HEI Highlights: Recent Progress and Future Directions

HEI 2024 Annual Conference
April 29, 2024

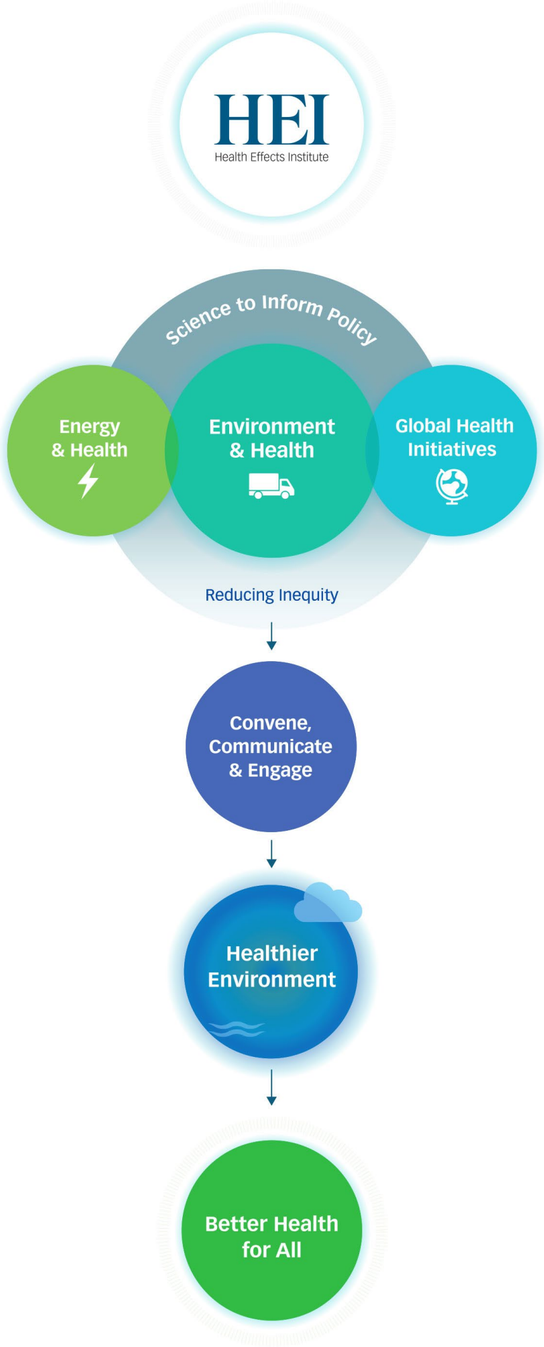
HEI

CONTENTS

HEI

OUR MISSION & VISION

HEI provides impartial science to inform decisions that foster a healthier environment and better health for all.



HEI

HOW WE ACHIEVE OUR MISSION

Fund and support policy -relevant scientific research.

Convene independent experts to select, oversee, and review scientific research.

Bring together government, industry, nongovernmental organizations, academia, and communities to help to guide research priorities.

Synthesize, interpret, and communicate scientific evidence to audiences in the United States and around the world.

Engage with HEI audiences to facilitate use of its science in decision making.

HEI

ENVIRONMENT & HEALTH

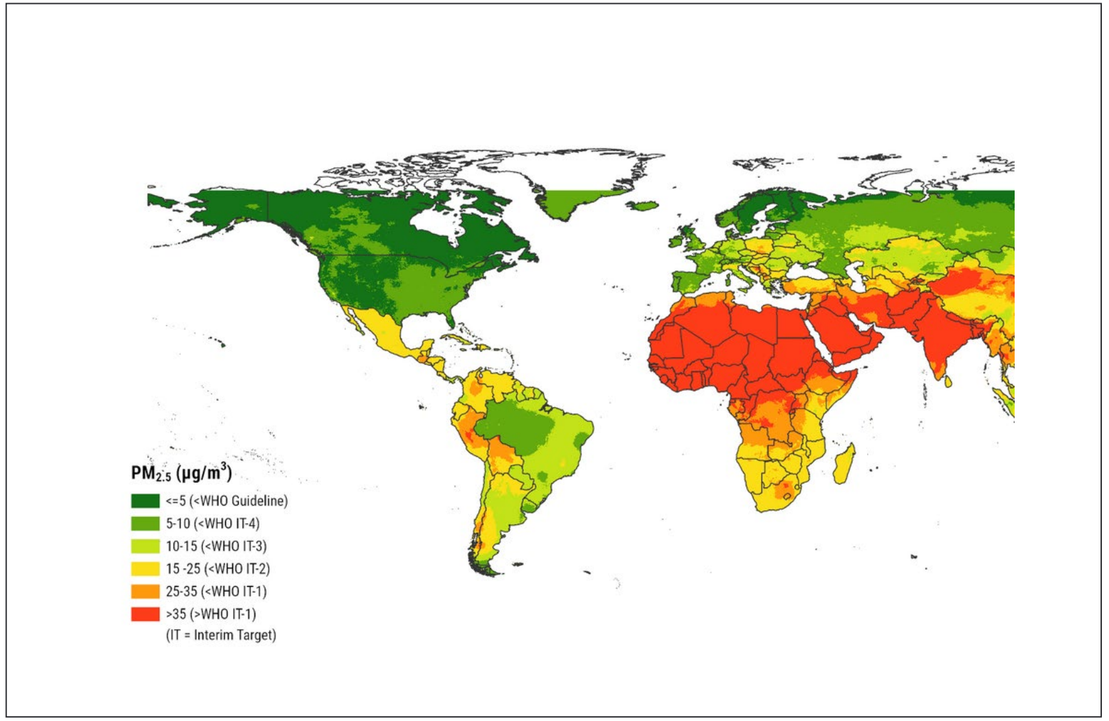
For 40 years, this program has provided independent, impartial science on exposures and health effects of air pollution to inform government, community, and industry decisions.

Funded jointly by US EPA and motor vehicle industry.

GLOBAL HEALTH INITIATIVES

The program provides science to improve understanding of health effects of air pollution, build local evidence, and strengthen scientific capacity and public awareness. The program works both globally and in geographical areas of interest.

Funded by philanthropies and development agencies.

