
HESI SUBCOMMITTEE ON EVALUATING CAUSALITY IN EPIDEMIOLOGIC STUDIES



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Subcommittee Steering Team Member

June 8, 2011
Emerging Issues Meeting
HESI Annual Meeting
Alexandria, VA

ILSI Health and
Environmental Sciences
Institute

Advantages and disadvantages of epidemiology studies

PRO

Human (not animal)

Real life exposures

Address multiple hypotheses at once

CON

Subject to bias, confounding

Exposure misclassification

Hypothesis generating



ISSUE:

Causation in epidemiology studies

Government and advisory bodies increasingly recommend that all available evidence from toxicological, clinical and epidemiological studies be combined in quantitative risk assessments.

BUT...

There is significant disagreement on what constitutes relevant and clear epidemiologic evidence for causation.

WHAT SHOULD BE DONE?

- The largely qualitative causal criteria for causation need a 21st century “makeover.”
- A modern approach that combines Bayesian statistical techniques with innovative methods for causal inference based on potential outcomes may offer a novel process for weight of evidence evaluations.



Causality

Causality as a CONCEPT

- No universal agreement -- “causality” itself is not well defined
- Must agree before used in weight of evidence

Causality in PRACTICE

- Are results true or false positive?
 - Are results true or false negative?
 - Science: shades of gray, probability

Emotions can overwhelm the process...



Subcommittee initiation

May 2010

Proposal presented at HESI Annual Meeting

September 2010

Proposal selected by EISC for HESI action

October 2010

Leadership Teleconference

November - December 2010

Steering Team teleconferences

February 2011

First Steering Team face-to-face meeting

Teleconferences continue...



Subcommittee Steering Team

INDUSTRY

- Carol J. Burns (Dow Chemical Company) – **Chair**
- A. Robert Schnatter (ExxonMobil Biomedical Sciences)
- J. Morel Symons (DuPont)

ACADEMIA

- Stephen R. Cole (University of North Carolina at Chapel Hill)
- James E. Klaunig (Indiana University) – **EISC Scientific Advisor**
- Leonard Ritter (University of Guelph)

GOVERNMENT

- Mary Ko Manibusan (US EPA Office of Pesticide Programs)
- Enrique F. Schisterman (NIH National Institute of Child Health and Human Development)



Subcommittee Mission

MISSION: Organize a symposium with published proceedings to stimulate a dialogue regarding the methods and issues related to evaluating causality, as well as interpretation of evidence from published epidemiology studies.

Objective: Strengthen the value and impact of epidemiologic studies in quantitative health risk assessments by fostering agreement on what constitutes clear and relevant epidemiologic evidence for causation.



Subcommittee Participation

ACADEMIA (n=7)

Aarhus University Hospital
Harvard School of Public Health
Indiana University
McGill University
University of Aarhus
University of Guelph
University of North Carolina, Chapel Hill

GOVERNMENT (n=7)

CDC ATSDR
Medical Research Council
NIEHS
NIH / NICHD
US EPA NCEA
US EPA OPP
US FDA CDER

INDUSTRY (n=10)

Bayer CropScience
Bristol-Myers Squibb
Dow
DuPont
ExxonMobil Biomedical Sciences
GlaxoSmithKline
Monsanto
Procter & Gamble
Shell Health
Syngenta Crop Protection

CONSULTANTS (n=1)

DLW Consulting Services



2011 – 2012 Work Plan

- **Steering Team is exploring dates for a 2011 meeting of the full Subcommittee (possibly in conjunction with a university causal inference workshop or society meeting)**
- **Steering Team and Subcommittee will work towards a 2-day public workshop in conjunction with the June 2012 Society for Epidemiologic Research (SER) Annual Meeting in Minneapolis, MN**
- **Workshop manuscript for publication in peer-reviewed journal (late 2012)**



2012 Workshop

PURPOSE: The purpose of the workshop is to stimulate a dialogue on evaluating causality in epidemiologic studies in a risk assessment context by bridging the gap between theory and practice and engaging multi-disciplinary experts from the epidemiology, medical, and toxicology communities.

Potential Discussion Topics:

- Existing framework for causation and shortcomings (e.g., Bradford Hill criteria for causation)
- Novel quantitative approaches to evaluating causality in epidemiology (e.g., Bayesian analysis, counterfactuals, causal diagrams)
- Weighing alternative data (e.g., laboratory, molecular, high-throughput data) in causality evaluations



Thank you!

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