Health Information Impacts on Seafood Demand: Experimental Auction Approach

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Motivation

• Challenge in communicating information
  • On health risk and benefit information across different species, sources and for different consumers.

• National Academy of Sciences study:
  • “Research is needed to develop and evaluate more effective communication tools when conveying health benefits and risks of seafood consumption.”
Motivation (2)

• Focus group sessions in RI revealed:
  • Have mixed and conflicting perceptions of fish as a healthy food option, but also carry risks due to contaminants.
  • Perceive farmed fish to have lesser health benefits and greater health risks than wild fish.
  • Lack knowledge about where to obtain unbiased and objective information about seafood’s attributes.
  • Have difficulty balancing health risks and benefits for farmed fish.

• Similar findings in other parts of the world
  • c.f., Verbeke et al. (2005): survey in Europe
Research questions

• Policy question: how to increase demand for farmed seafood in the US?
  • Will informing consumers do the trick?
• How does the information affect, if any, consumers’ purchasing behavior?
  • Content of information (health benefit vs. risk)
  • Source of information (govern’t agency, university researcher, etc)
• Are the effects different across:
  • Information types?
  • Product types?
Method: Auction experiment

• Three products to bid on
  • Wild salmon fillet, farmed salmon fillet, swordfish steak (all 1lb)
  • Simultaneous, second price sealed bid auction.

• Two information interventions.

<table>
<thead>
<tr>
<th>Round 1</th>
<th>Round 2</th>
<th>Round 3</th>
<th>Round 4</th>
<th>Round 5</th>
<th>Round 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wild</td>
<td>Wild</td>
<td>Wild</td>
<td>Wild</td>
<td>Wild</td>
<td>Wild</td>
</tr>
<tr>
<td>Farmed</td>
<td>Farmed</td>
<td>Farmed</td>
<td>Farmed</td>
<td>Farmed</td>
<td>Farmed</td>
</tr>
<tr>
<td>Swordfish</td>
<td>Swordfish</td>
<td>Swordfish</td>
<td>Swordfish</td>
<td>Swordfish</td>
<td>Swordfish</td>
</tr>
</tbody>
</table>

• Other controls
  • Consumption timing issue → use of vouchers
  • Budget effect → use of binding round
Information treatments

- Used **four** information sources:
  - **US government (FDA):** focusing on risks (of mercury)
  - **Industry:** focusing on the benefits (omega-3 DHA)
  - **University scientist:** balanced information but slightly more towards the risk; explicit mention of farmed vs. wild salmon.
  - **National Academy of Sciences:** similar to University info, but explicit in relative terms—but also requires more effort to understand.
Information treatments (2)

- Total of six information treatments
  - Five treatments with actual information, plus
  - One no-information treatment as control (N = 58).
Data

- Descriptive statistics
  - Total 32 sessions, 362 participants.
  - Data cleaned for “low bidders” → n = 340

<table>
<thead>
<tr>
<th>Bid price</th>
<th>Wild salmon</th>
<th>Farmed salmon</th>
<th>Swordfish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest</td>
<td>$60.00</td>
<td>$35.00</td>
<td>$40.00</td>
</tr>
<tr>
<td>Lowest</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>Average</td>
<td>$5.95</td>
<td>$4.96</td>
<td>$4.93</td>
</tr>
<tr>
<td>(Dave’s)</td>
<td>($11.99)</td>
<td>($6.99)</td>
<td>($11.99)</td>
</tr>
</tbody>
</table>
Estimation model

• Difference-in-Difference mixed linear model

\[ bid_{ijkt} = \alpha_0 + \alpha_{i} \text{Round}_{t} + \sum_{j=1}^{2} \beta_{j} \text{PROD}_{ij} + \sum_{k=1}^{5} \gamma_{k} \text{INFO}_{ik} + \delta_{1} \text{InfoC}_{t} + \delta_{2} \text{InfoS}_{t} \]

\[ + \sum_{k=1}^{5} \eta_{k} \text{INFO}_{ik} \cdot \text{InfoC}_{t} + \sum_{k=1}^{5} \theta_{k} \text{INFO}_{ik} \cdot \text{InfoS}_{t} + \sum_{j=1}^{2} \lambda_{j} \text{PROD}_{ij} \cdot \text{InfoC}_{t} + \sum_{j=1}^{2} \mu_{j} \text{PROD}_{ij} \cdot \text{InfoS}_{t} \]

\[ + \sum_{j=1}^{2} \sum_{k=1}^{5} \nu_{jk} \text{PROD}_{ij} \cdot \text{INFO}_{ik} \cdot \text{InfoC}_{t} + \sum_{j=1}^{2} \sum_{k=1}^{5} \nu_{jk} \text{PROD}_{ij} \cdot \text{INFO}_{ik} \cdot \text{InfoS}_{t} + \varepsilon_{ijkt} \]

\[ + \psi_{ij} + \phi_{t} \cdot \text{Random parameters} \]