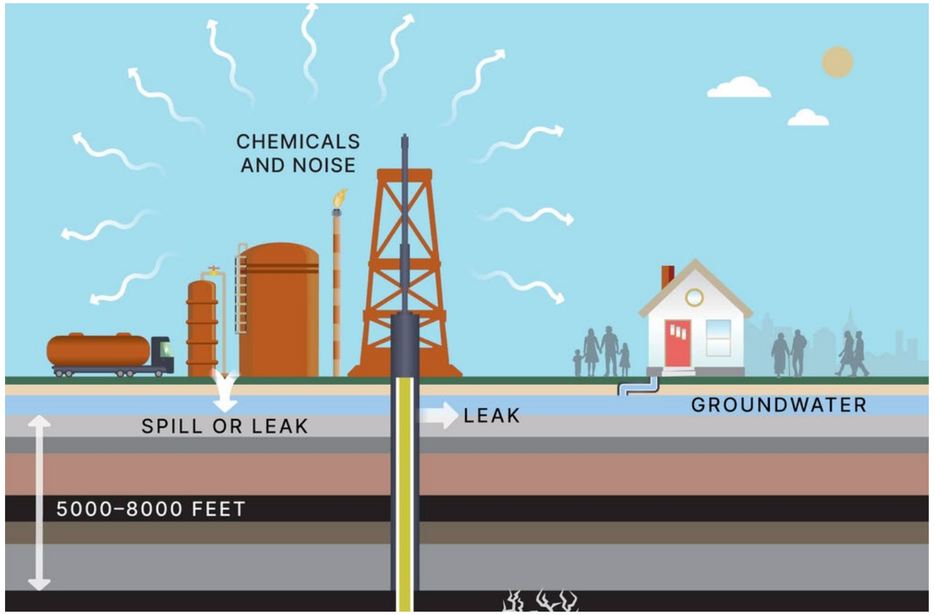


STATE OF GLOBAL AIR HEI

ENERGY & HEALTH

This program aims to support health-protective decisions by defining community exposures, health effects, and cumulative impacts of energy development, with an initial focus on oil and gas development.

Funded jointly by US EPA and oil and natural gas industry.



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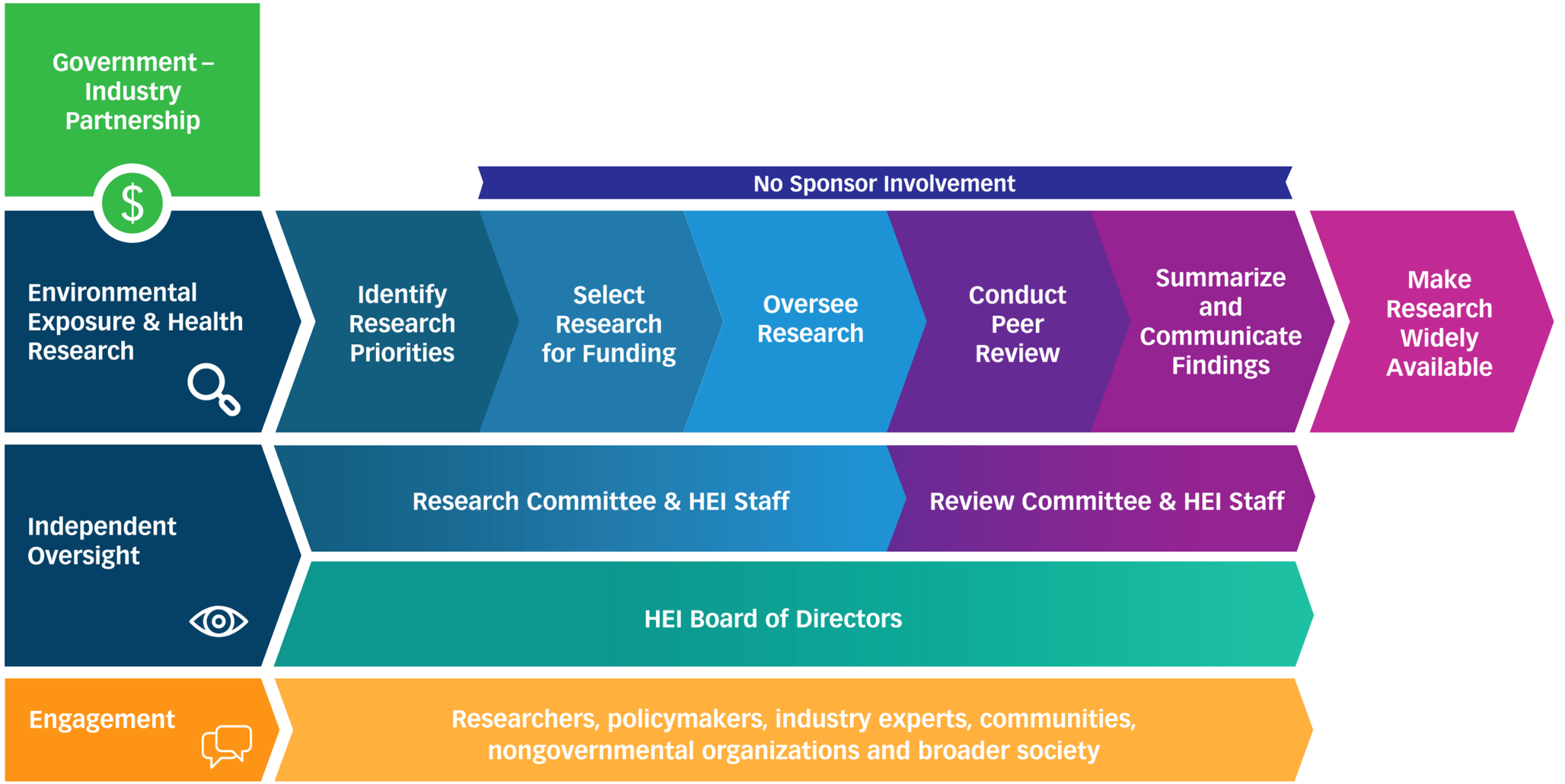
HOW HEI PROVIDES IMPARTIAL SCIENCE



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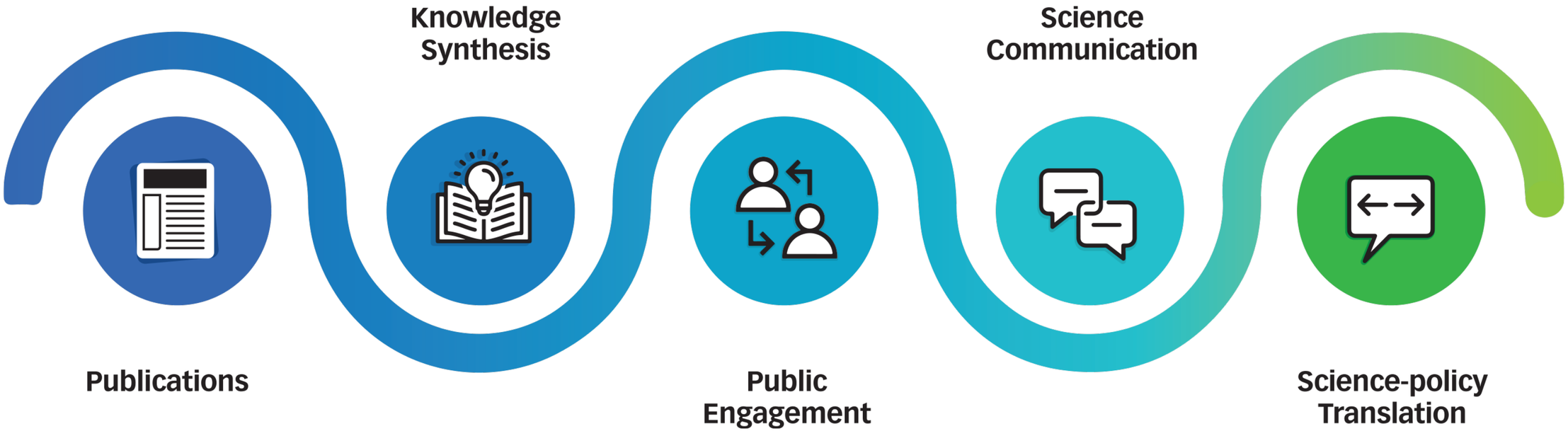
HOW HEI FACILITATES USE OF ITS SCIENCE IN DECISION-MAKING



