

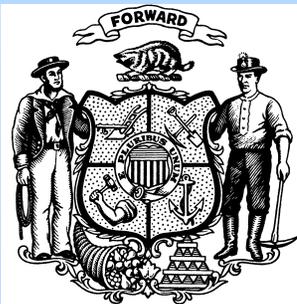
US EPA ARCHIVE DOCUMENT

# A State Perspective on the Environmental Health Effects on Older Adults

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# Traditional View of A Vulnerable Population

“Infants are not just *little adults*”

# A Continuum of Vulnerable Populations

“The aged are not just *older adults*”



**“Global fish consumption is at record levels, reaching 121 million tons in 1996 - making fish a more important staple than beef and poultry.”**



# 49 million sport fish caught every year

15,000 Lakes, 32,000 Stream miles,  
Lake Michigan and Lake Superior



**\$ 2.3 B in economic activity + 26,000 Jobs**

# National Academy of Sciences

- Conclusions reached in 2000 report
  - Prenatal exposure to MeHg can cause developmental delays.
  - *The effects of MeHg on the aging CNS, cardiovascular, immune and endocrine systems should be evaluated.*
  - RfD – 0.1 ug/kg/day

# Finnish Fisherman Study

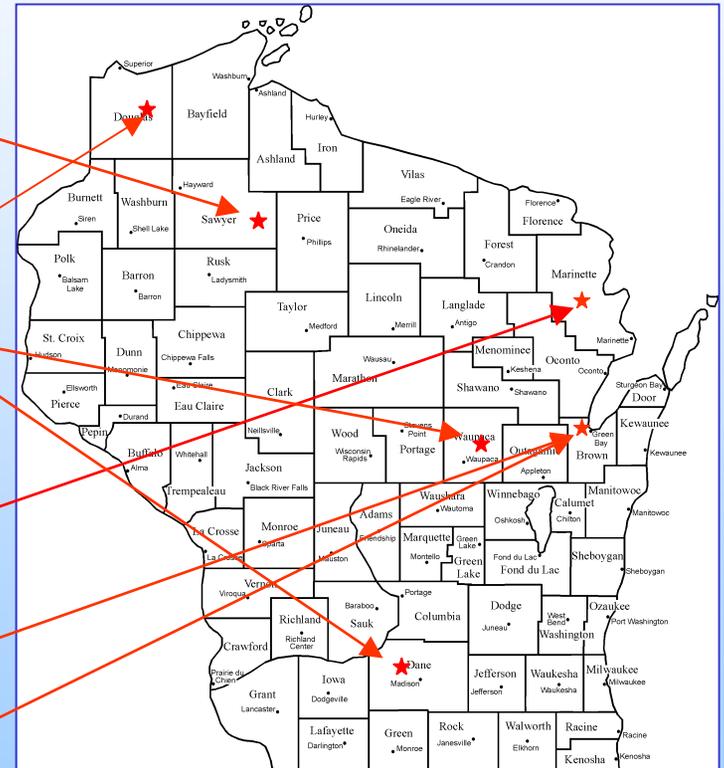
## A word of Caution

- Study of 1,833 fishermen aged 42-60
- *“ . . . a high intake of mercury . . . and the consequent accumulation of mercury in the body are associated with an excess risk of Acute Myocardial Infarction as well as death from Coronary Heart Disease, Cardiovascular Disease, and any cause . . . ”*

*Salonen, et al. Circulation, 1995*

# Seven Mercury Case Reports

- 1992, Bass Lake
- 1994, Madison
- 1999, Ogdensburg
- 2002, Lake Nebagamon
- 2003, Coleman
- 2003, Green Bay
- 2004, Green Bay



# Bass Lake Case

- 61-yr old diabetic man ate northern pike 3 times a day
- His 'severest symptoms began after he ate at least 40 northern in December 1991'
- Symptoms: Hallucinations, weight loss, numbness in legs, difficulty swallowing
- Mercury intake **> 100 ug/day** (advisory = 7 ug/day )

# Ogdensburg, 1999



- 61-yr old man
- Ate northern pike 2-3 times a week
- Underwent chelation therapy for several months
- Mercury intake ~ 19 ug/day