• \( PROD = \{\text{wild salmon, farmed salmon} \mid \text{base = swordfish}\} \)
• \( INFO = \{\text{FDA, Industry, FDA-Ind, University, NAS} \mid \text{base = no info}\} \)
• \( \text{InfoC}: \) dummy variable for first information (content) intervention
• \( \text{InfoS}: \) dummy variable for second information (source) intervention
Hierarchical structure of mixed linear model

Individual $i$

- Wild salmon
  - R1...R6
- Farmed salmon
  - R1...R6
- Swordfish
  - R1...R6

$\Psi_{ij}$

$\phi_i$
## Results (1): Regression output

<table>
<thead>
<tr>
<th>Variables (dependent var = bid)</th>
<th>Coefficients</th>
<th>Variables (dependent var = bid)</th>
<th>Coefficients</th>
<th>Variables (dependent var = bid)</th>
<th>Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Constant</strong></td>
<td>5.323***</td>
<td><strong>Info source x Information type</strong></td>
<td>-0.238</td>
<td><strong>Info content x info type x product (cont)</strong></td>
<td>0.415*</td>
</tr>
<tr>
<td></td>
<td>(0.537)</td>
<td>InfoS_FDA</td>
<td>-0.238</td>
<td>InfoC_FDA_farmed</td>
<td>(0.249)</td>
</tr>
<tr>
<td>Round</td>
<td>-0.0606</td>
<td>InfoS_IND</td>
<td>-0.304</td>
<td>InfoC_IND_farmed</td>
<td>0.123</td>
</tr>
<tr>
<td></td>
<td>(0.0496)</td>
<td>InfoS_FI</td>
<td>-0.544</td>
<td>InfoC_FI_farmed</td>
<td>(0.281)</td>
</tr>
<tr>
<td><strong>Product type (base = swordfish)</strong></td>
<td></td>
<td>InfoS_UNIV</td>
<td>-0.578</td>
<td>InfoC_UNIV_farmed</td>
<td>0.705**</td>
</tr>
<tr>
<td>wild salmon</td>
<td>0.545***</td>
<td>InfoS_NAS</td>
<td>-0.176</td>
<td>InfoC_UNIV_farmed</td>
<td>(0.325)</td>
</tr>
<tr>
<td></td>
<td>(0.170)</td>
<td></td>
<td>(0.424)</td>
<td></td>
<td>(0.416)</td>
</tr>
<tr>
<td>farmed salmon</td>
<td>-0.469***</td>
<td></td>
<td></td>
<td></td>
<td>1.430***</td>
</tr>
<tr>
<td></td>
<td>(0.151)</td>
<td></td>
<td></td>
<td></td>
<td>(0.489)</td>
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<tr>
<td><strong>Information type (base = no info)</strong></td>
<td></td>
<td><strong>Info content x Product type</strong></td>
<td>0.0525</td>
<td><strong>Info content x info type x product</strong></td>
<td>0.733</td>
</tr>
<tr>
<td>FDA</td>
<td>-0.229</td>
<td>InfoC_wild</td>
<td>0.0525</td>
<td>InfoS_FDA_wild</td>
<td>(0.481)</td>
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<tr>
<td></td>
<td>(0.723)</td>
<td>InfoC_farmed</td>
<td>0.0975</td>
<td>InfoS_FDA_farmed</td>
<td>0.830**</td>
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<tr>
<td>Industry (IND)</td>
<td>-0.0328</td>
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<td>(0.183)</td>
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<td>(0.376)</td>
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<tr>
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<td>(0.784)</td>
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<td></td>
<td>InfoC_FDA_farmed</td>
<td>0.266</td>
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<tr>
<td>FDA &amp; Industry (FI)</td>
<td>0.223</td>
<td><strong>Info source x Product type</strong></td>
<td>-0.432*</td>
<td>InfoC_FI_wild</td>
<td>(0.322)</td>
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<td>(0.808)</td>
<td>InfoS_wild</td>
<td>-0.432*</td>
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<tr>
<td>University (UNIV)</td>
<td>0.664</td>
<td>InfoS_farmed</td>
<td>-0.543**</td>
<td>InfoS_FI_wild</td>
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<td></td>
<td>(0.713)</td>
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<td>NAS</td>
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<td><strong>Info content x info type x product</strong></td>
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<td><strong>Info content x info type x product</strong></td>
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<tr>
<td></td>
<td>(0.671)</td>
<td>InfoC_FDA_wild</td>
<td>0.148</td>
<td>InfoS_FDA_wild</td>
<td>(0.481)</td>
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<td><strong>Treatment timing dummy</strong></td>
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<td>InfoC_IND_wild</td>
<td>0.715</td>
<td>InfoS_FDA_farmed</td>
<td>0.830**</td>
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<td>InfoC (information content)</td>
<td>-0.145</td>
<td>InfoC_FI_wild</td>
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<td>InfoS_FDA_farmed</td>
<td>(0.376)</td>
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<tr>
<td></td>
<td>(0.261)</td>
<td>InfoC_UNIV_wild</td>
<td>0.533</td>
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<tr>
<td>InfoS (information source)</td>
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<td>(0.351)</td>
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<tr>
<td></td>
<td>(0.339)</td>
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<tr>
<td><strong>Info content x Information type</strong></td>
<td></td>
<td><strong>Info content x info type x product</strong></td>
<td>1.737***</td>
<td><strong>Info content x info type x product</strong></td>
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<tr>
<td>InfoS_FDA</td>
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<td>1.737***</td>
<td>InfoS_FDA_wild</td>
<td>(0.371)</td>
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<tr>
<td></td>
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<td>(0.311)</td>
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<td>(0.351)</td>
<td>InfoS_FDA_farmed</td>
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<td>InfoS_UNIV</td>
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<td>(0.404)</td>
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<td>InfoS_FDA_farmed</td>
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<td>InfoS_NAS</td>
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<td>InfoS_FDA_farmed</td>
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<td>InfoS_FDA_farmed</td>
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<td><strong>Observations</strong></td>
<td></td>
<td><strong>Number of groups</strong></td>
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<td></td>
<td></td>
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</table>
### Results (2): Information effect

