

# **A WIN-WIN-WIN PATH FOR FLIGHT SAFETY, HEALTH, AND CORPORATE PROFITS**

**COLIN L. SOSKOLNE, PhD**

**PROFESSOR EMERITUS, UNIVERSITY OF ALBERTA, CANADA**

**ADJUNCT PROFESSOR, HEALTH RESEARCH INSTITUTE,  
UNIVERSITY OF CANBERRA, AUSTRALIA**

**FELLOW: COLLEGIUM RAMAZZINI; AMERICAN COLLEGE OF EPIDEMIOLOGY**

**PAST-CHAIR/PRESIDENT:**

**INTERNATIONAL JOINT POLICY COMMITTEE OF THE SOCIETIES OF EPIDEMIOLOGY (IJPC-SE) [2014-2016]**

**CANADIAN SOCIETY FOR EPIDEMIOLOGY AND BIostatISTICS [2007-2011]**

**[WWW.COLINSOSKOLNE.COM](http://WWW.COLINSOSKOLNE.COM) | [WWW.IJPC-SE.ORG](http://WWW.IJPC-SE.ORG)**

**GLOBAL CABIN AIR QUALITY EXECUTIVE (GCAQE)**

**THE 2017 AIRCRAFT CABIN AIR QUALITY CONFERENCE**

**IMPERIAL COLLEGE LONDON, ENGLAND – SEPTEMBER 19-20, 2017**

# **INTERNATIONAL JOINT POLICY COMMITTEE OF THE SOCIETIES OF EPIDEMIOLOGY**

*Health for all through ethical, independent and transparent science*

## **IJPC-SE**

AN ENDORSER OF THE 2017 AIRCRAFT CABIN AIR QUALITY CONFERENCE

# **IJPC-SE VISION STATEMENT**

**We strive to bring clarity to the science of epidemiology, paving the way to rational evidence-based policy. We work to promote and protect public health by serving as an ethical and effective counterweight to the misuse of epidemiology.**

# **ACKNOWLEDGEMENTS**

**Participation made possible thanks to the generosity of:**

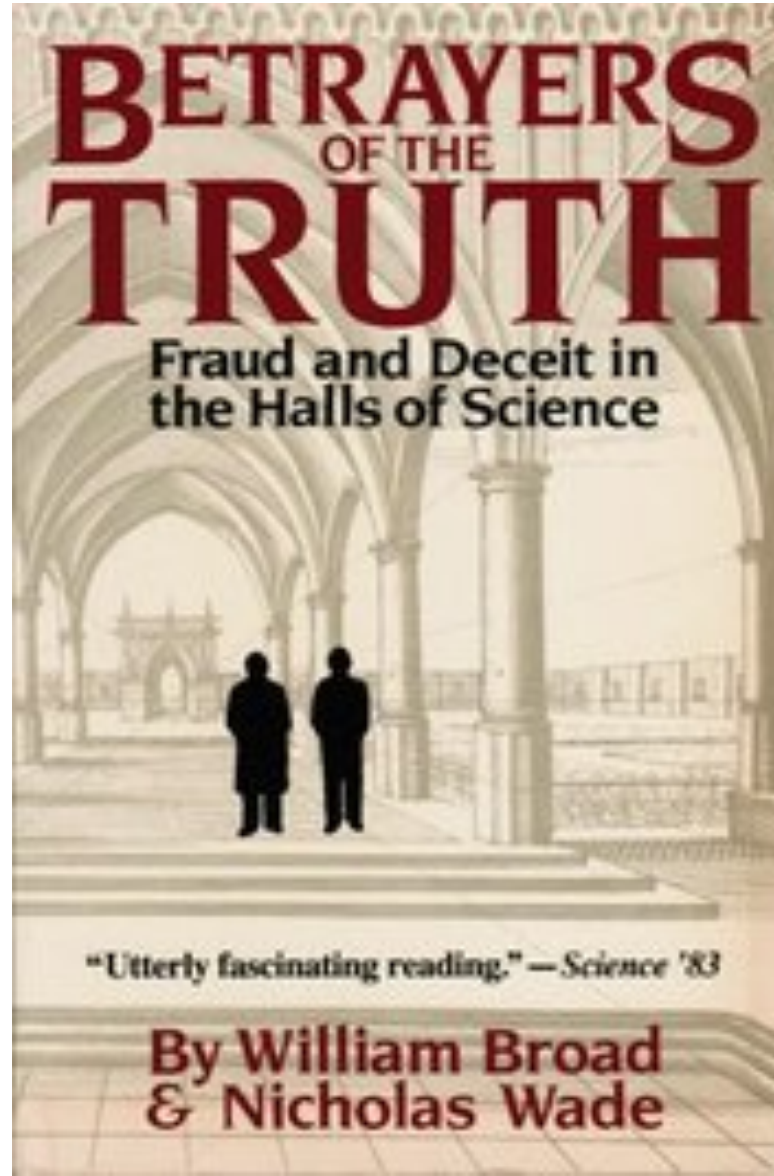
- **Global Cabin Air Quality Executive (GCAQE)**
- **Air Canada Pilots Association**

