

HEI Energy Research Program

The Committee's Progress



Presentation Overview

- HEI's Energy Research Program
- Progress on:
 - Epidemiology Literature Review
 - Exposure Literature Review
 - Research Planning
- Next Steps



HEI's Energy Research Program

Purpose of the program: Fill knowledge gaps about potential population exposures and health effects from onshore development of oil and natural gas from unconventional resources (UOGD) across the United States

Approach:

- Energy Research Committee oversees literature reviews, research planning, and original research
- All work implemented and peer-reviewed independently from sponsors with widespread public engagement and reporting of all results
- Modeled directly after the approach HEI has used for 35 years to answer questions about air quality and health

Products: Policy-relevant literature reviews and research

Intended beneficiaries: Regulators, industry, environmental organizations, community groups, academic researchers, and others



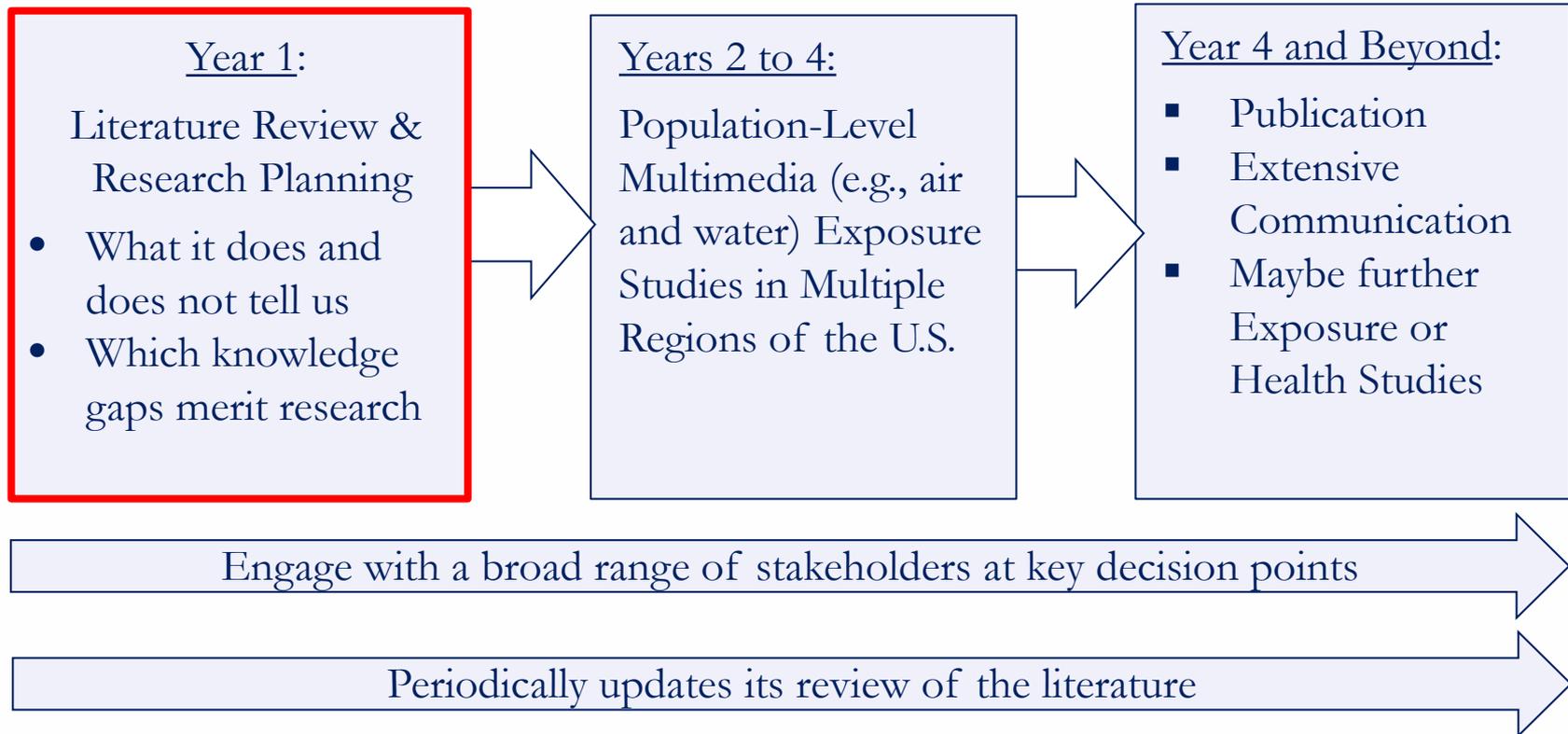
Origins of the Energy Research Program

HEI provides impartial science relevant to vehicle emissions and other air quality issues (since 1980)