**Explicit mention of salmon**

<table>
<thead>
<tr>
<th></th>
<th>Univ</th>
<th>Cont</th>
<th>Source</th>
<th>Total</th>
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<td>0</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>S</td>
<td>---</td>
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<th>Cont</th>
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<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>F</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>S</td>
<td>--</td>
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<td>0</td>
<td>0</td>
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<tr>
<td>F</td>
<td>0</td>
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<td>0</td>
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<tr>
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<tr>
<td>S</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Health RISK**

- Limited effect of benefit information.
- Stronger effect of risk information, but not the case for FDA.
- Information source had no impacts.

**Health BENEFIT**

No mention of salmon
Results (3): Information effect
Comparisons b/w product types

- Salmon products’ bids are generally *higher* than swordfish.
  - Mostly due to negative effect of information on swordfish bids.
- NAS information had positive effect on farmed over wild salmon.

<table>
<thead>
<tr>
<th>Information</th>
<th>Wild vs Sword</th>
<th>Farmed vs Sword</th>
<th>Wild vs Farmed</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDA</td>
<td>0.882 *</td>
<td>0.798 **</td>
<td>0.083</td>
</tr>
<tr>
<td></td>
<td>(3.29)</td>
<td>(5.11)</td>
<td>(0.03)</td>
</tr>
<tr>
<td>Industry</td>
<td>1.545 *</td>
<td>0.551</td>
<td>0.994</td>
</tr>
<tr>
<td></td>
<td>(3.44)</td>
<td>(1.99)</td>
<td>(1.53)</td>
</tr>
<tr>
<td>FDA/Industry</td>
<td>0.799 **</td>
<td>1.256 ***</td>
<td>-0.456</td>
</tr>
<tr>
<td></td>
<td>(4.22)</td>
<td>(9.93)</td>
<td>(2.32)</td>
</tr>
<tr>
<td>University</td>
<td>2.003 ***</td>
<td>2.126 ***</td>
<td>-0.123</td>
</tr>
<tr>
<td></td>
<td>(22.9)</td>
<td>(21.1)</td>
<td>(0.13)</td>
</tr>
<tr>
<td>NAS</td>
<td>1.071 ***</td>
<td>1.806 ***</td>
<td>-0.734 *</td>
</tr>
<tr>
<td></td>
<td>(7.59)</td>
<td>(12.3)</td>
<td>(3.54)</td>
</tr>
</tbody>
</table>

