works with communities in Pennsylvania to empower them with new knowledge so that they are better informed to influence decision makers about public health policy. To improve the environmental health of these and similar affected communities, the CEET educates health care professionals to improve public health outcomes.

CENTER OF EXCELLENCE IN ENVIRONMENTAL TOXICOLOGY

Perelman School of Medicine at the University of Pennsylvania

Director: Trevor Penning, PhD | Deputy Director: Sharon McGrath-Morrow, MBA, MD

THEMATIC AREAS

Air Pollution & Lung Health
Leader: Sharon McGrath-Morrow, MBA, MD

Environmental Exposures & Cancer
Leader: Ian Blair, PhD

Windows-of-Susceptibility
Leader: Sunni Mumford, PhD

Environmental Neuroscience
Leader: Sigrid Veasey, MD

FACILITY CORES

Biomolecular Mass Spectrometry Core
Director: Clementina Mesaros, PhD

Environmental Health Informatics Core
Director: Blanca Himes, PhD

Translational Research Support Core
Director: Anil Vachani, MD, MSCE
Associate Directors: Aimin Chen, MD, PhD; Wei-Ting Hwang, PhD

COMMUNITY ENGAGEMENT CORE (CEC)

Director: Marilyn Howarth, MD | Program Coordinator: Adrian Wood, MPH

Maria Antonia Andrews, MS
Andrea Apter, MD
Ian Blair, PhD
Olajumoke Fadugba, MD
Jeffrey Field, PhD
Ira Harkavy, PhD
Blanca Himes, PhD
Heather Klusaritz, PhD, MSW
Sarah Light, MPhil, JD
Jianghong Liu, PhD, RN
Michael Mann, PhD
Sharon McGrath-Morrow, MD
Sunni Mumford, PhD
Howard Neukrug PE, BCEE
Kevin Osterhoudt, MD, MSCE
Trevor Penning, PhD
Jennifer Pinto-Martin, PhD, MPH
Sajjad Savul, MD
Eugenia South, MD, MSHP
Rebecca Simmons, MD
Andy Tan, PhD
Sigrid Veasey, MD

CEC Stakeholder Advisory Board

Emily Adler – Environmental Health Scientist, Agency for Toxic Substances and Disease Registry
Mariana Arguelles, MSW – Health & Wellness Director, Puentes de Salud
Remy Babich, PhD – Epidemiologist, PA Department of Health
Sari Bernstein, Esq – Staff Attorney, Public Interest Law Center
Eric Cheung, Esq – Senior Attorney, Clean Air Council
Jana Curtis – Co-Founder, Get the Lead Out Riverwards
Susan Eckert – Community Stakeholder, Lancaster County
Rosemarie Halt, RPh, MPH – Policy Consultant, Children First
Donna Henry, MS – Executive Director, Southwest CDC
Fred Lewis – Director, Germantown Senior Environment Corps
Jeffrey Martin, MD – Chair, Lancaster Lead Coalition
Julie Miller, PhD, DABT – Toxicologist, PA Department of Health
Anil Nair, MD, MPH – Epidemiologist, PA Department of Health
Dalton Paxman, PhD – Regional Health Administrator, US Department of Health and Human Services
Richard Pepino, MS, MSS – Emeritus Faculty, University of Pennsylvania Earth and Environmental Science
Ted Pickett – President, Eastwick United
Charles Reeves – President, Taker Morris Neighbors Association
Amani Reid – Eastern Regional Coordinator, Environmental Protection Agency
Maurice Sampson – Eastern Pennsylvania Director, Clean Water Action
Kassahun Sellassie, PhD, PE – Director of Air Management Services, City of Philadelphia
Jerome Shabazz, MS – Executive Director, Overbrook Environmental Education Center
Rev. Dr. Horace W. Strand, Sr. – Chairman, Chester Environmental Partnership
Sachin Shankar, PE – Assistant Regional Director, PA Department of Environmental Protection
Jasmin Velez, MA – Lead Community Organizer, Kensington Corridor Trust
Lora Werner, MPH – Deputy Director, Delaware County Health Department
Earl Wilson – President, Eastwick Friends and Neighbors
Alice Wright-Bailey – Executive Director, Chester Environmental Partnership

CP1 PA Lead-Free Promise Project: Supporting Local Response to Childhood Lead in Pennsylvania

Panning, J. MS[1], Halt, R. RPh[1], MPH, Raja, K., MPH[1]

[1]Children First PA

Email: janetp@childrenfirstpa.org

The PA Lead-Free Promise Project (LFPP), funded by the Pennsylvania Department of Health (PA DOH) and administered by the non-profit Children First PA, seeks to reduce the number of children in Pennsylvania impacted by lead through increased testing and reduced exposure. LFPP works collaboratively through a state-wide network of over 300 community partners, including parents, pediatricians, nonprofit organizations and many others.

In 2024, Children First PA received additional funding from the PA DOH to create a pilot program to provide technical assistance to selected counties to strengthen coordinated and effective systems that increase the number of children tested for lead exposure and ensure that children and families receive needed services after testing with elevated blood lead levels.

Parents, providers, educators, housing stakeholders and others in the selected counties, together with the Children First PA team, will have an opportunity to assess together the current county response to childhood lead poisoning, identify resources and gaps, and troubleshoot barriers to develop and implement solutions. By looking at local, regional, state and other resources and practices, we will identify best practices and sustainable practices that will make a difference locally.

Five counties will be selected in the first year, based on factors such as the number of children impacted, lower-than-average testing rates, and percentage of pre-1960 housing units. The primary selection factor, however, will be local interest. LFPP is seeking communities that are interested in working together to strengthen our systems for preventing and responding to childhood lead poisoning.

