

**Critique of the August 2006
Final Report**
*Wabamun and Area Community
Exposure and Health Effects
Assessment*
Alberta Health & Wellness

Colin L Soskolne, PhD

Professor Emeritus, University of Alberta, Edmonton, Canada

Adjunct Professor, University of Canberra, Australia

URL: www.colinsoskolne.com (archive)

Health Issues Council - Alberta Medical Association, Calgary - May 5, 2014

Acknowledgment & Argument

Dr. Joe Vipond introduced me to the August 2006 Wabamun Final Report as well as to the vision of the *Canadian Association of Physicians for the Environment*. It is the former that I am now to critique ... for the reason that the Government of Alberta and Transalta continue to regard the 2006 study as justification for maintaining the *status quo vis á vis* coal-fired power generation. Both Drs. Rowe and Fenske, along with what Dr. Vipond provided to the Health Issues Council last October, show how indefensible Alberta's current position is against the robust body of evidence to the contrary.

**So, let us deconstruct the 2006
Wabamun study in the framework
of **critical appraisal** as we evaluate
the extent to which it contributes to
the body of evidence.**

**And then, let us ask:
*“in whose best interests?”***

In epidemiology ...

Research methods are key. We need to fully understand the methods applied in any population-based health study (e.g., design, statistical analysis, biases, interpretation).

CRITICAL APPRAISAL is often taught to students of any branch of epidemiology.

THE PROBLEM WITH “CRITIQUE” is that it can be overly negative. With epidemiology being an applied “soft” science, we need in our critiques to seek out not only the weaknesses, but also the strengths of any study in evaluating the body of evidence.

Tools for Assessing Bias ...

Sanderson et al. IJE 2007;36:666-676

Domains and criteria for evaluating each tool's content

Domain

- * Methods for selecting study participants
- * Methods for measuring exposure and outcome variables
- * Design-specific sources of bias (excluding confounding)
- * Methods to control confounding
- * Statistical methods (excluding control of confounding)
- * Conflict of interest

Tool item must address

- * Appropriate source population (cases, controls and cohorts) and Inclusion or exclusion criteria
- * Appropriate measurement methods for both exposure(s) and/or outcome(s)
- * Appropriate methods outlined to deal with any design-specific issues such as recall bias, interviewer bias, biased loss to follow or blinding
- * Appropriate design and/or analytical methods.
- * Appropriate use of statistics for primary analysis of effect
- * Declarations of conflict of interest or identification of funding sources

Bias by M Delgado-Rodríguez, J Llorca J Epidemiol Community Health 2004;58:635-641

The concept of bias is the lack of **internal validity** or incorrect assessment of the association between an exposure and an effect in the target population.

In contrast, **external validity** conveys the meaning of generalisation of the results observed in one population to others.

- 1 **SELECTION BIAS**
- 2 **INFORMATION BIAS**
- 3 **CONFOUNDING**

Lists of Selected Potential Biases

Biases in judgment and decision-making:

- * **Acquiescence**
- * **Anchoring**
- * **Attentional**
- * **Attribution**
- * **Belief**
- * **Choice-supportive**
- * **Cognitive**
- * **Confirmation**
- * **Congruence**
- * **Correspondence**
- * **Halo effect**
- * **Hindsight**
- * **Hostile attribution**
- * **Outcome**
- * **Recall**
- * **Response**
- * **Self-serving**
- * **Status quo**
- * **Survivorship**

Statistical biases:

- * **Ascertainment**
- * **Estimator**
- * **Information**
- * **Lead time**
- * **Omitted-variable**
- * **Sampling**
- * **Selection**
- * **Self-selection**
- * **Social desirability**
- * **Systematic error**
- * **Systemic**

Other Biases

- * **Media**
- * **Publication**
- * **Reporting**

Eleven concerns with the 2006 report that must be considered when drawing conclusions

