

Human Health Focus Group

This presentation represents the work of the Human Health Focus Group members:

- Pat Cirone, PhD
- Elaine Faustman, PhD- University of Washington
- Ken Kauffman- Oregon Department of Human Services
- Joan Rothlein, PhD- Oregon Health and Science University
- Sue MacMillan- URS Corporation
- Dave McBride- Washington State Department of Health

What is the risk for people who consume more than 4 ounces of fish per week (above the current water quality criteria)?



Who are we trying to protect? Vulnerable Populations



Why are PCBs important?

Health Effects of PCBs

- PCBs have also been shown to cause a number of serious non-cancer health effects in animals, including effects on the immune system, reproductive system, nervous system, endocrine system and other health effects.
Studies in humans provide supportive evidence for potential carcinogenic and non-carcinogenic effects of PCBs.

Why are PCBs important?

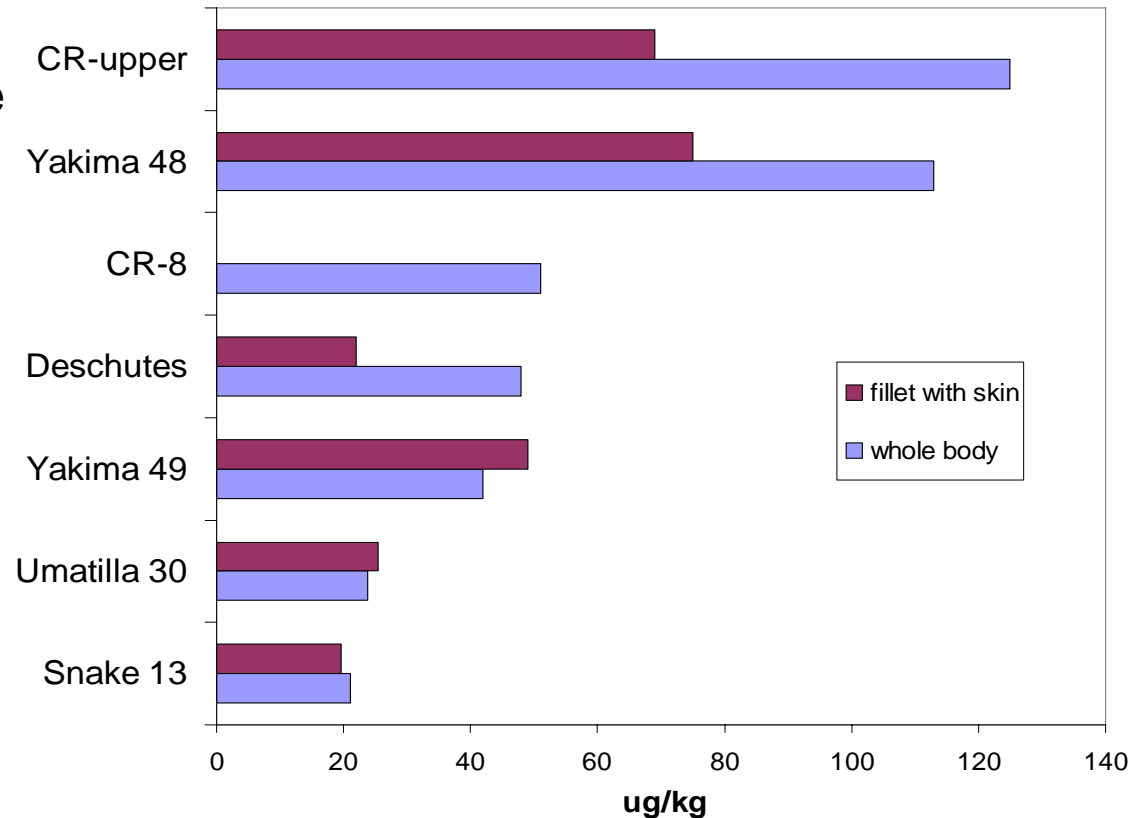
Health Effects of PCBs

Studies of reproductive effects have also been carried out in human populations exposed to PCBs. Children born to women who worked with PCBs in factories showed decreased birth weight. Studies in fishing populations believed to have high exposures to PCBs also suggest similar decreases.

Why are PCBs important?

PCBs are persistent chemicals that are found every where in our environment, especially in fish tissue.

PCBs in the environment



The average concentration of PCBs measured in largescale sucker from various sites in the Columbia River Basin (USEPA 2002)

Why is mercury important?

Mercury Toxicity



Mercury poisoning; Congenital Minamata disease, Minamata, Japan

Why is mercury important?