The Children First PA LFPP poster presentation will showcase the rationale and the plan behind the Childhood Lead Care Management Pilot Program. It will highlight the counties initially identified as potential participants and will include a QR Code for people who are interested in exploring participation for their county. We will provide an opportunity for academics and other stakeholders to explore partnership or participation with this program. *The PA LFPP team will be available during the poster session for further discussion and includes Janet Panning, MS, Program Coordinator LFPP Pilot; Rosemarie Halt, Health Policy Consultant LFPP Project; Kaanan Raja, MPH, Health Policy Associate.*

Supported by the Pennsylvania Department of Health.

CER1 Community Engaged Approaches to Asthma Research and Education

Ceire Hay[1,2], Zachary Steele[2], Sarah E. Henrickson[1,3,4]

[1]Immunology Graduate Group, Perelman School of Medicine, University of Pennsylvania

[2]Barbara and Edward Netter Center for Community Partnerships, University of Pennsylvania

[3]Division of Allergy & Immunology, Department of Pediatrics, Children's Hospital of Philadelphia

[4]Department of Microbiology, Perelman School of Medicine, University of Pennsylvania

Email: ceirehay@pennmedicine.upenn.edu

Asthma is a multifactorial pulmonary inflammatory disease that represents one of the most common chronic diseases of childhood, affecting 5 million children in the United States. In Philadelphia, 17% of school aged children are living with asthma – more than double the national prevalence rate of 7% for the same age group. Asthma is a leading cause of school absenteeism and contributes to a significant number of visits to the emergency room every year. To address the harm that asthma causes to vulnerable families in Philadelphia, this Academically Based Community Service (ABCS) course is designed to teach Penn graduate students to make the science of asthma accessible to the Philadelphia community. In this brand-new course, graduate students receive an introduction to the immunological and environmental causes of asthma and, importantly, will be provided with the opportunity to engage with the local community by working in small groups as co-teachers of pre-designed lesson plans in a Philadelphia middle school classroom. To accomplish this goal, this ABCS course has a unique structure: the first 6 weeks of the semester consists of bi-weekly on-campus lectures; in the remaining 10 weeks of the semester, graduate students will travel to Andrew Hamilton Middle school on Thursdays to work in small groups with sixth grade science class(es) as co-teachers.

Upon completion of this course, Biomedical Graduate Studies (BGS) students can expect to have attained a broad understanding of the environmental, social and economic impacts of asthma on the Philadelphia community. Specifically, students will be expected to support the science education of our partner school by engaging with sixth grade students on asthma related topics in a manner that incorporates enthusiasm, intellectual involvement, and self-reflection. Ultimately, this class provides a unique opportunity for graduate students to engage in a mutually beneficial partnership with the Philadelphia community aimed at improving asthma outcome in school children. Through the real-world application of concepts introduced in the first half of the semester, graduate students can acquire skills that strengthen several essential core competencies of doctoral training, including broad conceptual knowledge of a scientific discipline as well as collaboration and team science skills.

Supported by the Provost's Graduate Academic Engagement Fellowship at the Netter Center (PGAEF@NC)

CER2 Evaluating Public Perceptions of Lead Risk in Home Renovations in West Philadelphia

Adrian Wood, MPH[1], Marilyn V. Howarth, MD, FACOEM[1], Alexis Shulman, PhD[2], Arthi Sivendra[2], Jerome Shabazz[3]

[1]Community Engagement Core, University of Pennsylvania Center of Excellence in Environmental Toxicology

[2]The Academy of Natural Sciences of Drexel University

[3]Overbrook Environmental Education Center

Email: Adrian.Wood@pennmedicine.upenn.edu

In 2022, over 1,700 children in Philadelphia were diagnosed with lead poisoning (6% of children tested). West Philadelphia has some of the highest rates of lead poisoning in the city. In West Philadelphia zip codes 19151, 19131, and 19139, more than 10% of tested children had elevated blood lead levels. Elevated lead levels cause nerve damage, including decreased IQ and attention and behavior disorders. The major source of childhood lead exposure is through dust from lead paint. It is estimated that 95% of the housing units in Philadelphia were built before 1978, therefore having the potential for lead based paint. The highest percentage of children with elevated blood lead levels live in poor, predominately non-white neighborhoods. Factors significantly contributing to this correlation are dilapidated housing and unsafe renovation of homes.

The EPA Renovation Repair and Painting (RRP) rule addresses lead exposure during housing renovations. This rule requires that any renovation, repair, or painting being performed in any pre-1978 home, preschool, or childcare facility that can disrupt lead paint must be done by an EPA certified renovator. Though the intent of the RRP law is to ensure that contractors are performing lead safe practices, this law has proven difficult to enforce by the EPA due to the large number of jobs and contractors and the lack of inspectors available to oversee the work. While an estimated 95% of housing units in Philadelphia contain lead paint, only 5% of contractors in the Philadelphia area are RRP certified.

Through one-on-one community interviews of West Philadelphia residents and landlords, we aim to assess public knowledge of the dangers of lead poisoning during home renovation work and prior knowledge of the requirement of RRP certification of contractors. We plan to use the data gathered through the interviews to inform education campaigns and encourage RRP certification for Philadelphia contractors. We believe that the best way to protect children from lead exposure through home renovations is to pass an ordinance to require all contractors doing work in Philadelphia to be RRP lead certified in order to obtain or renew their contracting license.

Funding for this project was provided by the National Institute of Environmental Health Sciences (NIEHS) University of Pennsylvania Center of Excellence in Environmental Toxicology (P30-ES013508) and The Academy of Natural Sciences of Drexel University.