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Our Progress

2020-2025

STRATEGIC PLAN 2020-2025 : KEY THEMES

Accountability

Testing the links between air quality actions and health

Complex Questions for the Air Pollution Mixture

Transport and Urban Health

Global Health

Cross Cutting Themes: Sensitive Populations, Transparency, Data Access, Systematic Synthesis, Statistical Methods, and More

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ACCOUNTABILITY: UPCOMING REPORTS

Compares student health and performance in school districts with and without a program to replace or retrofit diesel school buses.

Quantifies the monetized societal health benefits associated with emission reductions from major source sectors — transportation and energy generation — in Canada and the United States.

Evaluates effects on birth outcomes given policies in Texas to curb transportation emissions.

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ACCOUNTABILITY: IN PROGRESS

Assessing mortality trends in two national Chinese cohorts from 2008 -2019 given policies to reduce emissions – *currently in review*

Investigating changes in health effects and air pollution associated with Chinese policy to ban coal heaters – *entering review 2024*

Comparing effects of policies targeting mobile vehicles and electricity generating units to improve air quality and estimating their health benefits in U.S. cities – *entering review 2024*

Developing U.S. national, fine-scale, and daily $PM_{2.5}$ source impact exposure estimates and their uncertainties

Images: https://chinadialogue.net/en/energy/what-next-for-clean-heating-in-rural-china/ ; https://pixabay.com/photos/pedestrians-crossing-traffic-1853552/

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COMPLEX QUESTIONS ON AIR POLLUTION MIXTURES

Major studies in this category are investigating the following:

- Strategies for enhanced exposure assessment and quantifying the influence of exposure measurement error. *All five studies are currently in review.*

- Influence of biomass burning – wildland fires and prescribed burns – on various health effects.

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COVID-19, AIR POLLUTION, AND HEALTH

Zorana Andersen (University of Copenhagen)

Long-Term Exposure to AIR Pollution and COVID-19 Mortality and Morbidity in DENmark: Who Is Most Susceptible?

Evaluated whether there is an association between exposure to outdoor air pollution and the risk of COVID-19 incidence, hospitalization, and mortality in a cohort of 3.7 million Danish adults.

Found elevated risks of all three COVID-19 outcomes associated with exposures to fine and coarse particulate matter, black carbon, and nitrogen dioxide.

Four other studies investigating the association between air pollution and COVID-19 outcomes are currently in review.

November 2023

https://www.healtheffects.org/publication/long-term-exposure-air-pollution-and-covid-19-mortality-and-morbidity-denmark-who-most

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TRANSPORTATION AND HEALTH

Joshua Apte (University of California Berkeley)

Scalable Multipollutant Exposure Assessment Using Routine Mobile Monitoring Platforms

Evaluated the use of mobile monitoring for several air pollution mapping and exposure assessment applications.

Evaluated and compared such data and approaches in Oakland, California, and Bangalore, India.

Produced relatively reproducible maps of traffic-related air pollution with data from relatively few repeated drive passes in both locations.

Three studies assessing adverse health effects from exposure to TRAP and investigating the effects from spatially correlated confounding or modifying factors are currently in review

January 2024

https://www.healtheffects.org/publication/scalable-multipollutant-exposure-assessment-using-routine-mobile-monitoring-platforms

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RESEARCH ON NON-TAILPIPE EMISSIONS

https://pixabay.com/photos/car-speed-road-traffic-subaru-8034787/

One study is investigating short-term respiratory health effects in non-smoking adults with mild to moderate asthma during and after sequential exercise exposures to three contrasting air quality environments in London, United Kingdom.

Another is providing real-world field measurements to estimate and understand population exposure to non-tailpipe versus tailpipe particulate matter.

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NEW RESEARCH: HEALTH EFFECTS OF TRAP

- Link several models to create a framework for full -chain assessment of transportation systems and impacts of TRAP on population health in the San Francisco Bay Area.
- Examine associations of TRAP between a panel of standard lipid risk factors and novel apolipoprotein and lipoprotein subfractions and incident cardiovascular disease events and explore potential mediating pathways of risk.
- Assess impacts of future urban transportation landscapes on cardiometabolic health through novel exposure estimation using an agent -based modeling approach together with numerical air quality modeling.
- Develop models relevant for characterizing exposures from vehicle (tailpipe and non - tailpipe), rail, and aircraft sources and relate those exposures to birth outcome data in the Los Angeles area.

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HEAVY-DUTY VEHICLE IMPACT ANALYSIS: WHY

Substantial improvements can be achieved with new technology for heavy-duty diesel engines (HEI *ACES* study*).

Almost half of the current fleet of trucks and buses are older vehicles that do not meet the newest standards.

Older, more polluting vehicles are often found in urban areas and historically marginalized communities.

An opportunity exists to identify the exposure and health benefits that could be achieved by replacing older diesel vehicles with new cleaner technologies.

https://pixabay.com/photos/truck-transport-america-vehicle-3492143 /

*Advanced Collaborative Emissions Study (ACES), https://www.healtheffects.org/publication/advanced-collaborative-emissions-study-aces-lifetime-cancer-and-non-cancer-assessment

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HEAVY-DUTY VEHICLE IMPACT ANALYSIS: WHAT

What are the potential emissions, air quality, human exposure, or health benefits that could be achieved by replacing older medium - and heavy-duty diesel vehicles in the United States with cleaner vehicle technologies?

Focus on potential near-term impacts of removing older vehicles and replacing them with cleaner diesel vehicles and emerging technologies.

Aims:

- Identify an urban hotspot in the United States that might benefit from fleet turnover.
- Quantify potential benefits of accelerating medium - and heavy-duty diesel vehicle fleet turnover in the selected hotspot.
- Identify challenges or barriers to replacement of the older vehicles through active engagement with owners and operators of medium - and heavy-duty vehicles and other audiences.

