



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

Concept: Continuation of the NIEHS Environmental Health Sciences Core Centers Program

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Liam O'Fallon
Toccara Chamberlain

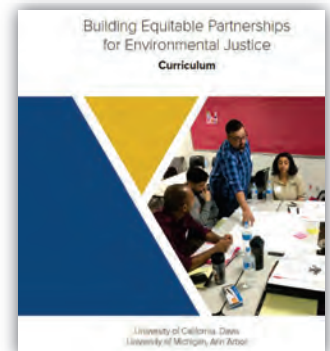
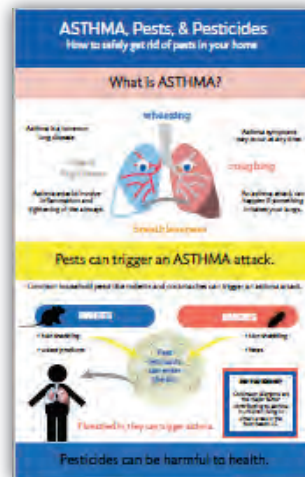
NAEHS Council, September 12, 2024

EHSCC Team: Kristi Pettibone, James Williams, LaTavia Miller, Camilo Asuncion, Clark Phillips, Varsha Shukla, Leroy Worth, Sharmice Outen, Deborah Jones & Kindra Morrison

National Institutes of Health • U.S. Department of Health and Human Services

Outline

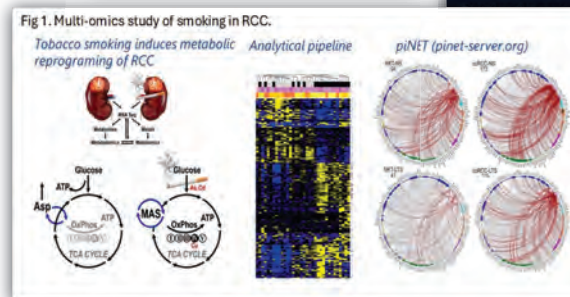
- Background and Structure
- Core Center Highlights
 - Career Development
 - Pilot Project Program
 - Translational Research
 - Disaster Response
- Summary and Future Vision for the Core Centers



Importance of the EHS Core Center Program

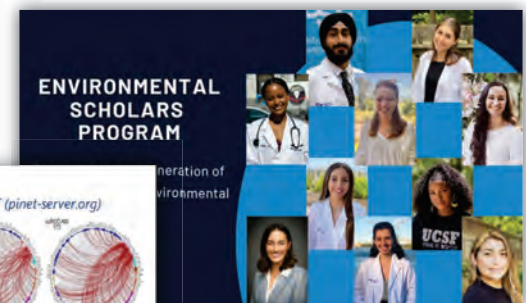
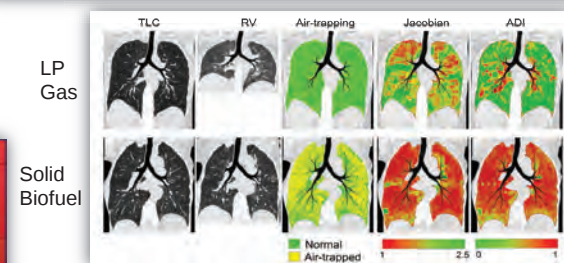
By the end of this presentation, I want to have demonstrated that Centers are incubators for:

- Science
- Translational Research
- Careers
- Community-engagement/Partnerships



RESEARCH ARTICLE

Imaging-based assessment of lung function in a population cooking indoors with biomass fuel: a pilot study