Pittsburgh-area foundations asked HEI to develop a *Strategic Research Agenda* to understand potential impacts of UOGD

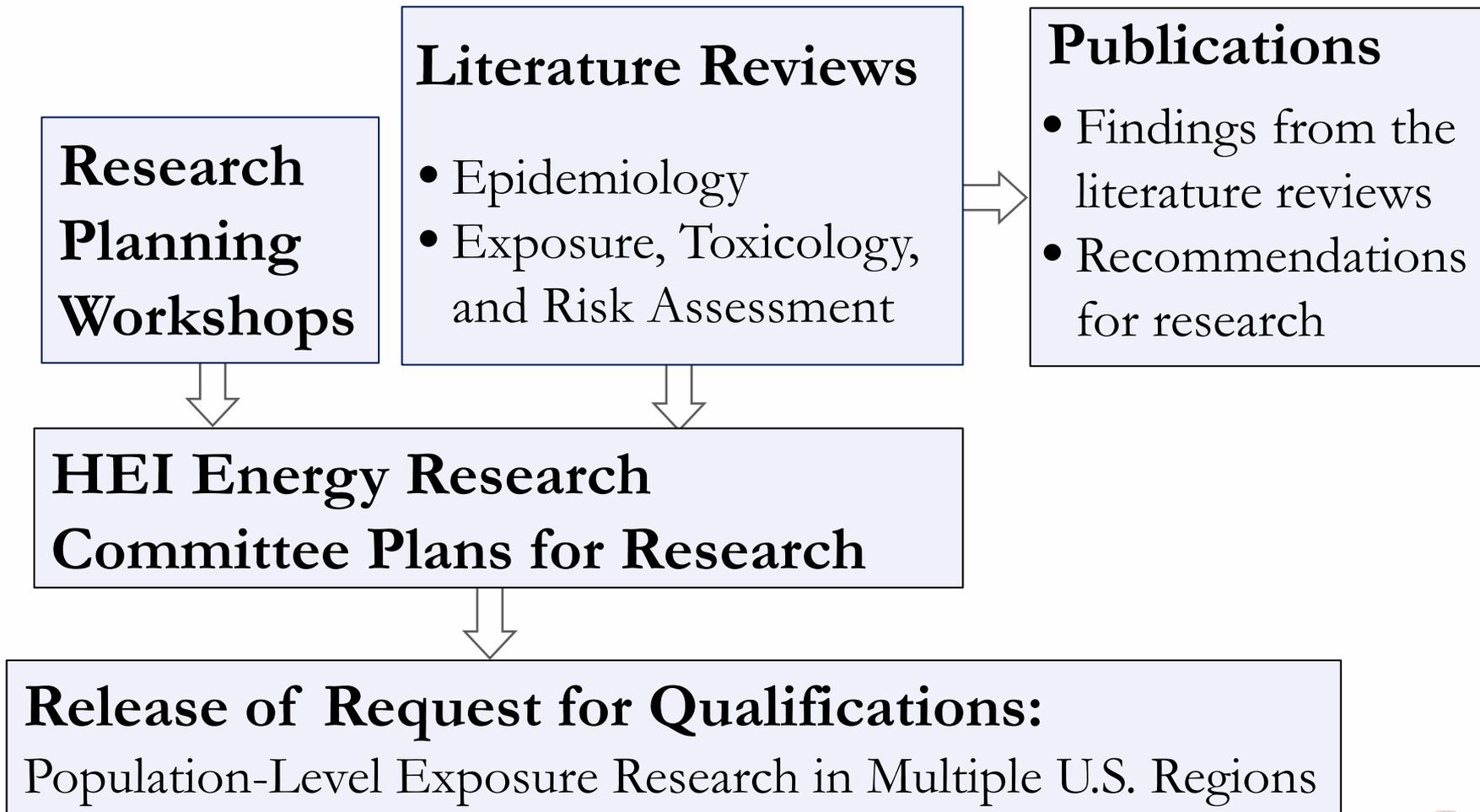
Energy Research Program formed to address a subset of research questions from the *Strategic Research Agenda*

