Acknowledgements

• Dr. Brode’s Office: Cyndie Monyko, Der Xiong, Stephanie Kneppel, Shelly Glassco, Thao Tran, Pat Taylor, Jan Joseph, Heather Labertew

• Study Staff: Michael Lipsett, Diana Lee, Alyce Ujihara, May Lynn Tan, Svetlana Smorodinsky

• Funders:
  • Delta Tributaries Mercury Council of the Sacramento River Watershed Program
  • State Water Resources Control Board
  • CALFED Bay-Delta Program
National Perspective

• Fish consumption is believed to be the primary source of mercury exposure in the general population.

• 6% of women of childbearing age have blood mercury levels of potential health concern (>5.8 mg/L; MMWR 2004).

• Among Asian, Pacific Islander, Native American, and multiracial women, this percentage is much higher (16.59 ± 4.0%; Hightower et al. 2006).
Sacramento has numerous nearby water bodies with sport fish consumption advisories due to mercury contamination.
Principal Objectives

1. Characterize mercury exposure in clinic population.

2. Assess the feasibility of incorporating blood mercury test into clinical practice, and the extent to which Medi-Cal and other health insurance providers will pay for these tests.

3. Through training and education, increase knowledge among Dr. Brode’s office staff and patients about health risks and benefits of fish and ways to reduce exposure to mercury.
Study Partner & CPSP

- Sacramento office of Dr. James Brode, M.D., FACOG.
- Serves primarily low-income women of color.
- A Comprehensive Perinatal Services Program (CPSP) provider, a statewide program administered through Medi-Cal and the CDHS’ MCH Branch
Comprehensive Perinatal Services Program (CPSP)

- Goal – improve pregnancy outcomes and lower health care costs
- Available to all Medi-Cal pregnant women enrolled in Medi-Cal managed care plan
- Prenatal, delivery, and postpartum care
- Health education, nutrition and psychosocial services
Study Inclusion Criteria

• Patients seeking pre-natal services from 10/16/06 to 2/6/07

• Age ≥ 18 and ≤ 49 years

• Pregnant and prior to 32 weeks’ gestation

• Fluency in English, Vietnamese, or Hmong.
Study Phases

Phase I Activities

- Consent & HIPAA
- Consumption Survey
- Education
- Blood Draw
- Clinical Follow-up all patients

Phase II

- CPSP Screening Protocol

$15.00 Incentive

$25.00 Incentive
Staff Capacity Building

- Study introduction
- Mercury in fish, health effects, advisories, education
- Tools and techniques for educating patients
- Obtaining patient consent
- Administering the survey
- Delivering the educational protocol
- Practice
Consumption Survey

- Administered by clinic staff in English, Hmong, and Vietnamese
- Fish consumption habits while pregnant
- Advisories awareness
- Portion sizes
- Demographic information
- Flip book demo.
- Summary Sheet
Used for Education & Clinical FU
Quick assessment for blood

- Patient wants information about the Delta:
  - Some of the fish caught around here have high levels of mercury in them, especially swordfish and orange roughy. You should avoid these fish or only eat them once a month.

- Patient wants information about the American River:
  - If you get fish from the American River, you should avoid anchovies, bass, pike, and smelt (these fish contain more mercury).
  - You can eat the safer fish, such as sunfish and bluegill, up to one time a week.

- Patient eats fish from other Northern CA waterbodies:
  - Check the current water body advisory label at the back of the brochure and explain. Give a copy of the advisory here.

- Ask if patient has any questions:
  - Record patient's questions:

- Explain blood test instructions:
  - As part of this study, we want to find out how much mercury is in your body right now.

**Commercial Fish Portions**
- SAFE (< 6g / 300g)
- MODERATE (6g-15g / 300g)
- HIGH (>15g / 300g)
- VERY HIGH (>30g / 300g)

**Summary Sheet**
- Patient does not eat fish or shellfish (reason):
  - Fish is good for your health and your baby. If you can, you should try to include fish in your diet up to 2 times a week. But follow the guidelines in this brochure.

- Patient eats fish:
  - It's good that you're eating fish. Fish is good for your health and your baby, and it's a good alternative to other kinds of meat. It sounds like you are eating:
  - Sometimes fish can have mercury. Too much mercury in your body could harm your baby's brain and growth. That's why you should learn which fish have more mercury in them.
  - You should never eat shark, swordfish, or ocean perch. They have the highest mercury. Children should not eat these fish either.