Health Effects of Methylmercury

- **Multiple effects at high dose (death, kidney toxicity, cardiovascular toxicity, immunotoxicity)**
- **Lower doses linked to NEUROTOXICITY in children exposed in utero**
 - **Delayed developmental milestones**
 - **Attention disorders**
 - **Deficits in fine motor function**
 - **Visual spatial disabilities**
 - **Memory problems**

Why is mercury important?

Health Effects of Methylmercury

Blood Hg Levels in Women Age 16-49 National Environmental Exposure Study

<http://www.cdc.gov/exposurereport/pdf/SecondNER.pdf>

- **8% (3.5 million women 20-44 years of age) of US women of childbearing age above recommended safety level for methyl mercury =**

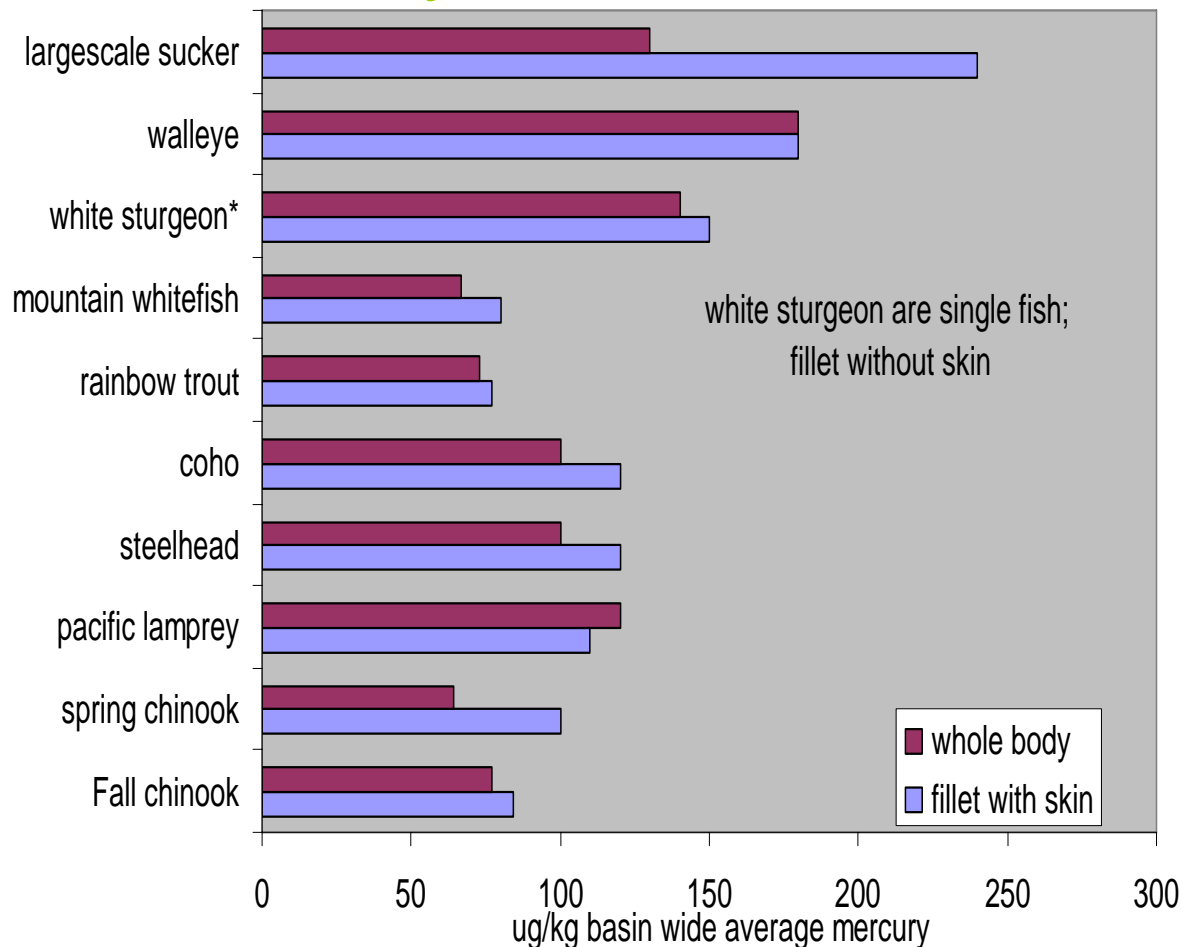
5.8ug methylmercury/L in blood

430,000 infants born each year to mothers who had blood conc. > RfD

Why is mercury important?

