

Hair Mercury Biomonitoring Results from Alaska and Hawaii

Demonstrating the Value of Local Fish
Consumption Advice



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Data ADPH Uses to Develop Fish Consumption Advice

- Mercury levels in Alaska fish
- Human biomonitoring data
- Fish consumption rates in Alaska
- Nutrition-related disease rates and trends in Alaska

Drawbacks of Restricted Consumption of Traditional Foods

- Health risks associated with alternative foods
 - ↑ saturated fat: cardiovascular disease
 - ↑ carbohydrates: diabetes
- Loss of nutritional and health benefits
- Overall negative health impact of dietary and lifestyle changes
- High cost of replacement foods
- Social, economic and health consequences from the breakdown of subsistence

What is Human Biomonitoring?

- Measure level of an environmental chemical (or its metabolite) in the human body
 - lab measurements of blood, urine, serum, saliva, or tissue samples
- Directly measure level of exposure
 - Reduced uncertainty of risk assessment

Hair Mercury Biomonitoring - Why?

- Estimate of exposure needed to predict health effects of contaminants
- Measuring actual exposure is much more accurate than modeling or risk assessment
- Hair a long-term methylmercury dose integrator
- Relationship of mercury in blood and hair well-characterized
- Hair is simple to collect, handle and ship

Alaska's Statewide Maternal Hair Mercury Biomonitoring Program

- Program initiated in July 2002
- Available to all women of childbearing age in Alaska
- Sample collected through Health Care provider
- Analyzed for free by Alaska Public Health Laboratory

Hair Mercury Concentrations of Alaska WCBA

July 2002–June 2009 (N=751)

