



# **Towards a mercury-free world**

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## **Mercury: health effects, exposure**

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# European Public Health Alliance Environment Network (EEN)

- Highlight the health dimension of environmental policy, the costs of pollution and the benefits of a more sustainable environment
- Increase the knowledge and participation of the health community in EU environmental policy
- Created in 2003, pan European umbrella network of not for profit NGOs from health and environmental sector.

# ***Public health goals and mercury***

- **Increase public awareness on the health threats of mercury and risks of low/high exposure, particularly for vulnerable groups**
- **Ensure guidelines are sufficiently protective**
- **Make the health effects and costs of mercury a key element in the EU and global mercury debate**
- **Advocate lowering pollution globally by a strong global treaty, bans, phasing out and substitution**
- **Target political opportunities (EU Strategy, Revision of guidelines, EU Action Plan on E and H, CEHAPE commitments)**

# ***Mercury exposure and health effects***

**Mercury: three forms – Different toxicity profiles, different absorption**

- **Elemental forms (vapours):** absorption lungs (<80%)
  - Dental fillings, thermometers
- **Inorganic mercury** (about 10%)
  - electrical equipment, some fungicides, industrial (compounds)
- **Organic forms (methylmercury >95%)**
  - fungicides in paints (other forms converted in environment)

***Health effect depends on type, amount and timing (when and how long) of exposure. (TIMING THAT MAKES THE POISIN)***

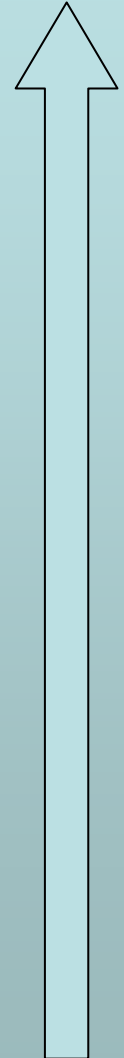
# ***Organic Mercury***

## **Sources of exposure**

- Environmental conversion:
  - Fish and shellfish (methylmercury)
- Anthropogenic Inadvertent:
  - Fungicides, Bactericides (phenylmercury)
- Anthropogenic Intentional:
  - Vaccine Preservatives (thimerosal)
  - Dental amalgams

# Effects of Prenatal Exposure

- **Mental Retardation**
- **Ataxia & Cerebral Palsy**
- **Seizures**
- **Vision & Hearing Loss**
- Delayed Developmental Milestones
- Language Difficulties
- Deficits in Fine Motor Function
- Visual Spatial Disabilities
- Memory Problems
- *High Blood Pressure*
- *Decreased Cardiac Rate Variability*



**DOSE**

***Solid evidence:***

# **Major Studies on Effects of Methylmercury Exposure**

- 1950's – Neuro disorders in predatory birds
- 1960's – Minamata Bay Disaster
- 1971-72 – Iraq Bread Disaster
- 1990's – Prospective Epidemiologic Studies
  - Seychelle Islands – No Effect
  - Faroe Islands – Developmental Neurotoxicity
- Decades of Animal Research

# What is the « acceptable » limit?

## Blood mercury levels:

- 5.8  $\mu\text{L}$  – level associated with brain damage/intelligence loss. (10 fold uncertainty factor)

## Weekly recommended intake levels:

- 1.6  $\mu\text{g}$  per kg body weight (international standards)
- .7  $\mu\text{g}$  per kg body weight (US-NRC)

# Blood MHg Levels in Women Age 16-49

## National Environmental Exposure Study

<http://www.cdc.gov/exposurereport/pdf/SecondNER.pdf>

- **8% of US women of childbearing age above recommended safety level (5.8)**
  - 3.5 MILLION women 20-44 years of age
- 1-5 year old children at “safe” levels
- Who else is above it???
  - Women and children in Europe (???)
  - Heavy fish eaters
  - Parts of Mediterannean and Arctic population

# European exposure estimates?

## EU Extended impact states:

- Between 3-15 million people in the EU near international reference dose (RfD) for clear neurological affects (coastal Mediterranean countries and northern Europe)
- *Arctic population and Mediterranean fishing communities are above the US Benchmark Dose Limit (BMDL) of 10 times the RfD (potentially 6 IQ point loss)*
- « certain.... subject to unacceptable levels of exposure...form of methylmercury through diet »