CER3 Engaging Philadelphia High School Students around Indoor and Outdoor Air Quality

Adrian Wood, MPH[1], Marilyn V. Howarth, MD, FACOEM[1], Shirley Posey Jackson, MS[2], Peter Winslow[3], Craig Johnson[3]

[1]Community Engagement Core, University of Pennsylvania Center of Excellence in Environmental Toxicology

[2]Imhotep Institute Charter High School

[3]Interpret Green

Email: Adrian.Wood@pennmedicine.upenn.edu

Philadelphia ranks as one of the nation's 25 worst metro areas for ozone and year-round particle pollution. Particulate air pollution, especially PM2.5, has been linked to an increasing risk of respiratory and cardiovascular illnesses, especially among sensitive populations such as children. Children in Philadelphia have rates of asthma more than triple the national average. While the effects of environmental exposures such as poor air quality directly affect children, education on these topics receives little attention in schools. Education on air quality integrates topics from environmental health and geography to local and federal policy and social and environmental justice. In addition to a lack of environmental topics in the curriculum, there is also very limited air quality data for assessing local air quality risks at schools in Philadelphia. Many schools in Philadelphia are near highways or point sources but are too far away from any official air quality monitoring stations to determine exposure. To develop an environmentally literate population, and to work toward solving the increasingly complex environmental issues facing Philadelphia, there is a need to increase students' access to environmental education in and outside the classroom.

The Community Engagement Core at the Center of Excellence in Environmental Toxicology partnered with Interpret Green, a local non-profit whose mission is to develop interpretive media that engages, educates and inspires while advancing advocacy for environmental sustainability, to develop an air quality curriculum for high school students in Philadelphia. This curriculum was piloted at Imhotep Institute Charter High School with their STEM ambassadors over 12 months. The goal of the curriculum was to educate high school students about air quality, its impact on health, how to monitor both indoor and outdoor air quality, and analyze and interpret results. Students learned how to use monitoring tools, analyze data, and propose strategies to improve air quality in different environments.

In this program, we sought to increase environment health literacy among high school students by focusing on the interrelated topics of air quality, health, and environmental justice. In addition, we sought to develop leadership skills through peer and community outreach. The students learned to present the information they learned to their peers, neighbors, family, and community leaders. The curriculum has been submitted to the Partnerships for Environmental Public Health (PEPH) Resource Center as a mechanism to attract students into STEM research.

Funding for this project was provided by the National Institute of Environmental Health Sciences (NIEHS) University of Pennsylvania Center of Excellence in Environmental Toxicology (P30 ES013508). Additional financial support was provided by Interpret Green.

CER4 Expanding Community Engagement in Clinical Research to Address Health Disparities and Drive Drug Development

Chinenye A. Mbata, MD, BSN[1]; Charles Mbata[1]; Seven Ezumba[1]

[1]mymonitor.ai

Email: info@mymonitor.ai

The call to increase diversity in clinical research, as mandated by the FDA, has underscored an urgent need to expand community engagement beyond traditional research areas, such as preterm birth, infertility, the health effects of e-cigarettes, consumer products, sleep deprivation, and neurodegeneration. Currently, underrepresented communities especially Black and Hispanic populations are disproportionately affected by environmental and health-related factors yet remain largely excluded from clinical research trials. This lack of representation limits the development of new drugs that can address the unique health concerns and genetic variations of these communities, ultimately hindering health equity and personalized medicine. Expanding research engagement to address broader health issues and actively involve these communities in the research process will not only improve health outcomes but also ensure that new drug therapies are effective across diverse populations.

mymonitor.ai emerges as a cutting-edge technology solution to bridge the gap in community-engaged collaboration for environmental health. By harnessing its advanced data monitoring and analytics capabilities, mymonitor.ai can enhance transparency, empower underrepresented communities with real-time, actionable insights, and facilitate more inclusive data collection and decision-making. Key features of mymonitor.ai include real-time environmental monitoring, community-sourced data reporting, and risk-based prioritization to target high-risk areas that disproportionately impact marginalized communities. Through accessible data visualizations, educational resources, and continuous tracking of intervention effectiveness, mymonitor.ai not only informs community members about local health risks but also supports their advocacy for policy change. This technology can drive meaningful, data-informed community engagement, addressing the FDA's mandate to increase Black and Hispanic participation in clinical trials while fostering an inclusive and representative approach to environmental health and drug development.

In summary, mymonitor.ai offers a transformative approach to integrating underrepresented communities in clinical research through enhanced engagement, data transparency, and community-driven collaboration. By empowering communities to understand, participate in, and benefit from environmental health initiatives, mymonitor.ai aligns with regulatory goals and paves the way for more effective, equitable health solutions.

CER5 Climate Change and Health: Engaging Communities in Philadelphia

Apsara Mitra[1], Colin Battis[1], Isabella Andreozzi[1], Marilyn Howarth[1]

[1]Philadelphia Regional Center for Children's Environmental Health

Email: apsara@sas.upenn.edu

Climate change is impacting Philadelphia residents in several ways. These impacts include more intense precipitation events, leading to more frequent flooding and scouring of potentially contaminated soil, and extreme temperatures, which are even higher in neighborhoods with limited green space and trees. Air pollution has also worsened because of increased electricity generation to combat high temperatures and because of wildfire smoke from Canada. Climate resilience depends on multiple factors, but the geography, aging infrastructure, and extreme poverty found in many Philadelphia neighborhoods makes these frontline communities more vulnerable to climate change impacts. To understand and address these important challenges, we held focus groups in two impacted communities: Kensington and Eastwick.

Kensington is a heat island due to its limited green space, extensive pavement, and row home housing. In collaboration with our community partner, Kensington Corridor Trust, who facilitated setting up the focus groups, we learned that, in addition to the pre-existing challenges, the existing mitigation techniques, cooling centers and children's spray grounds, were inadequate to meet the needs of the community. The residents also held misconceptions about trees and were reluctant to plant them which added another level of complexity to building a more resilient community. In response to these concerns, we engaged with childcare centers to provide shade structures and created moving infographics that addressed misconceptions about tree planting, specifically highlighting some of the benefits of tree planting: reducing energy costs and providing shade.