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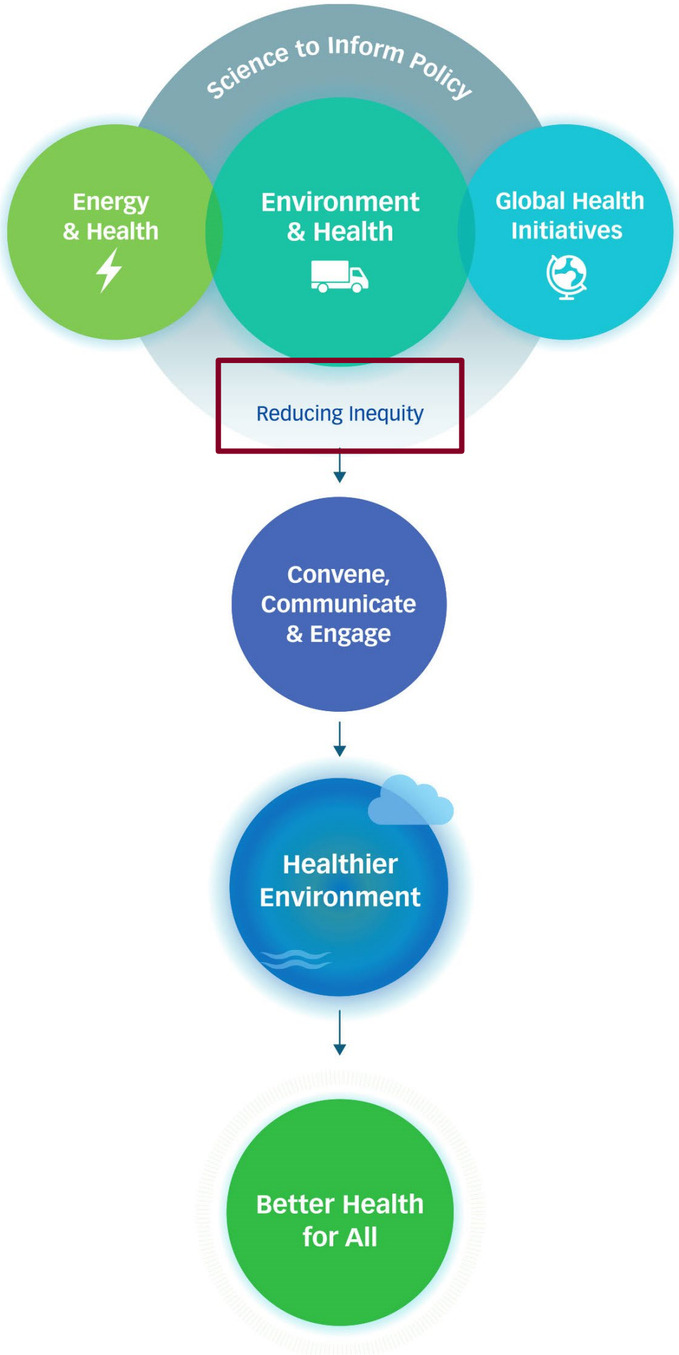
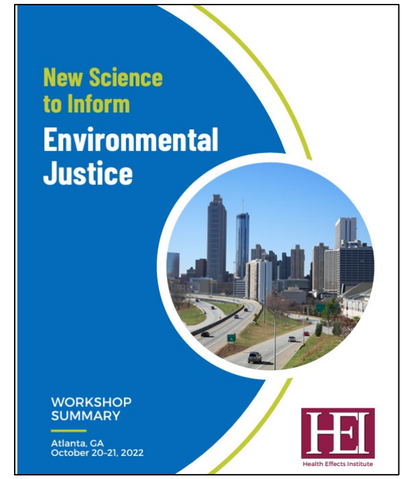


ENVIRONMENTAL JUSTICE PROGRAM

Facilitate, support, and fund scientific research, special projects, and research translation that advance environmental justice for historically marginalized communities in the United States.

- Incorporating equity and meaningful engagement throughout HEI's existing programs.
- Creating new funding mechanisms to support research focused on the needs of communities disproportionately affected by environmental pollution.
- Convening multisectoral groups to identify solutions.
- Developing tools and research translation mechanisms for decision making.



HEI

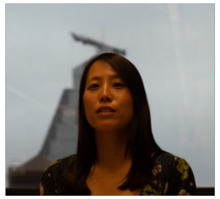
GOVERNANCE

Advisory Council

- Provides strategic advice.
- Ensures that the program achieves its mission.
- Advises HEI on integrating environmental justice considerations into its other programs.

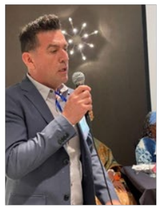
Maria Harris, PhD
Environmental Epidemiologist,
Environmental Defense Fund

Mychal Johnson
Founding Member,
South Bronx Unite



Yukyan Lam, JD, PhD
Research Director
Tishman Center, New School

Lesliam Quiros-Alcala, PhD
Assistant Professor,
Johns Hopkins Bloomberg School of
Public Health



Beto Lugo Martinez
Environmental Justice
Organizer
Rise4EJ

Elizabeth Scheele
Research Division Chief,
California Air Resources Board

Oversight Panel

- Defines research needs in Requests for Applications.
- Selects and oversees funded studies.
- Provides oversight and feedback while studies are ongoing.

Jayajit Chakraborty, PhD
Professor,
University of Texas at El Paso

Noelle Eckley Selin, PhD
Professor,
Massachusetts Institute of Technology

Christina Fuller, ScD *(Chair)*
Associate Professor,
University of Georgia

Melissa Gonzales, PhD
Chair and Professor,
Tulane University

Madeleine Scammell, DSc
Associate Professor,
Boston University

Neeta Thakur, MD
Associate Professor,
University of California, San Francisco

Linda Valeri, PhD
Assistant Professor,
Columbia University

Sherri White-Williamson, JD
Executive Director,
Environmental Justice Community
Action Network

REQUEST FOR APPLICATIONS: 23-2

Assessing Changes in Exposures and Health Outcomes in Historically Marginalized and Environmentally Overburdened Communities from Air Quality Actions, Programs, or Other Interventions

Objective

- **Evaluate actions, programs, or other interventions in the United States** at the national, regional, tribal, state, or local level that have affected or have the potential to affect **air quality, exposure, or health outcomes in historically marginalized communities.**
- Modeled after HEI's long history of funding accountability research to assess the effects of air quality actions on health outcomes.

REQUEST FOR APPLICATIONS: 24-1

Cumulative Impact Assessment For Decision-Making: A Community-Academic Partnership Approach

Objective

1. Strengthen community -academic partnerships, develop tools, and conduct dissemination activities designed to improve health and uptake of the research for decision -making.
2. Conduct cumulative impact assessments where results would be incorporated into a specific decision context.