Test statistics in parenthesis.
Significance levels are indicated as: * (10%), ** (5%), and *** (1%).
Results (4): Information effect

Comparisons b/w info types

• No difference for wild and farmed salmon.
  • All information types have similar effect (incl. no effect)
• For swordfish, University information had more negative impacts than other information types (excl. NAS)

<table>
<thead>
<tr>
<th>SWORDFISH</th>
<th>FDA</th>
<th>Industry</th>
<th>FDA-Industry</th>
<th>University</th>
<th>NAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDA</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry (IND)</td>
<td>0.289</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0.33)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FDA-Industry (FI)</td>
<td>0.393</td>
<td>0.104</td>
<td>0</td>
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<td></td>
</tr>
<tr>
<td>(1.42)</td>
<td>(0.04)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University (UNIV)</td>
<td>1.351</td>
<td>1.062</td>
<td>0.958</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>(8.51)</td>
<td>(2.97)</td>
<td>(3.96)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NAS</td>
<td>0.738</td>
<td>0.448</td>
<td>0.344</td>
<td>-0.613</td>
<td>0</td>
</tr>
<tr>
<td>(2.33)</td>
<td>(0.50)</td>
<td>(0.47)</td>
<td></td>
<td>(1.06)</td>
<td></td>
</tr>
</tbody>
</table>

Note: each value represents the difference ROW – COLUMN. For example, 1.351 means FDA information effect on swordfish is $1.35 higher than University information effect.

Test statistics in parenthesis. Significance levels are indicated as: * (10%), ** (5%), and *** (1%).
Conclusion

• Very limited influence of health **benefit** information.
  • Information that emphasizes the health benefit had almost no impact on demand for farmed salmon.
  • Explicitly distinguishing farmed vs. wild salmon may be effective for affecting demand for farmed salmon on the basis of health benefit.

• Strong influence of health **risk** information.
  • Negative and significant impacts on swordfish demand.

• Information source-wise:
  • University was effective for risk information.
  • FDA was very ineffective even for risk information.
Acknowledgement

• Funding for the project
  • Agriculture and Food Research Initiative
    Agricultural Economics and Rural Communities Program

• Collaborators
  • Lighthouse Consulting Group, Inc.
  • Dave’s Marketplace

• Research assistants
  • Miho Tegawa
  • Adam Stemle
Contact information

UCHIDA@URI.EDU
Experimental auction

• Key designs
  • Second-price sealed bid with $70 endowment.
  • Three seafood products: 1lb fillet of (a) wild salmon, (b) farmed salmon, and (c) swordfish.
Experimental auction

• Key designs
  • Second-price sealed bid with $70 endowment.
  • Three seafood products: 1lb fillet of (a) wild salmon, (b) farmed salmon, and (c) swordfish.
  • Simultaneous bidding: make bids for each product at the same time.
    • Mimic actual grocery shopping experience.
  • Two information treatments:
    1. Contents on seafood health risks and benefits.
    2. Source of the information provided.
  • Binding rounds
    • Avoid budget-effect in multiple auction rounds experiment.
  • Pre- and post-auction surveys
    • Demographic characteristics.
    • Seafood purchasing attributes (frequency, attitudes, etc).
    • Risk perceptions on seafood and information.
    • Perceived market prices for each product auctioned.
Information treatment:
FDA/EPA

What You Need to Know About Mercury in Fish and Shellfish

Advice for
- Women Who Might Become Pregnant
- Women Who are Pregnant
- Nursing Mothers
- Young Children

from the
U.S. Food and Drug Administration
U.S. Environmental Protection Agency

3 Safety Tips

1. Do not eat:
   - Shark
   - Swordfish
   - King Mackerel
   - Tilefish
   They contain high levels of mercury.

2. Eat up to 12 ounces (2 average meals) a week of a variety of fish and shellfish that are lower in mercury
   - Five of the most commonly eaten fish that are low in mercury are shrimp, canned light tuna, salmon, pollock, and catfish.
   - Another commonly eaten fish, albacore ("white") tuna has more mercury than canned light tuna. So, when choosing your two meals of fish and shellfish, you may eat up to 6 ounces (one average meal) of albacore tuna per week.