We also held focus groups, facilitated by Eastwick United, in Eastwick, a neighborhood experiencing increasing episodes of flooding due to its location at the confluence of Darby and Cobbs Creek. These focus groups drew our attention to the notification system. The residents were notified too late when these creeks were overflowing their banks. Residents had exhausted their savings repeatedly replacing utilities and personal belongings. Residents lacked knowledge of best practices for flood preparation, mitigation, and safe clean-up. In response we provided a flood toolkit including laminated information addressing preparedness, mitigation and response and practical items including a bucket, safer mold cleaning products, personal protective equipment and reusable barriers. The PRCCEH continues to identify opportunities to assist vulnerable residents in climate impacted neighborhoods.

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AP1 Sex Chromosome Dosage as a Mechanism of Male Vulnerability in Neonatal Hyperoxic Lung Injury

Rose Albert[1,2], Manuel Cantu[2], Abiud Cantu[2], Albertina Lee[2], Han-pi Chang[2], Krithika Lingappan[1,2]

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

[2]Division of Neonatology, Department of Pediatrics, Children's Hospital of Philadelphia, University of Pennsylvania

Email: rose.albert@pennmedicine.upenn.edu

Approximately 10% of neonates are born preterm globally (<37 weeks gestational age), and numerous environmental exposures are associated with preterm birth. Environmental exposures compounded with structural determinants of health can intensify preterm birth inequity. Preterm neonates often exposed to high concentrations of oxygen (hyperoxia) as a therapeutic; however, this lifesaving intervention also contributes to the development of bronchopulmonary dysplasia (BPD). BPD is the most common pulmonary morbidity affecting preterm neonates and is characterized by alveolar simplification and aberrant pulmonary vascular development. Impaired lung development leads to chronic respiratory challenges and increased vulnerability to later life exposures. BPD has a striking male bias in incidence and severity, so there is great need to unravel sex-specific mechanisms contributing to sex-biased outcomes. Our lab previously used the Four Core Genotypes (FCG) mouse model to demonstrate that XX chromosome complement was protective against neonatal hyperoxic lung injury, independent of gonadal sex. However, it is not known if the protective effect is due to the absence of the Y chromosome or the presence of two X chromosomes. To interrogate recovery as a function of sex chromosome dosage, we used the XY* mouse model that has XX, XO, XY, and XXY genotypes. Neonatal mice were exposed to hyperoxia (95% FiO2, PND 1-5 or room air (21% FiO2) and euthanized on PND 21. Two validated morphometric methods, radial alveolar count (RAC) and mean linear intercept (MLI), were used to assess alveolar preservation after injury. Statistical analysis using 3-way ANOVA assessed the effect of treatment, X chromosome dosage, and the presence of the Y chromosome as well as the interaction between independent variables. Analysis of MLI showed independent effects of treatment ($P = 0.0010$) and presence of the Y chromosome ($P = 0.0031$), and significant interaction between the Y chromosome and treatment ($P = 0.0017$). Analysis of RAC showed a main effect of treatment ($P < 0.0001$) and interactions between treatment and X dosage ($P = 0.0392$), as well as treatment and presence of the Y chromosome ($P = 0.0171$). Elucidating sex-specific mechanisms underlying response to respiratory insults will potentially inform development of precision medicine approaches.

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AP2 Role of Nitrated Polycyclic Aromatic Hydrocarbons in the Lung DNA and Protein Adductomic Profiles

Cátia F. Marques[1], Karam El Bayoumy[2], Clementina Mesaros[1], Trevor M. Penning[1]

[1]Center of Excellence in Environmental Toxicology & Department of Systems Pharmacology and Translational Therapeutics, University of Pennsylvania Perelman School of Medicine

[2]Department of Biochemistry & Molecular Biology, Penn State College of Medicine, Pennsylvania State University

Email: catia.marques@pennmedicine.upenn.edu

Air pollution (AP) is ranked as a Group 1 carcinogen by the International Agency for Research on Cancer, and it is estimated that it causes 29% of lung cancer deaths. AP will increase as a result of climate change and Diesel Engine Exhaust (DEE), which contains nitrated polycyclic aromatic hydrocarbon (NO2−PAHs), will be major contributor. DEE particles are found in the lungs of both smokers and never smokers with lung cancer and suggests an increased risk of lung cancer associated with NO2-PAHs. NO2−PAHs include 3-nitrobenzanthrone (3-NBA), 1-nitropyrene, 1,8-dinitropyrene, and 6-nitrocrysene. To become mutagenic and carcinogenic, NO2-PAHs require metabolic activation catalyzed by cytosolic nitroreductases [including human aldo-keto reductases (AKRs)], through a 6-electron nitroreduction pathway which via a nitroso-, hydroxylamino-, intermediate form an amine product. Reactive metabolites may contribute to nitroarene mutagenicity due to the formation of oxidative and covalent DNA adducts. AKR expression is induced by NRF2-KEAP1 stress response pathway, and disruption of this pathway may exacerbate nitroarene toxicity.

Our goal is to elucidate the relative contribution of oxidative and covalent DNA adducts to the nitroarene adductome and to determine whether NO2-PAHs may modify KEAP1. 8-oxo-2'deoxyguanosine (8-oxo-dG) and covalent adducts were quantified by stable-isotope dilution combined with liquid chromatography-mass spectrometry. The proteome profile of NO2-PAHs was elucidated by bottom-up and top-down proteomics approaches. By measuring oxidative and covalent DNA adducts in the same cell sample treated with 3NBA we found that both adducts contributed to the adduct profile. DNA measurements will be extended to NFEL2/NRF2 A549 k/o cells and to HBEC3-KT cells using NRF2 activators and inhibitors. Proteomic results indicate that nitroso intermediates can bind thiol groups on nucleophilic cysteine residues leading to the formation of sulfinamide and fully oxidized sulfonamide adducts. Target and untargeted proteomics will further elaborate the role of protein adducts in the carcinogenic process.