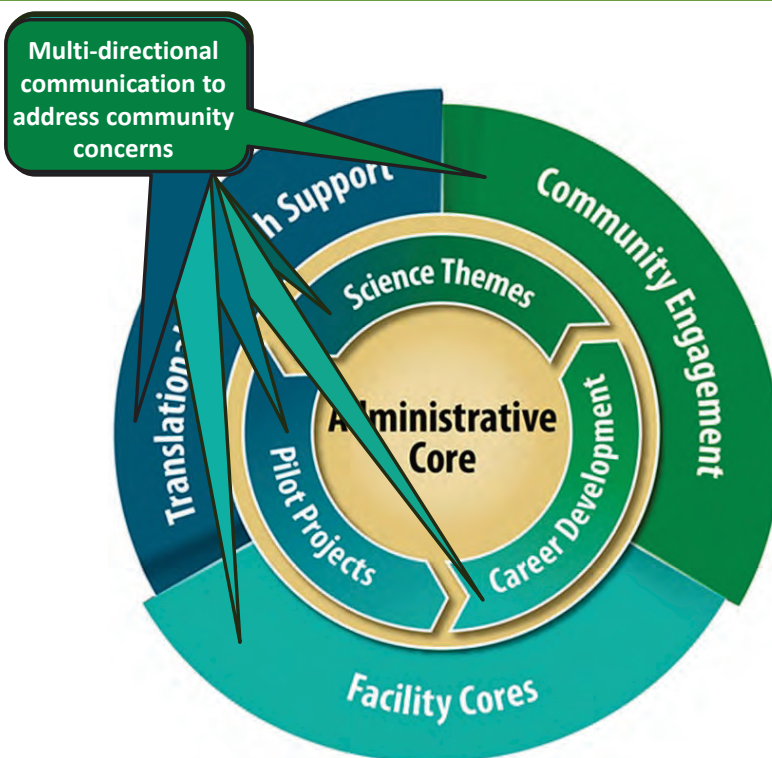


Background and Structure

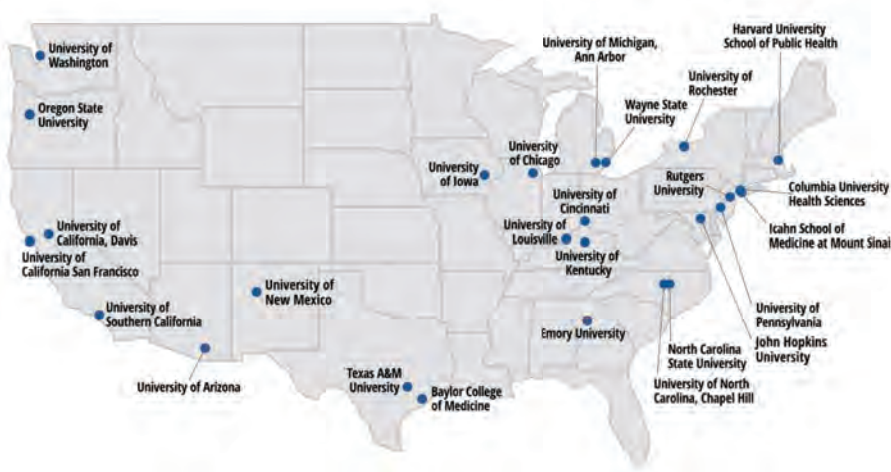
EHSCC Program Goals

Environmental Health Sciences Core Centers guide and support environmental health research at an Institution or region. Their goals are to:

- Provide intellectual leadership and foster innovation
- Translate research into public health outcomes
- Support new ideas and collaborations
- Provide career development for future leaders
- Engage communities in multi-directional communication



