



# Integrating Environmental Justice into Research and Action

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# EPA's Mission: Protect Human Health and the Environment



# Administration Priorities: Climate Change and Environmental Justice

**E.O. 13895:** Advancing Racial Equity and Support for Underserved Communities Through the Federal Government

**E.O. 13990:** Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis

**E.O. 14008:** Tackling the Climate Crisis at Home and Abroad

**E.O. 14091:** Further Advancing Racial Equity and Support for Underserved Communities Through the Federal Government

**E.O. 14096:** Revitalizing Our Nation's Commitment to Environmental Justice for All

\$40+ billion through Inflation Reduction Act to EPA for GHG reduction and Climate/EJ block grants



*"...We are going to take the most aggressive action ever, ever, ever to confront the climate crisis and increase our energy security..."*

- President Biden while signing the Inflation Reduction Act

Diversity in research is good for society and good for science.





# A One-Environment–One-Health Approach to Environmental Research

ORD recently received advice from the National Academies of Sciences, Engineering, and Medicine on integrating a One-Environment–One-Health framework across its research

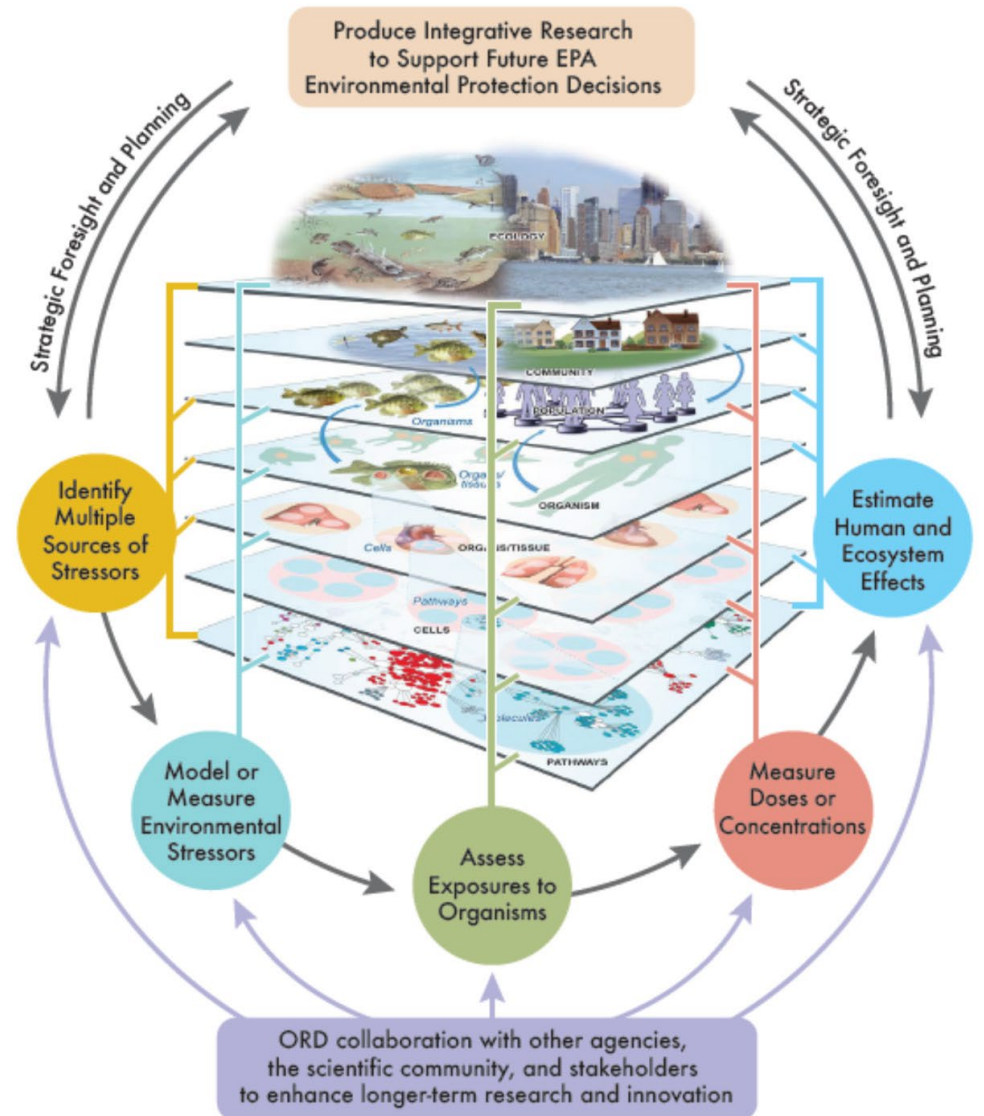


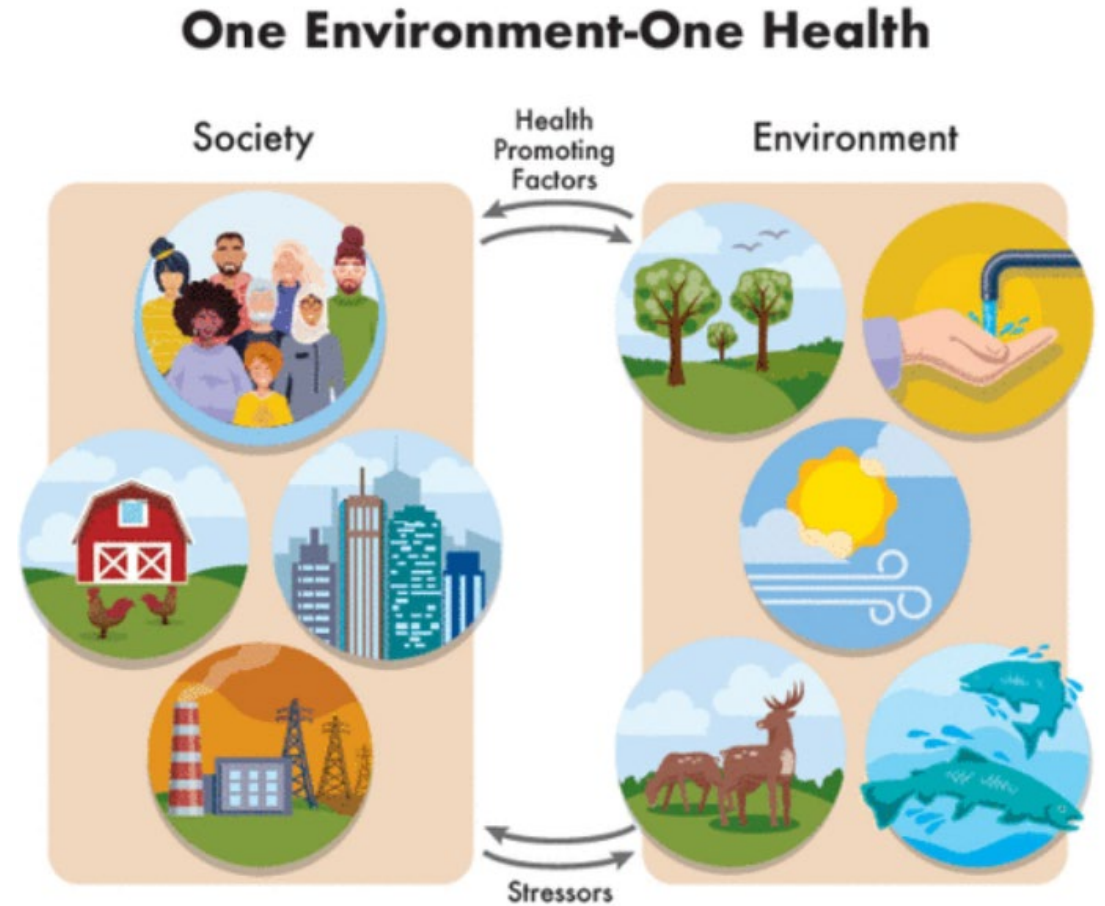
Image from: National Academies of Sciences, Engineering, and Medicine. 2023. Transforming EPA Science to Meet Today's and Tomorrow's Challenges. Washington, DC: The National Academies Press. <https://doi.org/10.17226/26602>.



