The Role of Vested Interests, Cultural Norms and Dominant Paradigms in Science, Risk Management and Risk Communication

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DISCLOSURE

• I strive for professional service in the public interest and served, until 2012, as an expert witness in litigation on behalf of plaintiffs, monies from which generally went into a University-managed research account; AND

• As a professional legacy, I bankrolled the IJPC-SE as a voluntary professional society for the past four years, hoping that it will become an enduring counter-balance in protecting public health www.ijpc-se.org

• I have helped Dr. Tsuda with editing his recent publication on thyroid cancer
OUTLINE

✦ The influence of dominant paradigms
✦ Professional roles and obligations in protecting the public interest
✦ Context for values, ethics and virtues
✦ How these things relate to risk assessment
✦ Humility and professional judgement
✦ Who takes the risks while who derives the benefits? In whose best interests?
As defined in *The Dictionary of Epidemiology*, we study a health problem with a view to applying the knowledge gained to control the problem.

→ The logical upstream determinant of *control per se* lies in well-formulated, evidence-based policy. Epidemiology is the science that informs policy ... by bridging toxicology to human health.
YET, HOW WELL DO WE TRANSLATE OUR KNOWLEDGE IN THE PRESENCE OF UNCERTAINTY?

AND WHAT ACCOUNTS FOR THE DEGREE OF UNCERTAINTY?
WHILE EPIDEMIOLOGISTS DO THEIR RESEARCH

Who takes the risks, and who derives the benefits?
HILL CONCLUDES ... (1965)

“All Scientific work is incomplete – whether it be observational or experimental.

All scientific work is liable to be upset or modified by advancing knowledge.

That does not confer upon us a freedom to ignore the knowledge we already have, or to postpone the action that it appears to demand at a given time.”
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.
• “Financial conflicting interests” is another class.
• 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).
CONFORMIST THINKING

Leadership requires the ability to think beyond the constraints of the dominant paradigm.
AND THEN THERE IS THE APPLICATION OF OUR SCIENCE, WITH ITS VARIOUS PARADIGMS, THAT OPERATES WITHIN THESE DRIVERS

Consider two paradigms available to us in environmental epidemiology within our working contexts of, for example:

- **Libertarian values** USA
- **Communitarian values** Canada
- **Egalitarian values** France
NEWTONIAN VS. COMPLEXITY PARADIGMS

Reductionism vs. Holism
Predictability vs. unpredictability
Linear vs. non-linear
Uncertainties acknowledged
Deterministic vs. non-deterministic
System equilibrium vs. instability

Newtonian assumptions hardly ever apply in the real world. “Newtonian” tends to be quantitative, and “Complexity” is addressed more qualitatively.
CLASSICAL HEALTH RISK ASSESSMENT – REDUCTIONIST AND LINEAR IN APPROACH

1. Hazard Assessment
2. Vulnerability Assessment
3. Risk Evaluation \[\rightarrow \text{epidemiology}\]
4. Risk Communication
5. Risk Management
PROFESSIONAL INTEGRITY / ETHICS / MORALITY / LAW:

The defining influences in our behaviour / conduct / choices as people ... and as research scientists ... is the social context in which we live, work and play.
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 we make.
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”
CLASSICAL TECHNIQUES THAT SKEW RESULTS: FROM BIASED METHODS TO JUNK SCIENCE

- Under-powered studies
- Inadequate follow-up methods
- Inadequate follow-up time
- Contaminated controls
- Unbalanced discussion
- Selective disclosure of competing interests
- Linear reductionism without post-normal science to complement quantitative methods
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)

THE FOUR D’S APPLIED TO SCIENTISTS STUDYING THAT WHICH DOES NOT SUPPORT THE STATUS QUO

Deny
Delay
Divide
Discredit
TEFLON?... LINKED TO BIRTH DEFECTS?

DON'T WORRY, THE ACCUSATION WON'T STICK.
Fukushima: Dominant Paradigm Constraints

DOMINANT PARADIGM

Cultural pressure for paternalism (as opposed to respect for autonomy)
AND, FROM IARC

PARADIGMATIC FLAWS

- Vaccarella et al. misquote Tsuda et al on thyroid ultrasound screening among children in Fukushima stating that a 30-fold increase was observed within a few months after the screening began; Tsuda had stated it was within 4 years.

- In attributing Fukushima’s thyroid cancer excess to over-diagnosis, they also overlooked clinical details in the Fukushima cases.

- More importantly, childhood thyroid cancer has rarely been detected among unexposed populations, even by ultrasound screening.
FURTHER ERRORS

- Attributing an increased worldwide incidence of thyroid cancer to over-diagnosis from “new diagnostic techniques,” they disregard the impact of worldwide nuclear testing. In the USA alone, 86 atmospheric nuclear tests contributed to an estimated increase of 49,000 cases (95% confidence interval: 11,300–212,000).

- I-131 exposure is a highly efficient carcinogen for thyroid cancer, leading to both cumulative and lifelong risk.

