Addressing the Challenges of Social Determination of Health

A View from the South

Jaime Breilh

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University of Toronto
Dalla Lana School of Public Health

Addressing the Challenges of Social Determination of Health:
A View from the South

Jaime Breilh Md, MSc, PhD
(Dean of Health Sciences Area)
Universidad Andina Simón Bolívar
Sede Ecuador

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Talking from the “South”, not only implies sharing the problems we face, but also sharing the strengths of our theoretical-methodological reasoning (many times made invisible by mainstream public health)
Main objective:

Understanding the fundamental character of the “social determination of health” paradigm (critical epidemiology)

- for the development of public health science, geared towards the building of healthy societies and health rights.
The Historical paradigm clash in Epidemiology
“Science as any other symbolic operation is ....a transformed, subordinated, transfigured and some times unrecognizable expression of the social and power relations of a society”

- Bourdieu, 1989
Epidemiology, as “diagnostic” instrument of public health, experiences the tensions, impulses and obstacles of all knowledge that contributes to define societal image and the degree of political success.
Lineal functional (conservative) conceptions and applications of epidemiology have operated historically as an instrument of hegemony and conservative governance, whereas, the progressive paradigms have become an instrument of emancipatory understanding of science.
Figure N°1 Historical dissent in epidemiology

XIX Cent.  \(\rightarrow\)  Conservative “contagionism”  \(\leftrightarrow\)  Progressive Virchovian “miasma”

1st Half XX Cent.  \(\rightarrow\)  Unicausality  \(\leftrightarrow\)  Precursor XXC social theory

2nd Half XX Cent.  \(\rightarrow\)  Empirical multicausalism (Linear multivaried causalism: risk theory)

XXI Cent.  \(\rightarrow\)  Social Epidemiología (Social determinants of health; causes of causes)

A “recent” emblematic case of conflict of interests that affect scientific work: cell phone, RF impacts on health

(Based on: D. Davis, Cellphone exposure toxicity and epidemiology: an update. National Institute of Environmental Sciences, April 4th, 2012)
Evidence of cell phone technology impact has been dismissed in mainstream research through misconception of “dose”: low intensity or power of radiation.
"Workshop on Possible Biological and Health Effects of RF Electromagnetic Fields", Mobile Phone and Health Symposium, Oct 25-28, 1998, University of Vienna, Vienna, Austria:

- Energy between 10 KHz-300 GHz
- Causes a repeated irradiation of a more or less fixed amount of body tissue.
- Radio Frequency Radiation (RFR) during the normal use of mobile telephones could lead to hazardous health effects. Research studying RFR of frequencies and waveforms similar to those emitted from cellular telephones and intermittent exposure schedule resembling the normal pattern of phone use is needed.
The impact of any form of radiation depends on the nature of the waves

- Frequency (pace)
- Amplitude (power)
- Pulse (beats)
- Intensity (power density)
- Polarity
- Information content

Courtesy of Margaritis et al.
Cell Phone Dangers | Dr. Devra Davis @ National Institute of Environmental Health Sciences (NIEHS) - YouTube

Exponential/erratic/inconstant changes in signal intensity in 4 seconds can provide different informational content.

- Speaking
- Listening
- End of call
- Standing-by
- Ringing

Time 4 sec/division

Do not take without permission
Cell phone standards are based on a heavy-set 6 foot+ tall man.

900 MHz: the SAR maximum occurs in the center of the ear case (w 15 mm spacer for 10 gm).

1800 MHz: SAR max occurs at edge of case, Cornet et al, 2010.

Images courtesy of IT'S, 2010.

ENVIRONMENTAL HEALTH TRUST
Microwave/RF Radiation

Positive Impacts
- Treats liver cancer
- Stops bleeding
- Enhances uptake of drugs to brain
- Detects cancer

Negative Impacts
- Damages DNA
- Disrupts blood brain barrier
- Weakens & damages sperm
- Changes brain metabolism
Cell Phone Radiation Penetrating Skull

Study by Gandhi et al. University of Utah, 1996.