Format

Co-PIs:
1) Research Institution
2) Community -Based Organization

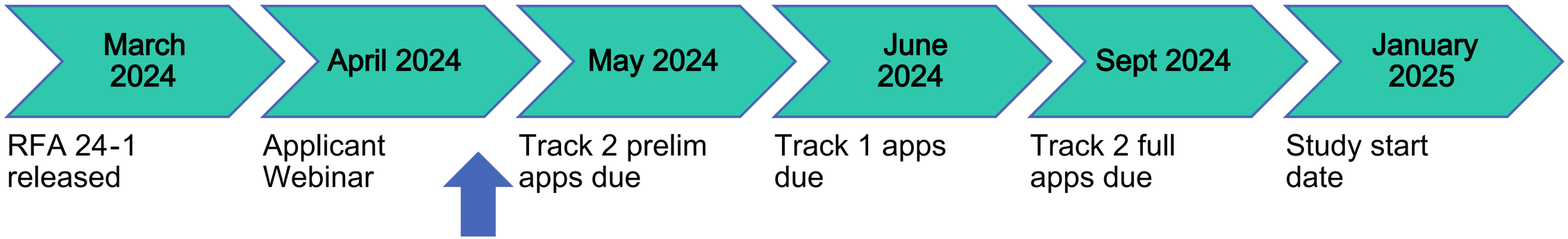
Track 1: Multiphase — Single application → **Phase I. Partnership Strengthening and Problem Formulation** → **Phase II : Research Implementation and Translation**

Track 2: Single Phase — Preliminary application → Full application → **Phase II : Research Implementation and Translation**

REQUEST FOR APPLICATIONS: 24-1

Cumulative Impact Assessment For Decision-Making: A Community-Academic Partnership Approach

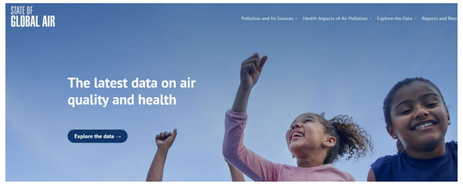
Timeline



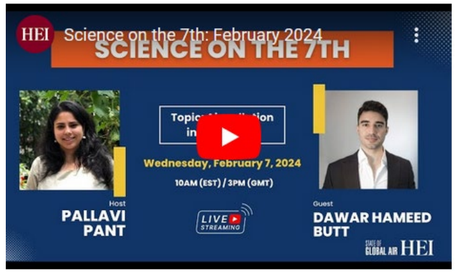
STATE OF GLOBAL AIR

Track and communicate long -term trends in air quality levels and health impacts for cities and countries around the world.

Updated website



Livestream series



Resources in multiple languages

NEW: Video on air pollution and children's health

STATE OF GLOBAL AIR /2024

UPCOMING: State of Global Air 2024, in partnership with IHME and UNICEF

STATE OF GLOBAL AIR HEI

https://www.stateofglobalair.org/ | https://www.healtheffects.org/science-on-the-7th

WORK IN SOUTH ASIA

Collaborative on Air Pollution and Health Effects Research (CAPHER) Network - work continues, including a national consultation on the revisions to the Indian National Ambient Air Quality Standards.

NEW: Additional funding to expand the network to other South Asian countries.

Santu Ghosh (St John's Research Institute, India) is developing India -specific exposure -response models to examine the association between long -term $PM_{2.5}$ exposure and coronary artery disease in three Indian cohorts.

Archana Patel (Lata Medical Research Foundation, India) is examining the association between exposure to air pollution and maternal and neonatal health outcomes.

NEW: Work underway with an expert panel to assess changes in air quality in Indian cities since the launch of the National Clean Air Programme (NCAP).

STATE OF GLOBAL AIR HEI

WORK IN EAST AFRICA

Mapping evidence on air pollution and health

Spatial bibliography on available literature on air quality and health in East African countries

Scoping review on health effects of air pollution; panel of 6 experts from Africa

Engagement and outreach

Webinar series – September 2023 - January 2024

CLEAN-Air Partnership

https://www.healtheffects.org/global/interactive-database/east-africa
https://www.healtheffects.org/meeting/webinar-series-air-pollution-and-health-east-africa

STATE OF GLOBAL AIR HEI

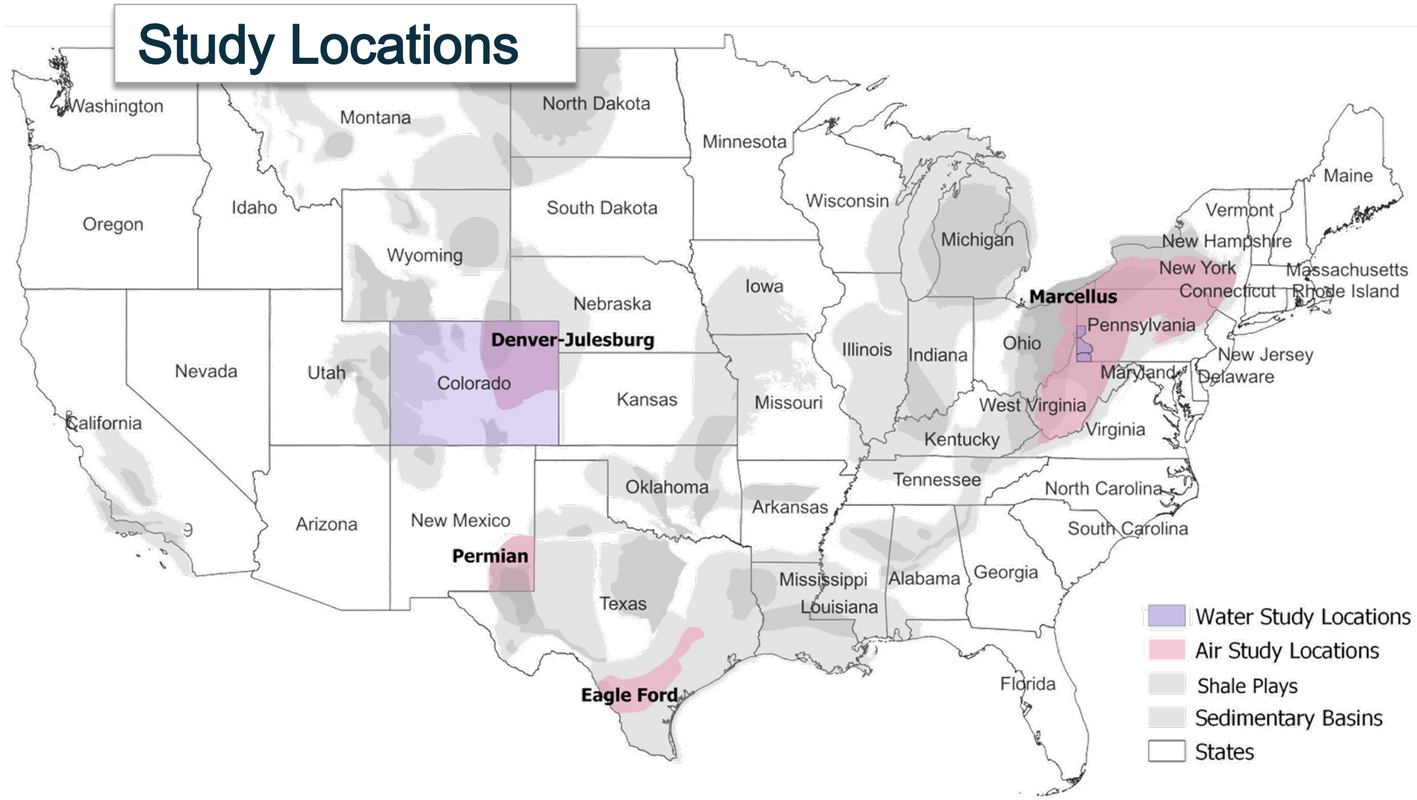
HEI ENERGY PROGRAM OF EXPOSURE RESEARCH

Community Exposures to Oil and Gas Development

- Understand how exposure varies among subpopulations, regions, and operational conditions.
- Know how to mitigate exposures of concern for health.