# EPA Research Efforts Aligning with One Environment–One Health

## ORD invests in innovative and high-profile research:

- Environmental Justice and cumulative impact assessment
- Climate change research
- Community-based science



EPA Science for Protecting People,  
Communities, and Ecosystems

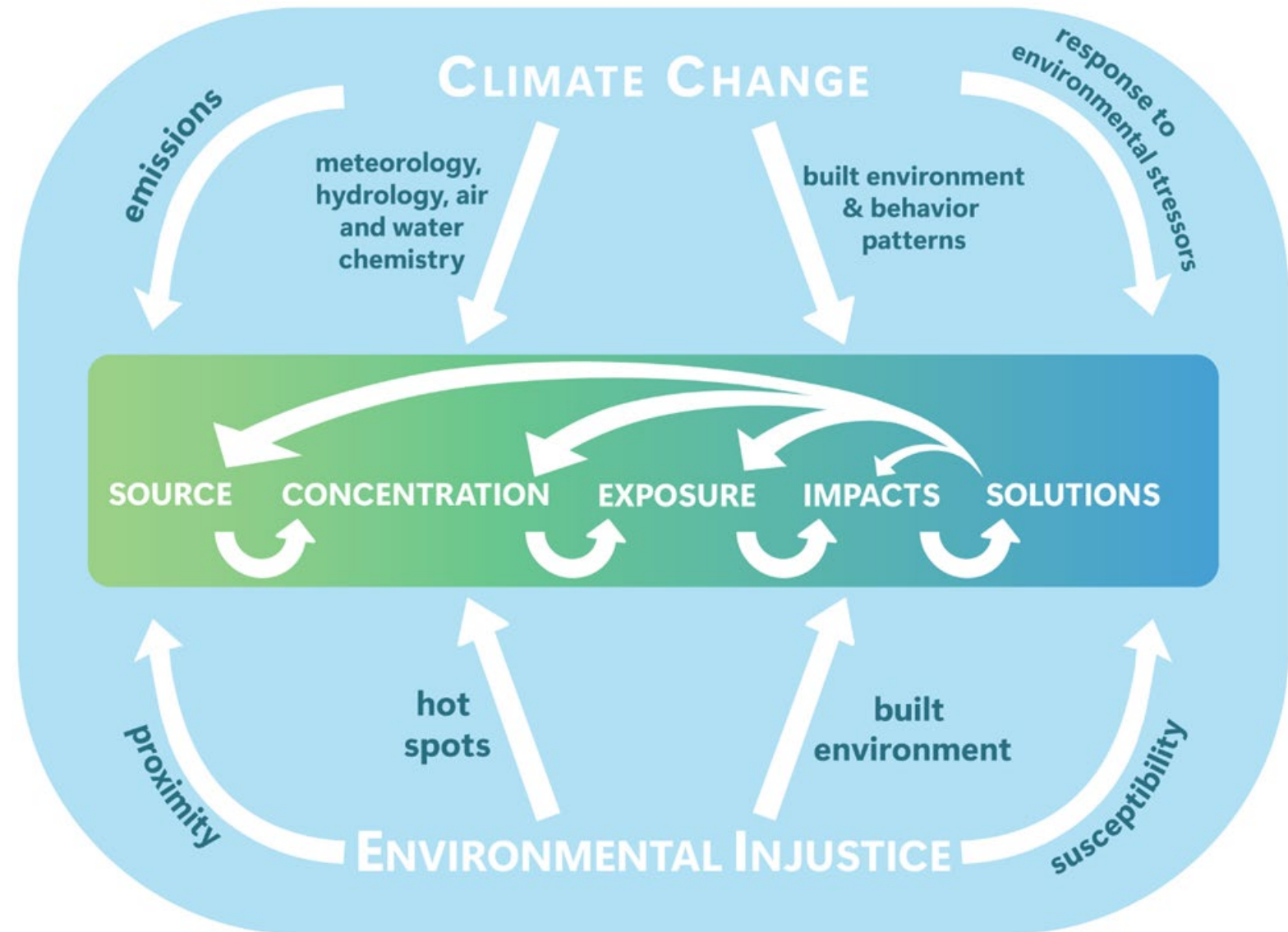




# Source-to-Impacts Continuum

Climate change and environmental injustice interact with human health

Holistic approach includes reducing environmental and health inequities AND responding to the impacts of climate change.



ORD will advance two new climate-focused initiatives, an **Interdisciplinary Climate Assessment Program (ICAP)** and **Regional Climate Assistance Network (RCAN)**:

## ICAP

- Quantitative assessments of climate damages
- Assessments of the costs of climate change and the benefits of national, state, and local actions to control GHGs
- Input to metrics, e.g., the Social Cost of Carbon