Number of Samples

0

Median = 0.47

1

2

3

4

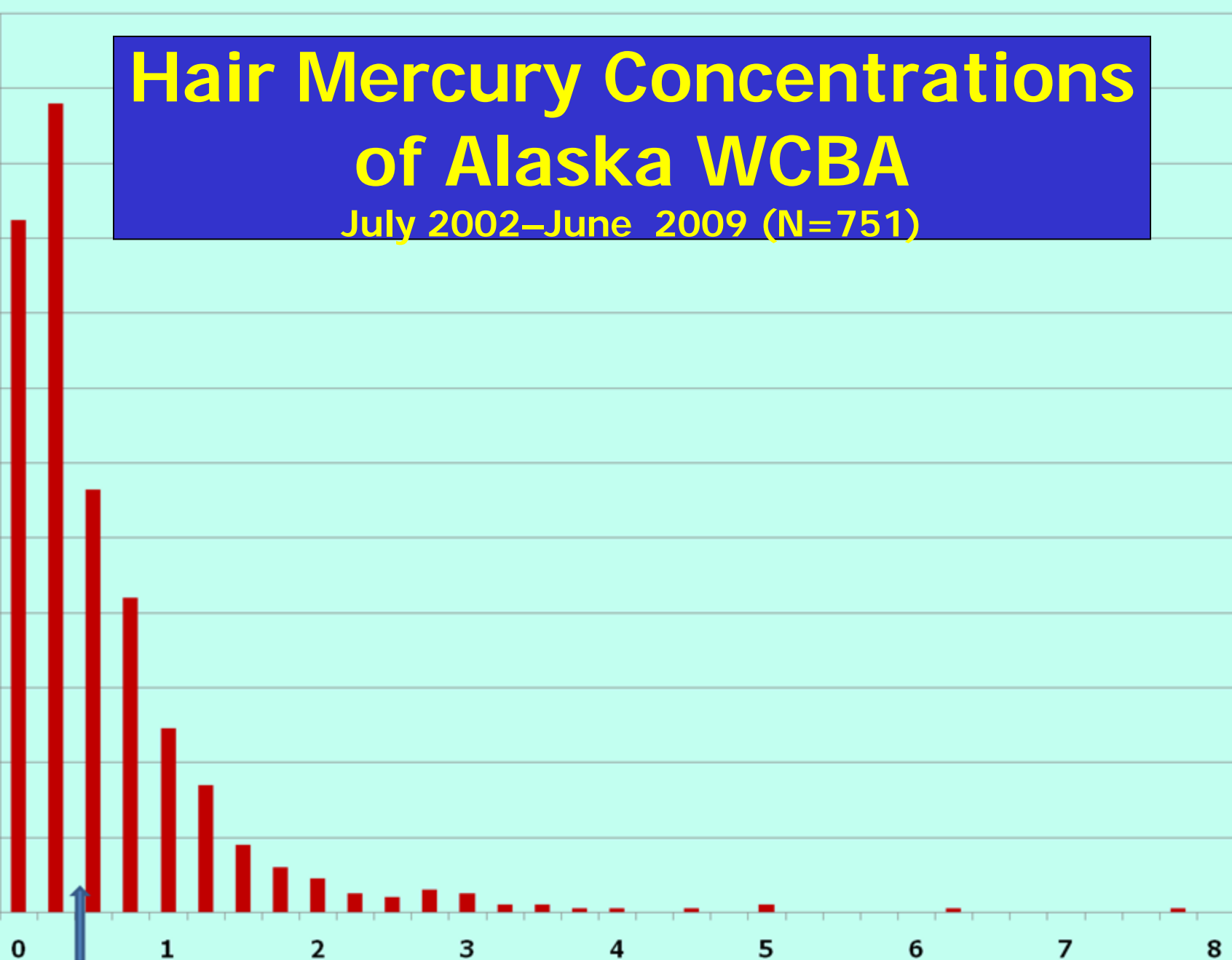
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