Community Engagement

- HEI staff and research teams actively engage with community members, government officials, industry, NGOs, and academic institutions in our study locations.



WATER-RELATED COMMUNITY EXPOSURE TO OIL & GAS DEVELOPMENT: UPCOMING REPORTS

Using Geoscientific Analysis and Community Engagement to Analyze Exposures to Potential Groundwater Contamination

Principal Investigator: Jennifer Baka, Penn State

Assessing the Effects of Unconventional Oil and Gas Development on Community Water Sources

Principal Investigator: Joseph Ryan, Univ of Colorado

HEI energy

COMMUNITY EXPOSURE TO AIR EMISSIONS AND NOISE FROM OIL & GAS DEVELOPMENT: IN PROGRESS

Air quality and noise monitoring over the life cycle of a well to understand potential exposures at different distances from UOGD sites and to evaluate the TRACER model.

A new TRACER model to predict chemical emissions from specific UOGD processes and their effects on local and regional air quality.

- Can be adapted for use anywhere in the U.S. to track changes in UOGD emissions and exposure over time.
- Leverages oil and gas industry-funded Appalachian Methane Initiative (AMI).

Air Quality and Noise

Tracking Community Exposures and Releases (TRACER) Collaboration

Jeffrey Collett
Colorado State

Lea Hildebrandt Ruiz
Univ of TX-Austin

Meredith Franklin
Univ of Toronto

Study Duration: 2022 -2024

HEI energy

COMMUNITY EXPOSURE TO AIR EMISSIONS & SPILLS

4 new studies beginning in Spring 2024 under October 2023 Requests for Qualifications

RFQ E23-1 Assess trends in air quality and community exposures associated with unconventional oil and gas development.

RFQ E23-2 Conduct regional groundwater quality modeling to help understand how spills associated with unconventional oil and gas development might affect groundwater used as a source of drinking water in the Marcellus region.

HEI energy

DESIGNING A CUMULATIVE IMPACT ASSESSMENT FOR AN OIL & GAS COMMUNITY

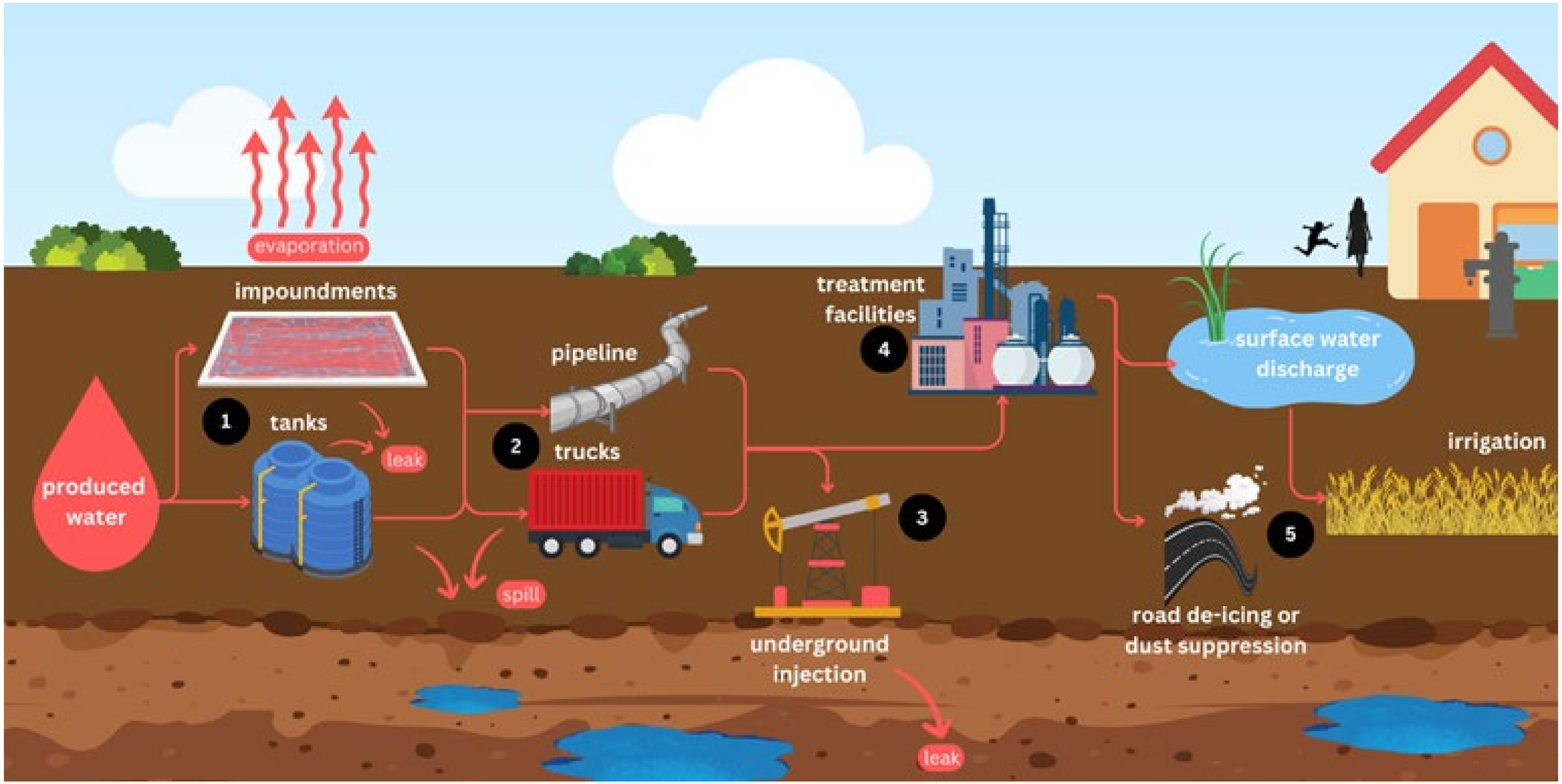
Upcoming Events

- Next Webinar: May 17, 2024
- Workshop to discuss the design: Winter 2024 -2025

HEI energy

RESEARCH PLANNING WORKSHOP ON COMMUNITY EXPOSURE TO OIL & GAS PRODUCED WATER

Summer 2024, Golden, Colorado



HEI energy

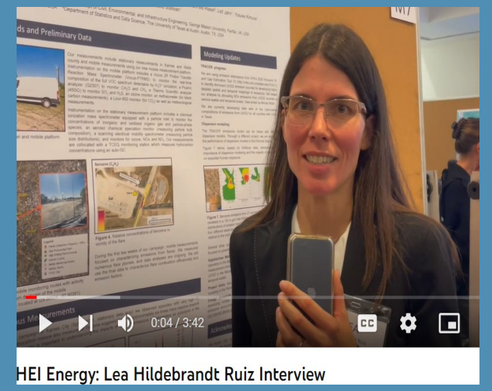
OUTREACH FOR RESEARCH

In-person & virtual community open houses

Jeffrey Collett presents his research at the Colorado Oil and Gas Conservation Commission weekly

