Environmental epidemiology for the people:

Working with communities on toxic chemicals and the precautionary principle

Frank Bove
Science for the People Conference
April 12, 2014
Outline and Main Points

• The practice of environmental epidemiology should be consistent with the precautionary principle

• However, environmental epidemiology as practiced by public health and environmental agencies does not adhere to the precautionary principle and fails to serve communities

• Two examples of environmental epidemiology with/for the people:
  – Brick Township, NJ autism cluster investigation
  – U.S. Marine Corps Base Camp Lejeune, NC studies of drinking water contamination and adverse health outcomes
EPIDEMIC! Cancer-Producing Society

US DEATHS FROM VARIOUS CAUSES

CANCER DEATHS, 1975 .............................................. 365,000
World War II Battle Deaths ........................................ 292,000
Viet Nam War Deaths (6 years) .................................... 41,000
Korean War Deaths (3 years) ....................................... 34,000
Your Accidental Deaths (1969) ................................... 26,000
Racism Deaths (This week) ......................................... 3,000

RACISM AT HARVARD
MALE CONTRACEPTION
JOBS AND THE ENVIRONMENT
NONVERBAL COMMUNICATION & WOMEN

JULY 1976 VOL. VIII NO. 4 $1
Primary roles of epidemiologists

• Design and conduct scientific research

• Apply knowledge from scientific research to promote public health
  – Participate in policymaking and interventions
  – **Advocate** for public health – an obligation to act!
Precautionary Principle

“When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some of the cause and effect relationships are not fully established scientifically.”

Precautionary Principle: Central tenets

• Heed early warnings!

• Take preventive action in the face of uncertainty (but with credible evidence of potential harm)

• Shift burden of proof to the proponents of activity

• Explore a wide range of alternatives
  – Set goals that move us towards desirable futures

• Increase public participation in decision-making
Environmental Community Action (ECO-Action)

- GA environmental and social justice grassroots organization, founded in 1989

- Recognizes that environmental threats to health and quality of life of many communities are rooted in political and economic inequalities
eco-action

• **Mission:**
  – help communities organize to confront environmental health threats
  – strengthen community participation in environmental (& other local issues) decision-making

• Assisted Athens GA community to fight planned expansion and increased TCE emissions by an auto parts plant
  – Nakanishi Co. agreed to replace TCE with a non-carcinogenic, low toxicity degreaser
  – The process recaptures chemical for re-use
INCONCLUSIVE BY DESIGN:

Waste, Fraud and Abuse in Federal Environmental Health Research

An Investigative Study by the Environmental Health Network and the National Toxics Campaign Fund

May 1992
Epidemiologists and other public health practitioners tend to:

• Have a negative attitude toward advocacy
  – fear that advocacy will undermine “objectivity”

• view activists as emotional and inflexible, unable to be rigorous and objective
  – fear that community involvement will “contaminate” the research
Health and environmental agencies tend to:

– Maintain ownership of the problem definition and the problem solution

– Discount local knowledge

– Decide-Announce-Defend (‘DAD’) strategy
  • the public is “involved” only after the deliberation and decision-making process is over.

– Conduct research that is not responsive to community needs
Health and environmental agencies tend to:

– Use a “one-size fits all” methodological approach

– Ignore assumptions and values underlying their methods

– Use statistical significance testing to deny a causal relationship
  • Err on the side of rejecting a causal relationship

– Deny links between chemical exposures and diseases

– Be more concerned with conserving their resources
A Spring Night In Cancer Alley
Mossville, LA | 1956 - 2013
UNLUCKY CHAP, WATSON... APPARENTLY HE MET WITH AN ACCIDENT...
### Table 26.4  Key aspects of research likely to affect the outcome of a study, whether underestimating (false negative) or exaggerating (false positive) the possible existence of an environmental hazard

<table>
<thead>
<tr>
<th>Methodological features and their main direction of error</th>
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<tbody>
<tr>
<td>Inadequate statistical power</td>
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<td>Lost cases and inadequate follow-up for long-term effects</td>
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<td>Exposure misclassification</td>
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<td>Insensitive or imprecise outcome measures</td>
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<td>Adjustment for confounders with better precision than the exposure</td>
<td>False negative</td>
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<td>Failure to adjust for confounder with effects in the opposite direction</td>
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<td>Disregarding vulnerable subgroups</td>
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<td>5 % probability level to minimize risk of false positives (Type I error)</td>
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<tr>
<td>20 % probability level to minimize risk of false negatives (Type II error)</td>
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<tr>
<td>Pressure to avoid false alarm</td>
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<tr>
<td>Incomplete adjustment for confounders with similar effects</td>
<td>False positive</td>
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<td>Post hoc hypothesis</td>
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<td>Publication bias towards positive findings</td>
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“I can prove it or disprove it! What do you want me to do?”
THERE IS NO CONCLUSIVE PROOF THAT PCBs CAUSE CANCER, ACCORDING TO A RECENT STUDY BY...
Definition of a public health catastrophe:

“a health effect so powerful, even an epidemiologic study can detect it.”

-David Ozonoff
Chemical Industry Tactics

• Fund and publish research that supports the industry position

• Hide industry involvement in research

• Suppress or criticize research that does not support the industry position

• Change scientific standards

• Disseminate industry’s interpretation of risk in the lay press and directly to policymakers
“Doubt is our product since it is the best means of competing with the ‘body of fact’ that exists in the minds of the general public. It is also the means of establishing a controversy.”

Brown & Williamson Document #332506: Smoking and Health Proposal
Key demands of community activists

Health and environmental agencies must:

- be transparent

- involve full public participation
  - at an early stage (or beginning) of deliberation
“Epidemiologists would not be required to surrender rigor, but they would be required to share power”

New Jersey            Brick Township
Prevalence Study Results
Brick Township, NJ 1998

- Prevalence of autism spectrum disorder (ASD) was 6.7 cases per 1,000 children.

- Previous estimates of ASD prevalence:
  - U.S. in the 1980s = 0.4/1,000
  - Non-U.S. studies prior to 1998 = 2/1,000
KEEP OUT
HAZARDOUS WASTE SITE
FOR ACCESS OR INFORMATION CONTACT EMD AT EXT. 5068

Lejeune Water
CONTAMINATION
(L-R) Jerry Ensminger, Mike Gros & Jeff Byron Being Sworn In At Congressional Hearing in June 2007.
Documentary focuses on one Marine -- Master Sgt. Jerry Ensminger -- who lost his daughter to a rare disease blamed on contaminated drinking water that has long plagued Camp Lejeune.
Obama signs law giving health care to Lejeune tainted water victims

The Honoring America’s Veterans and Caring for Camp Lejeune Families (‘‘Janey Ensminger’’) Act of 2012
“At places like [the] CDC, you often have to have a public affairs person sitting there taping interviews and policing the scientist’s statements.”

— Dan Vergano, science reporter and columnist at USA Today, 2012

“I am supposed to direct the request to our media office, and I do so. However . . . I often provide detailed background information to the reporter, off the record, so the reporter can move ahead with preparing her/his story.”

— anonymous CDC scientist, 2012
CENSOR-MATIC

Scientific Research

Reduction

Political Manipulation

Simplification

Sugar Coating

Fact Elimination

Published Results