# DISCLOSURE

- *I have served as an expert witness in litigation on behalf of plaintiffs in the past, monies from which generally went into a University-managed research account*
- *As a professional legacy, between 2012 and 2016, I bankrolled the IJPC-SE to become a self-sustaining public interest charity serving as a veritable David vs. Goliath in the pursuit of truth against moneyed influence in health policy*
- *My comments are my own and are not necessarily endorsed by the IJPC-SE*

# **A REALITY CHECK ABOUT SCIENCE AND SCIENTISTS ...**

# IN 1982 ... EXAMPLES ... FROM GALILEO AND MANY MORE



"Utterly fascinating reading." — *Science* '83

By William Broad  
& Nicholas Wade

# EXAMPLES OF MISCONDUCT AND DISHONESTY FROM THE BASIC AND PHYSICAL SCIENCES

- Ptolemy who took the credit from another Greek astronomer, Hipparchus
- Galileo, father of empiricism, whose experiments defied replication
- Newton who, from his lofty seat as president of the Royal Society, accused Leibniz of plagiarism while doctoring supporting measurements to make his own Principia more persuasive



**The book argues that the conventional wisdom of science being a strictly logical process, with objectivity the essence of scientists' attitudes, errors being speedily corrected by rigorous peer scrutiny and replication, is a mythical ideal.**

# EPIDEMIOLOGY

The study of the distribution and determinants of disease in populations and its application to the control of health problems

- *Our focus is on preventing harms to populations (morbidity; premature mortality; and well-being)*
- *Epidemiology is the applied science that informs policy by bridging toxicology (results from animal experiments) to the human response to toxicants.*

# POLICY RELEVANCE

Epidemiology is the science that is basic to rational, evidence-based public health policy formulation

Our work involves navigating through all types of **bias** that influence research in public health

# **EPIDEMIOLOGY AS AN APPLIED SCIENCE**

**Because it is possible to manipulate experimental and control groups in ways that introduce bias and thus fail to serve the public interest through the pursuit of truth (as expected of scientists), it is more and more recognized that ethical training and oversight are crucial.**

**Our ethics and values determine in large part our behaviours and the choices that we make.**

# THE FUNDAMENTAL PRINCIPLES OF BIOETHICS INCLUDE

## RESPECT FOR AUTONOMY

- Requires respect for individual rights and freedoms

## BENEFICENCE

- Requires doing good

## NON-MALEFICENCE

- Requires doing no harm

## SOCIAL AND DISTRIBUTIVE JUSTICE

- Requires fair and equitable allocation of risks and benefits to all without discrimination

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Belmont Report. Federal Register (1979)

Beauchamp and Childress. Principles of Biomedical Ethics 7<sup>th</sup> Edition (2013)

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

Adapted from Reece and Siegal (1986). *Studying People: A Primer in the Ethics of Social Research*

**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, NEGATIVE, or NO EFFECT
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**