EHSCC Program By the Numbers



26

Current Centers

1,946

Members

1,682

Publications in 2023

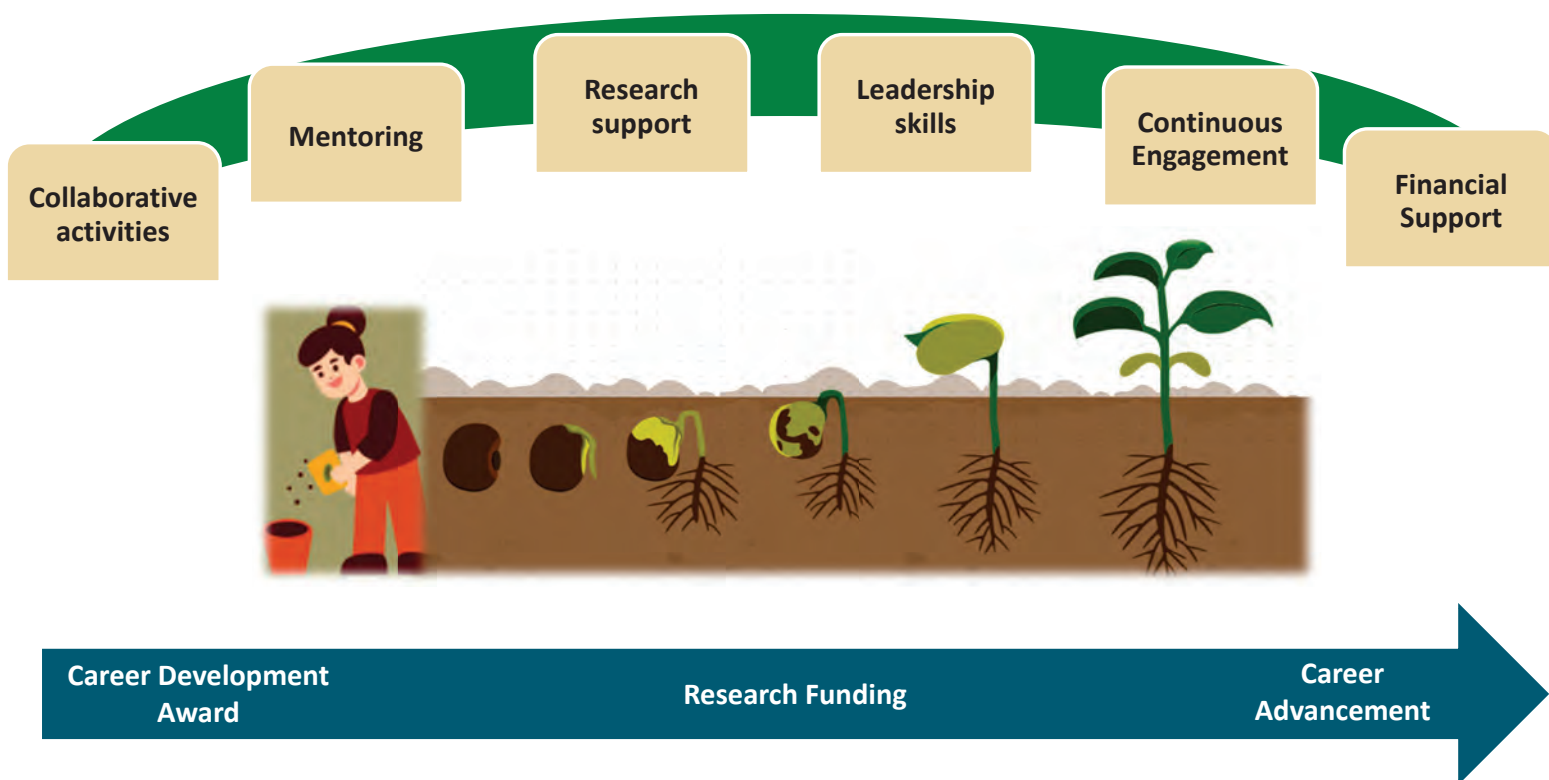
4,411

of times publications
were cited in FY 2023

338

Resources: written and
educational materials

Core Center Highlights: Career Development



Career Development Summary 2017-2024

- Approx. 223 career development recipients
- Approx 135 pilot awards
- Over 228 NIH grants awarded
- Over 2600 publications



*19 Centers responded to the request for career development highlights.

Mentoring



Targeted Training



Research Support



Scientific Enrichment



Diana Hernández, Ph.D.
Columbia University



**Career Development
Award 2016-2018**



**40 Publications as
awardee (100+ total)**



**NIH Funding
R01**



**Deputy Director,
P30 Center**



Core Center Highlights: Pilot Projects



Core Center Pilot Project Impact

Pilot Project
Investments
\$13,338,696



Pilot Project
Return
\$158,979,393

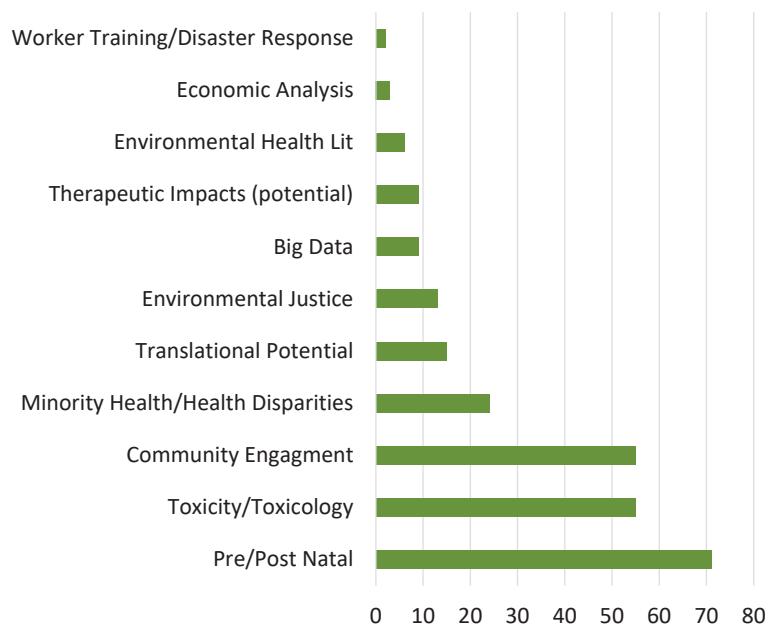
**PPP: Return on
Investment**
Ave \$11.91 : \$1
Range \$2.5-\$15M : 1

