



Impacts of Recent Health and Environmental Research on Perceptions of Risks from Coal-Fired Power Plants

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SUMMARIES

Health Effects: The dichotomy between the two major studies of the outcomes of prenatal exposure (Sechelles vs. Farooq) is unlikely to be resolved and should be declared a "standoff"...

Exposures: Exposures of the U.S. general public, including pregnant females, have decreased in recent decades and are not a current concern...

Atmospheric Modeling and Ground Truth: Models must be validated to be sufficiently credible to serve as a basis for public health policy...

Acknowledgment: We thank several of the 7th ICMP authors for providing manuscripts and John Janusz of the Southern Company for providing some unpublished information...

Reviews and Editorial Assessments: The lay literature on mercury issues is fraught with misconceptions. There are large differences between assessments made by independent scientists and those having a regulatory agenda...

HEALTH EFFECTS

US Study of 212 Preschool Children Finds PCBs More Important than Mercury in Terms of Cognitive Development

Paul Stewart, Jacqueline Brittain, Edward Lowy, Thomas Dorsville, and James Pegaso
Oswego, New York, January 2007. The effects of fish contamination were investigated by comparing the test performances of 212 children whose mothers were varying amounts of local fish during pregnancy...

Our Comments: The average Hg content of the 25 of their mothers (0.5 ppm) is similar to the mean of national samples of those eating fish three or more times per week (see graph)...

Infants Whose Mothers Ate More Fish During Pregnancy Show Enhanced Development, Mercury Content Notwithstanding

Julie Daniels, Michael Lungu, Andrew Rowland, and Jean Goldsmith
March 2004. The 191 British children were tested using the MacArthur Communication Inventory at age 15 months and the Denver Developmental Screening Test at 18 months...

Our Comments: Although the mercury exposures in this cohort are only about 13% of those in the Faroes, from which data were derived for the EPA reference dose, they are nevertheless about three times the U.S. national average for women of childbearing age...

American Academy of Pediatrics Assesses Effects of Environmental Chemicals on the Developing Embryo, Infant, Child, and Adolescent

The Pediatric Perspective: Robert Brent, Suzanne Tanski, and Michael Weitzman
Wilmington, Delaware, October 2004. Developmental and clinical research shows adverse effects may occur at lower exposure levels than adults...

Health Was Not a Major Focus of the 7th International Conference on Mercury as a Global Pollutant (ICMP)

October 2004, Stockholm, Sweden. The program for the seventh in this series of international conferences comprised 630 papers and posters, of which only four were concerned with the epidemiology of consuming fish contaminated with mercury...

The Seychelles Child Development Study: Recent analyses of prenatal methyl mercury exposure

Conrad Shamlaye, Gary Myers, Philip Davidson, Christopher Co, Li-Shan Huang, Thomas Clarkson
Brookhaven, New York, June 2004. The Seychelles children have been evaluated six times through 11 years of age, and no consistent pattern of developmental advantages has been found using a linear dose-response function...

Children's Health and the Environment in the Faroes: Underestimation of human methyl mercury toxicity due to exposure misclassification

Ebbe Borch-Jorgensen and Philippe Grandjean
Copenhagen, Denmark, June 2004. Three different exposure measures (umbilical cord blood Hg, maternal fish consumption, and fish intake) were used to estimate the Hg exposure of children in the Faroes...

Our Comments: Exposure misclassification or measurement error can have other statistical ramifications, for example, when a regression slope is biased low, the x-axis intercept is shifted to the left...

EXPOSURE

National Survey of Mercury Exposures Finds Low Values for U.S. Women of Childbearing Age, Based on Hg Content of Hair

Margaret McDowell, Charles Daniel, John Osterloh, Michael Rogler, Eda Pelizzari, Richard Tennant, Robert DeGru, Susan Scholten, Thomas Sikka, Robert Jones, Kathryn Mahaffey, Huanhui, May, 2004. Hair samples obtained from 1726 women aged 16-49 and 838 children aged 1-5 show mercury concentrations well below those at which adverse effects have actually been observed...

Our Comments: Median hair Hg levels in women of childbearing age have declined by 50% since 1981. However, the distribution has broadened, based on 2820 observations, the maximum level in 1991 was 69 ppm, and the apparent effect of seafood consumption has increased slightly...