# **CONTEXT: WE MUST NOT BE NAÏVE**

*Be aware of forces at play that influence both science and policy*

*... Great vigilance and personal integrity are required to counter the influence of financially interested parties and corrupt / morally bankrupt governments*





**“Industry’s offensive against the regulation of health and safety hazards uses academics to downplay or deny the seriousness of the hazards...”**

**Clayson and Halpern  
J. of Public Health Policy  
September, 1983**

# BIASES COUNTER TO THE PUBLIC INTEREST

- Publication Bias
- Suppression Bias
- Repression Bias
- Funding Bias

*“There are none so blind as those who will not see”*

# MANUFACTURING DOUBT

► **Samuel Epstein**

*The Politics of Cancer*, 1978

► **Devra 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

► **David Michaels**

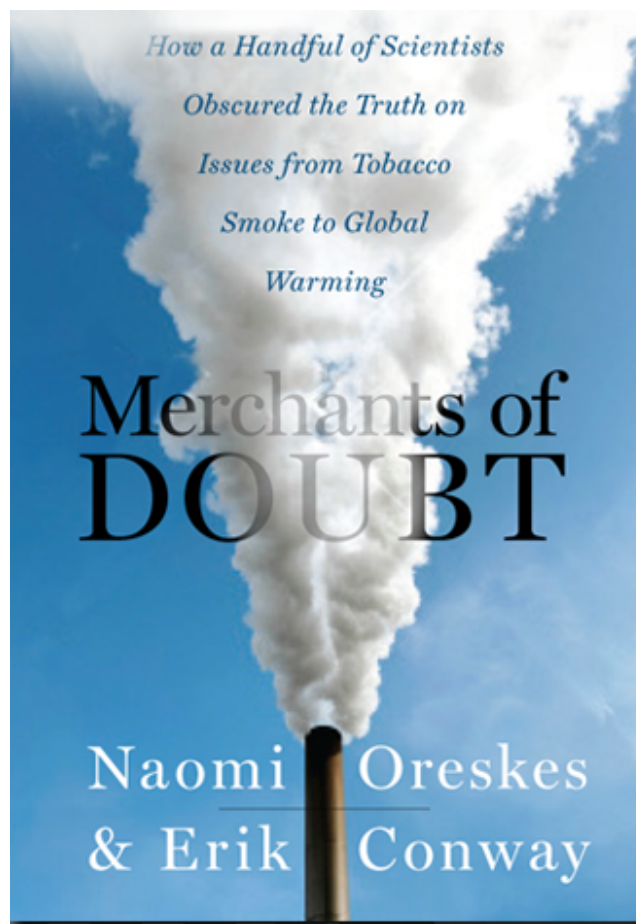
*Doubt is their Product: How Industry's Assault on Science...*, 2008

► **McCulloch & Tweedale**

*Defending the Indefensible: The Global Asbestos Industry ...*, 2008

The policy-maker's conundrum ► **fomenting uncertainty by vested interests.** By increasing uncertainty, the policy-maker's ability to implement health policy is made all the more difficult.

# MERCHANTS OF DOUBT: HOW A HANDFUL OF SCIENTISTS OBSCURED THE TRUTH ON ISSUES FROM TOBACCO SMOKE TO GLOBAL WARMING



*Also made into a movie...  
Released in 2015*

# TOBACCO EXAMPLE IS BEST KNOWN

- Full circle – ~50-year story now told
- Disinformation campaigns
- Lies, manipulation, deceit
- Co-option or appropriation of scientists to lie. Is this bad in itself?

*The real tragedy is that scientists accept these monies and then proceed to please their sponsor.*

# THE 'FOUR DS' APPLIED TO SCIENTISTS STUDYING THAT WHICH DOES NOT SUPPORT THE *STATUS QUO* (OR *DOMINANT PARADIGM*)

- **Deny**
- **Delay**
- **Divide**
- **Discredit**
- **Dismiss / Death** = shoot the messenger
  - *Erin Brokovich* (Julia Roberts...) [2000]
  - *Silkwood* (Meryl Streep...) [1983]
  - *China Syndrome* (Jane Fonda...) [1979]

# EXAMPLES TO LEARN FROM

**DENY**, **DELAY**, **DIVIDE** and **DISCREDIT** have been played out in many commercial areas, for instance:

- Tobacco
- Nickel
- Benzene
- Lead
- Asbestos
- Climate Change
- Cabin Air Quality?