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WS1 Specific and Potent Inhibition of Steroid Hormone Pre-Receptor Regulator AKR1C2 by Perfluorooctanoic Acid: Implications for Androgen Metabolism

Andrea Andress Huacachino[1,2], Anna Chung[1], Kim Sharp[1], and Trevor M. Penning[1,2,3]

[1]Department of Biochemistry & Biophysics, Perelman School of Medicine, University of Pennsylvania

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

[3]Department of Systems Pharmacology & Translational Therapeutics, Perelman School of Medicine, University of Pennsylvania

Email: aandress@pennmedicine.upenn.edu

Per- and polyfluoroalkyl substances (PFAS) are ubiquitous environmental pollutants that are highly stable synthetic organofluorine compounds. One congener perfluorooctanoic acid (PFOA) can be detected in nearly all humans and is recognized as an endocrine disrupting chemical (EDCs). EDCs disrupt hormone synthesis and metabolism and receptor function. One mechanism of steroid hormone action is the pre-receptor regulation of ligand access to steroid hormone receptors by aldo-keto reductases. Here we report PFOA inhibition of AKR family 1 member C2 (AKR1C2), leading to dysregulation of androgen action. Spectrofluorimetric inhibitor screens identified PFOA as a competitive and tight binding inhibitor of AKR1C2, whose role is to inactivate 5α-dihydrotestosterone (5α-DHT). Further site directed mutagenesis studies along with molecular docking simulations revealed the importance of residue Valine 54 in AKR1C2 inhibitor specificity. Binding site restrictions were explored by testing inhibition of other related PFAS chemicals, confirming that steric hinderance is a key factor. Furthermore, radiochromatography using HPLC and in line radiometric detection confirmed the accumulation of 5α-DHT as a result of PFOA inhibition of AKR1C2. We showed that PFOA could enhance the transactivation of AR in reporter genes assays in which 5α-DHT metabolism was blocked by AKR1C2 inhibition in HeLa cells. Taken together, these data suggest PFOA has a role in disrupting androgen action through inhibiting AKR1C2. Our work identifies an EDC function for PFOA not previously revealed.

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WS2 Combining Pregnancy and Environmental Health Data to Characterize Windows of Susceptibility for Preeclampsia

Chloé F. Paris, BS[1], Rachel Ledyard, MPH[2], Heather H. Burris, MD, MPH[1,2], Joseph D. Romano, PhD, MPhil, MA[1]

[1]University of Pennsylvania

[2]Children's Hospital of Philadelphia

Email: chloe.paris@pennmedicine.upenn.edu

Preeclampsia is thought to originate from a dysfunctional placenta; however, little is known about how the placenta reaches that state. The precise placental developmental timeline points to periods of differing vulnerability to external insults. Many individual environmental exposures have been studied in their role of increasing preeclampsia risk. Identifying windows of susceptibility with regards to environmental exposures can inform public health interventions to lower exposures during specific gestational periods. In this work we lay the foundations and create the data infrastructure to explore windows of susceptibility in an individual's pregnancy during which maternal environmental exposures have a heightened impact on future risk of preeclampsia. We have built a preeclampsia case-control population nested within GeoBirth, a retrospective cohort of births since 2008 at the Hospital of the University of Pennsylvania and Pennsylvania Hospital, and collected a wide range of environmental exposures, encompassing both chemical and non-chemical exposures that can readily be observed from individual and area-level data. We have combined the GeoBirth participants and their timestamped pre-natal area-level/participant-level environmental exposures into the graph architecture for an observational temporal graph of exposures. This data infrastructure will be used to model the pregnant state as discrete states with heightened vulnerability and generate windows of susceptibility for individual environmental exposures using heterogeneous temporal graph machine learning.

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EN1 Endocrine Disrupting Chemical Exposure Affects Expression of Genes Involved in Neuronal Development and Activity

Alekh Paranjapye, PhD[1,2], Rili Ahmad[1], Steven Su[1], Erica Korb, PhD[1,2]

[1]Department of Genetics, Perelman School of Medicine at the University of Pennsylvania; Epigenetics Institute, Perelman School of Medicine at the University of Pennsylvania

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

Email: alekh.paranjapye@pennmedicine.upenn.edu

Both environmental and genetic factors contribute to neurodevelopmental disorders (NDDs). A disproportionate number of the NDD susceptibility genes, particularly those linked to Autism Spectrum Disorder (ASD), encode epigenetic regulators. Mutations in these proteins may affect chromatin accessibility and gene expression but they are often not fully penetrant. This suggests that other factors such as environmental toxicants may influence the incidence, severity, and development of disorders. Most previous research has focused on the gene of interest or exposure alone, but rarely examine them in combination. Thus, the convergence contributing to neuronal dysfunction remain largely unknown. To address this, we first examined the effect of endocrine disrupting chemicals (EDCs) on primary mouse neurons using a formulation termed ToxiMix. ToxiMix is a variation of a low-dose mixture of common EDCs that are of public health concern at doses replicating normal population exposure levels. We found broad dysregulation in the transcriptome of neurons treated with ToxiMix, particularly in genes encoding proteins involved in neuronal development and function. The gene regulatory consequences of ToxiMix exposure exhibit a strong, inverse correlation to those of exposure to a high level of bisphenol A (BPA), indicating dose-dependent responses. Next, To determine gene-environment effects, we depleted each of 10 chromatin modifiers that are closely linked to ASD in neurons on a vehicle or ToxiMix background. We observed strong dysregulatory interactions between exposure and partial loss of several of these chromatin regulators. To fully understand the functional consequences of exposure, will next assess neuronal morphology and spontaneous firing activity. To follow up these experiments in a more biological relevant system, we are treating mice with or without ToxiMix during pregnancy to determine the effects of perinatal exposure on behavior and the transcriptome with single-nuclei sequencing.