- Vaccarella et al. might rather have confined their analysis to adults to have avoided the pitfalls identified...
CONCLUSION FROM FUKUSHIMA

The careful interpretation of evidence in Fukushima, including second round screening is indeed warranted.
TWO EXAMPLES (FROM WEED 1997)

Meta-Analyses:
- Alcohol & Breast Cancer
- Induced Abortion & Breast Cancer
SAME PLANET, DIFFERENT WORLDS.
THE WAY FORWARD

True democracy through a well-informed public, underscored by an improved government science, technology and innovation strategy that should:

• Offer *incentives* to non-profit professional organizations in support of capacity-building to expose junk science, particularly where applied science works at the nexus of policy; AND

• Introduce *disincentives* (i.e., regulatory penalties) for those engaging in producing junk science.
FIRST,
A REALITY CHECK ...
ACADEMIA IS A MULTI-BILLION INDUSTRY THAT FAILS TO ADEQUATELY ADDRESS CONFLICTING INTERESTS

- At the end of the day, ethics are key to science and to public health
- Without a serious, effective system of ethical oversight, evidence and public policy are being easily corrupted by vested interests
- Overwhelming evidence of this has been provided by: the tobacco industry, the asbestos industry, the fossil fuel industry, the chemical industry, the fast food industry, the mining industry, the sweetened beverage industry, the lead industry; the list is endless
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 plagiairy while doctoring supporting measurements to make his own Principia more persuasive.
IN 1982 ... EXAMPLES ... FROM GALILEO AND MANY MORE
The book argues that the conventional wisdom that science is 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.
TO UNDERSTAND INFLUENCE AND ITS IMPACT WE MUST UNDERSTAND

• The Dominant Paradigm
• The Contextual Narrative
• The Role of Impartial Science in the Public Interest
WHAT ARE WE UP AGAINST?

What creates/drives misconduct in science?
What tempts scientists away from the pursuit of truth?

How does misconduct derail scientific discourse?
How does misconduct influence public policy and hence population and global environmental health?

Confrontation, and the challenge of speaking truth to power!
RESPONSIBLE SCIENCE: ENSURING THE INTEGRITY OF THE RESEARCH PROCESS

- PANEL ON SCIENTIFIC RESPONSIBILITY AND THE CONDUCT OF RESEARCH
- COMMITTEE ON SCIENCE, ENGINEERING, AND PUBLIC POLICY

“THE RIGHT TO SEARCH FOR TRUTH IMPLIES ALSO A DUTY; ONE MUST NOT CONCEAL ANY PART OF WHAT ONE HAS RECOGNIZED TO BE TRUE”

– ALBERT EINSTEIN
GREENBERG M AND GOLDBERG L

Surveys of almost 1,500 members of three professional societies that do risk analysis (e.g., environmental economics, epidemiology, exposure assessment, industrial hygiene, toxicology) found that 3 in 10 respondents had observed a biased research design, 2 in 10 had observed plagiarism, and 1 in 10 observed data fabrication or falsification.
This is the first meta-analysis of surveys asking scientists about their experiences of misconduct. It found that, on average, about 2% of scientists admitted to have fabricated, falsified or modified data or results at least once ... and up to one-third admitted a variety of other questionable research practices including “dropping data points based on a gut feeling”, and “changing the design, methodology or results of a study in response to pressures from a funding source”.

In surveys on the behaviour of colleagues, questionable practices were reported in up to 72%
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.
HUMAN AND SYSTEM FRAILTIES

Junk science: Our professional obligation to be vigilant and especially careful in peer review

Need for oversight (as in Human Research Ethics Boards/IRBs)

The need to keep ourselves on track with ETHICS GUIDELINES and related professional activities
RELENTLESS PRESSURE FROM VESTED INTERESTS

Manoeuver 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?

A current initiative of the IJPC-SE is its Working Group on Conflict-of-Interest and Disclosure.
INTERNATIONAL
JOINT POLICY COMMITTEE
OF THE SOCIETIES OF EPIDEMIOLOGY

Health for all through ethical, independent and transparent science

WORKING AT THE NEXUS OF RESEARCH AND POLICY

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 epidemiologic evidence.
IJPC-SE GOAL AND APPROACH

Goal is to serve the public interest by informing health policy and related areas of endeavour through its work at the nexus of research and policy

Coordinates inter-professional society activities that are related to research and practice in the generation of evidence, as well as in evidence-based policy application, formulation, implementation and evaluation

Promotes epidemiological best practices to inform policy
COI CAN ARISE IN EVERY AVENUE OF OUR ENDEAVOUR

• Serving as a peer reviewer
• Publishing
• Receiving financial support
• Election to office and having a vote
• Serving on boards and on review / editorial / advisory panels
• Interpreting the evidence before us
• Receiving donations (from vested interests?)
• And so on …
By fomenting uncertainty, the health policy-maker’s role is undermined … → the subversion and ambushing of science
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
ETHICS GUIDELINES


VIRTUES OF PROFESSIONALS

Humility  – Respects the input and opinions of others/Self-effacement

Fidelity  – Honor one’s commitments/Promote trust

Justice  – Act fairly

Patience  – Take time to hear others’ viewpoints

Industry  – Do your level best/Excel

Veracity  – Tell the truth/Be honest

Compassion  – Empathize

Integrity  – Demonstrate good moral character

Serve  – Protect the most vulnerable/Serve the public interest

Prudence  – Err on the side of caution/Demonstrate good judgment
TAKE HOME MESSAGES

Uncertainty IS inherent to science

Science strives to be value-neutral/-free, but the human instrument is not

Look first to ourselves, because causal inference is a function of who it is that is making the inference which, in turn, is a function of how we apply our scientific methods
DISCUSSION