# BENZENE AND WORKER CANCERS: 'AN AMERICAN TRAGEDY'

Internal documents reveal  
industry 'pattern of behavior' on  
toxic chemicals

*A pattern of concealment from workers ...*

By David Heath and Jim Morris

<http://www.publicintegrity.org/2014/12/04/16330/internal-documents-reveal-industry-pattern-behavior-toxic-chemicals>



# CENTER FOR PUBLIC INTEGRITY

[WWW.PUBLICINTEGRITY.ORG](http://WWW.PUBLICINTEGRITY.ORG)

***“Industry attacks on Public Health research have become more strident.”***

**Linda Birnbaum, Director, US-NIEHS**

**Industry Muscle Targets Federal “*Report on Carcinogens*”  
(July 30, 2013)**

# **CLASSICAL TECHNIQUES THAT SKEW RESULTS: FROM BIASED METHODS TO JUNK SCIENCE**

- Under-powered studies
- Inadequate follow-up methods
- Inadequate follow-up time
- Inappropriate biomarker of exposure
- Contaminated controls
- Unbalanced discussion
- Selective disclosure of competing interests

# CLASSICAL TECHNIQUES THAT SKEW RESULTS:

- **Biased/selective interpretation**
- **Mechanistic information is ignored for inferring effects**
- **Exaggerated differences are made between human and toxicology studies, the insistence being on separating effects seen in animals from effects in humans**
- **The fact that molecular structures predict hazard potential is ignored**

# TECHNIQUES THAT SKEW POLICY

- **The insistence on first demonstrating effects in local populations of exposed people despite demonstrated effects in humans elsewhere**
- **The failure to make explicit the implicit value judgements that go into deciding appropriate standards of evidence for drawing policy-relevant conclusions (i.e., suppressing dominant interests and values)**

*Cranor C. [Legally Poisoned: How the Law Puts Us at Risk from Toxicants](#) (Harvard University Press, 2011)*

# **TO UNDERSTAND INFLUENCE AND ITS IMPACT WE MUST UNDERSTAND**

- **The Dominant Paradigm**
- **The Contextual Narrative**
- **The Role of Impartial Science  
in the Public Interest**

# WORKING AT THE NEXUS OF RESEARCH AND POLICY

There are many forces, or drivers, at play in working to inform policy in order to maintain and improve population health.

- **Ideology** is one class of such drivers → bias
- **Financial conflicting interests** is another class → bias
- Both are integral to our personal **contextual narratives** (i.e., the **dominant paradigm** that defines the story of our lives ... that which gives meaning to us as individuals in society) → reduced OBJECTIVITY

# CONFORMIST THINKING

Leadership requires the ability  
to think beyond the constraints  
of the **dominant paradigm**

# **PERVASIVE INFLUENCES AND PRESSURES ON SCIENTISTS**

- **From funding sources to peer review**
- **From the questions we ask through access to data**
- **From study design to data analysis and interpretation**
- **From dissemination to job security**



# **RELENTLESS PRESSURE FROM VESTED INTERESTS**

- **Manoeuvre their way onto review panels, influence Boards of our professional associations, and infiltrate the literature with junk science**
- **Expert witness tensions arise between the plaintiff and defence sides of the argument in tort actions where the rubber hits the road concerning policy decisions**
- **David vs Goliath?**