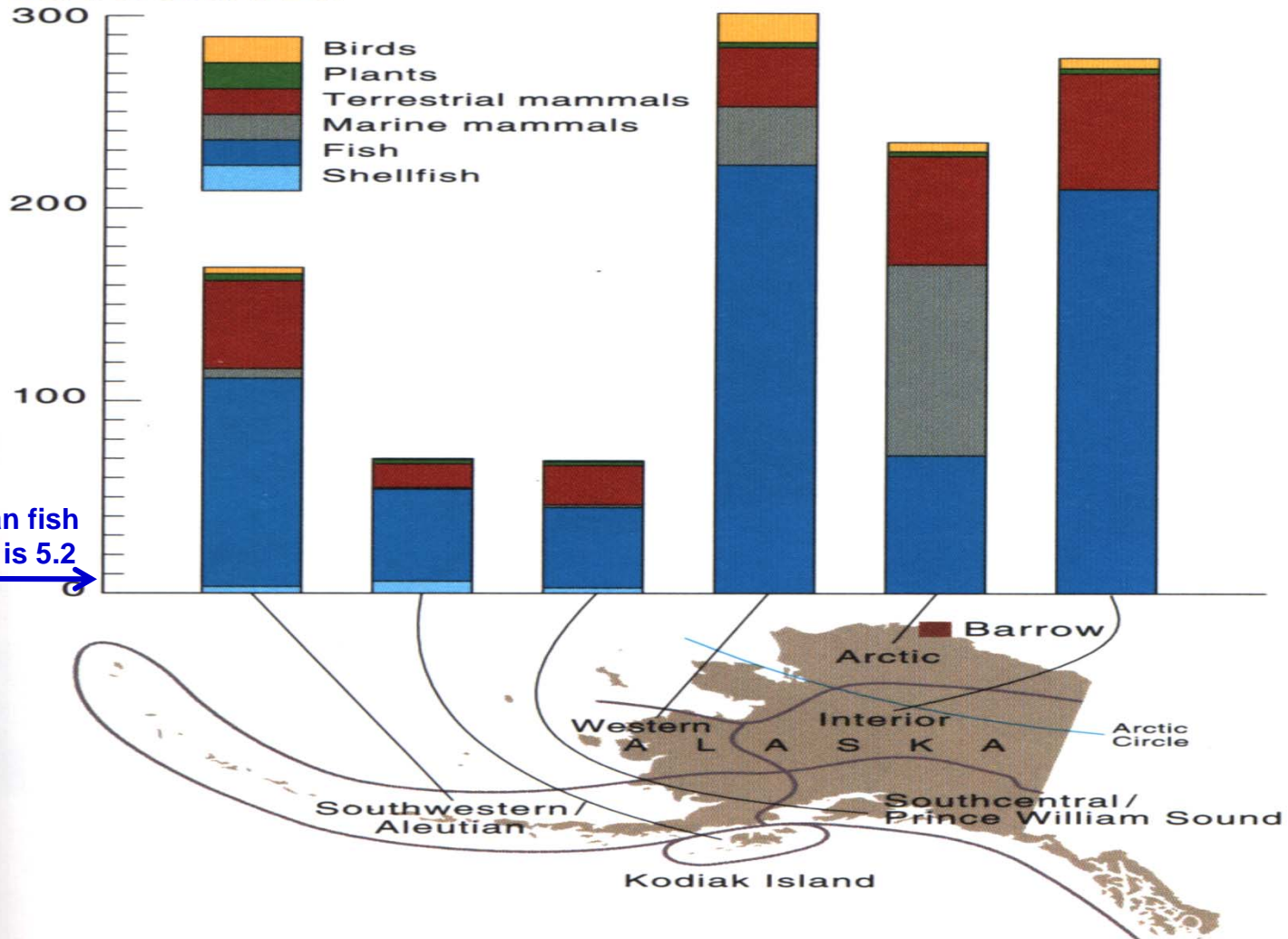
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Hair Mercury Concentration (ppm)