1. Children absorb more energy than adults from the same phone.
2. Tumors in mid brain are more deadly than those in temporal lobe.
3. Children’s cells are reproducing more quickly than adults.
4. Children’s immune system is not as well developed as adults.
5. Longer potential for life-time exposure for children than adults.
SCIENCE UPDATE: CELL PHONES AND HEALTH
23 May 2011, Istanbul

Investigation of EMF effects on the cell number of hippocampus and cerebellum using stereological techniques

Süleyman Kaplan
Department of Histology-Embryology
Medical School
Ondokuz Mayis University
skaplan@omu.edu.tr
The research question:
Do electromagnetic fields (EMFs) inhibit the formation and differentiation of neural stem cells during embryonic development in the hippocampus.
Experimental Studies of RF/Microwave Radiation from Mobile Phones

Nesrin Seyhan, Ph.D.

GAZİ UNIVERSITY
FACULTY OF MEDICINE
BIOPHYSICS DEPARTMENT

www.biyofizik.gazi.edu.tr
http://www.gnrb.gazi.edu.tr/
DNA is first unwound under alkaline conditions and then subjected to electrophoresis.
DNA fragments migrate towards the anode, thereby forming a comet-like appearance.
Amount of DNA damage is quantified by the length and density of the comet tail.
RF Effects

- DNA Strand Breakage
- Chromosomal Abnormalities
- Cell Death
- Cellular Stress
- Neurological Degeneration
- Aging
- Free radical formation
Damage to Cell Function or Structure

- Cell Function &/or epigenetics
  - Free radical formation
  - Reactive oxygen species (ROS) formation
  - Impeding melatonin metabolism
  - Altering proteomics, GLF
  - Impeding DNA repair may be key

- Cell Structure
  - Disrupting Resonance or Spin
  - Gap junction inhibition
  - Weakening membranes &/or blood-brain barrier
Explanations for some negative experimental results

- Apply constant signals not intermittent ones
- Rely on resistant cells rather than susceptibles
  - i.e., adult lymphocytes are resistant, while neural stem cells are susceptible
- Human mesenchymal stem cells are more sensitive to EMF exposure than adult cells

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Chi$^2$ = 39.8 (p = 2.3x10⁻⁹)

Table 1: Industry-Funded and Independently-Funded Cellphone Biological Studies
Explanation for some negative experimental results
There is evidence of sponsorship bias (Lai, 2008)
21st Century Paradox

The potential of science as an instrument of life is undermined by the “misdirections of science” (and) ”the maturing of the science of doubt promotion - the concerted and well funded effort to identify, magnify and exaggerate doubts about what we could say that we know as a way of delaying actions to change the way the World operates.”

Emblematic tobacco case: transnationals invested billions of dollars to discredit critical research through contracted science geared at producing doubt.

“Doubt is our product, the best way to compete with the ‘body of evidences’ that exists in the general public. It is also the way to establish a controversy.”

So we must submit to critical scrutiny our research paradigms and answer some questions which underline the critical analysis of graduate research and superior education governance.
Are public health and environmental sciences being misdirected by the pressure of sponsorship?
Is biased and doubt promoting science contributing to the derailment of public health research and teaching?
Are apparently sound but essentially biased scientific prescriptions only an ethical issue? (conflict of interests)...

....or do they derive from a theoretical-methodological flaw?
And finally:

What are we doing in graduate programs to develop our paradigms, methodology and means of incidence to correspond to the complex challenges of unhealthy living modes and deteriorating ecosystems?
“The only thing that interferes with my learning is my education.”

A. Einstein
The need to debate conceptual and logic foundations of Public Health sciences such as epidemiology
DEFINING A SCIENTIFIC MODEL
What we include, what we leave out; weights;
(Critical processes)

Questions. Conceptual representations; observation methodology; proof criteria

Content and subjects of our actions; our relationships; strategic links.
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*Figure N°4 Comparative analysis of health determination paradigms (models)*

- **CAUSAL LINEAL**
  - MacMahon
    - 1960
    - 1975
  - Rothman
    - 1998
    - 2008

- **EMPIRICAL ECOLOGY**
  - Leavell
    - Clark
    - 1965

- **CRITICAL (TRANSITION)**
  - Marmot
    - 2006
    - Solar
    - 2007
  - Krieger
    - 1994
    - 2001
    - 2011

- **CRITICAL**
  - Breilh
    - 1976/77
    - 1979
    - 2003
    - 2011
The Unity of Logic and Action