Vision for a Multi-Year Energy Research Program



Energy Research Program

Year 1: Planning for Research



Progress on Epidemiology Literature Review



- Stakeholder Involvement
 - January 2018 Scoping Meeting
 - 55 participants; HEI Committee and a wide range of experts and stakeholders
- Approach to the Literature Review
 - Modeled after the systematic review process developed by the National Toxicology Program (NTP) Office of Health Assessment and Translation (OHAT)
 - Includes explicit quality criteria applied uniformly to all studies
- Report Status
 - Undergoing peer review

For more information:

<https://www.healtheffects.org/meeting/scoping-meeting-human-health-study-critique>



Progress on Exposure Literature Review



For more information:

<https://www.healtheffects.org/meeting/hei-energy-jul-2018-workshop>

- Stakeholder Involvement
 - July 2018 Workshop with 78 participants; HEI Committee and a wide range of experts and stakeholders
 - Current Workshop
- Report Status
 - Literature review in process
 - Draft review will be released for public comment before finalizing

July 2018 Workshop Overview

Presentations and Panels:

- Occupational exposures (outside the program scope but some information potentially helpful)
- Industry and regulatory trends
- Status of research from Marcellus Shale Energy and Environment Laboratory (MSEEL)
- Air emissions and air quality
- Water quality
- Human health risk assessments in Colorado

Two breakout groups addressing charge questions

For more information:

<https://www.healtheffects.org/meeting/hei-energy-Jul-2018-workshop>



Well tour in Weld County, July 10, 2018



July 2018 Workshop

Recommendations from Participant Breakout Groups

Research Priorities

- Study community-based exposures
- Capture heterogeneity across populations, operations and regions
- Conduct exposure characterization of chemical and non-chemical agents using quantifiable measures
- Distinguish between UOGD and non-UOGD sources
- Provide information that is actionable and useful to regulators
- Leverage partnerships among multiple expert groups

Study Design

- Review available data before collecting more (“data mining”)
- Exposure assessment studies should include:
 - Standardized research methods
 - Measurements of both potential acute and chronic exposures
 - Source apportionment
 - Fate and transport information
- A focus on air emissions, considering multiple possible measurement methods