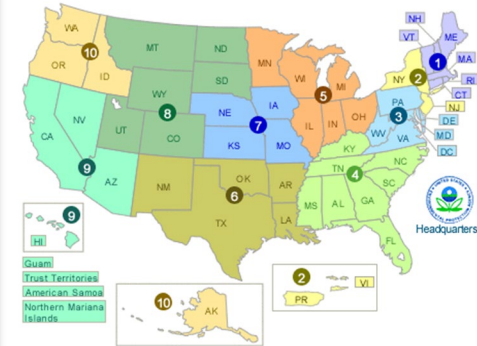
## Integration and Evaluation

of products, processes, and outcomes to inform both ICAP and RCAN



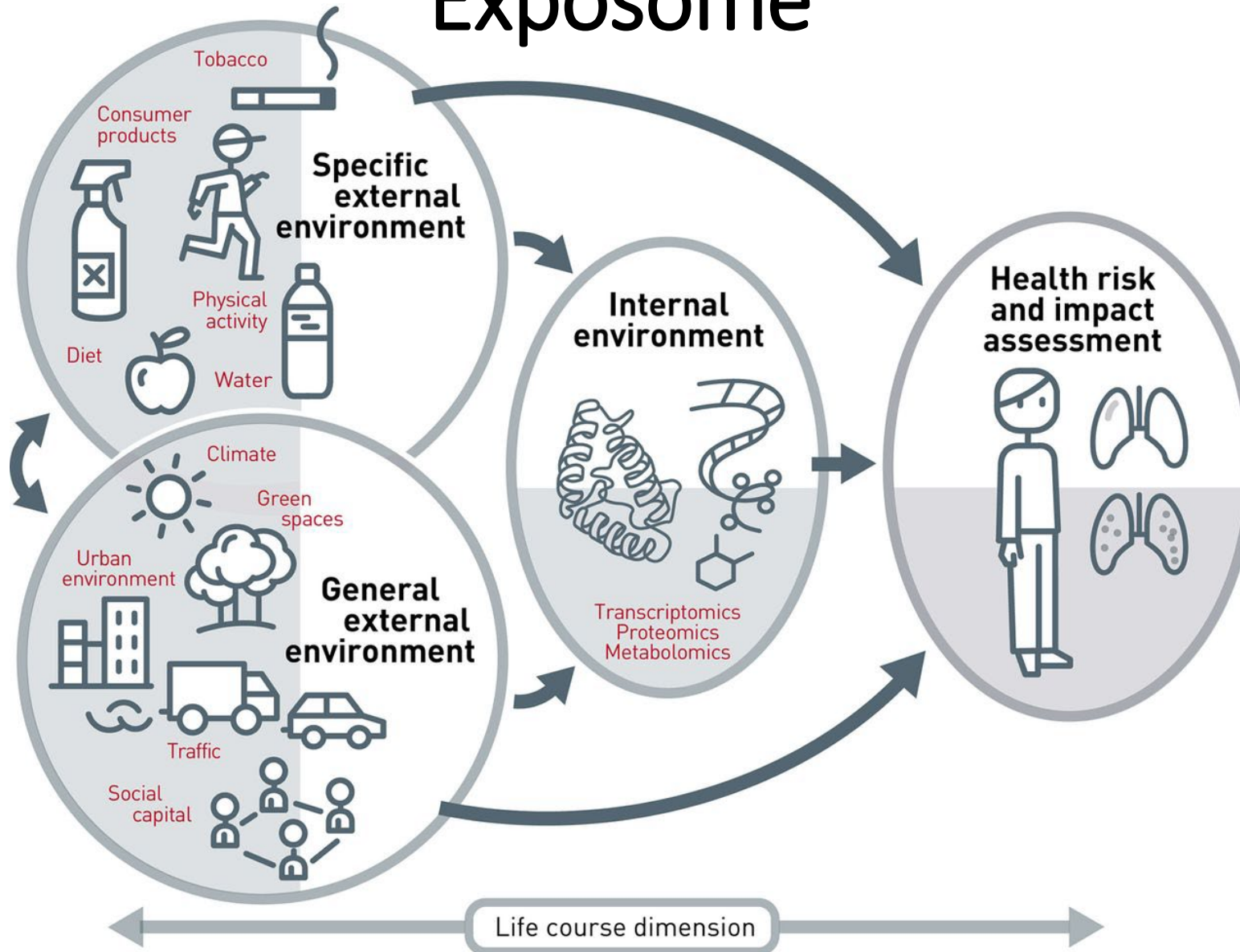
## RCAN

- Regionally-relevant assessments, technical support, capacity building