**Since 2007, the Core Centers have funded
595 pilot projects**

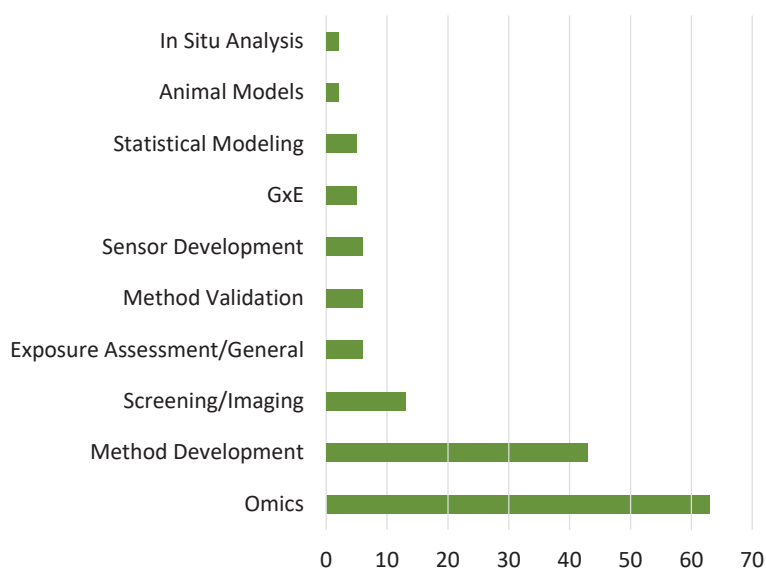
**During this same time period, the Centers have
invested over \$13M into Center pilot projects**



Pilot Project Approach Topics



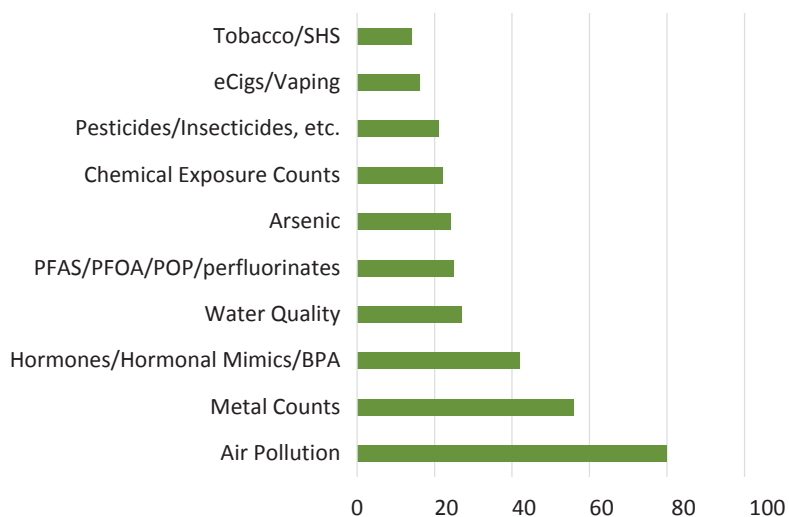
Pilot Project Methods Topics



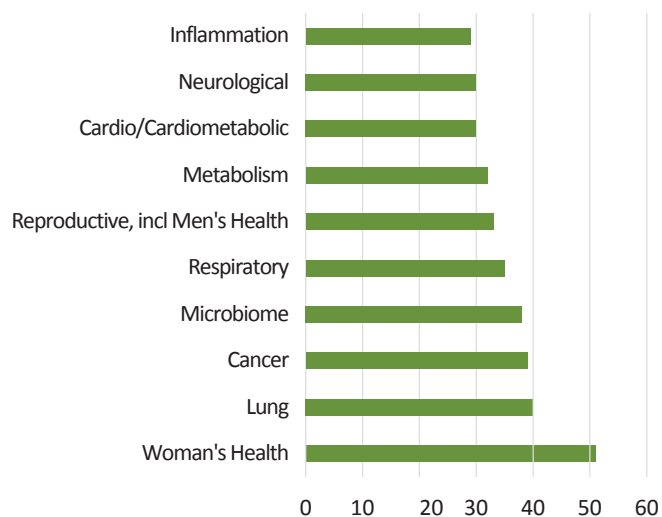


Pilot Project Top Ten Exposures and Outcomes

Exposures



Outcomes



EHSCC Pilot Project: Action on Spina Bifida in Bangladesh



Maitreyi Mazumdar, MD



- Pilot Project: Neural Tube Defects and Environmental Arsenic Exposure
 - case-control study to assess the relationship between environmental arsenic exposure and neural tube defects
 - Partial support for the development of a birth defect surveillance program
- R01 026317-01: Does Arsenic increase risk of neural tube defects in a highly exposed population – ONES Awardee (2016-2020)
- In June 2024, the Bangladesh Ministry of Health passed resolutions related to spina bifida including **setting standards for folate intake** and recommending a **surveillance program** for neural tube defects

