# Mercury Levels in High-End Consumers of Fish

**Environmental Health Perspectives**
**April 2003, Vol. 111, No. 4, pp. 604-608**

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BACKGROUND INFORMATION:

| Human Weight Pounds | Human Weight Kilograms | Upper Limit of Consumed Hg/day |
|---|---|---|
| 50 | 23 | 2.3 µg |
| 100 | 45 | 4.5 µg |
| 150 | 68 | 6.8 µg |
| 200 | 90 | 9.0 µg |
| 250 | 114 | 11.4 µg |

5 oz fish = 150 g
6 oz tuna = 170 g (one can)
8 oz fish = 227 g

Average methyl mercury level in fish (µg/g):

| | | |
|---|---|---|
| Shark | 1.327 µg/g | 6 oz serving (170 g) = 225 µg |
| Swordfish | 0.95 µg/g | 6 oz serving (170 g) = 161 µg |
| Ahi Tuna | 0.38 µg/g | 6 oz serving (170 g) = 65 µg |
| Halibut | 0.25 µg/g | 6 oz serving (170 g) = 43 µg |
| Snapper | 0.25 µg/g | 6 oz serving (170 g) = 43 µg |
| Lobster | 0.232 µg/g | 6 oz serving (170 g) = 39 µg |
| Tuna (other) | 0.206 µg/g | 6 oz serving (170 g) = 35 µg |
| Sea bass | 0.157 µg/g | 6 oz serving (170 g) = 27 µg |
| Crab | 0.117 µg/g | 6 oz serving (170 g) = 20 µg |
| Flounder | 0.092 µg/g | 6 oz serving (170 g) = 16 µg |
| Shrimp | 0.047 µg/g | 6 oz serving (170 g) = 8 µg |
| Scallops | 0.042 µg/g | 6 oz serving (170 g) = 7 µg |
| Salmon | 0.035 µg/g | 6 oz serving (170 g) = 6 µg |

FROM ABSTRACT:

All patients in a 1-year period (n = 720) who came for an office visit in a private internal medicine practice in San Francisco, California, were evaluated for mercury excess using the current RfD(reference dose).

Mercury levels ranged from 2.0 to 89.5 µg/L for the 89 subjects analyzed. The mean for 66 women was 15 µg/L, and for 23 men was 13 µg/L; 89% had levels exceeding the RfD.

Subjects consumed 30 different forms or types of fish. Swordfish had the highest correlation with mercury level.

The mean level for women in this survey was 10 times that of mercury levels found in a recent population survey by the U.S. Centers for Disease Control and Prevention. Some children were > 40 times the national mean.

THESE AUTHORS ALSO NOTE:

1) Consumption of food containing mercury has been identified as a health risk.

2) The U.S. Environmental Protection Agency (U.S. EPA) and the National Academy of Sciences recommend keeping the whole blood mercury level < 5.0 µg/L or the hair level < 1.0 µg/g. This corresponds to a reference dose (RfD) of 0.1 µg/kg body weight per day.

3) "Fish accumulate methyl mercury in their tissues, where it becomes strongly bound. Methyl mercury is not removed from fish tissue by any practical cooking method."

4) "Methyl mercury is absorbed on average 95% when consumed."

5) "Methyl mercury is excreted predominantly in the feces but also in urine and sweat."

6) Methyl mercury accumulates especially in the brain, muscle, and kidney.

7) "Methyl mercury crosses the maternal to fetal blood compartments, where it binds to red blood cells and other fetal tissues. By the time of parturition, cord blood is on average twice [and sometimes much higher] that of the maternal blood concentration."
**[Infant levels of mercury are much higher than their mother's]**

8) "Methyl mercury easily crosses the blood–brain barrier, where biotransformation to inorganic mercury takes place. Once in the central nervous system, methyl mercury can be demethylated to inorganic mercury. This latter form of mercury has a long half-life in brain tissue and can be measured in years."

9) "The average half-life in blood for methyl mercury in adults is 70 days, in children 90 days, and in lactating women 46 days."

10) Symptoms consistent with excess methyl mercury levels include fatigue, headache, decreased memory, decreased concentration, and muscle or joint pain.

11) Fish that are low in mercury include salmon, tilapia, sole, sardines, or small shellfish.

12) Of the blood levels tested in this study of high fish consumers:
A)) 89% were ≥ 5.0 µg/L
B)) 54% were ≥ 10 µg/L
C)) 16% were ≥ 20 µg/L
D)) 4% were > 50 µg/L
E)) 82 subjects had levels greater than 5 µg/L,
F)) 16 subjects had levels greater than 20 µg/L

13) "Four adult patients had received Thimerosal containing vaccinations within 60 days before testing, and their mercury levels ranged from 9.9 to 35.4 µg/L."

14) A patient who had all dental amalgams removed at least 2 years before testing had a mercury level of 76.0 µg/L. **[Apparently, removal of mercury dental amalgams drastically increases blood mercury levels for years]**

15) Swordfish consumption had the highest correlation with blood mercury levels.

16) Seven children were included in the study. Children who did not consume fish and were not vaccinated still had high levels of blood mercury if they breast-fed and their mother had high levels of blood mercury.

17) Higher economic status and education level appear to be risk factors for elevated blood mercury levels because the price of fish is not a deterrent.

18) Consumers who "consume a large portion of their dietary protein from fish, especially if they choose large predators such as swordfish, sea bass, etc., would be at risk for exposure to mercury."

19) "The U.S. Centers for Disease Control and Prevention (CDC) estimated the U.S. mean total blood mercury level to be 0.3 µg/L for children ages 1–5 and 1.3 µg/L for women ages 16–49. The mean level for women in our survey was 10 times that of mercury levels found in this recent CDC population survey. Our survey found that children had > 40 times the national mean."

20) "Fish consumption was positively correlated with mercury elevations in the study patients."

21) "Swordfish had the highest positive correlation, but 19 adult patients (21%) had levels > 5.0 µg/L and did not eat swordfish."

22) Those with the highest mercury level of 89.5 µg/L ate the most servings of swordfish, averaging 14 servings per month.

23) "Many patients in this study took longer than 21 weeks to reduce blood levels to < 5.0 µg/L and or hair levels to < 1.0 µg/g."

24) Reports show that the mean mercury level in cardiac muscle was 22,000 times higher in (IDCM) patients than in control subjects.

25) Exposure to methyl mercury will impair the immune and reproductive systems, even modest elevations of mercury.

26) "Fish-oil–derived fatty acids reduce the risk of acute coronary events; however, a high mercury content in fish could attenuate this protective effect."

27) Adverse effects occur in children when, during pregnancy, the mother's blood contains more than 15 μg/L, or 4–5 μg/g in hair.

28) These authors state that the mercury burden found in the blood from vaccines and from dental amalgams to be negligible and insignificant compared with diet.

29) Mercury exposure can cause or exacerbate autoimmune diseases, chronic fatigue syndrome, fibromyalgia, depression, sinusitis, coronary artery disease, and other problems.

30) These authors conclude that diets high in fish consumption significantly elevate blood mercury levels above that which is safe for human health. "Women of reproductive age and pregnant women were found to have levels considered unsafe for the developing fetus."

31) Abstaining from fish consumption will reduce blood mercury levels, but this will take 21 weeks or longer for many individuals.

32) "Because fish consumption is promoted as preventing heart disease and as good nutrition, we might expect to see patients who have excess fish intake showing side effects caused by the contaminants that are present."