for adaptation planning and resilience
- Special focus on frontline communities most vulnerable to climate impacts
- Technical support for mitigation actions





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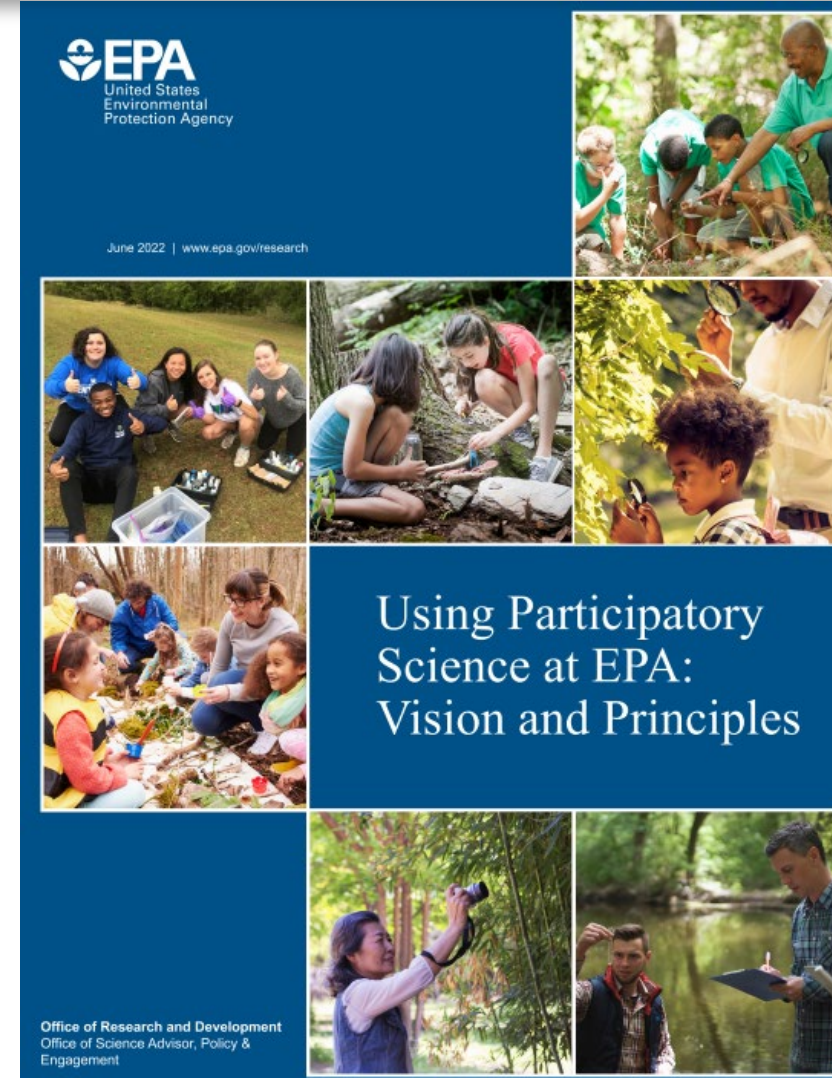