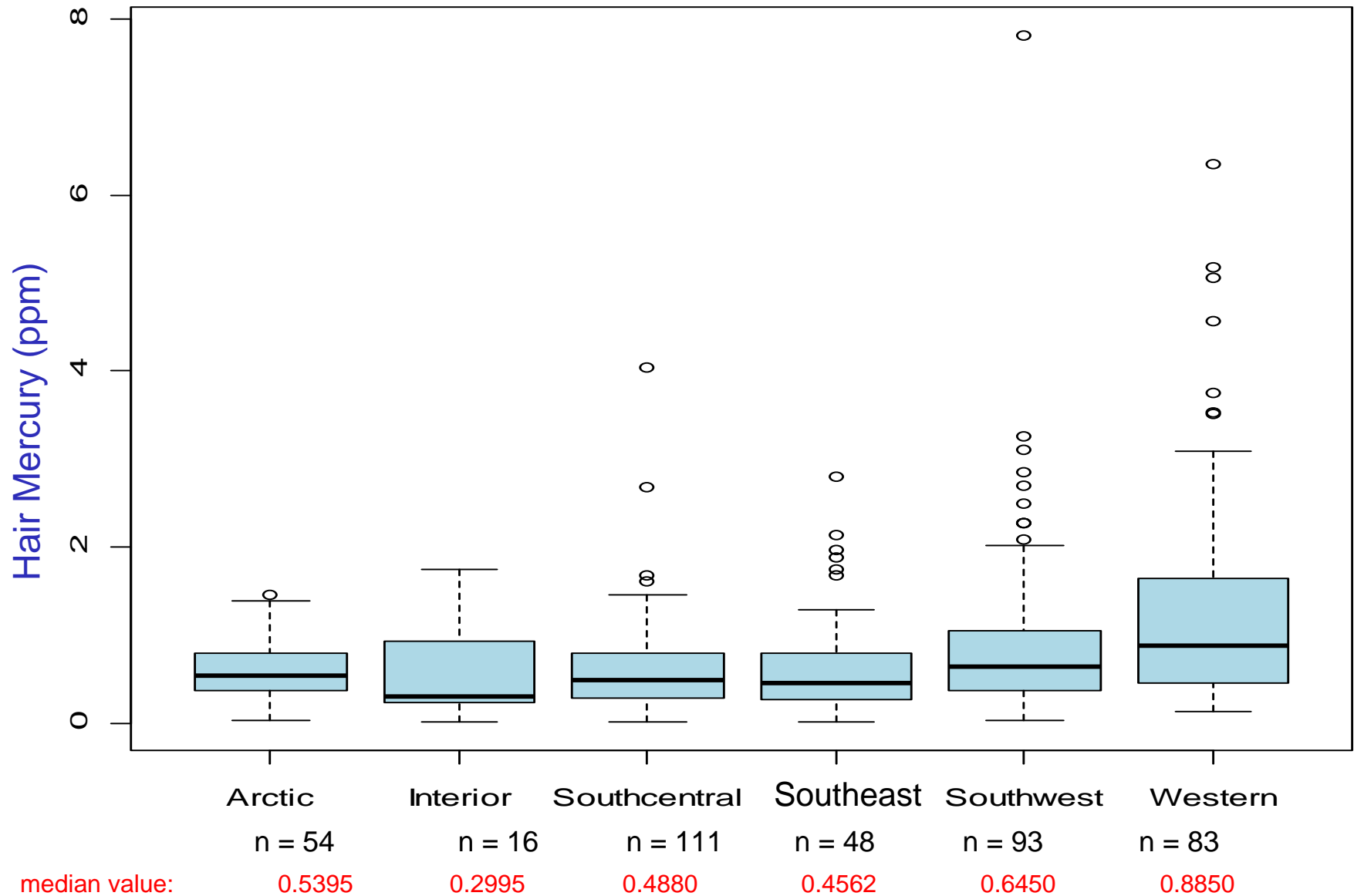


Alaska Subsistence Food Harvest

Harvest of subsistence food,
small and mid-size communities, Alaska,
kg/person/year



Hair Mercury in Women of Childbearing Age (incl. Pregnant Women) in Rural Alaska





Mercury in Northern Pike in National Wildlife Refuges in Alaska

- USFWS Special Project, Alaska Region
- Collaborative effort with Alaska DHSS
 - Hair mercury biomonitoring
 - Fish consumption surveys
 - Pike consumption guidance
- Determine mercury levels in northern pike meat from traditional and well-used subsistence fishing sites



Hawaii Mercury Biomonitoring

- Collaborative project between Hawaii DOH and University of Hawaii
- Volunteers from Special Supplemental Nutrition Program, Women, Infant and Children (WIC) clients
- Goal-Collect hair from 1000 volunteers

WIC

- Child Nutrition Act of 1966
- Serving ~36,000 low-income women, infants and children at nutritional risk monthly.
 - 50% children, 25% infants, 25% womennote: 50% of births
- Categories served: children (0-5), pregnant women, 6 months post-partum, 1 year if breastfeeding

Why get tested?

Mercury can be very harmful to the brain and even small amounts can damage a brain that is just starting to form or grow. Too much mercury may affect a child's behavior and lead to learning problems later in life.

By finding out how much mercury your body is exposed to you will know if the amounts and types of fish you eat are safe.

Who can be tested?

Anyone who eats fish can be tested.



How often does it get tested?

Once a year or more often if you eat a lot of fish.

High fish consumption can be a risk.

Free Mercury Testing



What happens when you agree to be tested for mercury



The test involves cutting a small sample of your hair and sending it to our lab to process the result.

Don't worry! The amount of hair we take is very small. We cut from a part of your hair no one will notice.



This hair sample is about how much we cut.

After your hair sample is cut, you'll fill out an envelope with your address. When we get the result of your test, we'll mail it to you and explain what the result means. It's that easy!

I'm happy to have the opportunity to take this test. I heard about the risk until now I didn't know how to find out if I was at risk.
-S.P., Kahala

Eating Fish Safely for Pregnant Women Nursing Mothers & Young Children

Make wise choices about the

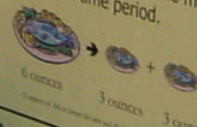
- kinds of fish you eat &
- how often you eat fish

Fish you should not eat:

- ❌ kajiki (pacific blue marlin)
- ❌ shark
- ❌ swordfish (shutome)

Space out your fish meals.