**OBJECT**

**WHAT WE LOOK AT**
- *What we include.*
- *What we leave out.*
- *Vision.*

**CONCEPT**

**HOW WE INTERPRET**
- *Way to state scientific questions.*
- *Modes of observation.*
- *Demonstration criteria.*

**FIELD**

**HOW WE ACT**
- *Focus and content of our actions*
- *What for?*
- *With whom?*
THE NEED TO OVERCOME THE REDUCTIONIST APPLICATION OF CAUSATION
TUBERCULOSIS: POSITIVIST MODELS

[A] KOCH: BACILLUS

\[ X \rightarrow Y = \text{Tuberculosis} \]

[B] MULTICAUSALITY:

Malnutrition \[ X_1 \]
Work overload \[ X_2 \]
Alcoholism, etc. \[ X_n \]

\[ X_1 \rightarrow X_2 \rightarrow \text{Bacillus} \rightarrow Y = \text{Tuberculosis} \]

* FORMAL ASSOCIATIVE REASONING
* FUNCTIONALIST, COSMETIC INTERVENTION
HISTORICAL EVOLUTION OF TUBERCULOSIS

Average Mortality Rates, Standardized to 1901
(England & Wales)

Identification
Bacillus

Chemotherapy (medicines)
BCG (vaccine)

Source: Mckeown-The Role of Medicine
Critique of MacMahon’s Causal Web ("Epi.:E,M yP." Breilh, 1979)

Indirectly Associated Factors

Social Class

Viral transmission

Disease

(Ultimate causal link: simple)

Plural Cause Conjunction (Bunge)
EMPIRICAL ECOLOGY MODEL

Natural history of disease

(- self determined)

A (- biological)

H

E (- purely natural)
CAUSAL LOGIC (Fragmenting)

OBJECT
- CAUSAL FACTORS
  - Fragmenting reality
  - “Risk factors”

CONCEPTS
- RISK PARADIGM
  - Risk-associated fragments
  - Weighting “risks”

FIELD
- FUNCIONAL ACTION
  - Social function
  - Factor modification
SDH and the Historical paradigm clash in Epidemiology
Shortcomings of conventional social and environmental epidemiology
Shortcomings of conventional social and environmental epidemiology

• **Ontological**: reductionism, both social and ecological; neglects political economy of determination.

• **Epistemological**: interpretative monism; uniculturality.

• **Practical**: governance - not critique of the economic concentration/exclusion system; of the “civilization model” and the corresponding relations with nature.
Premise: the “kuhnian divide”

• **Normal scientific theories:** problems must be focused from conventional knowledge; accepted canons; known laws.

• **“Post normal” theories:** projected outside present hegemonic scientific and philosophical boundaries.
Scientific critique of positivist science (Emphasis of the 70s)

• “Health sciences are divorced from real life and societal needs.”
• “Non critical application of dominant paradigm (models)”
• “Dependent on central hegemonic scientific groups.”
Divorce: society (humans) and nature

Anthropocentric philosophy:

Classical economy:

Critical economy (political economy):

Metabolism (material interchange and Regulatory action –conditions imposed By nature and the human capacity – productive forces of society.)
“A human being is part of the whole, called by us 'Universe,' a part limited in time and space. He experiences himself, his thoughts and feelings as something separated from the rest - a kind of optical delusion of his consciousness. This delusion is a kind of prison for us, restricting us to our personal desires and to affection for a few persons nearest to us. Our task must be to free ourselves from this prison by widening our circle of compassion to embrace all living creatures and the whole nature in its beauty. Nobody is able to achieve this completely, but the striving for such achievement is in itself a part of the liberation, and a foundation for inner security”, 1950

A. Einstein
Functional epidemiology (hegemony)

• Denounces without revealing.
• Informs without providing pathways for profound action and mobilization.
• Works on isolated factors, but without explaining structural and socio-ecological processes which generate them.
Recuperating complexity: redefining “health” and understanding “determination”
Health is a polysemic and complex notion

Field of action
PRAXIS

Health as an object of reality

Health as a subjective concept
Need to overcome the linear reductionist perspective about health determination

- **Linear and functionalist model**
- **Associated determinants, living conditions**
- **Causal risk factor theory**
- **Redistributive governance geared to risk factor correction**