3. Check local advisories about the safety of fish caught by family and friends in your local lakes, rivers, and coastal areas.

If no advice is available, eat up to 6 ounces (one average meal) per week of fish you catch from local waters, but don’t consume any other fish during that week.

Follow these same recommendations when feeding fish and shellfish to your young child, but serve smaller portions.

Visit the Food and Drug Administration’s Food Safety Website www.cfsan.fda.gov or the Environmental Protection Agency’s Fish Advisory Website www.epa.gov/fast/fish for a listing of mercury levels in fish.

Frequently Asked Questions about Mercury in Fish and Shellfish:

- What is mercury?
  Mercury occurs naturally in the environment and can also be released into the air through industrial pollution. Mercury falls from the air and can accumulate in streams and oceans and is turned into methylmercury in the water. It is this type of mercury that can be harmful to your unborn baby and young child. Fish absorb the methylmercury as they feed in these waters and so it builds up in them. It builds up more in some types of fish and shellfish than others, depending on what the fish eat, which is why the levels vary.

- I’m a woman who could have children but I’m not pregnant - so why should I be concerned about methylmercury?

- I don’t see the fish I eat in the advisory. What should I do?
  If you want more information about the levels in the various types of fish you eat, see the FDA food safety website www.cfsan.fda.gov/~dms/fishmer.html or the EPA website at www.epa.gov/fast/fish.

- What about fish sticks and fast food sandwiches?
  Fish sticks and “fast-food” sandwiches are commonly made from fish that are low in mercury.

- The advice about canned tuna is in the advisory, but what’s the advice about tuna steaks?
  Because tuna steaks generally contain higher levels of mercury than canned light tuna, when choosing tuna.

- What is the difference between “12 ounces” and “6 ounces”?
  It is important to know what qualifies as 12 ounces (two average meals). A 12-ounce serving is the same as a 4 1/2-ounce filet of salmon, or about six 2 1/2-inch-long pieces of canned tuna. A 6-ounce serving is about three 4 1/2-ounce servings or about nine 2 1/2-inch-long pieces of canned tuna.
Information treatment: Industry

Food Marketing Institute, Int’l Food Information Council, Nat’l Fisheries Institute, Nat’l Healthy Mothers, Healthy Babies Coalition

For good health,

**GO FISH**

Eating seafood is important to good health, especially during pregnancy and breastfeeding.

Fish is rich in many nutrients, including healthy omega-3 fatty acids, which are essential for brain and eye development in babies. Fish is also good for mom’s brain, heart and weight.

Follow these recommendations for eating fish if you are pregnant or breastfeeding or when feeding fish to young children.

- Eat a variety of seafood
- Eat 12 oz. of seafood every week (2-3 meals)
- Half of the fish you eat every week (6 oz.) can be white albacore tuna
- Do not eat shark, king mackerel, tilefish and swordfish

Lessthan 20% of women who may become pregnant eat enough seafood every week.

Fish to feast on.

Eating a variety of seafood 2-3 times per week provides the omega-3s, called DHA, that you and your baby need without introducing concerns about mercury. In fact, international experts recommend that pregnant and nursing women get at least 200 milligrams of omega-3 DHA everyday. Here’s how much you get per serving of the 10 most popular fish—all of which test well below U.S. and global standards for levels of mercury.

<table>
<thead>
<tr>
<th>Seafood: The Nutrition Star</th>
<th>Omega-3 DHA fats (milligrams)*</th>
<th>Average mercury level below the FDA limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most Popular Seafood (3 ounces)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Shrimp</td>
<td>122</td>
<td>✓</td>
</tr>
<tr>
<td>2. Canned White Tuna</td>
<td>535</td>
<td>✓</td>
</tr>
<tr>
<td>Canned Light Tuna</td>
<td>190</td>
<td>✓</td>
</tr>
<tr>
<td>3. Salmon</td>
<td>1238</td>
<td>✓</td>
</tr>
<tr>
<td>4. Pollock</td>
<td>383</td>
<td>✓</td>
</tr>
<tr>
<td>5. Tilapia</td>
<td>111</td>
<td>✓</td>
</tr>
<tr>
<td>6. Catfish</td>
<td>109</td>
<td>✓</td>
</tr>
<tr>
<td>7. Crab</td>
<td>196</td>
<td>✓</td>
</tr>
<tr>
<td>8. Cod</td>
<td>131</td>
<td>✓</td>
</tr>
<tr>
<td>9. Clams</td>
<td>124</td>
<td>✓</td>
</tr>
<tr>
<td>10. Scallops</td>
<td>169</td>
<td>✓</td>
</tr>
</tbody>
</table>