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EN2 Investigating the Role of Prenatal PBDE Exposure on 2, 3, and 4 Year Sleep Outcomes

Kelli Williams, MPH[1], Jagadeesh Puvvula, PharmD, PhD[1], John Holmes, PhD[1], Wei Yang, PhD[1], Sigrid Veasey, MD[2], Jianghong Liu, PhD, RN[3], Kim Yolton, PhD[4], Kim M. Cecil, PhD[4], Yingying Xu, PhD[4], Joseph M. Braun, MSPH, PhD[5], Bruce P. Lanphear, MD, MPH[6], Clara Sears, PhD[7], Ann M. Vuong[8], Aimin Chen, MD, PhD[1]

[1]Department of Biostatistics, Epidemiology and Informatics, Perelman School of Medicine, University of Pennsylvania

[2]Department of Medicine, Perelman School of Medicine, University of Pennsylvania

[3]Penn Nursing, University of Pennsylvania

[4]Cincinnati Children's Hospital Medical Center, Cincinnati, Ohio

[5]Brown University, Providence, Rhode Island

[6]Simon Fraser University, Burnaby, British Columbia, Canada

[7]University of Louisville, Louisville, Kentucky

[8]University of Nevada Las Vegas, Las Vegas, Nevada

Email: kelli.williams1@pennmedicine.upenn.edu

Children are especially vulnerable to toxic chemicals like polybrominated diphenyl ethers (PBDEs). Although these flame retardants were phased-out due to neurotoxicity concerns, they persist in the environment through dust, food, and air, remaining in older products and posing risks. PBDE exposure has been linked to neurodevelopmental issues, including hyperactivity, cognitive deficits, and behavioral problems. PBDEs may impair sleep, crucial for cognitive and psychosocial development. Poor sleep may cause attention difficulties, anxiety, and depression; and PBDEs may disrupt thyroid function, further impairing sleep regulation. This study investigates how prenatal PBDE exposure impacts children's sleep from 2 to 4 years. We used data from the Health Outcomes and Measures of the Environment (HOME) Study, a longitudinal cohort of 410 children born to 400 women between 2003 and 2006 in Greater Cincinnati, Ohio, which examines how environmental toxicants affect child health and neurodevelopment. We focused on five PBDE analytes: -153, -100, -99, -47, and -28. Imputation, transformation, and correlation analysis were performed based on the limit of detection (LOD). Chemicals detected in >80% of samples were treated as continuous variables, with undetected levels replaced by LOD divided by the square root of 2. For chemicals detected <80%, missing values were imputed using a left-truncated log-normal distribution. PBDEs were analyzed using lipid-standardized concentrations. Sleep outcomes were assessed using four domains from an adapted Children's Sleep Habits Questionnaire (CSHQ): sleep irregularity, hypersomnolence, sleep disruption, and sleep duration (minutes). We used Generalized Additive Models (GAM) to assess nonlinear dose-responses, and used Linear Mixed-Effects (LME) models and Generalized Estimating Equations (GEE) to evaluate the impact of prenatal PBDE exposure at 16-week on child sleep outcomes at 2, 3, and 4 years, adjusting for covariates. Most effect estimates across PBDEs were close to zero, suggesting no consistent association with sleep irregularity. However, at 4 years, PBDE-100 (-0.44, CI: -0.91, 0.02) and PBDE-153 (-0.40, CI: -0.82, 0.02) showed trends toward reduced hypersomnolence with higher exposure. PBDE-99 was positively associated with sleep disruption (0.57, CI: 0.09, 1.06), while PBDE-28 exposure significantly reduced sleep duration (-18.62 minutes, CI: -35.47, -1.78). Further analysis will explore potential age-specific susceptibility windows and PBDE mixtures.

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EN3 Identifying Potential ASD-Related Pollutants Through Genetics and Protein-Protein Interactions

J. Dylan Weissenkampen[1], Aimin Chen[2], Ronnie Sebro[3], Maja Bucan[1]

[1]Department of Genetics, Perelman School of Medicine, University of Pennsylvania

[2]Department of Biostatistics Epidemiology & Informatics, Perelman School of Medicine, University of Pennsylvania

[3]Majo Clinic, Jacksonville, FL

Email: James.vankampen@pennmedicine.upenn.edu

Autism Spectrum Disorders (ASD) are neurodevelopmental disorders characterized by deficits in social communication and stereotyped behavior. While ASD has a strong genetic component, there is increasing evidence of a large role for environmental factors, such as in utero exposures to certain compounds. We hypothesize that investigating molecular pathways for compounds may reveal enrichment of ASD risk genes and therefore provide information on susceptibility to ASD. In this study, we utilized the Comparative Toxicogenomics Database (CTD) for the all known interacting genes/proteins for compounds (interactomes) in conjunction with a list of ASD-associated genes to identify compounds that may affect ASD risk. We identified which compounds had a greater fraction of interaction with ASD genes than expected by chance, thus having a greater associated with ASD. Several of the top identified compounds were endocrine disruptors or steroids, such as bisphenol A (BPA), dexamethasone, and bisphenol F, and an estrogen receptor antagonist (fulvestrant).

Interaction networks may provide stronger evidence for relationships between compound interactomes and ASD risk genes at the primary and secondary level, providing key insights into potential targets for further research. To that end, protein-protein interaction (PPI) networks were constructed using the Biological General Repository for Interaction Datasets (BioGRID) and STRING databases. These network connections were then weighted by the mutational burden observed in 20,561 unrelated participants with ASD within the Simons Powering Autism Research (SPARK) consortium, providing valuable insights into genes and sub-networks that are most often burdened with rare, likely deleterious variants. Of these genes and networks, both the ESR1 and ESR2 genes were within the top 10 genes with the highest neighborhood mutation scores. When these scores were then used to rank the compound interactomes, an endocrine disruptor (butylbenzyl phthalate), an estrogen compound (4-hydroxy-equilenin), and a steroid (27-hydroxycholesterol) were identified within the top 10 compound interactomes.

