

Overview of the Issue and Merits

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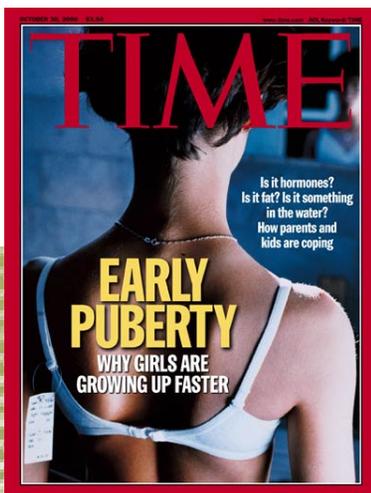
15th Annual MCH-EPI Conference

Tampa, FL

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The opinions expressed are mine and do not reflect the views of DHHS/CDC

Separating “hype” from risks is a challenge

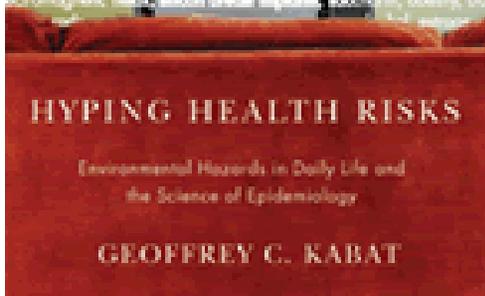


The 3rd WHO International Conference on Children's Health and the Environment



if not now, when?

HOME



Environmental Health Trust
DR. DEVRA LEE DAVIS



Why is it difficult...?

The essential challenge is a conflict of competing social values.

All good – but not all possible.

Disagreements about the balance of competing “goods”.



Balancing “goods”

Healthy mothers and children

Clean water

Affordable fruits and veggies

Sustainable cost-effective energy

Low cost goods and services

Free market economy

Autonomy for persons/states

etc....

Risk perception



- People are more comfortable with risks that they choose
 - Smoking
 - Drunk driving
- Less comfortable with risks outside of their control
 - Nuclear power plants
 - Pollution
- Public opinion and risk perceptions can drive policy
 - BPA in plastic bottles



Chemicals in the environment

- In the past 60-70 years, chemical production in the US has increased 20 fold
- The number of chemicals registered for commercial use has grown >30% in the last 20 years
 - ~80% not tested for human health effects
- Biomonitoring studies routinely detect chemicals in the general population
- They're not good for you
- Are they harmful?



Precautionary Principle

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

In this context the proponent of an activity, rather than the public, should bear the burden of proof.

1998 Wingspread conference



What does that mean?

The principle implies that there is a responsibility to intervene and protect the public from exposure to harm where scientific investigation discovers a plausible risk in the course of having screened for other suspected causes.

The protections that mitigate suspected risks can be relaxed only if further scientific findings emerge that more robustly support an alternative explanation.

In some legal systems, as in the European Union, the precautionary principle is also a general and compulsory principle of law.



Where and when to “protect”

- Most people would agree that we should have some protection from hazards, but significant disagreements arise over:
 - Who should protect/regulate
 - EPA? States? Individual choice?



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 - Strength and type of evidence
 - Who pays the “cost” of protection
 - Where is the burden?
 - Is the “cost” worth the benefits



What is the nature of the risk?

- Strength of the evidence
 - Often small groups with unique exposures
 - Publication bias
- Severity of the outcome(s)
 - Serious outcomes (death, disability etc.)
 - Less serious, but common (public health burden)
- Likelihood of exposure
 - Levels commonly encountered
 - Identify groups at risk
- Ease of ameliorating risk



How do we decide?

Human Health Risk Assessment

- **Step 1 - Hazard Identification**
Examines whether a stressor has the potential to cause harm to humans and/or ecological systems, and if so, under what circumstances.

- **Step 2 - Dose-Response Assessment**
Examines the magnitude of the relationship between exposure and effects.

- **Step 3 - Exposure Assessment**
Examines what is known about the frequency, timing, and levels of contact with a stressor.

- **Step 4 - Risk Characterization**
Examines how well the data support conclusions about the nature and extent of the risk from exposure to environmental stressors.



Factors to consider

- Maternal and fetal genotype
- Dose and timing of exposure
 - Intergenerational effects
 - Developmental impact
- Variations from a “typical” dose-response curve
- Exposure scenarios for vulnerable populations are often riskier
- Risks of exposure may not outweigh benefits in some places
 - DDT and malaria



Outcomes that could be influenced by environmental factors

- Maternal health
 - Infertility and subfertility
 - Spontaneous abortion and stillbirth
 - Pregnancy complications
- Child health
 - Asthma
 - Autism spectrum
 - Hypospadias
 - Obesity
 - Preterm birth

Evidence for associations with adverse birth outcomes

- Strong
 - Carbon monoxide
 - Cocaine, alcohol, tobacco
- Moderate
 - Air quality
 - Pesticides (OC, OP)
 - Metals (Pb, Hg, As)
 - Pentachlorophenol
 - PCBs
 - Solvents
 - Drinking water DBPs
- Weak
 - Dioxin
 - Phthalates
 - PFOS/PFOA
 - Carbon tetrachloride
 - BPA

Evidence for associations with child health

□ Strong

- Lead, mercury
- Ionizing radiation
- PCBs and PAHs
- Environmental tobacco smoke
- Air quality (PM and ozone)

□ Moderate

- Pesticides
- Solvents

□ Weak

- Drinking water DBPs
- Phthalates
- EMF

Evidence for associations with fertility

□ Strong

- Lead
- Pesticides
 - Phenoxyherbicides
 - Organophosphates

□ Moderate

- Persistent organic pollutants
- Solvents
- Air quality (PM and ozone)

□ Weak

- EMF
- BPA

Mendola, P, Messer LC, Rappazzo, K. Science linking environmental contaminant exposures with fertility and reproductive health impacts in the adult female. Fertil Steril 2008, 89(sup 1) e81-e94.