**Health**

- **Object**
- **Concept**
- **Field of action**

- **Critical action model**
- **Structural determination**
- **Complex movement theory**
- **Transformation of productive structure and living modes**
Critical epidemiology in Latin America
Latin American books on social determination of health and many peer review articles 1976-2011 made invisible by mainstream science and WHO
Aportes de Epidemiología Crítica Latinoamericana (I)
Aportes de Epidemiología Crítica Latinoamericana (II)
Aportes de Epidemiología Crítica Latinoamericana (III)
Challenge 1: Understanding the obstacles of the bio-medical pharmo-business model and empirical ecological models

Multiple crisis

Paradigms of life sciences

Global social and environmental

Biomedical model

Empirical ecology

Integral critical Epidemiology and Ecology

Ethical challenge present future
Challenge 2: Understanding the SOCIAL DETERMINATION (not “determinants”)

Society

Metabolism

Nature

Social determination

Environment

Social determination of LIFE

Health
Biomedical model is based on the positivist paradigm

Works for health operating on isolated phenomena of the empirical plane.

Converts or reifies processes in “risks” (factors)
SOCIAL DETERMINATION PROCESSES

EMPIRICAL EVIDENCE
(Isolated individual findings, disconnected environmental findings)

SCIENTIFIC VISIBILITY
Critical science: not only describing cause-effect empirical associations between isolated “factors” and problems, but explaining determinating processes.

Descriptive knowledge
Empirical logic

Empirical evidence
(Isolated individual findings,
disconnected environmental findings)

Critical knowledge
Explains social determinatng processes

Social determinatation processes
An emancipating approach to interculturality
COMPLEMENTARY PERSPECTIVES

IMPORTANT & INNOVATIVE VISIONS

Critical epidemiology

Indigenous holism
INTERSUBJECTIVITY
(Historical Subjects)

INTERCULTURALITY
Relation among types of knowledge which correspond to specific groups, that co-participate in a historical setting where meanings, identities, representations, subjectivity, symbolic power (culture and significance) are produced and reproduced.

INTERDISCIPLINARITY
Relationship between types of academic knowledge that share a common learning/teaching and research setting, participating in the direct production and reproduction of knowledge and the indirect production/reproduction of culture.
**Interculturality**
*(Critical interculturality)*

An strategic / dialogic relation between culturally differentiated subjects, to build, counter build, and deconstruct an emancipating social project.
INTERCULTURAL HEALTH DETERMINATION

“HEALTHY HUMANLY LIVING” / “SUMAK KAWSAY”

CRITICAL EPIDEMIOLOGY

HEALTHY MODE OF LIVING:
Distinguishing structural collective patterns of living (group characteristics), from individual free will life styles.

Opposition of protective healthy processes versus the destructive, unhealthy ones.

INDIGENOUS KNOWLEDGE

SUMAK KAWSAY:
The logic or rationale of collective living; placing life and subsistence in the centre.

Kawsay: living in community.
Sumak: notion of good, pleasant, protecting, beautiful.

Emancipating and preventive sense

Autarchic and protector sense

Both emphasize the preeminence of common good, of collective life and harmonious relations with nature, over private logic and interests.
Epidemiological profile (multidimensional)

Processes

Protective

Structural cooperative and complementation systems

Healthy living modes (good living)

Healthy life styles

Process

Destructive

Structural dominance and exclusion logic

Unhealthy living modes

Unhealthy lifestyles

Society

(General)

Living modes

(Groups)

Life styles

(Individual)

Organism

Psiquism

Physiology

Wellbeing & Decision

Physiopathology

Illness & Failure
Critical processes of good living ("buen vivir")

4 S’s of good living

- Sustainable and Sovereign
- Solidary
- Secure and healthy (integral biosecurity)
- Workplace
- Consumption and homeplace
- Collective/community supports and political means (empowerment in the face of social control and accountability)
- Emancipating subjectivity, critical thinking and intercultural development
- Natural ecosystemic
“The world is not dangerous because of those who do harm but because of those who look at it without doing anything”

A. Einstein
Our ethical approach in scientific work: Our indigenous grandparents taught that wisdom implies not only ”ñucto” logical reasoning (left brain) but also “shungeo” or compassion (right brain).
Thank you
Jaime Breilh, Md. MSc. Ph.D
Health Sciences Area
Universidad Andina “Simón Bolívar”
www.uasb.edu.ec/saludyambiente