Our work will provide novel insights into the possible link between ASD-risk genes and susceptibility to compounds that may be strongly associated with ASD. Through our unbiased approaches, we have identified steroid hormone pathways, especially estrogen pathways, that appear enriched for mutational burden within ASD. We hope that this integrated approach will provide possible models for more experimental validation of the effects of specific compounds on ASD risk.

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CC1 Understanding Heat Exposure Perceptions and Climate Change Knowledge in Elderly Asian Immigrants in New York City 2023

Inkyu Han[1], Jin Young Seo[2], Elynna Volkova[1]

[1]Department of Epidemiology and Biostatistics, Temple University College of Public Health

[2]Hunter-Bellevue School of Nursing, City University of New York

Email: inkyu.han@temple.edu

Extreme heat is a leading cause of climate-related illness and death in the United States, with low-income elderly immigrants being particularly at risk. To address this, we partnered with a local grassroots community-based organization to explore heat risk perceptions among 45 elderly Asian immigrants (ages 63-89, mean age 74±6 years) in New York City, recruited between August and September 2023. Participants completed an Indoor Home Heat Exposure Survey, which assessed their perceptions of heat risk, knowledge of climate change, locus of control, perceived heat exposure at home, temperature preferences, and demographic factors. The majority (64%) reported annual household incomes below $40,000. Despite financial challenges, participants had high heat risk perception scores (7.8/10), while their perceived heat exposure at home was moderate (6.4/10). The preferred indoor temperature was 23.9±3.5°C. A positive correlation was found between heat risk perception, perceived home heat exposure, and climate change knowledge. Participants under 75 years showed higher heat risk perception, though income, education, and sex were not significant factors. These findings highlight the need for targeted interventions to raise awareness and promote adaptive behaviors to protect low-income elderly immigrants from extreme heat risks.

Supported by R21 ES035188, Temple University.

CC2 Evaluating the Role of Temperatures on Small-for-Gestational-Age in Pennsylvania Births in 2010

Jennifer Ko, MPH[1], Jagadeesh Puvvula, PhD[1], Kyle Jackson, MD, PhD[2], Angela Aherrera, PhD[1], Aimin Chen, MD, PhD[1]

[1]Department of Biostatistics, Epidemiology and Informatics, Perelman School of Medicine, University of Pennsylvania

[2]Department of Surgery, Perelman School of Medicine, University of Pennsylvania

Email: jennifer.ko@pennmedicine.upenn.edu

Heat exposure can be a potential trigger for adverse health outcomes in pregnant women, who are more likely to dehydrate and have decreased appetite, resulting in reduced blood flow and nutrition to the fetus. The primary aim of this study was to determine the impact of extreme temperature exposure throughout pregnancy on small-for-gestational-age outcomes in children born to women giving birth in Pennsylvania. This retrospective cohort study utilized information from Pennsylvania birth records and utilized 74,477 births throughout the year 2010. Any birth between 32 and 42 weeks was included, and birth records missing temperature throughout the gestational period, birthweight, length of pregnancy, and any covariate information were excluded. Records with length of pregnancy and gestational age discrepancies greater than two weeks were also excluded. Birth records were linked to the maternal addresses, and temperatures were attributed to individuals from 2 weeks before their last menstrual period up to the birth record date. We modeled the exposure-outcome relationship utilizing a distributed lag non-linear model for weekly-specific average maximum temperature (Tmax) exposure during gestation. The exposure assessment was based on data from the PRISM climate group, with 800m resolution. The primary outcome of interest was small for gestational age (SGA), defined as any birthweight below the 10th percentile stratified by sex and week of gestation. This model accounted for confounders such as maternal race/ethnicity, education, marital status, and behavioral characteristics, including smoking. A small non-linear relationship was present between temperature and SGA outcomes throughout the second trimester. For example, at 25 weeks of gestation, compared to 25°C, (reference weekly Tmax), extremely cold temperatures (below -3°C) are associated with a 5% increase in odds of SGA, while average temperatures between 0 and 20°C are associated with 3 – 8% lower odds of SGA (figure 1). The risk was higher between 25 and 30°C, although not statistically significant. The risk was decreased at extreme heat temperatures (above 33°C), possibly due to protective behaviors and preventative measures such as indoor cooling systems. We are extracting additional climate data for a larger sample size and estimation precision for future analyses.

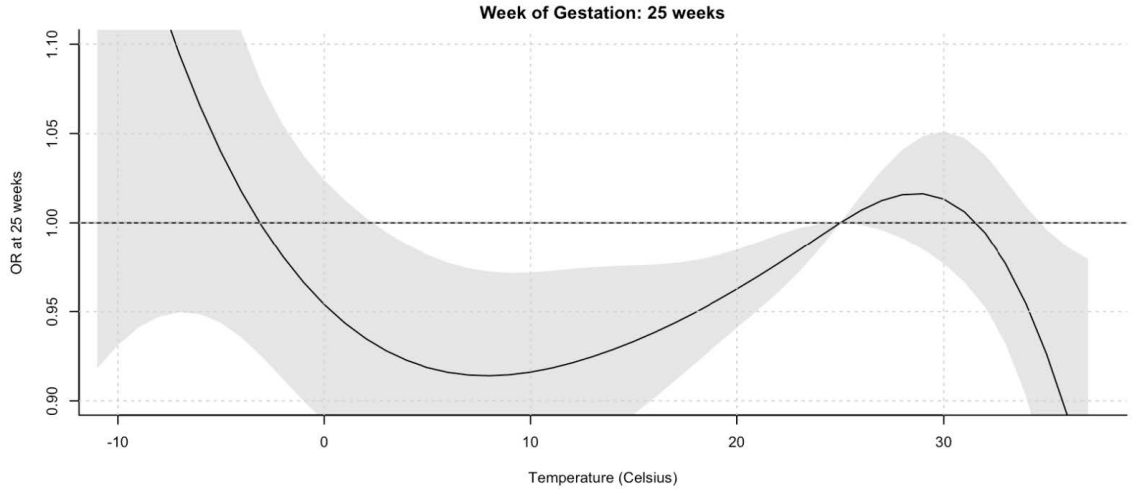

Figure 1. OR Holding Weeks of Gestation at 25 weeks over temperature exposure

CC3 Project G.R.E.E.N. O.R. (Guiding Reductions in Excess and Expenses in the Neurosurgery Operating Room): a Pilot Study