Core Center Highlights:

Nimble, translational, and collaborative

Nanoplastics: Responding to emerging topics



240,000 – 400,000 nanoplastic particles per **Liter** of bottled water

Rutgers & Columbia

■ ■ *There's much more plastic in our brains than I ever would have imagined or been comfortable with*
Matthew Campen, University of New Mexico

Bioaccumulation of Microplastics in Decedent Human Brains Assessed by Pyrolysis Gas Chromatography-Mass Spectrometry

[Matthew Campen](#), [Alexander Nihart](#), [Marcus Garcia](#), [Rui Liu](#), [Marian Olewine](#), [Eliseo Castillo](#), [Barry Bleske](#), [Justin Scott](#), [Tamara Howard](#), [Jorge Gonzalez-Estrella](#), [Natalie Adolphi](#), [Daniel Gallego](#), and [Eliane El Hayek](#)

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The quantity of microplastics in brain samples from 2024 was about 50% higher from the total in samples that date to 2016, suggesting the concentration of microplastics found in human brains is rising at a similar rate to that found in the environment.

Microplastics: Responding to Communities



University of Rochester



EHSCC P30
Pilot projects



Community
Inputs



Team
building



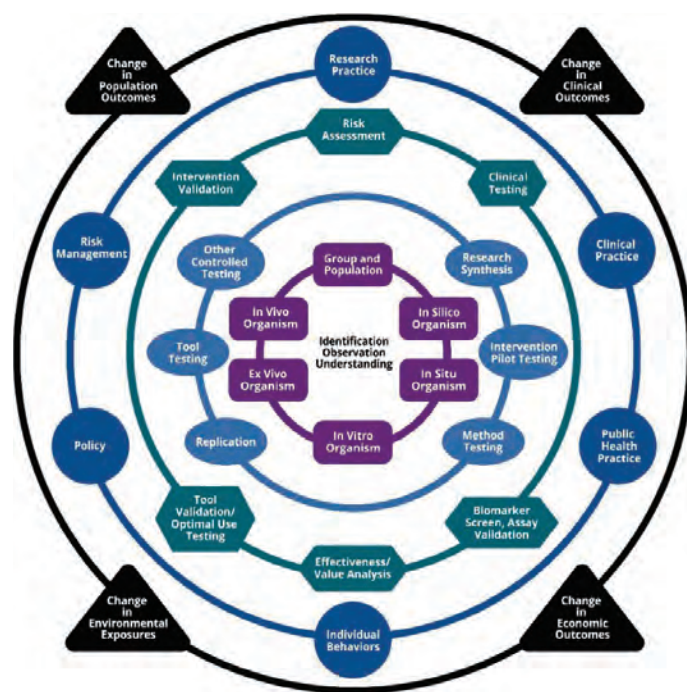
New COHH P01
Lifecycle of microplastics,
origins, distribution,
human exposure, health
effects, and impacts of
changing climate

The over-arching goal of this new Center, led by Katrina Korfmacher, is to prevent negative human health impacts of MP in the context of climate change in the Great Lakes. The Community Engagement Core involves diverse partners in all aspects of the Center, including community science, direct action, development and dissemination of materials, and building partners' capacity to promote solutions.