*Source: USDA National Nutrient Database
Information treatment: University
C.R. Santerre, Ph.D., Foods and Nutrition, Purdue University

**Fish for Your Health**

Learn More
For more information please visit our website:
fn.cfs.purdue.edu/fish4health/
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**Best Choices**

- Lowest in Mercury & Highest in Healthy Fats
  - herring
  - mackerel (Atlantic, jack, chub)
  - rainbow trout (farm raised)
  - salmon (wild or farm raised)
  - sardines
  - whitefish

Eating as little as 6 ounces per week of these fish provides the recommended amount of healthy omega-3 fatty acids.

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**Lowest Mercury**

12 ounces per week
- catfish (farm raised)
- clam
- cod
- crab
- flounder, plaice, sole
- haddock
- herring
- mackerel (Atlantic, jack, chub)
- mullet
- oysters (cooked)
- pollock
- rainbow trout (farm raised)
- salmon (wild or farm raised)

**Moderate Mercury**

4 ounces per week
- bass (saltwater, black)
- buffalo fish
- carp
- freshwater perch
- grouper
- halibut
- lobster (northern, Maine, Atlantic)
- mahi mahi (Dolphin-fish)
- Pompano (Florida)
- sablefish
- sea trout (weakfish)
- snapper
- Spanish mackerel (s. Atlantic)
- tilefish (Atlantic)
- tuna (Albacore, Yellowfin, White, canned)
- white croaker (Pacific)

**High Mercury / PCB**

- bass (striped*)
- bluefish*
- CLean sea bass
- golden snapper
- jack (Amberjack, Crevalle)
- king mackerel
- manta
- orange roughy
- shark *
- Spanish mackerel (Gulf of Mexico)
- swordfish
- flounder (Gulf of Mexico)
- tuna (all fresh or frozen)
- walleye (Great Lakes)

*PCB (polychlorinated biphenyls) are higher in these species.

Excessive mercury can pass through the placenta or mother’s milk and harm your baby. Do not eat fish from the high mercury category. If you eat 4 ounces from the moderate category, don’t eat any more fish from this category until the next week.
Information treatment: NAS

Mercury

Omega-3s

- Methylmercury (μg)
  - -0.30 -0.15 0.00 0.15 0.30 0.45 0.60 0.75 0.90 1.05 1.20 1.35 1.50 1.65 1.80 1.95

- EPA/DHA (g)

<table>
<thead>
<tr>
<th>Fish</th>
<th>Methylmercury (μg)</th>
</tr>
</thead>
</table>
| (1) Salmon, Atlantic, farmed  
| (1) Salmon, Atlantic, wild  
| (2) Oyster, Pacific  
| (13) Rainbow trout, farmed  
| (2) Oyster, eastern, wild  
| (1) Salmon, Pacific  
| (13) Rainbow trout, wild  
| (122) Tilefish  
| (29) Tuna, white, canned  
| (81) Swordfish  
| (112) Shark  
| (5) Pollock, Atlantic  
| (8) Flounder/sole  
| (21) Halibut, Atlantic and Pacific  
| (2) Oyster, eastern, farmed  
| (4) Scallops, bay and sea (100g)  
| (6) Crab, king  
| (61) King mackerel  
| (10) Ocean perch, Atlantic  
| (4) Shrimp, mixed  
| (2) Clams, mixed  
| (10) Cod, Pacific  
| (10) Tuna, light, canned  
| (6) Haddock  
| (8) Catfish, wild  
| (8) Catfish, farmed  
| (10) Cod Atlantic  
| (26) Lobster, northern  

- Omega-3s

- 150 0.00 0.15 0.30 0.45 0.60 0.75 0.90 1.05 1.20 1.35 1.50 1.65 1.80 1.95
Data (2): Demographic

[Pie chart showing gender distribution: 130 males, 168 females]

[Another pie chart showing age distribution: 108 21-30, 79 31-40, 47 41-50, 17 51-60, 8 >71]
Literature

• Consumers sometimes respond irrationally to risk information.
  • Parsons, et al. (2006)

• Consumers did not react to fish risk warning and labels.
  • Roosen, et al. (2009)

• FDA’s mercury advisory was effective, and also too effective.
  • Shimshack, et al. (2007)