Rongrui (David) Liu[1]; Susanna D. Howard, MD[2]; Zarina S. Ali, MD[2]

[1]University of Pennsylvania, College of Arts and Sciences

[2]Department of Neurosurgery, Perelman School of Medicine, University of Pennsylvania

Email: LiuDav@pennmedicine.upenn.edu

Introduction: Operating rooms (OR) are a major center of waste generation and energy usage in modern hospitals. OR sustainable improvement studies have traditionally focused on one of two efforts: surgical tray optimization or waste management. Available literature detailing the specific implementation of these initiatives is scarce. This quality improvement (QI) study implemented a comprehensive strategy of optimizing waste segregation and surgical instrument inventory in neurosurgery ORs and measured the effects.

Methods: This study was conducted at a tertiary health center from May to October 2024. Surgical inventory metrics were measured, i.e., instrument count, weight, tray assembly time, and labor costs. Before and after the intervention, the Regulated Medical Waste (RMW) and Non-RMW mass associated with neurosurgical spine cases were measured. A questionnaire was used to measure employee engagement on a seven-point Likert scale from least engaged to most engaged.

Results: A total of 18 neurosurgery trays were reviewed by four neurosurgeons. Instruments deemed rarely used were removed from the trays, resulting in a mean reduction in instrument count of 23% (standard deviation (SD) 9.8%) and a mean reduction in assembly time of 29 minutes (SD 7 minutes) per surgery. Based on these reductions, annual labor cost savings was estimated to be $8000 (SD $1500). Across 68 neurosurgery cases (15 anterior cervical discectomy and fusions, 13 posterior cervical fusions, 19 lumbar laminectomies, 21 thoracolumbar fusions), the ratio of mean RMW to mean Non-RMW decreased from 1.4 (SD 0.3) to 0.8 (SD 0.2). Mean employee engagement increased by 23% (SD 12%) following the intervention (n = 61).

Conclusion: This study demonstrated the feasibility and preliminary success of implementing interventions to improve neurosurgery OR sustainability. Similar QI initiatives can be adopted in other surgical specialties or at other institutions.

Supported by the Penn Undergraduate Research & Mentorship Program.

CC4 Connecting Climate Change and Public Health: Engaging Teachers and Students to Enhance Environmental Health Literacy

Margaret Ferrandino[1], Isabella Andreozzi[1], Marilyn Howarth[1]

[1]Philadelphia Regional Center for Children's Environmental Health

Email: maggieferrandino@gmail.com

Understanding how climate change impacts health is an important motivator for action. Studies have shown that children are fearful about climate change and the effects. Education on climate change can help children develop the tools they need to protect themselves and the environment from the impacts of climate change. To enhance environmental health literacy around climate change, we designed educational programming directed towards children and educators. An initiative aimed directly at children, three interactive sessions were delivered to children ranging in age from 5 to 12, at a summer camp in Chester, Pennsylvania. The presentations were focused on air quality and climate change, fostering engagement and understanding. For educators, we focused on providing resources to incorporate climate change into the curriculum. We have created a curriculum for grades 5-8, "A Journey Through Water's Path and Its Challenges." This comprehensive curriculum features five engaging lesson plans, complete with PowerPoints, worksheets, and interactive activities covering the topic of climate change's impact on the water cycle along with the impacts on the environment and public health. A webinar series was also created for educators. Each session provides educators with lectures and teaching materials specifically addressing climate change's impact on air quality, temperature, and water. Through the creation of the curriculum and webinar series, we aim to enhance the environmental health literacy of educators and empower them with materials to facilitate discussion of climate change and public health in the classroom. Collectively, these projects aim to empower the next generation and equip educators with the necessary tools to effectively teach these critical issues.

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BMS1 Inhalation Toxicology of Chlorine Gas-on-a-Chip

Niyati Bhandari[1], Sezin Aday Aydin[2], Jimmy Xu[1, 3], Dongeun Huh[2, 3], Clementina Mesaros[1, 3]

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

[2]Department of Bioengineering, University of Pennsylvania

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

Email: xupei@pennmedicine.upenn.edu

The overarching goal of our project is to establish an entirely new approach to the development of biomarkers and effective medical countermeasures for Cl2-induced respiratory complications by transforming the conventional methods of modeling and predicting the toxicity of inhaled Cl2 gas in human lungs, using the power of lung-on-a-chip technology, that reproduce the living tissues of the human respiratory tract and their native microenvironment. We simulated realistic and physiologically relevant exposure conditions and measure an array of biological responses to inhaled Cl2 gas for quantitative microfluorimetric and multi-omics analysis. We conducted MS-based multi "omics" analysis of cells and vascular perfusate from the exposed lung-on-a-chip models to identify, characterize, and validate metabolomic and lipidomics biomarkers of Cl2 exposure. We discovered that beside the Cl-tyrosine formation in a concentration dependent manner based on the Cl2 exposure, proline, lysine and histidine are additional biomarkers changed after chlorine exposure.

The rest of the amino acids that were not changed, worked as negative controls. However, the largest biomarkers signature came from the lipidomic changes. We identified over 100 lipids that were secreted by the top epithelial cells after 15 min of Cl2 exposure. We focused the validation part of the study by developing and SID-LC-MS method for accurate quantification of several biomarkers, that combined gave an ROC with AUC around 0.9.

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Notes

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