- Patient eats commercial fish:
  - For fish that you buy, keep eating it up to 2 times a week. But remember, since fish is a meat protein, each time you should eat only a bit as much as your hand.

- Patient eats tuna:
  - It sounds like you are eating canned tuna. You can eat tuna as part of your two meals a week. Chunk light tuna has less mercury than albacore or white tuna, or tuna steaks. When you buy tuna, look for the label (show example).

- Patient eats sport fish (caught by self, friends, family):
  - Make sure you know where your fish comes from. Check the advisories for that place, before you eat any fish. (FAQ)
  - The safest fish to eat from around here are salmon, tilapia, trout, and sunfish. Eat up to 1 meal of tuna a week. Avoid other fish unless there is an advisory for that place.
  - Remember, since fish is a meat protein, each time you should eat only a bit as much as your hand.

- Patient eats both commercial and sport fish:
  - Every week, you can either eat 2 meals of fish that you buy (except shark, swordfish, albacore tuna or tuna steaks) or 1 meal of fish caught by friends or family.
  - Don't eat both commercial and sport fish in the same week.
**Safety Tips for Eating Fish:**

*Post survey*

*Review types of fish*

*Advisory info.

*Q & A*

**Eating fish is good for your health.**

But some fish have a harmful chemical called mercury in them.

Too much **mercury** can harm the growth and development of babies and children.

**Never** eat shark, swordfish, tilefish, or king mackerel.

These fish are highest in mercury.

Fish has protein and healthy fats. These are good for you and your children.

**FOR MOST OF THE FISH THAT YOU BUY:**

You can eat up to **2 meals of fish in a week.** It's best to eat a **variety of fish.** Choose **low-mercury fish**, such as:

- Wild Salmon
- Flounder, Sole, Pollock, Cod, or Tilapia
- Sardines
- Herring
- Clams
- Farmed Trout
- Farmed Catfish
- Canned Tuna
- Shrimp
- Scallops
- Crab
- Canned Tuna

**SAFER**

Safest: Salmon, Tuna

**LESS SAFE**

Stop eating: Sturgeon, Wild Catfish, Yellowtail

**FOR FISH CAUGHT BY YOU, FRIENDS, OR FAMILY:**

Always follow health and fishing advisories in your area. If there is no advisory, eat up to **1 meal a week** of this safer fish, and no other fish in the same week. Avoid less safe fish (eat once a month or less).

*If you eat tuna, choose chunk light canned tuna. It has **less mercury** than white or albacore canned tuna, or tuna steaks.*

**Children** can eat fish too. They may eat up to 2 meals in a week, but give them **smaller amounts.**

Within the same week, don't eat fish you buy AND fish caught by you, friends, or family.
Blood Draw

- Location
- Fees negotiated with clinical laboratory
- ICP-MS
- EHLB provides 10% validation sample for comparison

<table>
<thead>
<tr>
<th></th>
<th>Typical Fees</th>
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<tbody>
<tr>
<td>Hg in whole blood analysis</td>
<td>$95.25</td>
</tr>
<tr>
<td>Blood draw</td>
<td>$8.00</td>
</tr>
<tr>
<td>Medi-Cal reimbursement</td>
<td>$14.12</td>
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<tr>
<td>Negotiated draw and analysis</td>
<td>$25.00</td>
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</table>
Clinical Follow-up Protocol

Above 5.8 μg/L and ≤58 μg/L

<table>
<thead>
<tr>
<th>Health Impacts</th>
<th>To infant: No significant risk of adverse effects, but some uncertainty exists due to incomplete data and individual variability.</th>
</tr>
</thead>
</table>
| Provider Action | ▪ Review blood test result at next scheduled visit.  
▪ Review Survey Summary  
▪ Provide counseling on ways to reduce exposure.  
▪ Reinforce key messages about fish consumption.  
▪ Respond to patient’s questions/concerns.  
▪ Repeat blood test at 2 months.  
▪ Continue follow-up |
| Information | ▪ Review benefits of fish consumption  
▪ Recommend health advisories for commercial and sport fish.  
▪ Recommend consuming low mercury fish.  
▪ Answer questions as needed. |
| Referrals | If no fish consumption reported on the Survey Summary, non-fish sources of mercury exposure should be suspected. Refer patient to UC Davis Medical Center, Occupational and Environmental Health Clinic. |
Mercury Exposure Among Women in a Private OB/GYN Practice