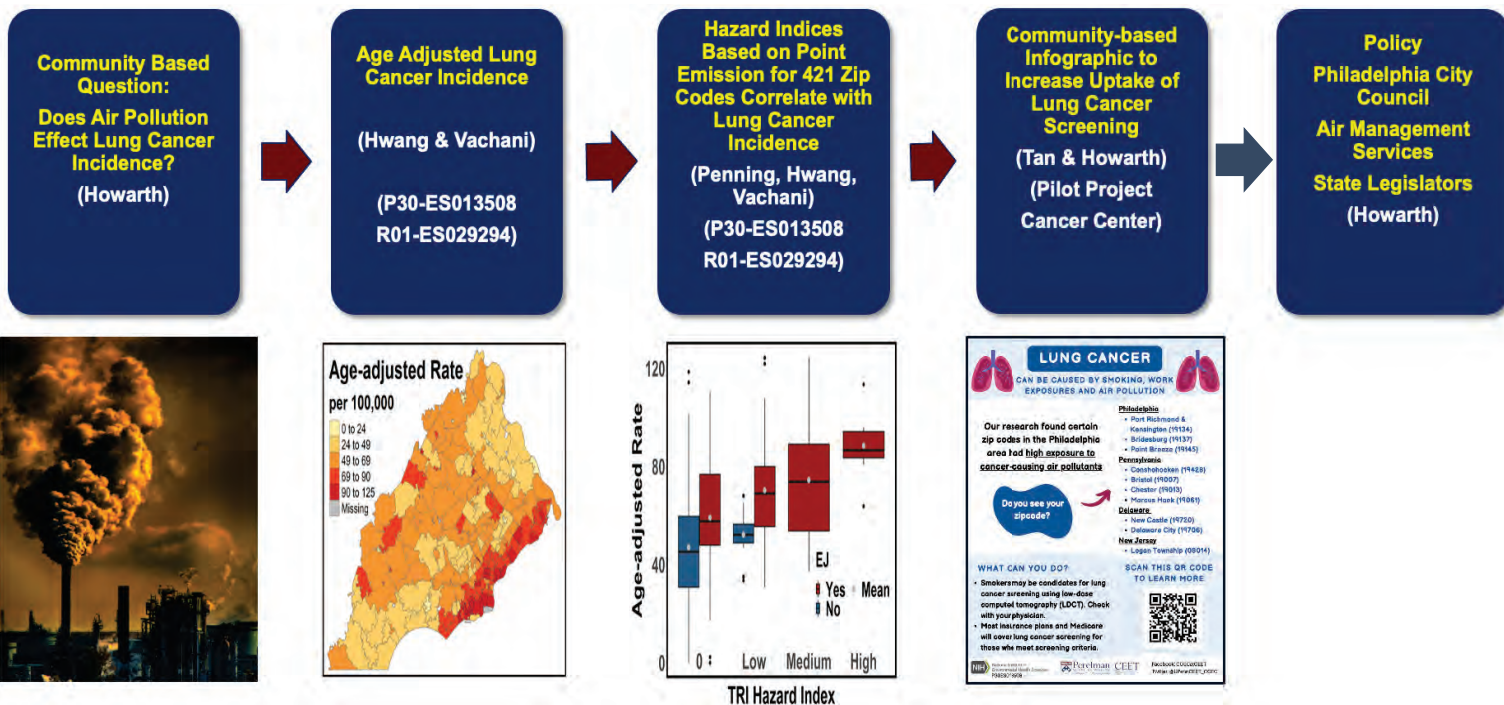
EHS Core Center Meeting (September 25, 2024)
Special scientific session on micro-plastics

Promoting Translational Research

- ~2006 -- new requirement for Centers to focus on translation of research to clinical and public health practice
 - Core structure was left to the grantees to develop as needed to meet the Center's goal
- 2017 – NIEHS rolled out a new translational research framework (TRF)
- 2021 – cores renamed to Translational Research Support Cores



Translational Research: Value of Bi-directional Community Engagement





Findings from large scale epidemiological study inform ongoing mechanistic research on Cd exposure supported by CHHE infrastructure.

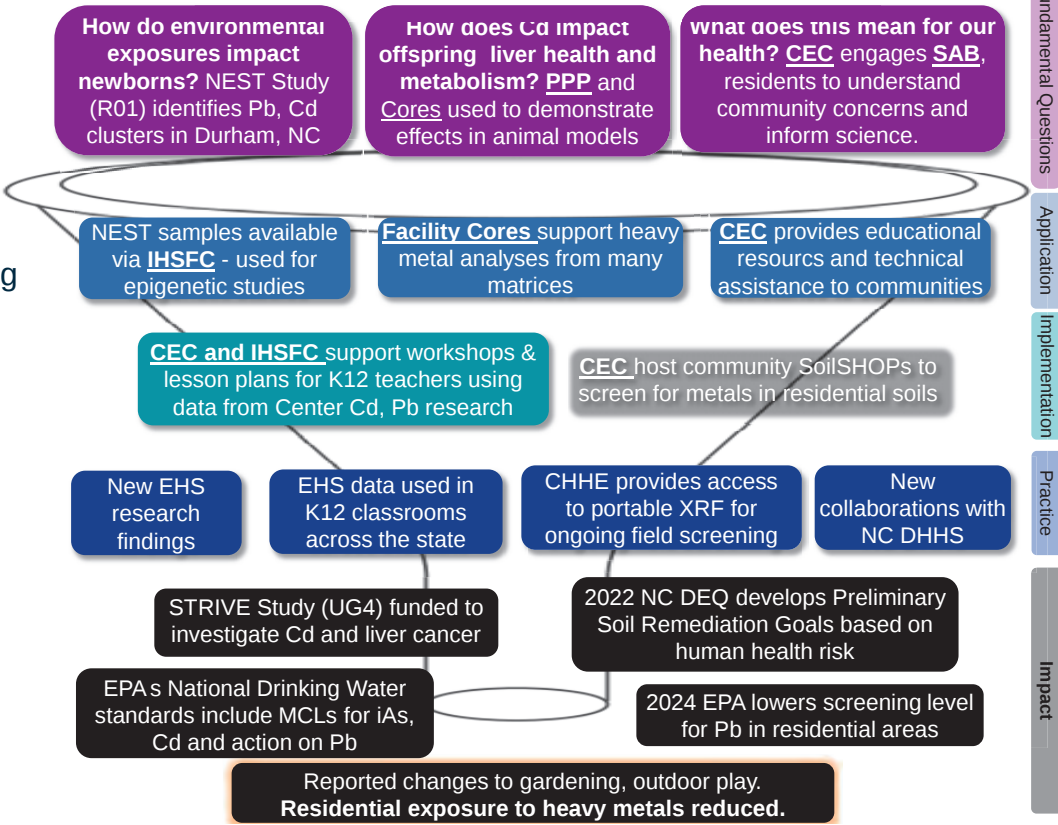
Data from these studies inform ongoing CEC work with communities and educators.