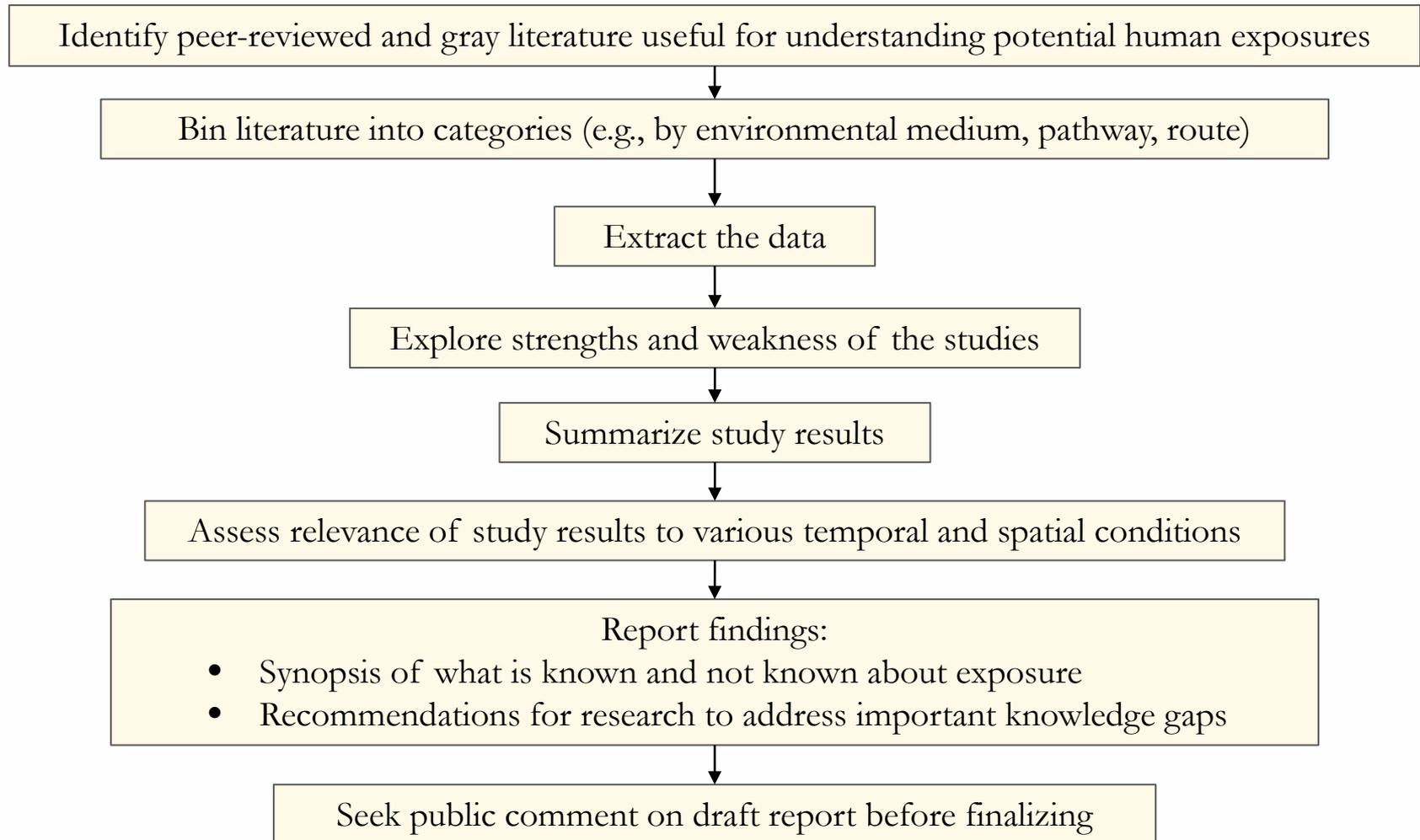


Primary Literature Review Question

What is known about potential UOGD-related human exposures?