Instead of eating 6 ounces of fish at one meal, try eating two 3-ounce portions over the same one month or one week time period.



Follow the Local Guide to Eating Fish Safely.

It gives you a list of fish you can safely eat.

Our WIC staff can help you find the guide.

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How much hair do we need



Questionnaire



- Questions on fish consumption
- How much, how often and what types?
- Previous knowledge of mercury risk?



STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. Box 3329
HONOLULU, HAWAII 96801-3329

CHYONG L. FUKINO, M.D.
DIRECTOR OF HEALTH

It is up to you to protect
your health.

Date _____

Dear XXXX-

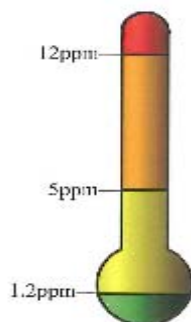
Thank you for participating in the Hair Analysis for Mercury and Arsenic Project of the Hawaii Department of Health. **The result of your hair mercury test is listed below.**

Results:

The amount of mercury measured in your hair sample was **XX ppm** (parts per million).

- ☐ The result of your test was good, you should not change which fish you eat.
- ☐ We recommend you choose fish lower in mercury. Use the "Local Guide to Eating Fish Safely" pamphlet we have included with your test results to help choose fish low in mercury.
- ☐ We recommend you only eat fish listed as "eat any time" from the "Local Guide to Eating Fish Safely" pamphlet. We will call you or you can call our office at 586-4249 for more assistance.

The following points will help you understand what your level means:



- We don't expect a result of zero. Almost everyone has some mercury in their hair.
- A result of 12 ppm or higher is considered harmful for the developing brain. It may be ok for adults who won't become pregnant, but most people should change their eating habits to lower a level this high.
- A result between 1.2 ppm and 12 ppm does not necessarily mean that a developing baby will be affected because there is a built in safety factor. However, mercury has no health benefits in the body. We suggest that you take steps to lower your mercury levels, especially if you are pregnant or about to become pregnant. In order to prevent approaching the unsafe level of 12 ppm, we will contact you if your hair result is above 5 ppm to talk about steps that you can take to reduce your mercury.
- A result below 1.2 ppm is considered safe for anyone. This level was chosen as a guideline with a built-in safety factor.

(over)

Demographics of Participants

Self Identified Race

- Native Hawaiian/Pacific Islander-40%
- White-33%
- Asian-55%
- Black-2%
- Native American-2%

Fish Consumption In the past month

- Several times a day-8%
- 2-6 times a week-36%
- Once a week-21%
- 1-3 times a month-30%
- None-6%