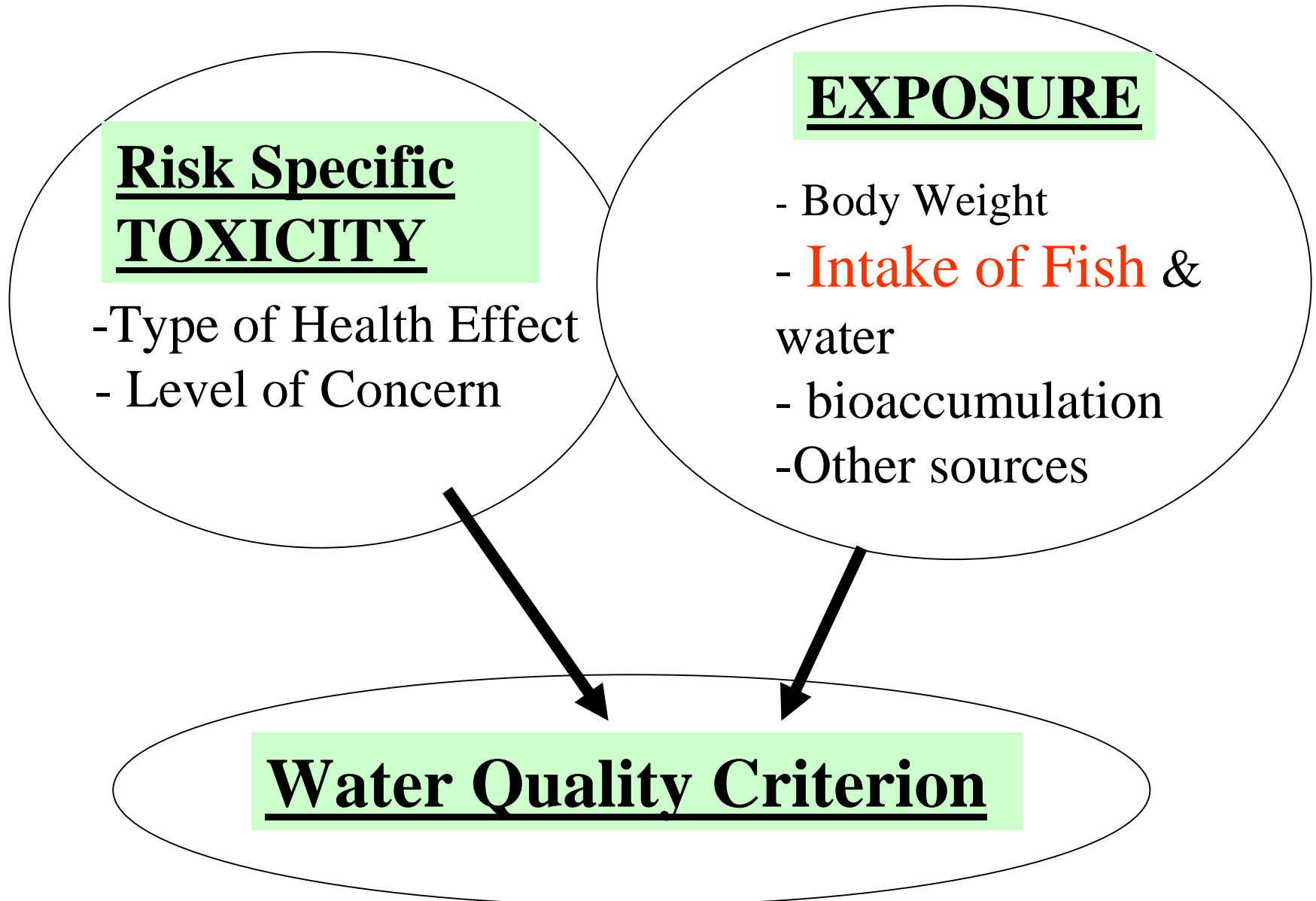
Mercury in the environment

Mercury is found every where in our environment, especially in fish tissue.



The average concentration of mercury measured in different fish species collected from the Columbia River Basin (USEPA 2002)