Reducing exposures when you can

- Avoidance
 - Organic produce
 - Personal protective equipment
 - Integrated pest management
- Awareness
 - Lead in the home, remodeling
- Follow instructions

Officials say pesticide in home likely killed infant in Anderson County



Anderson Baby Death

★★★★★ Ratings | 137 Video

of the DAY NEWSPHOTO the clock is ticking.

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Your Weather

Things to Do



We are more likely to act when...

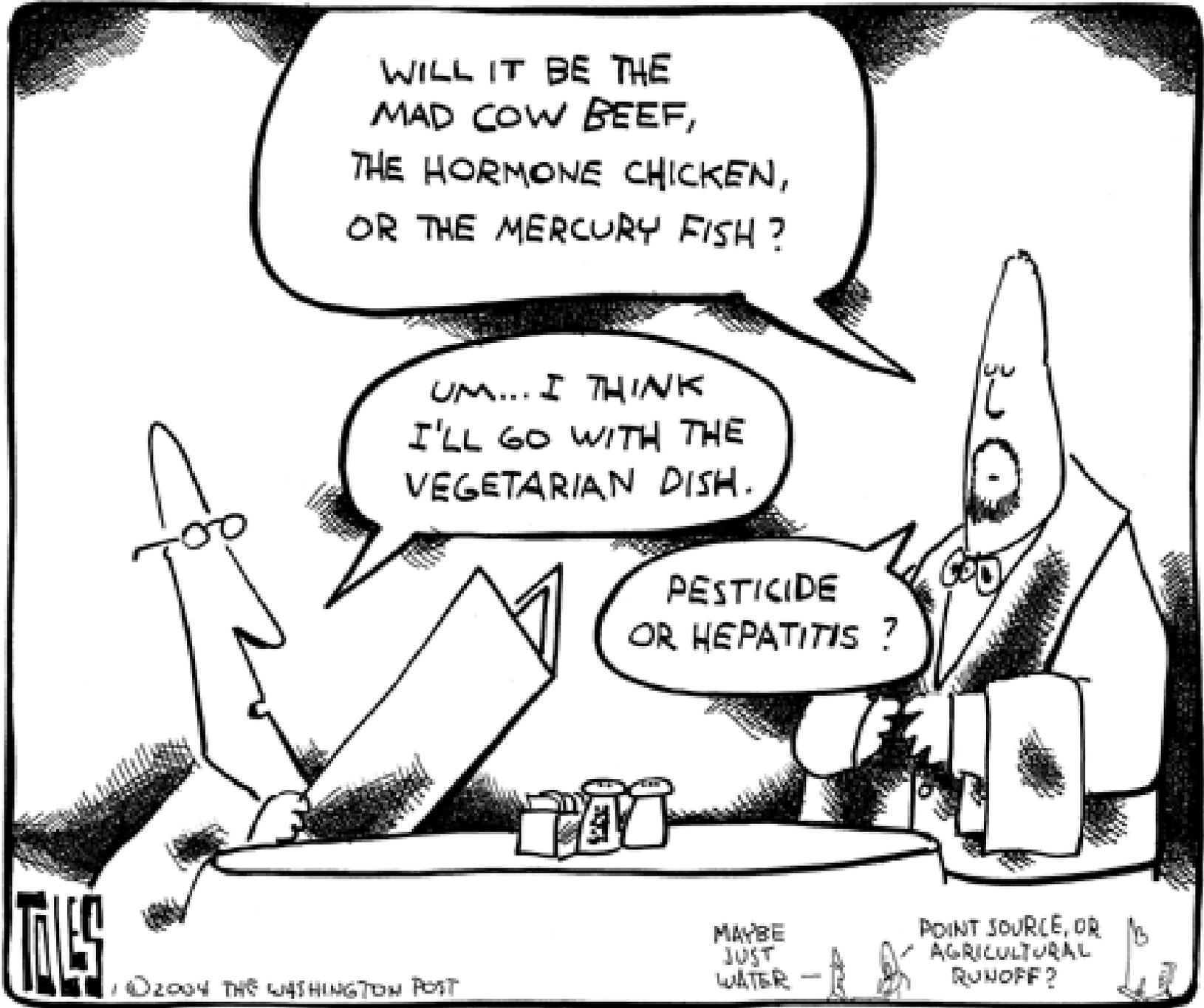
- The evidence is strong
 - The threshold for MCH may be lower than other populations?
- The outcomes are common and/or severe
- Exposures are identifiable
- There is a solution or remediation available
 - Especially when it's affordable and easy to apply



Remember the balance...

“The truly fatal flaw of the precautionary principle... is the unsupported presumption that an action aimed at public health protection cannot possibly have negative effects on public health.”

Cross, Frank B. (1996), "Paradoxical Perils of the Precautionary Principle." Washington and Lee Law Review, 53, 851--921.



WILL IT BE THE
MAD COW BEEF,
THE HORMONE CHICKEN,
OR THE MERCURY FISH?

UM... I THINK
I'LL GO WITH THE
VEGETARIAN DISH.

PESTICIDE
OR HEPATITIS?

TALS

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MAYBE
JUST
WATER

POINT SOURCE, OR
AGRICULTURAL
RUNOFF?