# Participatory Science at EPA

- EPA envisions a future where all parts of society help advance scientific knowledge that informs environmental protection.
- In this vision, participatory science projects will provide **accessible, actionable information** that improves decision making.

Additional EPA participatory science resources include:

- Policy Guidelines & Checklist
- Data Management Assessment & Action Plan
- Quality Assurance Handbook & Toolkit





# Community-Engaged Research Collaborative for Learning and Excellence (CERCLE)

ORD, with EPA Region 2, is establishing a community-engaged research collaborative in Edison, New Jersey. CERCLE will:

- Build **long-lasting, trusting relationships** with overburdened communities
- Connect community challenges with EPA science
- Support **joint research studies** in and with communities, helping translate results into community actions
- Conduct **STEM** engagements with community youth
- **Share results widely** to build the scientific community's capacity to work directly with communities





# Scientific Leadership

## PROMOTING ORGANIZATIONAL CHANGE

EPA National Research Programs

Regional Climate Assistance Network (RCAN)

Community-Engaged Research Collaborative for Learning and Excellence (CERCLE) with Region 2

ORD EJ Council

## CREATING EXTRAMURAL OPPORTUNITIES

**42 Grants and \$54 million in funding**

- ★ Community-based research to mitigate cumulative health impacts and environmental health disparities in underserved communities
- ★ Cumulative health impacts for children in underserved rural agricultural communities in the U.S.
- ★ Contaminated sites, natural disasters, changing environmental conditions and vulnerable communities
- ★ Integrating human health and well-being with ecosystem services

## LEADING THE CONVERSATION



## ENGAGING EXPERTS



**BOSC**  
BOARD OF SCIENTIFIC COUNSELORS



**SCIENCE ADVISORY BOARD**  
A Federal Advisory Committee to the U.S. Environmental Protection Agency

**NATIONAL ACADEMIES**  
Sciences  
Engineering  
Medicine





# Advancing the Science

## Building Knowledge and Capacities: Example Projects

### Vulnerabilities and Exposure

- Effects of Historical Redlining on Climate and Health Vulnerability
- Next Generation Emissions Measurement (NGEM) for Fugitive and Area sources and Fenceline Monitoring
- Use of wrist bands to measure personal exposure to air toxics in individuals residing in advantaged and disadvantaged neighborhoods
- Examination of sleep disruption as a biological basis for the adverse cardiovascular effects of rising temperature and air pollution

### Characterize Health and Ecosystem Impacts

- Characterizing the effects of chronic stress on susceptibility to adverse health impacts of air pollution in disadvantaged communities using inflammation and epigenetic biomarkers
- Identifying the role of non-chemical stressors on chronic disease and behavioral outcomes and subsequent environmental resiliency
- Characterizing cumulative health impacts of deprivation and environmental pollution using biomarker-based indices of allostatic load, chronic inflammation, autoimmunity, and biological aging

### Mitigation Options and Solutions

- Assessing built, natural, and social vulnerabilities and the impacts of climate change near contaminated land and waste sites for building equitable climate adaptation and mitigation strategies
- Design for community resilience and equity
- Develop and evaluate effective and low-cost treatment technologies for small, disadvantaged, and vulnerable systems, particularly for contaminants undergoing regulatory development