Briefings with government, industry, and communities

Regular plain English updates on progress

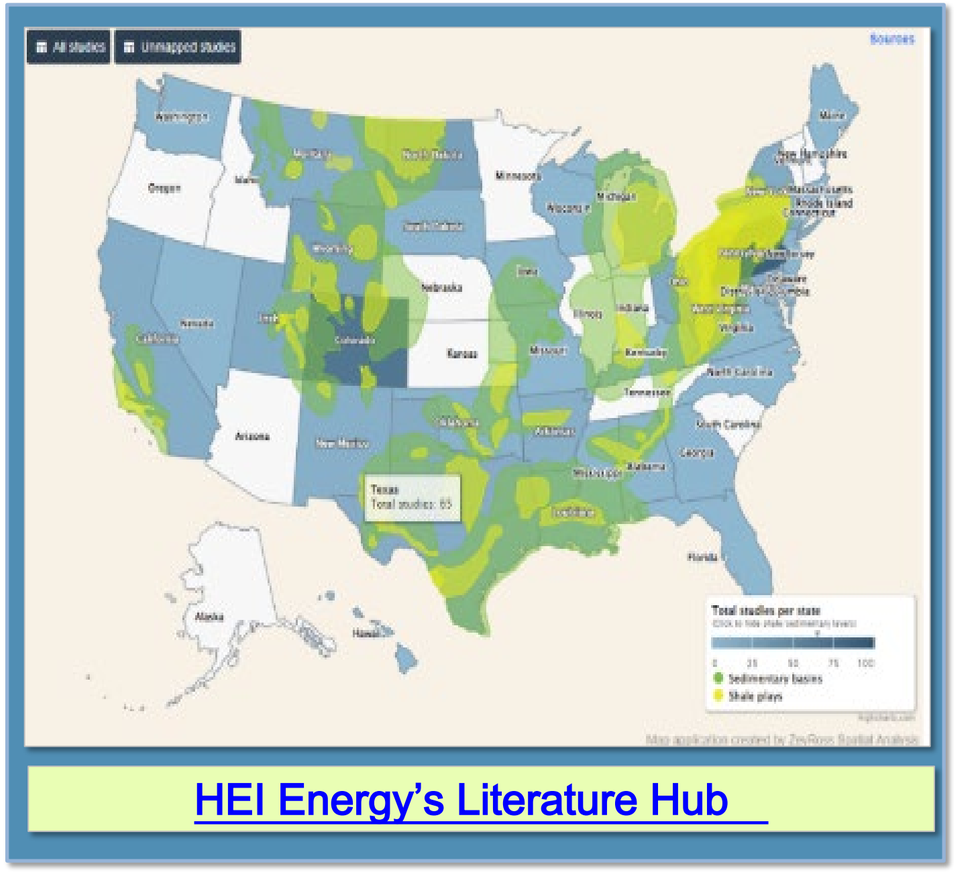


HEI Energy: Lea Hildebrandt Ruiz Interview

Video summaries of Energy posters at HEI Annual Conferences

HEI energy

GENERAL OUTREACH



HEI Energy's Literature Hub

"Energy & Health" Webinar Series

Environ. Res. Lett. **18** (2023) 074012 https://doi.org/10.1088/1748-9326/acdae7

ENVIRONMENTAL RESEARCH
LETTERS

LETTER

Environmental risks and opportunities of orphaned oil and gas wells in the United States

Mary Kang[1,*], Jade Boutot[1], Renee C McVay[2], Katherine A Roberts[2], Scott Jasechko[3], Debra Perrone[4], Tao Wen[5], Greg Lackey[6], Daniel Raimi[7], Dominic C Digiulio[8], Seth B C Shonkoff[9,10,11], J William Carey[12], Elise G Elliott[13], Donna J Vorhees[13] and Adam S Peltz[2]

Research Briefs, Reports, and Publications

Draft Strategic Plan

2025-2030

HEI

STRATEGIC PLANNING: PROCESS AND TIMELINE

HEI

THE CONTEXT

Greater urgency to mitigate and adapt to the effects of **climate change** .

An **energy transition** toward low-carbon technologies and systems.

Global push for the adoption of **new transportation technology** .

Renewed effort to address the **environmental inequities** suffered by historically marginalized communities.

And a desire from HEI sponsors to broaden our scope and diversify our funder base.

HEI

Transportation and Health

Environment & Health

Accountability

Assessment of the effectiveness of specific policies to reduce traffic-related air pollution and improve public health and other policies, such as those to mitigate climate change, that could also affect air pollution exposures.

Non-Tailpipe Emissions

Evaluation of exposure to and health effects of emissions from brake and tire wear and resuspended dust, and identification of better markers of non-tailpipe emissions.

The Vehicle Fleet

Investigation of the effects on air quality, exposure, and health of the turnover of the legacy fleet to cleaner vehicle technologies given the changing emissions of NO_2, black carbon, ultrafine particles, and other pollutants.

Transportation Hubs

Assessment of air pollution exposure and health effects in areas near transportation facilities – ports, railyards, airports, and goods distribution centers – with attention to the role of environmental, social, and behavioral factors. This topic includes evaluation of changes in air pollutant emissions related to implementing new technologies for goods movement.

Alternative Fuels

Assessment of the effects on air quality and health of alternative fuels for motor vehicles, including a comparison of all alternative fuels. This topic would be addressed in conjunction with the Energy and Health Program that would investigate the corresponding effects for alternative fuel production.

HEI

Air Quality, Climate, and Health

The Changing Climate

Evaluation of the health effects associated with the changes in air pollution exposures related to a changing climate. This topic includes the investigation of the role of air pollution in heat-related mortality and morbidity.

Wildland Fires

Evaluation of the health effects of short- and long-term exposures to ambient smoke, including from unintended forest fires, prescribed burning, and agricultural burning. Topic includes the investigation of long-term health effects from repeated vs low-level chronic exposures.

Ozone

Assessment of the health effects of short- and long-term exposure to ground-level ozone and its interactions with other pollutants in relation to cause-specific mortality and morbidity.

Sand & Dust Storms

Investigation of health effects from short- and long-term exposures to sand and dust storms, including effects of long-range transport to neighboring regions.

