Washington State's Chemical Action Plans

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Characterizing Chemicals in Commerce

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What we'll cover

- Chemicals and kids
- Chemical Action Plans
- Challenges
  - Alternatives assessment
  - Can HPV data help?
- Conclusions

Why focus on kids ?

- Kids are more susceptible and more exposed
  - Eat more, drink more, breathe more per body weight = a bigger dose
  - Absorb more (lead)
  - Hand to mouth behavior
    - Important for contaminants in soil (pesticides, lead, arsenic), toys (phthalates)
  - Breast milk contaminants
- Not little adults
  - Windows of vulnerability
  - Brains are still developing through teen years
- *In utero* exposure is key
  - First trimester is especially important

Environmental Health Perspectives
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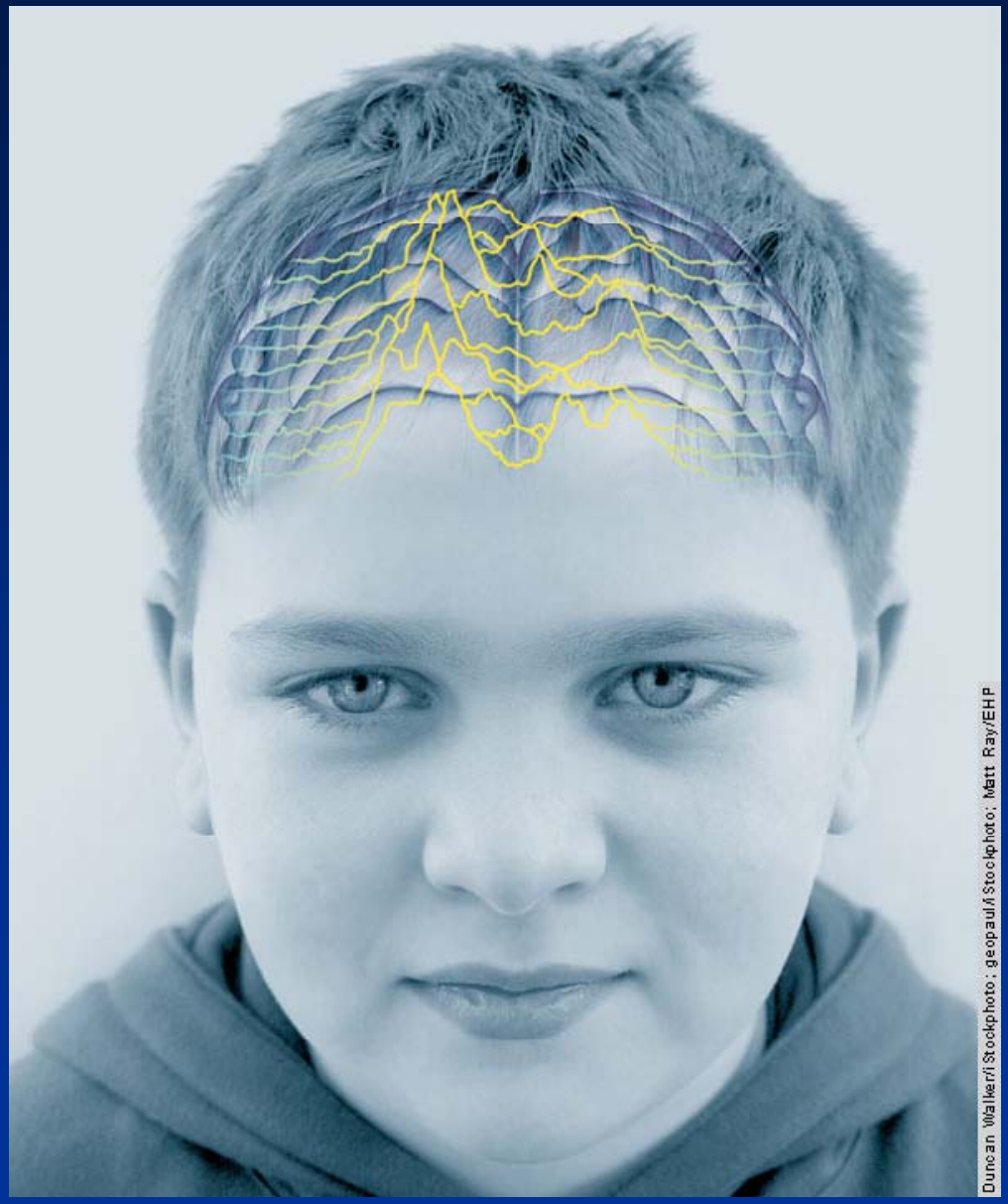
Focus - New Thinking on Neurodevelopment



Why is our concern for kids increasing?

- Increase in developmentally related diseases
  - About 17% of school-age children in the US
    - Impaired behavior, memory, or ability to learn.
  - Attention deficit/hyperactivity disorder (ADHD), autism
  - Costs in US estimated at $81.5 - 167 billion/yr
    - Estimate attributed to environment - $4.6 to 18.4 billion/yr

Ref: Boyle et al. Pediatrics. 1994 Mar;93(3):399-403
Ref: Muir and Zegarac. EHP December 2001.
Ref: Landrigan et al. EHP July 2002.