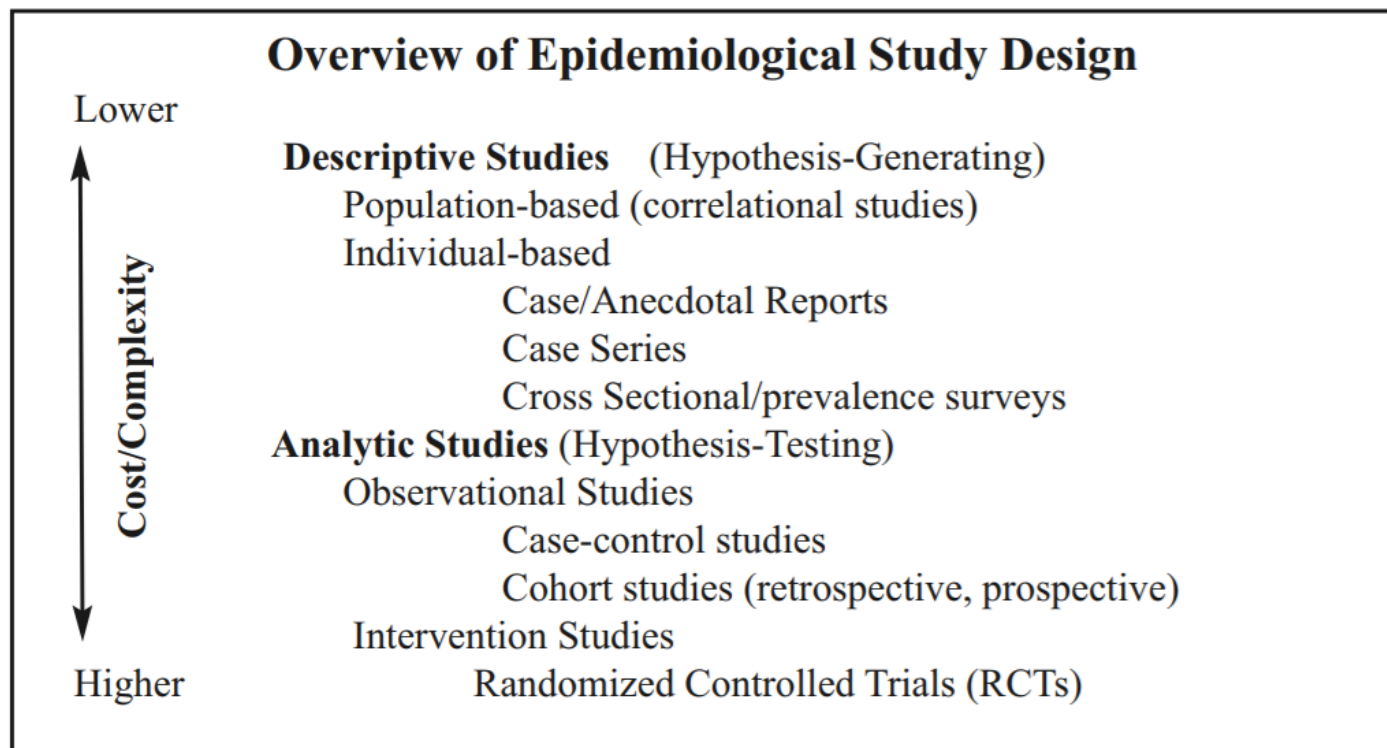
# **TRICRESYL PHOSPHATE (TCP)**

- **Transparency and openness for scientific advancement**
- **The pursuit of truth**
- **The Precautionary Principle**
- **Unbounded faith in technological perfection, despite evidence to the contrary**

# EVIDENCE: CAN EPIDEMIOLOGY HELP?

*From theory to practice in environmental epidemiology: developing, conducting and disseminating health research.* C.L. Soskolne, J.E. Andruchow, F. Racioppi

[http://www.euro.who.int/\\_data/assets/pdf\\_file/0006/91095/E91890.pdf](http://www.euro.who.int/_data/assets/pdf_file/0006/91095/E91890.pdf)



**Figure 1.1. Overview of epidemiological study designs**  
(adapted from Hennekens & Buring 1987).

# PRECAUTIONARY PRINCIPLE

**Where there is a risk from a certain agent, the presence of uncertainty shall not be used as a reason for postponing cost-effective measures to prevent such exposure**

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[http://www.fasenet.org/IJOEH\\_Precautionary\\_Principle.pdf](http://www.fasenet.org/IJOEH_Precautionary_Principle.pdf)