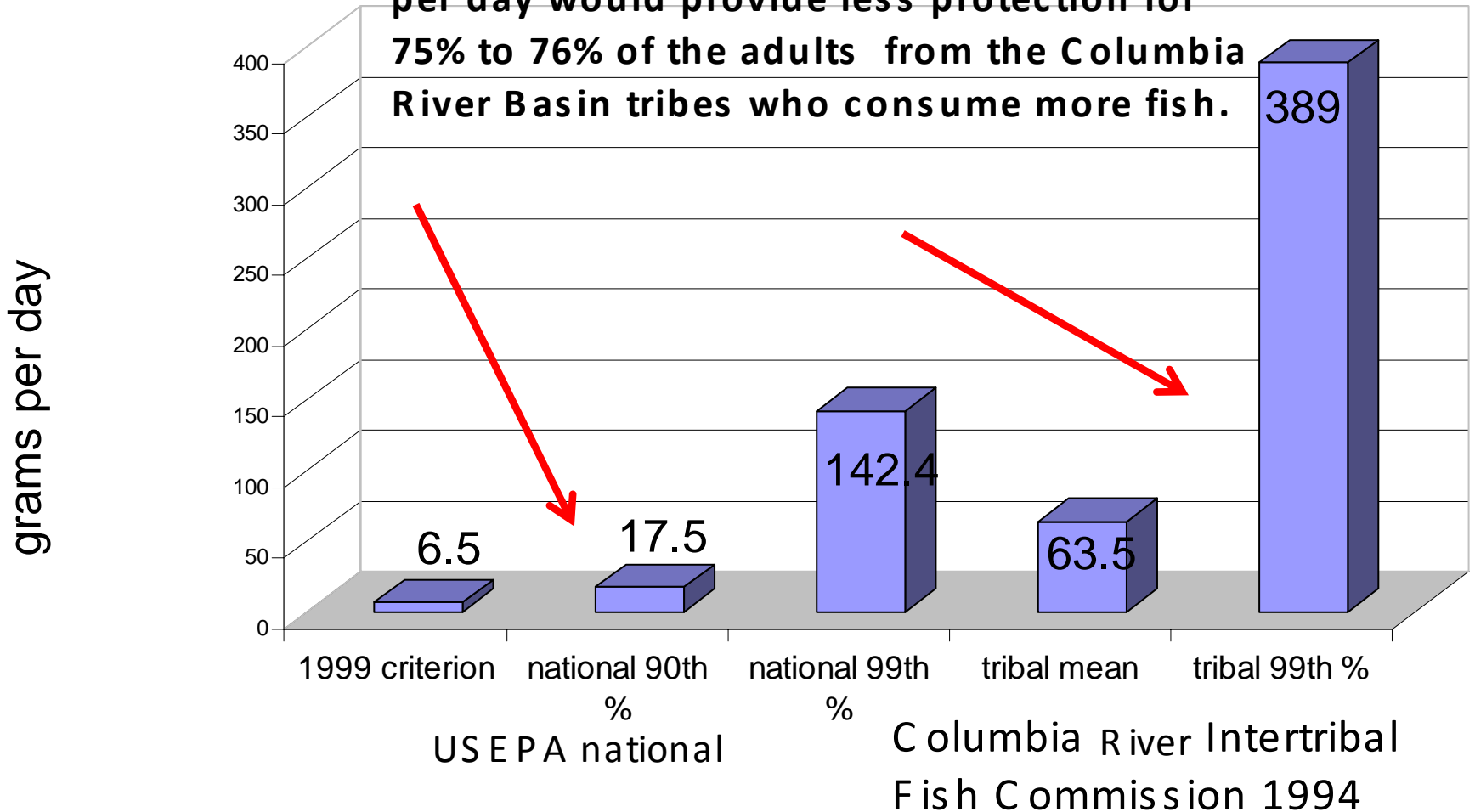
Criteria are based on a specific fish consumption rate



Variability in Fish Consumption Rates

There are a variety of national and regional fish consumption

The EPA national default rate of 17.5 grams per day would provide less protection for 75% to 76% of the adults from the Columbia River Basin tribes who consume more fish.



Risk Calculations for chemicals in fish at different fish consumption rates

Note: USEPA and FDA recommend two 6 ounce meals per week (12 ounces)

Daily Consumption
g/day
Weekly
consumption

17.5	48.5	175
4 ounces	12 ounces	40 ounces

Cancer

PCBs	1 in a million	3 in a million	10 in a million
------	----------------	----------------	-----------------

Non
cancer

mercury	Equal to reference dose	Exceeds reference dose	Exceeds reference dose
---------	-------------------------------	------------------------------	------------------------------

Risk Assessment Uncertainties when deriving water quality criteria

- General
 - Lag between science and regulatory guidance
 - Lack of knowledge (disease mechanisms, chemical uptake)
 - Use of defaults
- Toxicity
 - Sensitivity or vulnerability to toxic chemicals
 - Extrapolation from animal studies to humans
 - Extrapolation from observed effect to environmental exposure
 - Single estimate for RfD
- Exposure
 - Human variability (body weight, fish ingestion, etc)
 - Exposure to multiple chemicals
 - Risks to Children
 - Risks to the elderly

Scientists provide advice

- “Many of the choices facing society are moral and ethical ones, and scientific information can inform them. Science does not provide the solutions but it can help understand the consequences of different choices.” (Jane Lubchenco, Oregon State Prof Of Zoology 1998)