The Chemical Big Picture

- 80,000 chemicals on TSCA inventory
  - 60,000 prior to TSCA
- 1,500 new chemicals every year
- EPA established categories to streamline review of new chemicals
  - Persistent, bioaccumulative and toxic (PBT) is one of 45 categories

Reducing Toxic Threats

- One of Ecology's four initiatives
  - Goal to reduce toxics in air, land, water, and in homes and businesses
- Some examples of what we are seeing leads to a focus on PBTs:
  - Increasing levels of PBDEs in breast milk in US
  - Fish consumption advisories based on mercury, PCBs and DDT
  - Puget Sound orca whales and seals have high levels of PCBs and flame retardants (PBDEs)

Focusing on Persistent, Bioaccumlative Toxins (PBTs)

- PBTs considered the “worst of the worst”
  - Remain in the environment for a long time - Persistent
  - Build up in human or animal tissue - Bioaccumulative
  - Have adverse effects on living organisms - Toxic
  - Migrate between the air, land and water and travel long distances
- PBTs cause human health impacts
  - Young children, fetuses, and women of child-bearing age are especially vulnerable
- PBTs impact environment
  - Orca whales, marine and terrestrial mammals have increasing levels of some PBTs

PBT Reduction Efforts

- Ecology PBT Rule is first state regulation in U.S. that
  - Identifies and lists PBTs and certain metals of concern
  - Establishes a process to review and update the list
  - Establishes procedures for developing Chemical Action Plans (CAPs)

Washington's PBT List

Metals
- Methyl-mercury

Combustion By-Products
- Polyaromatic Hydrocarbons (PAHs)
- Chlorinated Dioxins & Furans
- Brominated Dioxins & Furans

Metals of Concern
- Cadmium
- Lead

Banned Pesticides
- Aldrin/Dieldrin
- Chlordane
- DDT/DDD/DDE
- Heptachlor Epoxide
- Toxaphene
- Chlordecone
- Endrin
- Mirex

Banned Flame Retardants
- Hexabromobiphenyl

Banned Organic Chemicals
- Polychlorinated Biphenyls (PCBs)

Flame Retardants
- Polybrominated Di-phenol ethers (PBDEs)
- Tetrabromobisphenol A
- Hexabromocyclododecane
- Pentachlorobenzene

Organic Chemicals
- 1,2,4,5-Tetrachlorobenzene
- Perfluorooctane Sulfonates (PFOS)
- Hexachlorobenzene
- Hexachlorobutadiene
- Short-chain Chlorinated Parraffins
- Polychlorinated Naphthalenes

What is in a Chemical Action Plan?

- Collaboratively developed with Dept. of Health
- Identifies, characterizes and evaluates uses and releases of a specific PBT
- Recommends actions to protect human health or the environment

What information is in a CAP?

- Production and Washington-specific uses/releases
- Human health and environmental impacts
- Evaluation of current management approaches
- Identification of policy options
  - Reducing use, phase out, managing wastes, minimizing exposures, safer substitutes
  - Consistent with existing state and federal law
  - Consider economic and social impacts
- Implementation actions
- Performance measures/milestones

What CAPs have been or will be developed?

- To date, CAPs completed for:
  - Mercury (2003)
  - Polybrominated diphenyl ethers (PBDEs) (2006)
- Proposed next CAPs
  - Lead - 2007
  - Polyaromatic Hydrocarbons (PAHs) - 2008
  - Perfluorooctane Sulfonates (PFOS) - 2009

PBDE CAP Challenges

- End-of-life solutions
  - Difficult to implement
  - Opportunities for education about indoor exposure
- Source control
  - Legislation
    - Deca-BDE
- Alternatives assessment
  - Are there safer substitutes?

PBDE Alternatives Assessment

- Significant lack of data
  - Promising phosphate-based alternatives already in use by major electronics manufacturers
  - Not enough data to make the call
- Modeling not the answer
  - Some good data
  - Not suitable for all chemicals
- Can HPV process be useful for alternatives??

Where does this leave us?

June 23, 2006
RIVER AMONG MOST POLLUTED
Spokane River fire retardant level leads state
Spokesman Review

Monday, July 10, 2006
Columbia River toxins moving up food chain
By Craig Welch
Seattle Times staff reporter

Friday, October 27, 2006
New alert on eating local salmon
State warns to limit meals of Puget Sound chinook
By CHERIE BLACK
P-I REPORTER

March 31st, 2005
Abnormal flame retardant levels in Sound fish
Scientists find high concentrations of harmful flame retardants in Puget Sound fish and marine mammals.
They say action is needed now.
The News Tribune

Where does this leave us?

- Behavior change is only part of the answer
  - Eat Fish, Be Smart, Choose Wisely
  - Reduce, Reuse, Recycle
  - Select less-toxic alternatives
- Site cleanup and other end-of-pipe management is only part of the answer
  - 376 contaminated sites in Washington where PCBs exceed cleanup levels
  - Several fish consumption advisories because of PCB contamination

Improvements are a must

- Avoid working backwards
  - Detection ⏩ exposure ⏩ health concern ⏩ regulation ⏩ alternative
- Green chemistry up front
- Understanding sources and pathways
- Consumer education

A Call for Change

A new framework to protect children from environmental hazards is an ethical imperative. Given the increasing evidence linking children's exposures to environmental hazards with adverse health consequences, a framework to protect children from environment hazards must include regulations to test new chemicals and other potential hazards before they are marketed.

Lanphear et al, EHP October 2006