*From EU Strategy on Mercury, February 2005*

## ***Mount Sinai study:***

### ***Public health and economic consequences of Methyl Mercury Toxicity to the Developing Brain***

**February 28, 2005** <http://ehp.niehs.nih.gov/members/2005/7743/7743.pdf>

- IQ loss affect between **300,000-600,000** children annually, cost an estimated **8.7 billion in lost earnings**.
- Loss of IQ hits between **10-15 % of children born**.
- IQ losses range from **one-fifth to as much as 24 points**.
- Even 1.6 drop could cost a person **31,800 Euro** in lifetime earnings

**WHAT IS THE GLOBAL LOSS?????**

# **Solutions: limit exposure, eliminate mercury**

- Fish Consumption Advisories
  - Fish Consumption Advisories
- Source Reduction
  - EU level
  - Global level

## Health community priorities

- Fish advisories, medical equipment, waste incineration, dental amalgams, vaccines

# WHO/FAO intl Committee: new dietary intakes for mercury

June 27 2003 WEBSITE: <http://www.who.int/mediacentre/news/notes/2003/np20.en/> - summary

- Reviewed JECFA Risk Assessments for cadmium and mercury
- New evidence for revising the PTWI (**Provisional Tolerable Weekly Intake**) for methyl mercury, recommending **reduction to 1.6 µg per kg body weight** per week to sufficiently protect the developing fetus. (prior recommendation for a dietary limit of 3.3 µg per week.)
- Noted that swordfish and shark are most significant sources of methylmercury.

# EFSA guidelines: mercury in fish

March 19, 2004 [http://www.efsa.eu.int/press/258\\_en.html](http://www.efsa.eu.int/press/258_en.html)

- European consumers **close to international JECFA standards** (1.6  $\mu\text{g}/\text{kg}$  body weight) and exceeding US – NRC .7  $\mu\text{g}/\text{kg}$  body weight)
- Exposure data missing for vulnerable groups

# ***Public health opportunities***

- UNEP Governing Council Conclusions
- EU Strategy on Mercury
- EU Action Plan on Environment and Health (Biomonitoring and Risk Communication)
- WHO European Regional meeting to look at reducing children's exposure to heavy metal contamination (December 2005)

# **Role of health professionals: successful campaigns**

- Communicating guidelines for fish consumption
- Minimizing and alternatives to waste incineration
- Eliminating mercury in hospitals
- WHO training modules for healthcare providers (globally)

# Physicians for Social Responsibility

## Healthy Fish, Healthy Families

- Precautionary fish consumption guidelines
- Pocket-size reference guide targeted to consumers when purchasing fish
- Publicised health costs – 630,000 babies
- Got public involved

<http://www.mercuryaction.org/fish/>

*« I'm so happy to see people that know this. My sister is pregnant and I told her and her doctor said he never heard anything like that. »*



**Healthy Fish, Healthy Families**

*How you can enjoy the benefits of seafood, while making smart choices to lower the risks of pollution*

The graphic features a blue and green background. On the right side, there are two vertical photographs: the top one shows a young boy in a white t-shirt and a dark cap holding a fish, and the bottom one shows a smiling pregnant woman in a black tank top.

# Health Care Without Harm: getting rid of mercury

- ***Making Medicine Mercury-Free***  
campaign, pledge and  
educational/technical materials
- ***Guide: How to plan and hold a mercury  
fever thermometer exchange***
- ***Fast Facts: The Mercury Problem***  
(addressing hospitals/healthcare professionals)

[www.noharm.org](http://www.noharm.org)

# What YOU Can Do

## **SECONDARY PREVENTION**

- Fish Consumption Advice

## **PRIMARY PREVENTION**

- Mercury Free Office
- Mercury Free Hospital
- Mercury Free Communities
  - Thermometer Exchange
  - Hazardous Waste Education

# Source reduction long term strategy

« Obviously, a public health policy that also asks expectant mothers to give up certain foods while allowing industries to continue contaminating them is absurd.. »

Sandra Steingraber, *Having Faith: the ecologist's journey to motherhood*



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