- 1. The report is in the grey literature, not in a peer-reviewed publication; no indication is provided of an external assessment of its validity.**
- 2. Co-funded by industry. This can lead to bias.**
- 3. People wore their monitoring systems for one week. However, people's health effects would be an issue only during times of heavy smog, temperature inversions, etc. The groups were not likely to have been monitored during these heavy exposure periods.**
- 4. The monitoring was done on all types of people. Those with asthma/COPD/heart disease would be the ones most effected, and therefore the studies should have focused on them rather than the general population.**
- 5. Health monitoring was done through the patient's family physician, which did find increased respiratory disease (albeit mostly infectious) in the participants (“cases”) than in their selected control populations (“controls”). ER visits would have been more informative than family practitioner visits.**

Concerns (continued)

6. Study goal was to recruit 300 volunteers. Only 196 were recruited, and only 151 provided complete data. Participants had normal lung function.

Volunteers are very problematic for validity in epidemiologic research.

7. Children excluded, in part, because of "likelihood of having higher exposures to particles and other chemical constituents than adults because of their activity patterns".

8. Only 40 participants completed the particulate exposure assessment.

9. Unable to determine amount of time outdoors in the study, but appears to be less than 15 percent.

10. Comparison is often between Wabuman and other "high-risk" (previous study) groups, like Fort Sask, Fort McMurray, rather than a "control" population (like Banff, Red Deer, Calgary).

11. 10% of the <14 y. age group have COPD in their health study. How can that be versus 14% for other monitored locations? Standard definitions used?

Much of the science demonstrating public health harms from coal-fired point source power plants derives from epidemiological research. Epidemiology is the public health science that informs policy. And, in October 2013, Dr. Vipond took this Health Issues Council through the large body of evidence of the public health harms from coal-fired power plants.

Yet, with all of the science demonstrating public health harms, on what argument does the Government of AB rely in its resistance to an early phase out of coal-fired power plants? In Ontario, for instance, they have had no such problem and have moved quickly to eliminate coal as a source of energy because of its recognized health harms.

Other than pressure from coal-powered interests, AB has insisted on relying on a single study, one that it commissioned, the final report of which is dated August 2006 around Lake Wabamun.

Instead of seeing a solitary negative study as providing reason to pause and ask, in the face of all of the positive evidence, how valid such a negative study could be, the government of AB cites this study as evidence of no harm from coal-fired power in Alberta.

Central to inferring causation in epidemiology, it is on the body of evidence that we rely and, certainly, one swan does not a summer make.

The Hill “criteria” (1965). Is an observed association causal in nature?

- ❑ Strength of Evidence**
- ❑ Consistency across studies**
- ❑ Specificity of effects**
- ❑ Temporality of effects**
- ❑ Biological Gradient (dose-response)**
- ❑ Plausibility of effects**
- ❑ Coherence with other knowledge**
- ❑ Experimental evidence**
- ❑ Analogy based on experience**

Deontological Ethics (i.e. duty-based ethics)

*In essence, the scientific ethic expects of scientists
the duty to:*

1. Use appropriate methods
2. Be objective
3. Be honest in reporting
4. Publish results - **POSITIVE** as well as **NEGATIVE**
5. Prohibit distortion in, for example:
 - Falsification of data
 - Biases inherent to study design
 - Proper analytical procedures
 - Objective interpretation
6. Do one's own work:
 - Plagiarism
 - Acknowledge sources
 - Graduate students not to be exploited

GOOD ETHICS ⇔ GOOD SCIENCE

Manufacturing Doubt

- **Epstein**
The Politics of Cancer, 1978
- **Davis**
When Smoke Ran Like Water: Tales of Environ Deception ..., 2002
The Secret History of the War on Cancer, 2007
Disconnect: The Truth About Cell Phone Radiation ..., 2010
- **Michaels**
Doubt is their Product: How Industry's Assault on Science..., 2008
- **McCulloch & Tweedale**
Defending the Indefensible: The Global Asbestos Industry ..., 2008

*By fomenting uncertainty, the
health policy-maker's role is undermined ...
→ the subversion and ambushing of science*

END

In whose best interests?