Types of Fish Eaten

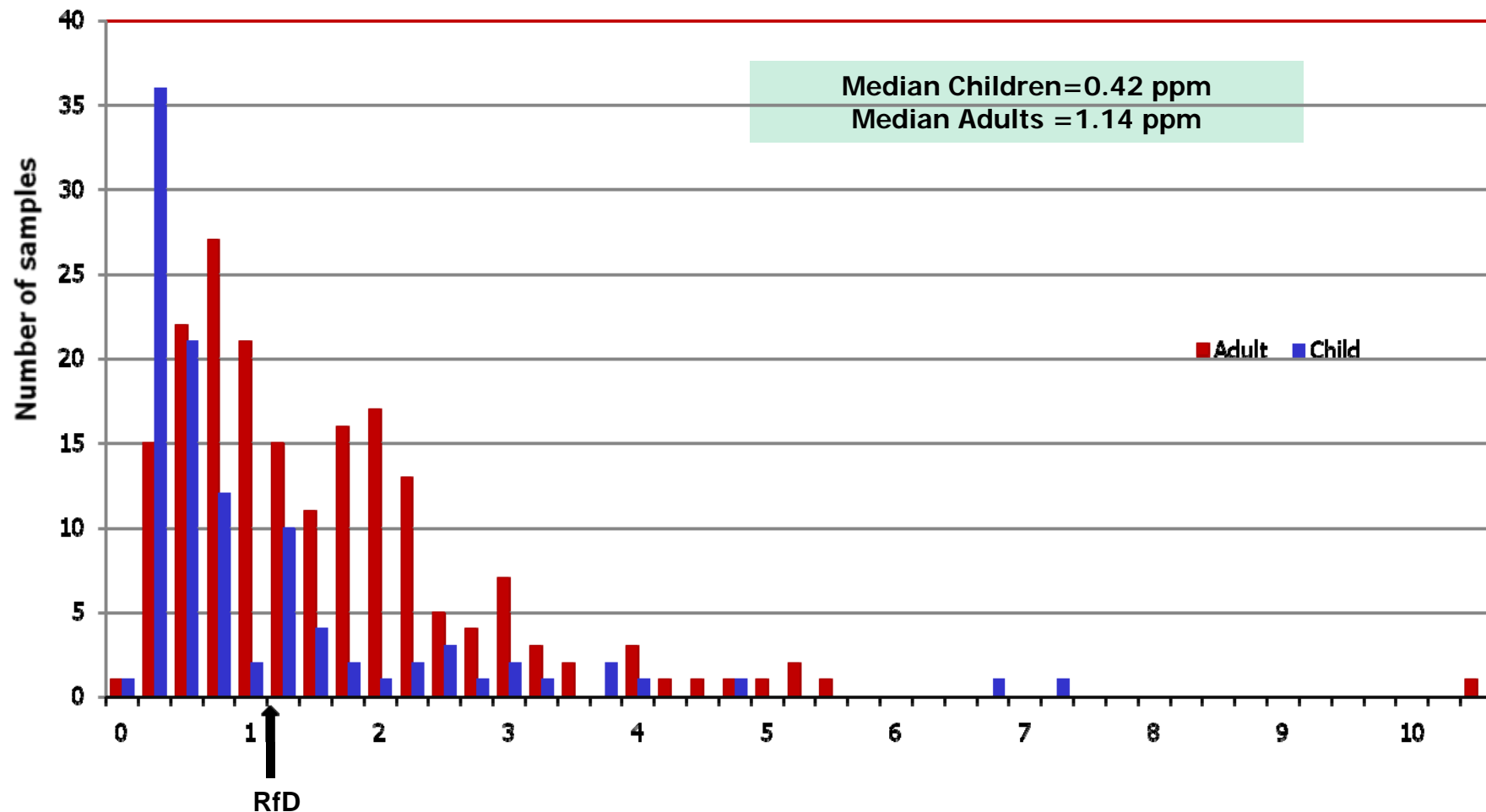
- 55% ahi
- 35% canned tuna
- 26% salmon
- 13% mahimahi
- 14% tilapia
- 13% aku