Heavy metal exposure remains a concern for residents of central NC.

- State, federal policies become more protective.
- Exposure reduction behaviors informed by research and policy.



Core Center Infrastructure Supports Translational Heavy Metals Research



Highlights: Power of Center Collaborations

Imperial Valley, California

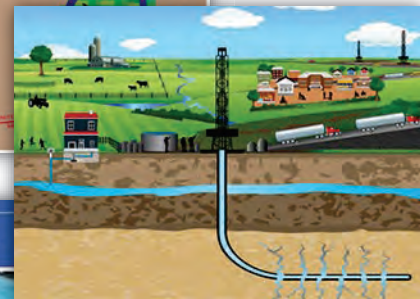
- Issue: multiple air quality concerns
- Sensor development for community air monitoring network
- Dust analysis from Salton Sea
- Examine child respiratory health outcomes

Air Sensor Stories

- Issue: knowledge gap on air sensors – types & purpose
- Workshop materials developed & tested
- Resources for communities

Hydraulic Fracturing

- Issue: new exposure with many unknown factors
- Inter-center working group established
- Data collection
- Research translation



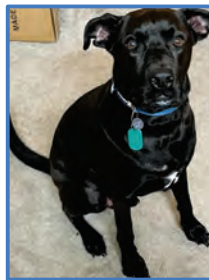
Core Center Highlights: Disaster Response

PNW EHSC at Oregon State University

Pacific Northwest Center for Translational Environmental Health Research



Developing capacity for research in Environmental Health Sciences



Flexible “just in time” pilot grant funding allowed a rapid response by the Chemical Exposure Core to an environmental disaster (East Palestine train derailment) to start a canine-sentinel exposure study.

Studying *inflammatory* gene expression response to wildfire exposure (pilot funded by UW EDGE Center 2022-2023 in support of rapid field research)

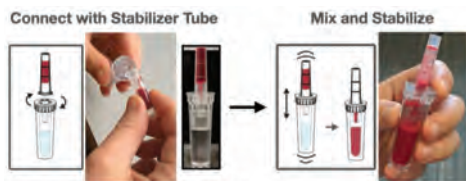


Image credit: www.tasso-inc.com

- Technology to collect blood samples at home
- Innovation to stabilize RNA for shipment
- Allows for transcriptomics analysis of samples collected remotely

EDGE pilot provided first dedicated funding for application of this approach

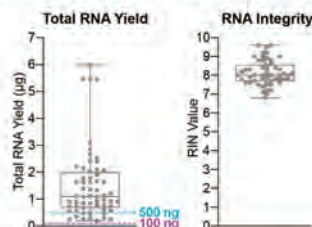
- Samples collected before, during, and after wildfire smoke exposure in high and low wildfire areas
- Two publications to date
- Supported new NIEHS grant 1R21ES034338-01



homeRNA kit

stabilizer tube

RNA yield and integrity are sufficient for downstream transcriptomics analysis.