### Resources to Support Decisions



**Equitable Resilience Builder**



**Eco-Health Browser**



**UST Finder**



**EnviroAtlas**



**Environmental Quality Index**



**Bloomwatch**

# Building Community Capacity and Trust

## Bringing the Science to Decision-Makers

### Regulatory Support

*-PM NAAQS ISA  
-Lead and Copper Rule*

### State and Tribal Collaboration

*-ECOS/ERIS  
-Tribal Science Council*

### Technical Support

*-Technical Support Centers  
-Regional Climate Adaptation Network  
-Cumulative Impact Assessment*

### Training

*-HIA Region 5 Pilot  
-Collaborative Workshops*

### Communications

*-External Webinar Series  
-Websites  
-Targeted Conferences*

## Conducting Place-Based Research

*Research span diverse geographies, demographics, and scales*

*Studies include urban & rural communities that result in building community capacity and trust*

**40+ STAR Grants doing community-engaged research**

**Solutions Driven Research-Climate Resilience in Chesapeake Bay**

**Seven Regional-ORD Applied Research (ROAR) Place-Based EJ/CI Projects**

**Wildfire Study to Advance Science Partnerships for Indoor Reductions of Smoke Exposures (ASPIRE)**

**Community-Engaged Research Collaborative for Learning and Excellence (CERCLE) with Region 2**

**Participatory Science**

Hyperlinks provided for underlined text



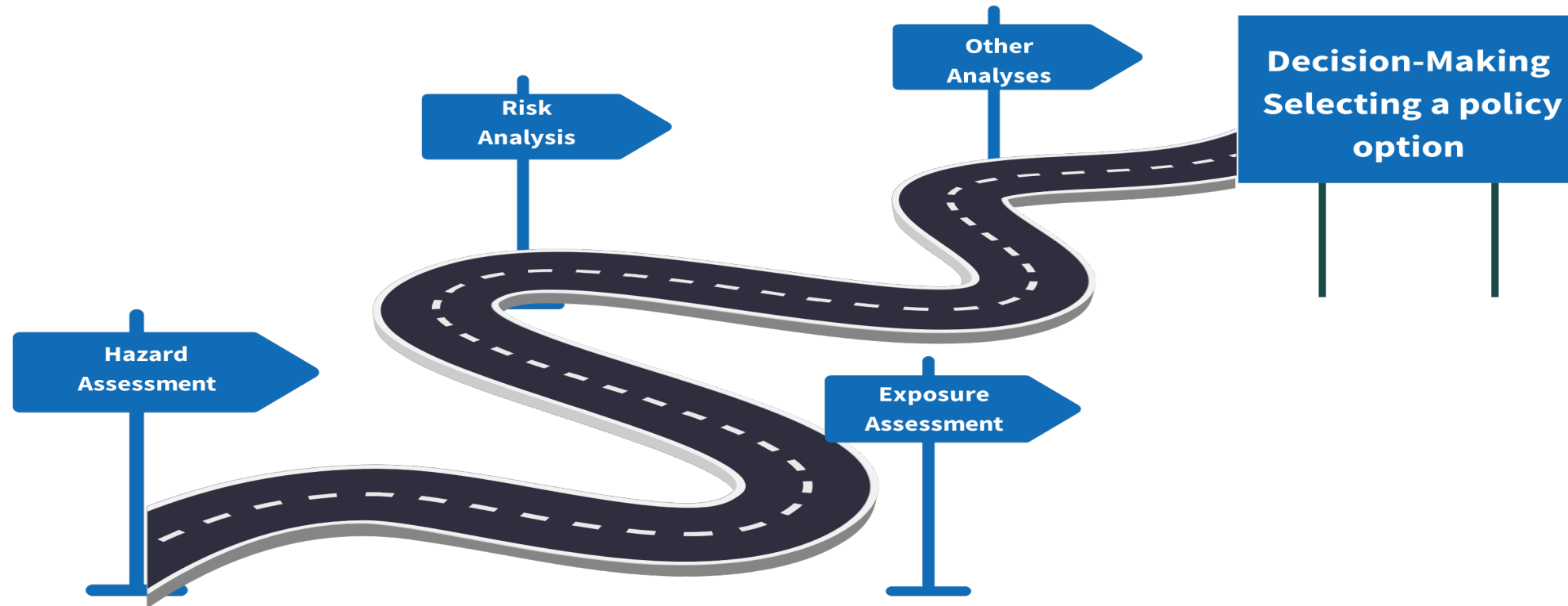
# Identifying and Accounting for EJ Human Health Risk Assessment (HHRA): Scientific and Analytical Issues