<http://esperandoaiyasu.wordpress.com/2008/01>

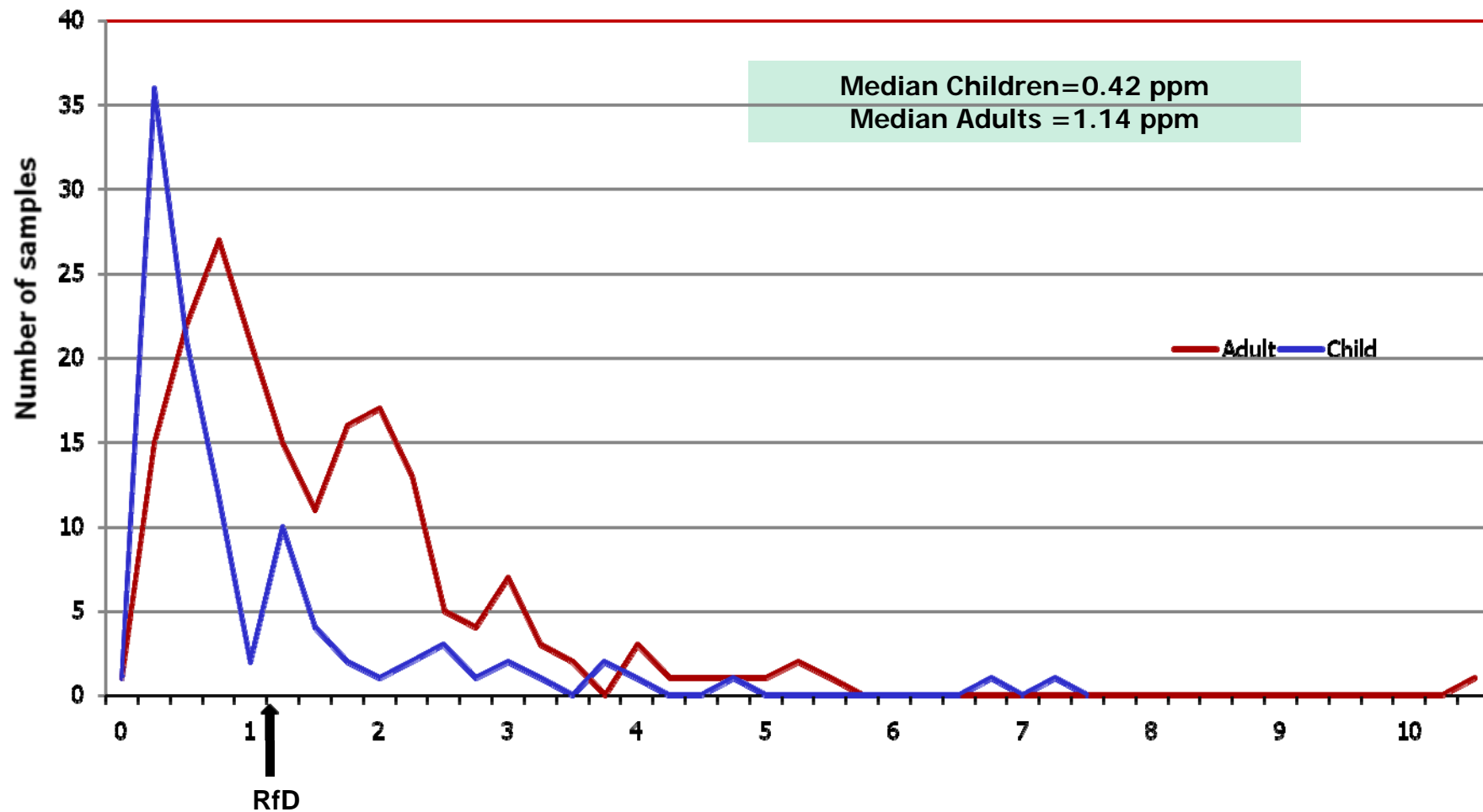
Hair Mercury Concentrations

Hawaii Children(n=103) and Women (n=189)