Accountability

Assessment of the effectiveness of adaptation and mitigation measures, air quality indices, high-heat communications, and early warning systems to reduce exposures to air pollutants and prevent acute health outcomes.

HEI

Multipollutant Mixtures

Environment & Health

Multipollutant Models

Development of modeling approaches to improve estimates of risks and impacts from multipollutant mixtures.

Exposure Estimation

Improvement of air pollutant exposure estimation using novel models that can be applied in epidemiological studies and risk assessment.

Particulate Matter

Assessment of the changing nature of PM, the increasing role of ammonia sources, and emerging sources of PM (e.g., wildland fires, microplastics, and increased biologicals due to climate change).

Cumulative Impacts

Identification of key factors that contribute most to cumulative impacts to focus assessments while maintaining credibility and inclusion of relevant stressors.

Toxic Pollutants

Assessment of exposure and health effects of toxic pollutants for which sources are relatively well understood and emerging contaminants for which sources and exposures are poorly understood (e.g., PFAS, 6-PPD).

HEI

Reducing Environmental Inequities

Environment & Health

Method Development

Development of methods to assess historically marginalized community exposure to chemical and non-chemical stressors at high resolution, including characterization of uncertainties, biases, and accuracy.

Contributing Factors

Identification of contributing factors to inequities in environmental exposures and health outcomes, especially those that can be changed.

Solutions

Identification of national and local policies and solutions to determine how best to address environmental inequities.

Accountability

Assessment of EJ investments under the Infrastructure Investment and Jobs Act and the Inflation Reduction Act to determine whether policies or actions are having the desired effects.

Resources &Tools

Creation of EJ literature database and spatial bibliography and aggregation of environmental data to facilitate solution-oriented research and decision-making.

Research involves a spectrum of community engagement, including research led by community-academic partnerships.

HEI

State of Global Air

Global Health Initiatives

Reports

Periodic, in-depth reports leveraging Global Burden of Disease (GBD) and other global or local datasets on key topics, including air pollution and children's health, climate, air quality and health, household air pollution and energy access, and air pollution and non-communicable diseases.

Evidence synthesis

Review of literature on new health outcomes for inclusion in GBD and other disease burden estimates (e.g., tuberculosis).

Resources

Produce curated materials on air pollution and health in multiple languages and formats (e.g., factsheets, videos, infographics) leveraging GBD and other global and regional data sources.

Trainings

Facilitate in-person and virtual trainings on air pollution and health, including GBD methods and data applications, in geographies of interest.

HEI

Research Synthesis and Evidence Generation

Global Health Initiatives

Epidemiology

Evaluation of the health effects of short- and long-term exposures to air pollution in select geographies with high pollution levels.

Accountability

Assessment of the effectiveness of specific policies to reduce air pollution and improve public health, with a focus on target geographies of interest.

Particulate Matter

Quantification of contribution of key sources to $PM_{2.5}$ at high temporal and spatial scales.

Climate & health

Investigation of health effects from short- and long-term exposures to sand and dust storms, extreme heat, and wildland fires.

Environmental Inequities

Mapping inequities in exposure patterns in target geographies of interest.

HEI

Bolstering Technical Capacity

Global Health Initiatives

Pilot grants

Provide small grants for targeted, locally relevant research led by in-country investigators in geographies of interest.

Early career grants

Multi-year grants and mentorship to promising early career researchers based in low- and middle-income countries on topics related to HEI's mission and work.

Training

Conduct targeted training for scientists on research methods and methods for communication and science-policy translation.

Resources & Tools

Maintain interactive literature databases on air pollution and health for target geographies of interest.

Knowledge Exchange

Promote exchange of ideas and knowledge across low- and middle-income countries through convenings and regular dialogue.

HEI

Oil and Gas Development: Direct Follow-ons to the Current Program of Exposure Research

Energy & Health

Exposure Modeling

Continued development of the TRACER emissions model to quantify local and regional exposures in multiple U.S. oil and gas regions. The model has numerous applications, such as quantifying co-benefits of GHG emissions reduction.

Air Toxics

Evaluation of VOC emissions reduction associated with the National Emission Standards for Hazardous Air Pollutants for Oil and Gas.

Noise

Addition of noise to the TRACER model to predict exposures and to support assessments of health risks from exposure to noise from pre-production processes and flaring.

Abandoned Wells

Assessment of the potential for emissions to air and groundwater before and after plugging abandoned wells to understand the health value of these expenditures and the potential for the plugging process to create adverse exposures.

Wastewater Use

Identification of current and planned use of oil and gas wastewater, referred to as produced water, outside the oil field for road treatment, agriculture, drinking water aquifer recharge, and other applications that might result in human exposures. Assessment of exposure and health risks from the most concerning applications.

Oil and Gas Development: Expanded Scope and Research Methods

Energy & Health

Oil & Gas Supply Chain

Assessment of exposure and health risk associated with oil and gas distribution and transport (e.g., leaky pipelines and combining natural gas with hydrogen), refining, processing (e.g., cracker plants), and waste streams.

Health Risk

Evaluation of links between oil and gas development and adverse health outcomes using the TRACER model to improve on the exposure metrics based on proximity that dominate the current body of literature.

Method Development

Development of methods for incorporating community knowledge, including indigenous knowledge & traditional environmental knowledge, into environmental health assessments to improve the credibility and acceptance of assessments.

Accountability

Assessment of the effectiveness of specific policies to reduce exposure to air emissions from oil and gas development (e.g., EPA's methane rule).

Cumulative Impacts

Identification of the most important factors, both beneficial and adverse, to consider in a cumulative impact assessments for communities affected by oil and gas development.

Health Effects of the Energy Transition

Hydrogen Hubs

Assessment of the health risks and benefits associated with hydrogen hubs. Initial assessments should form part of the U.S. Department of Energy's Community Benefits Plans for each hub.

Carbon Capture

Assessment of the health risks associated with emissions and wastes from carbon capture, sequestration, and use technology in heavy industry and other applications. Also, simultaneous consideration of its co-benefits.

Geothermal

Assessment of the health risks and benefits associated with large-scale geothermal operations involving the same pre-production processes used for oil and natural gas development.

Alternative fuels

Assessment of the health risks and benefits associated with the production of alternative fuels, such as corn-based biofuels, renewable natural gas, and hydrogen.

Electrification & the Battery Value Chain

Assessment of the health risks and benefits associated with an expanded and modified electricity infrastructure, including battery manufacturing and the acquisition of critical minerals from the earth or recycled from produced water and wastes.

Frameworks for comparing health risks and benefits associated with alternative energy production pathways

We want to hear from you!

Scan the QR code to access the Draft Strategic Plan and the following feedback mechanisms:

1. **Jamboard** – Share brief thoughts on the plan and see what others have to say.
2. **Survey** – Provide detailed feedback submitted directly to HEI.

bit.ly/Draft -Strategic -Plan

The Jamboard and Survey will be open until 11:59 PM EDT on May 17, 2024 .

HEI