# A Critical Role for HHRA in Regulatory Decision-Making

- EPA's health-based decisions are informed by the outputs of human health risk assessment



# Accounting for Vulnerability/Susceptibility is Key

- Aggregate exposure
  - Same chemical, multiple sources, media, and pathways

- Multiple chemical exposures
  - Chemical mixtures



- Social and economic exposures
  - Poverty, psychosocial stress, food insecurity, poor housing quality, etc

- Biological Factors
  - Pre-existing disease, lifestage, disability status



# Scientific and Analytical Issues

- Convened risk assessors across the agency's programs to discuss their experiences, challenges, and needs regarding identifying and accounting for EJ concerns in HHRA with a focus on social susceptibility
- Framed conversations around three steps in the HHRA paradigm
  - Hazard Identification/Dose-Response Assessment
  - Exposure Assessment
  - Risk Characterization
- Crowdsourced recommendations on actions to address challenges and meet needs

- **Scientific Knowledge:** How social factors drive chemical stressor-related health risk
  - Better understanding of the intersection of social and biological phenomena; progression from sub-optimal social conditions to biological and health outcomes
  - Increase evaluations of social factors as effect modifiers in epi studies; mine existing studies for evidence of effect modification
  - Develop strategies for conducting systematic literature searches for relevant studies on social factors



- **Data:** Improve data quality to strengthen social susceptibility evaluations
  - Inconsistent reporting of social factors in the literature limits synthesis of information and the ability to draw inferences across multiple studies
    - Example: Measure of socioeconomic status include poverty, wealth, household income, etc.
  - Differences in the spatial and temporal resolution of various social factor data, which makes combining social factors and alignment with chemical exposures difficult
  - Underrepresentation of sociodemographic groups mostly affected by environmental inequities in national data sets

- **Methods:** Standardize approaches for combining multiple factors to characterize social susceptibility
  - Relative influence/impact of various social factors on health outcomes and chemical-related health risk is unknown
  - How to weight individual social factors when combined in an index
  - Parsimonious models (what is the most appropriate suite of factors, i.e., strategies to include/exclude)

- Science informs decisions
- There is a broad range of decision contexts
- Need for flexibility, tailoring of approaches
  - Data, tools, models, and approaches are evolving
  - Decision contexts vary with regulatory and policy contexts
  - Decisions need to be made under constraints (time, budget, available information): need for tractable, parsimonious approaches
- The Agency continues to invest in new data, tools, models, and approaches, and research
- Contributions to data, tools, models, and approaches are needed from the broader scientific community.
- There is tremendous opportunity for the research community to make a difference

# Science to Achieve Results (STAR) Funding Opportunity



## Air Quality Information: Making Sense of Air Pollution Data to Inform Decisions in Underserved Communities Overburdened by Air Pollution Exposures

*Overarching goal: Provide underserved communities science-based information, tools and approaches to utilize air and related environmental data to engage with decision-makers and take actions to address community-identified air pollution concerns*

**EPA is soliciting community-engagement research that addresses the following research areas:**

- ❖ Methods and tools for data integration and analysis to characterize community exposures to air pollution in underserved communities
- ❖ Effective communication of air quality information to communities and decision makers to support actions to address air pollution concerns in underserved communities

**Solicitation Closes:** June 26, 2024 at 11:59:59 Eastern Time

**Funding:** EPA anticipates funding approximately 8 awards at up to \$1.25 million per award

EPA intends to use up to 50% of the total funding amount available for institutions that include Minority Serving Institution (MSI) partnerships.