# Green Bay, 2003

- 65-yr old man and 59-yr old wife
- Organic farmers
- Ate home-raised turkeys and fish they caught in Canada and Minnesota
- 1 perch and 2 walleye meals/week
- Used a cilantro pesto to reduce Hg uptake
- Blood Hg levels 24 and 14 ug/L

(advisory = 5.8 ug/dl )

# Coleman, 2003

- 61-yr old man and 59-yr old wife
- Ate sport-caught fish from Vilas Co. lake
- 9 meals a week
- Bluegill, perch, bass, walleye and pike
- Blood mercury levels were 44 and 9 ug/L (advisory = 5.8 ug/dl )

What do these cases have in common?

aging men  
and women

High Intake Rates  
(1 to > 5 lbs/week)

Fish Hg levels ~ 0.3-0.8 ppm



# **Use of Human Biomarkers To Assess Exposure**

# Study Methods

**4,206 BRFSS participants were asked about fish consumption and advisory awareness**

**2,000 adult hair donors completed fish consumption/advisory awareness questionnaires**

# Demographics of Study Populations

Characteristic	BRFSS N = 4,206	Hair Donors N = 2,028	Different?
Income above \$50,000/yr	35%	53%	
Male Gender	49%	48%	NO
Average age in years	49.2	49.4	NO
White Race	90%	95%	
College graduates	30%	59%	
Fishing license in home	37%	50%	
% Who eat fish	83%	95%	
Had heard about Hg in fish	78%	94%	



# Types of fish consumed BRFSS

<b>Types of fish reported eaten</b>	
<b>Light tuna</b>	<b>11%</b>
<b>Albacore tuna</b>	<b>12%</b>
<b>Restaurant servings</b>	<b>25%</b>
<b>Commercial fish cooked at home</b>	<b>28%</b>
<b>Sport-caught fish</b>	<b>17%</b>
<b>Total number of meals reported</b>	<b>15,635</b>

# Median Hair Hg Level among Women of Childbearing Age NHANES, 12-State, WI 2004

	# Meals/month			% above 1 ppm
	0	1 to 2	≥ 3	
<b>NHANES N =1,726</b>	<b>0.11 ppm</b>	<b>0.20 ppm</b>	<b>0.38 ppm</b>	<b>~12%</b>
<b>12-State N=414</b>	<b>0.08 ppm</b>	<b>0.22 ppm</b>	<b>0.54 ppm</b>	<b>12%</b>
<b>WI 2004 N = 413</b>	<b>0.04 ppm</b>	<b>0.14 ppm</b>	<b>0.34 ppm</b>	<b>12%</b>

# Correlation of Fish Intake & Hair Hg Level (2004)

# Meals/month	Ave Hg Level in ppm	No (%) > 1 ppm
0	0.09	0/97 = 0%
1-4	0.46	63/570 = 11%
5-8	0.71	140/717 = 18%
>8	1.00	222/703 = 32%

# 2004 Hair Mercury by Gender and Age

		Hg Level in ppm		
Age Group	N	Mean	Median, Max	> 1 ppm
<b>Women</b>				
<46 yrs	413	0.47	0.28, 3.8	11.8%
>45 yrs	637	0.57	0.38, 5.3	13.3%
<b>Men</b>				
<46 yrs	310	0.67	0.40, 5.4	18.7%
>45 yrs	670	1.03	0.64, 15.2	32.9%

# Low vs High Exposure Groups

	Hair Mercury Level	
	< 0.1 ppm N = 188	>2.0 ppm N = 131
<b>Gender</b>	66% women	78% men
<b>Race</b>	94% white	>98% white
<b>Average age</b>	43 yrs	54 yrs
<b>% over 50 yrs of age</b>	33%	63%
<b>Fishing license holders</b>	30%	70%
<b>Advisory awareness</b>	62%	87%
<b>Income &gt; \$50,000/yr</b>	49%	48%
<b>Ave fish intake rate</b>	3 meals/mo	12 meals/mo
<b>Ave sportfish intake rate</b>	0.3 meals/mo	4 meals/mo

# Questions?