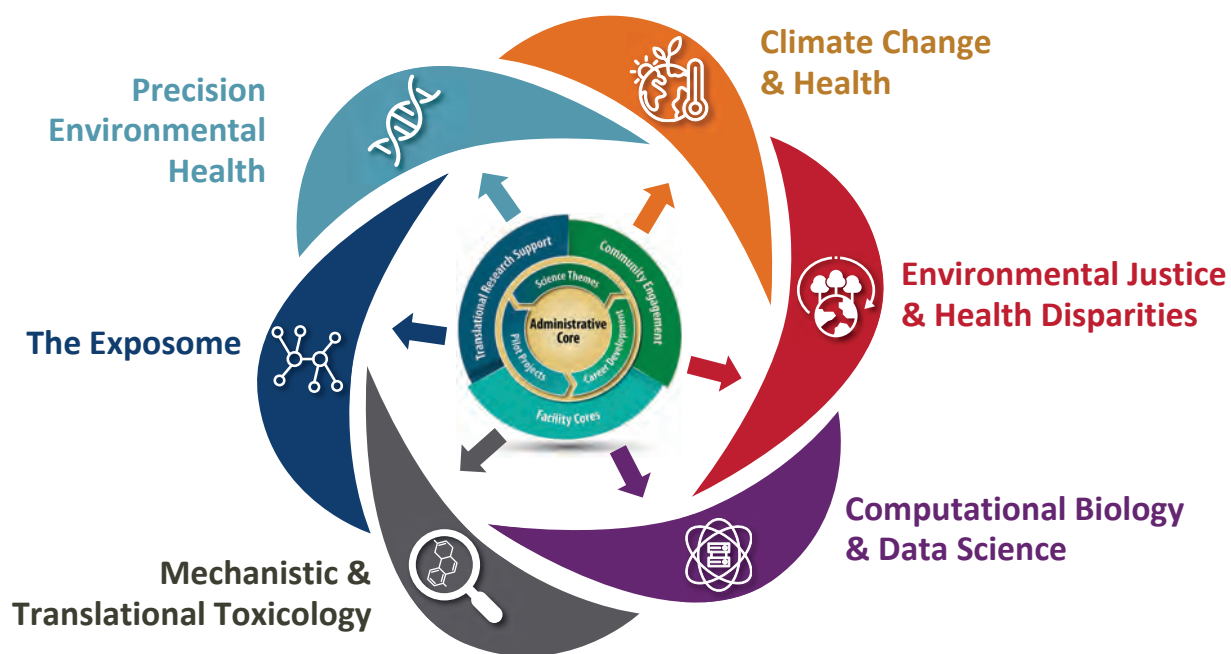


Haack*, Lim*, Kennedy, Day, Adams, Lee, Bertrier, Theberge, Anal. Chem. 2021. 93. 13196

Images courtesy of Ashleigh Theberge

Summary and Future Vision for the Core Centers

NIEHS Emerging Scientific Priority Areas



Previous Core Center Evaluations

	2004	2010	2015	2019	2024
Timeframe	1993-2003	2007-2010	2004-2014	2015-2019	2017-2024
Type	Outcome	Process	Process and Outcome	Process	Outcome
Focus	Key highlights Pilot projects Supplements	Programmatic and structural changes that were made in the 2005 FOA	Complex, Emerging and Translational Research	Impact of Centers on ESI/NI Success and Change in funding base & sliding scale	Career Development & Contribution of Centers to NIEHS grant base
Outcome	Made major changes to FOA Added IHSFC	Updated eligibility criteria in 2013	Developed EHS Translational Research Framework	Eliminated sliding scale Required Translational Vision	Changed eligibility criteria

Core Center Program Responsiveness

Identified Opportunities

Implemented Solutions

Building research capacity for “gap areas” on the map including MSIs, HBCUs, Tribal Colleges and Universities, and underfunded Institutions



Offering webinars and technical assistance to Institutions across the US

Leveraging NIH and other assets (federal and non-federal)



- New eligibility criteria
- Growing connections through pilot projects

Enabling greater cross-Center collaborations



Actively encouraging collaborations among the Centers

Bringing DEIA into the Center structure



- Centers can now receive diversity supplements
- Plans to enhance diverse perspectives have been added to the Centers

Proposed Concept

- **Mechanism:** P30
- **NOFO:** RFA with annual receipt dates for next 3 years
- **Minimum requirement:** funded research base of 3.0M in DC of supported Environmental Health Sciences projects that can be a mix of NIH, Federal and private grant support; at least 50% of the research base must be from NIH.
- **Structure:** Required
 - Admin Core
 - Facility Core
 - Career Development
 - Community Engagement Core
 - Pilot Project Program
 - **Translational Vision**
 - **Plan for Enhancing Diverse Perspectives**
- **Total cost for program:**
 - \$6.0 – \$7.5M/year based on availability of funds
 - New: \$850K/yr for 4 yrs; Competing renewals \$1.0M/yr for 5 years

Discussion and Questions

Council Discussants:

Dr. Gary Miller
Dr. Darryl Hood

Questions for Council

- What input or recommendations does Council have for advancing efforts to address the gap areas?
- A new evaluation of the Core Centers Program seems appropriate, what topics or focus areas would interest Council?



THANK YOU