Preliminary Approach: Exposure Literature Review



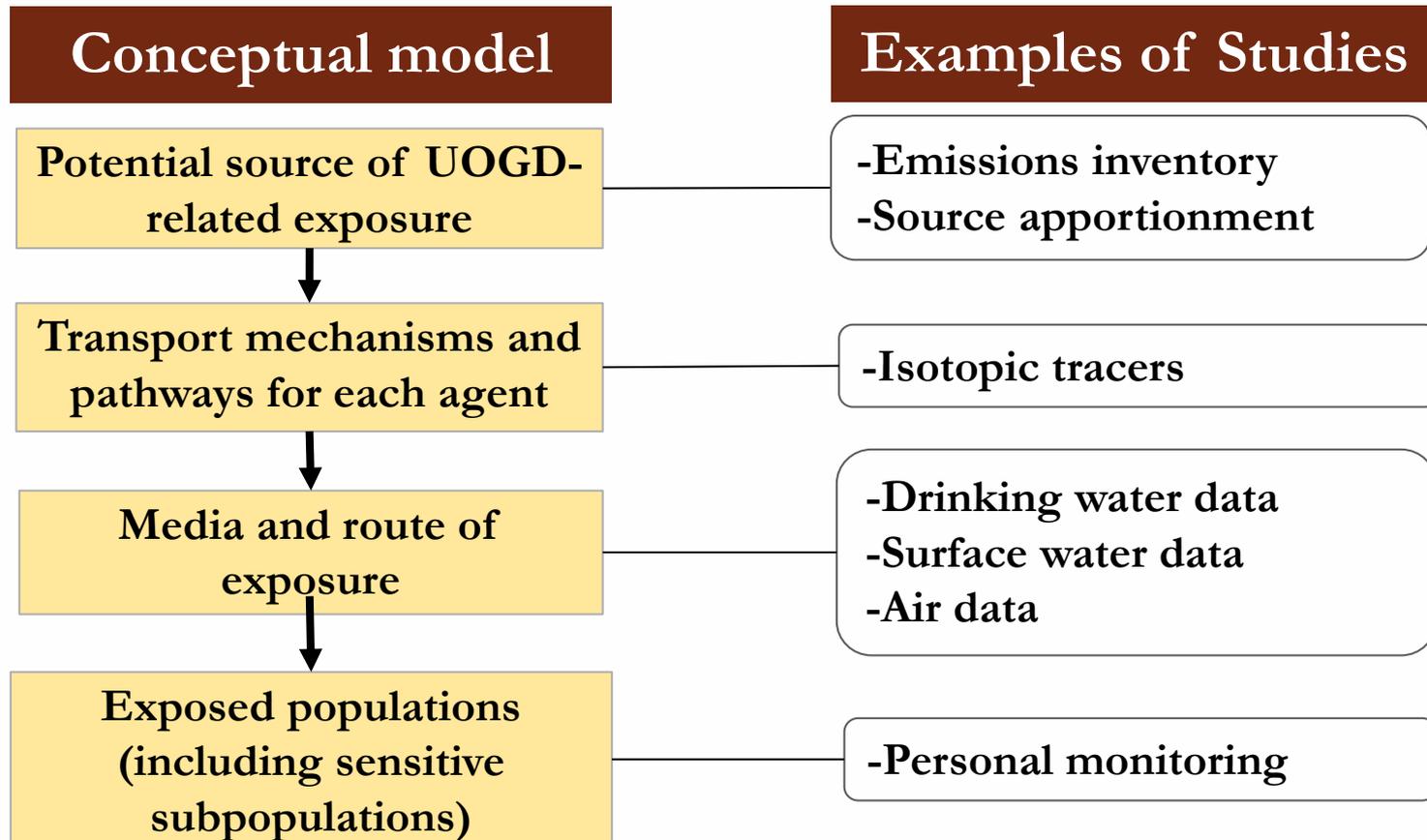
Literature Acquisition and Screening

- Gathered from:
 - Electronic database searches (Web of Science, PubMed, Google Scholar)
 - Expert consultations
- Primary screening criterion:
 - Manuscript or report “screened in” to the Committee’s review if it contains information that might be helpful to understanding the potential for human exposure.

HEI Bibliography: <https://www.healtheffects.org/energy/bibliography>



Review Literature to Build a Conceptual Model of Potential Exposure



Examples of Questions to Be Asked of the Literature

| Topic Area | Question |
|---------------------|---|
| Source | <ul style="list-style-type: none"> - What operations result in environmental releases (e.g., air emissions and spills) that might result in human exposure? - What is the frequency and magnitude of releases? |
| Transport mechanism | <ul style="list-style-type: none"> - What is the composition and physical/chemical characteristics of releases? |
| Media of exposure | <ul style="list-style-type: none"> - Which environmental media are affected that people might contact? |
| Routes of exposure | <ul style="list-style-type: none"> - Have the emissions been detected in the air in nearby communities? Have relevant contaminants been detected in drinking water? |
| Exposed populations | <ul style="list-style-type: none"> - To what extent are people living nearby exposed? - What approaches have been used to distinguish between exposures associated with UOGD and those associated with other sources? - What is the magnitude, frequency and intensity of exposures? |



Example Study Quality Elements To Be Assessed

- Whether the study provided information about exposure variability
- Whether the study provided sensitivity analysis in order to understand the degree of uncertainty in exposure estimates
- Whether the exposure models represent current field conditions and include key parameters
- Whether standard quality assurance/quality control procedures were followed
- What can be learned from studies with limitations



Criteria for Prioritizing Research

(taken from HEI's 2015 *Strategic Research Agenda*)

1. Capacity to directly inform decision-making and planning
 2. Feasibility (e.g., cost, understanding of subject matter, data ascertainment)
 3. Geographic applicability (i.e., generalizable to other regions)
 4. Contributes to understanding of multiple exposures or impacts
 5. Significance of potential impacts (e.g., severity and relevance to large geographic areas and populations)
 6. Time sensitivity (e.g., applicability to future conditions)
 7. Value to local communities
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Some Principles to Guide Exposure Research Planning

- Informs policy decisions
- Complements the work of others
- Involves collaboration across sectors
- Helps to define the extent of exposure
- Is applicable to multiple populations, operating conditions, and locations
- Distinguishes among exposures during different UOGD phases (e.g., drilling, well completion, production)
- Distinguishes between UOGD-related exposures and those from conventional oil and gas development and other possible sources



Engaging with Stakeholders Before, During, and After Research

- Workshops
- Webinars
- Conference presentations
- Fact Sheets
- Peer-reviewed HEI reports and journal publications

Next Steps in the Committee's Review

September 28, 2018: Submit your responses to workshop charge questions and comment on the Committee's approach to the literature review (submit to: dvorhees@healtheffects.org)

November 2018: HEI's Energy Research Committee meets privately to discuss its literature review and to begin discussion of Request for Qualifications (RFQ)

Late 2018/2019: Release of:

- HEI report: Epidemiology Literature Review
- Draft HEI report: Exposure Literature Review and Research Recommendations
 - Request for public comment on the draft report
- RFQ and commencement of original population-level exposure research