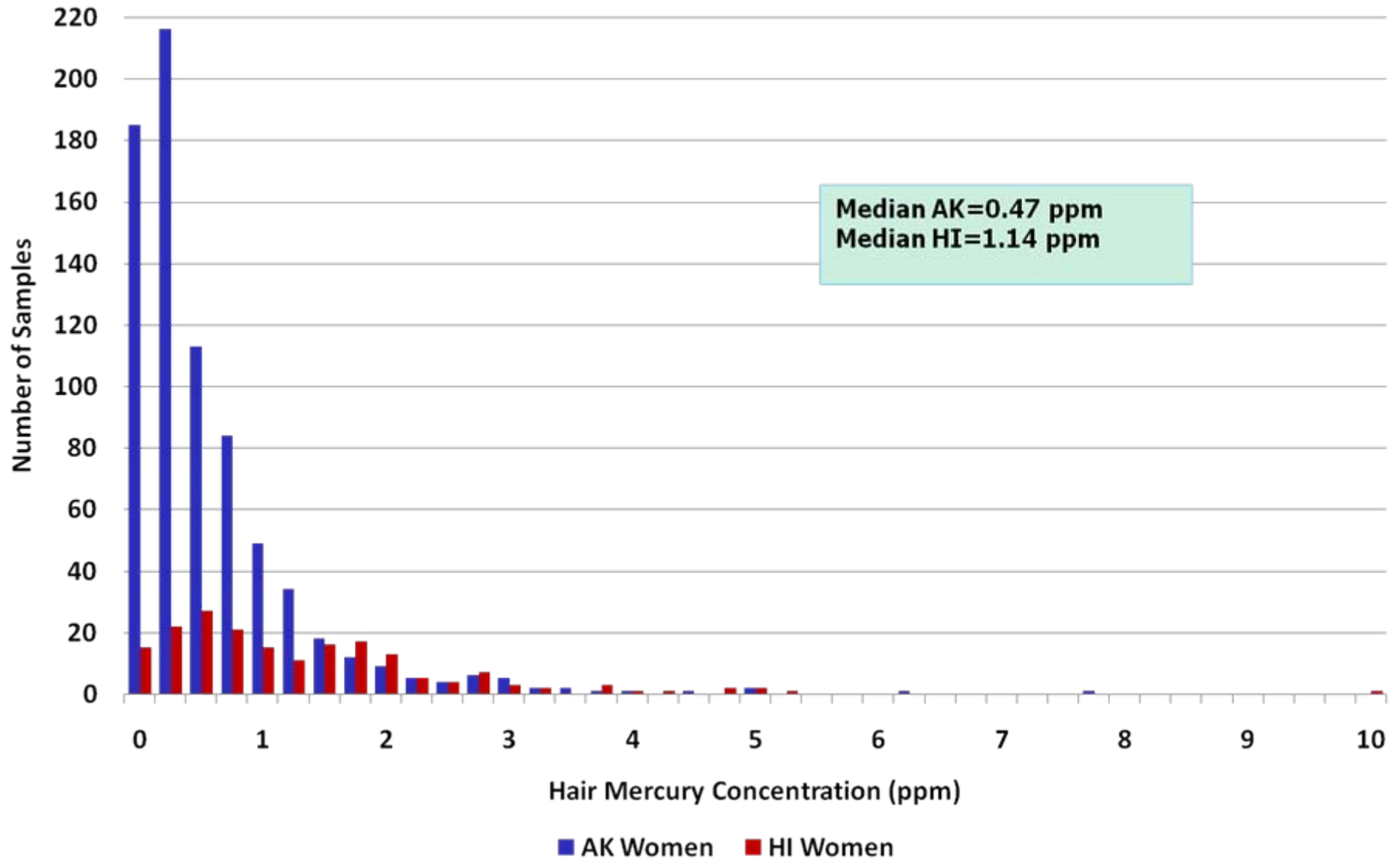


Hair Mercury Concentrations

Hawaii Children(n=103) and Women (n=189)



Hair Mercury Concentrations in Women in Alaska and Hawaii



Comparisons – Alaska and Hawaii



- Median hair mercury over twice as high in Hawaiian WCBA than in Alaska WCBA
 - Likely due to differences in types of fish consumed
- Many similarities:
 - Fish very important to culture in sub-populations
 - Sub-populations rely heavily on fish – far more than 2 meals/week
 - Both states have some high-mercury and some low-mercury fish
 - Hawaii: large ocean fish vs. tilapia
 - Alaska: pike vs. salmon
 - Both states want to steer fish consumption to low-risk species; not limit fish consumption per se

Current U.S. EPA Advice for WCBA about fish consumption

1. "DO NOT EAT: shark, swordfish, king mackerel, or tilefish
2. Eat up to 12 ounces (2 average meals) a week of a variety of fish and shellfish that are lower in mercury.
3. Check local advisories about the safety of fish caught by family and friends in your local lakes, rivers, and coastal areas."

Recommendations

- Use local data to give fish consumption advice
 - Fish monitoring
 - Human biomonitoring
 - Consumption surveys, culture, food security, health status also potentially important
- Federal agencies: Public should consult local officials for more than just the RISK (negative) side of fish consumption advice