Descriptive Preliminary Results
# Ethnicity (n=180)

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>57</td>
<td>32%</td>
</tr>
<tr>
<td>Asian/PI</td>
<td>86</td>
<td>48%</td>
</tr>
<tr>
<td>Hmong</td>
<td>33</td>
<td>18%</td>
</tr>
<tr>
<td>Vietnamese</td>
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<td>14%</td>
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<tr>
<td>Chinese</td>
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<td>7%</td>
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<tr>
<td>Other</td>
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<td>9%</td>
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<tr>
<td>White</td>
<td>19</td>
<td>11%</td>
</tr>
<tr>
<td>Latino</td>
<td>16</td>
<td>9%</td>
</tr>
<tr>
<td>Native Am.</td>
<td>2</td>
<td>1%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>180</td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

![Bar chart showing ethnicity distribution](chart.png)
Age (n=180)
Annual Household Income n=180

- <$20,000: 70%
- $20,000-$39,999: 10%
- $40,000-$59,999: 5%
- $60,000+: 5%
- Don't Know: 0%
Education (n=180)
Blood Mercury Results

- 18 pts (11%, 18/163 pts) elevated ($\geq 6 \mu/L$)
- Range 6 to 15 $\mu/L$
  - 14 pts retested
    - 11 pts, levels declined
    - 3 pts received 3rd test, still following up
  - 4 pts no follow up
    - 3 could not be contacted
    - 1 clinic chose not to recontact
- Ethnicity of elevated pts
  - 11 Vietnamese
  - 7 Chinese
Insurance Coverage

• Successfully demonstrated that MediCal will pay for mercury in whole blood.
• Need correct ICD-9 codes for a.) pregnancy and b.) exposure to heavy metals
• Not sure of percentage tested for whom suspected elevated exposure from Summary Sheet, but more than ¼.
Mercury Exposure Among Women in a Private OB/GYN Practice

Evaluation
Focus Group Findings

- Retention of information at follow up: Most all participants seemed to remember some information, ranging from remembering one kind of fish to avoid to several.

- Most all participants remembered that fish caught out of nearby rivers, etc. should not be consumed or consumed only in small amounts.

- Many participants drew big distinctions between store-bought fish and caught fish. All store-bought safe; caught fish unsafe.

- Many participants seemed unclear about the dangers of mercury—what it does and what makes it harmful. They just understood it to be “bad for the baby.”

- All participants said they found the brochure easy to understand. Most still had it. Some posted it on walls at home and some filed it in a drawer.
Importance of Blood Test

• Many participants said that they found the blood-mercury test to be important and informative.

• One rated it equal to genetic tests she had recently undergone. One said that it was important, but not as important as an HIV test.

• One wanted her whole family to go out and have their blood-mercury tested and that everyone should have this information.
Understanding the test

• Very important because it gave them more concrete information about their health.

• Understandings of the test results were somewhat varied. Generally, most people understood their low levels to be an indication of “safety.”

• A few conveyed the feeling that the test offered “truth” about their blood-mercury level that could not be obtained in a different way.

• One person said she was “negative.”

• One asked me if it was okay to have low mercury? In other words, was that healthy.
Implications for Biomonitoring

- A few participants drew on other health tests as templates to understand and frame test results.
- Many participants, despite having low mercury, still cut down on fish consumption.
- Challenges for communicating results with no clinical action point, or for exposures that are difficult to avoid in daily life.
- Will become more difficult and will require careful crafting and participant feedback.
Mercury Exposure Among Women in a Private OB/GYN Practice

Next Steps
Data Analysis

• Study population characteristics

• Fish consumption rate (commercial, sport, overall; g/d and g/kg body weight/day; above advisory limits)

• Predictors of mercury level, fish consumption, and advisory awareness

Svetlana
CPSP

- Access to shared population of concern
- Assessment of fish intake can be component of both health education and/or nutrition assessment
- Education and follow-up regarding safe consumption of fish can be integrated into care plan
- Coverage for laboratory testing for mercury if needed, based on fish intake
- State-wide CPSP presentation in October 2007