

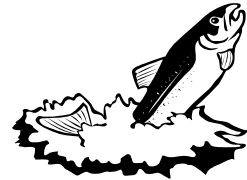
## **Hawaii WIC Mercury Exposure Hair Analysis Biomonitoring**

A Collaborative Project with Hazard Evaluation and Emergency Response (HEER) Office<sup>1</sup>, WIC Services Branch<sup>2</sup>, State Laboratory Division<sup>3</sup> and the University of Hawaii

### **Purpose of Investigation**

This project will assess exposure to mercury in Hawaii WIC's childbearing-aged women and young children on a voluntary basis statewide via hair analysis. The long-term goal of the project is to reduce unsafe mercury exposure in the vulnerable target population. The project goals are to:

- Identify individuals at risk for excessive mercury exposure;
- Survey individuals on fish consumption habits; and
- Educate families about how to minimize mercury exposure while maximizing health benefits of fish consumption.



### **Background**

Fish is an important food source in Hawaii and a potential source of methyl mercury exposure. Sampling by the Department of Health (DOH) in 2003 indicated that ahi (tuna) and other large pelagic species contain significant levels of methyl mercury. The Hawaii WIC Program has taken a leading role in the education of families on this important public health concern. WIC collaborated with others to develop an official DOH fish advisory for pregnant women and children with advice to restrict consumption of the higher mercury fish. The DOH distributes approximately 10,000 fish advisory brochures a year.

The 2003 data on mercury levels in many of the popular species of fish consumed in Hawaii and WIC participant consumption data indicated that Hawaii WIC participants were at risk for unsafe levels of exposure to methyl mercury due to the amount and types of fish they commonly consumed. Therefore, in an effort to not contribute to this serious health problem, Hawaii WIC requested and was given special dispensation from USDA in 2003 to offer canned salmon as an option to the tuna offered to exclusively nursing WIC women.

Data from two sources indicate that mercury exposure levels in Hawaii exceed national levels. The DOH's Heavy Metal and Pesticide Exposure Database indicate that more than 50% of women of childbearing age that were tested for mercury from 2002-2006 have mercury blood levels that exceed EPA's reference concentration of 5.8 ug/L. Mercury measurements in cord blood of 188 women giving birth in 2004-2005 at the largest birthing center in Hawaii found 28% exceeded the EPA reference concentration compared to 6% nationally. Therefore, a need exists to better characterize mercury exposure in Hawaii with the goal of designing education and outreach efforts to minimize risks from mercury exposure. A biomonitoring program is the most effective strategy to accomplish this task. Hair provides a convenient, non-invasive and readily obtainable specimen. The State Laboratory has the capacity to analyze mercury in hair samples.

<sup>1</sup>Environmental Health Division, Hawaii State Department of Health

<sup>2</sup>Family Health Services Division, Hawaii State Department of Health

<sup>3</sup>Hawaii State Department of Health

## **Recruitment into Study and Procedures**

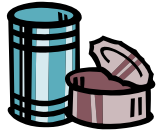
Project staff will coordinate with the WIC Program to set up information tables at various WIC locations throughout the islands to recruit volunteer study participants. After the initial test site in Honolulu, the study will include other sites on Oahu. Depending upon resources, staff will visit the neighbor island WIC clinics. The project goal is to obtain hair samples from 1000 WIC women of child bearing age in the first year.

Project staff will explain the goal of the project and provide informational materials describing how the hair sample will be taken. Each participant who agrees to be in the study will be asked to fill out a questionnaire and an informed consent form. After informed consent has been completed, the project staff will collect hair, place into a labeled plastic bag, and transport to the DOH State Laboratory for analysis using proper chain of custody procedures.

Individual test results for mercury with a written explanation of their meaning will be provided to the participants. Following dissemination of individual results, the HEER Office Toxicologist with assistance from WIC and DOH resources will be available to answer questions the participants may have. Recommendations for follow-up actions will be made, if warranted, including repeat testing or consultation with a physician/medical home.

## **Implications for the WIC Food Package Revisions**

The WIC food package revisions for exclusively nursing women allows states to add canned sardines, salmon, and mackerel to tuna. By August 2009, states must offer at least two canned fish choices and increase the amount from 26 to 30 ounces per month. Hawaii WIC has not yet determined which options will be offered, although culturally sardines may be most acceptable of the alternates. Sardines, mackerel and salmon are all lower in mercury than canned tuna (see following table).



Species	Mean concentration (ppm)	Consumption Limits
Halibut	0.252 <sup>1</sup>	Once per week
Mahimahi (Dolphinfish)	0.190 <sup>2</sup>	Once per week
Ahi (Bigeye tuna, fresh)	0.47 <sup>2</sup>	Once every 2 weeks
Ahi (Yellowfin tuna, fresh)	0.31 <sup>2</sup>	Once every 2 weeks
Tuna (light, canned)	0.160 <sup>3*</sup>	Once per week
Tuna (light, canned)	0.118 <sup>1</sup>	Once per week
Salmon (fresh, frozen, or canned)	Non-detectable <sup>1</sup>	None
Sardines	Non-detectable <sup>1</sup>	None
Mackerel Atlantic (N. Atlantic)	0.050 <sup>1</sup>	4 meals per week
Mackerel Chub (Pacific)	0.088 <sup>1</sup>	2 meals per week

<sup>1</sup>U.S. Food and Drug Administration. Mercury Levels in Seafood Species.

<sup>2</sup>Hawaii State DOH, Hazard Evaluation and Emergency Response Office, 2002-2003

<sup>3</sup>Consumer Reports, June 2001. Mercury: Gauging the risks.

\*Results from the Consumer Report study found a higher mean concentration than the FDA study.

## **Implications for Education and Dietary Practices**

The need to educate Hawaii's WIC population on mercury exposure continues and this project will empower WIC participants to become aware of their own exposure levels and potentially change individual/family dietary practices.