*Late lessons from early warnings.* European Environment Agency (2001, 2013)



## **FINAL REPORT** (130 pages)

**PRELIMINARY CABIN AIR QUALITY MEASUREMENT CAMPAIGN (CAQ)  
EASA.2014.C15**

**and**

**PRELIMINARY CABIN AIR QUALITY MEASUREMENT CAMPAIGN-CAQ II  
EASA.2014.C15.SU01**

**Prepared by:**

**Sven Schuchardt, Annette Bitsch, Wolfgang Koch and Wolfgang Rosenberger of  
FRAUNHOFER INSTITUTE FOR TOXICOLOGY AND EXPERIMENTAL MEDICINE  
(ITEM) and the Hannover Medical School (MHH), Lufthansa Technik AG /  
Deutsche Lufthansa AG, Condor Flugdienst GmbH, British Airways**

## **EASA 2014; P. 109**

***Taking into account the current data situation ... which indicates a very low OPC incidence in aircraft, the still ongoing discussion about the so-called “aerotoxic syndrome” remains completely incomprehensible.***

**Casting doubt about the exposures of concern?**

# EASA 2014; P. 111

*A human exposure study is the long-needed tool to provide an unequivocal and sound data set to end the misguided discussion on cabin air quality once and for all.*

...

*Human exposure can be seen as an important contribution to the objectification of the currently **misguided** discussion on cabin air quality.*

**Does the use of “misguided” suggest a bias?**

**Will the correct exposures and endpoints be measured?**

**MORRIS GREENBERG** PLAYED A PROMINENT ROLE IN OCCUPATIONAL MEDICINE IN THE UNITED KINGDOM OVER THE PAST HALF CENTURY. HE FOUGHT THE POWER OF INDUSTRY THROUGHOUT HIS CAREER, DEDICATING HIMSELF TO THE HEALTH, SAFETY, AND WELL-BEING OF WORKERS. HE CONTINUES TO DO SO AND SAYS:

*“... The discharge of gases and fumes into an aircraft cabin can only be justified after prior investigation finds the practice to be innocuous. The chemical cocktails to which passengers and crew are exposed will vary qualitatively and quantitatively, so that even if a standard examination methodology has been employed, their effects need not be identical between incidents”*

It is a situation where it would be appropriate to apply the Precautionary Principle

The design of one aircraft has avoided the problem”

→ OUR OBLIGATIONS ARE TO ENGINEER THE PROBLEM OUT AND TO ACKNOWLEDGE HARMS CAUSED



# CONCLUSIONS

- **Systemic, institutionalized bias enables conformity with the dominant paradigm**
- **Susan Michaelis and team are to be saluted for their leadership in moving us all beyond the confines of the dominant paradigm**
- **We all loose when the trajectory on which we find ourselves is flawed and unsustainable**
- **A WIN – WIN – WIN outcome is most likely when the pursuit of truth is sought with a mind open to adapting to empirical realities**
- **The GCAQE is leading to a favourable outcome in which flight safety, health, and corporate profits all win**

# BDL WAS INVITED TO PARTICIPATE IN THIS SEMINAL CONFERENCE. OTHERS TOO ...

The BDL Position Statement claims the following:

*Regarding the topic of cabin air, it has repeatedly been stated in the past few years whether the health of the passengers and crews as well as the safety of the flight could be endangered by the penetration of burned oil residues into the cabin air. It is therefore important to the airlines to know whether there are actually reliable findings from scientific investigations that confirm these statements and whether there is a problem that necessitates changes in flight operations or the maintenance or manufacture of aircraft.*

If BDL sees a glaring inconsistency between the BDL decision to not participate in this conference and with the above words, they may have aligned their actions with their words by sending a representative and some of the German aviation industry to participate in the conference.

By boycotting an opportunity to advance science and to have a seat at the table, science is denied the opportunity to advance through transparent, open discussion and access to data.

# THANK YOU

[www.ijpc-se.org](http://www.ijpc-se.org)

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