Survey of American Diets Shows that Tuna is Common, but Fish that are High-Mercury are Rare

National Center for Health Statistics, Centers for Disease Control
Nutritionist: HG. A 1999-2000 survey of about 10,000 subjects provided data on the rates at which various types of fish and shellfish are consumed, based on personal recall of the past 30 days...

Table with 4 columns: Species, % of sample, median mg mercury/mg wet wt, and Specific % of sample, median mg mercury/mg wet wt. Rows include bluefish, tuna, salmon, cod, flounder, perch, and unknown fish.

Our Comments: These survey data show that tuna accounts for about half of all fish meals and probably more than half of the dietary intake of Hg. For most fish species, about 2 meals were eaten per month, on average...

Can Nutrition Affect Methyl mercury Toxicity?

Most of the epidemiology studies on methyl mercury exposure from eating fish neglect any effects from the "rest of the diet." Although it is clear that the first population study on the topic...

Can Nutrition Affect Methyl mercury Toxicity?

Arthur Faust, International Journal of Toxicology, Volume 21, pp. 419-424 (2002), San Francisco, CA, June 2002. This essay discusses three examples. Selenium is shown to inhibit methyl mercury toxicity, especially with regard to aquatic poisons...

The Influence of Nutrition on Methyl mercury Intoxication

Laurie Chapman and Lin Chan (Environmental Health Perspectives Supplements, Volume 108, pp. 26-36)
Montreal, Canada, January 2004. This review comprises 121 references and discusses effects on pharmacokinetics, toxicity, and mechanisms. It concludes that a wide variety of foods and nutrients alter methyl metabolism...

Nutritional Factors May Modify the Toxic Action of Methyl Mercury in Fish-Eating Populations

Thomas Clarkson and James Strain (Journal of Nutrition, Volume 133, pp. 1539E-1545E (2003)), Berkeley, CA, June 2003. At an international conference on "Trace Elements in Man and the Environment," the topic presented by Dr. Merly, was reviewed and the possible role of nutrients in fish was discussed...

Eating tropical fruit reduces mercury exposure from fish consumption in the Brazilian Amazon

Carlos Passos, Dama, Myrielle de Góes, Silvanora Moraes, Marc Lacouture, Fabrice Laribe, Roberto Davidson, Sylvia de Góes (Environmental Research, Volume 93, pp. 123-130)
Montreal, Canada, January 2004. A small group of female villagers (n=26) were studied for one year, including daily food diaries and monthly hair Hg analysis...

ATMOSPHERIC MODELING AND GROUND TRUTH

Any Projected Health Benefits from Reduced Power Plant Mercury Emissions are Wholly Based on Atmospheric Modeling and Theoretical Rates of Methylation and Uptake by Fish

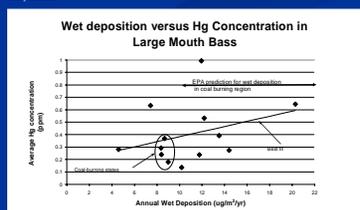
Which of the world will appear that reducing global mercury is a desirable goal. But "the devil is in the details." Which sources of Hg are the most important? How much intercontinental transport is there? What are the spatial and temporal relationships between Hg deposition, fish Hg content, and Hg exposures of the most susceptible populations?...

Global Emissions and Transport: What is Known and Unknown

Russell Bullock, Jr. (presented at the USGS-EPA Mercury Roundtable, Sept. 15, 2004).
Revised, VA, Sept. 15, 2004. This paper presents some back-of-the-envelope estimates of the fraction of Hg deposited in the U.S. that originated elsewhere...

Review of Published Ground-Truth Data Shows Weak Local and Regional Effects of Mercury Emissions from Power Plants

Paul Lipfert, Terry Sullivan, and John Renner
Anaheim, California, March 29, 2004. Seven experimental studies of local Hg deposition and related effects were reviewed and reanalyzed, some dating back to 1973. Local effects (<30 km downwind) indicated that only about 5-10% of emitted Hg was deposited and retained in soil or sediment cores...



Downwind Mercury Measurements Show Reductions of Relative Gaseous Mercury (RGM) to Elemental Hg (Hg(0)) in Coal-Fired Power-Plant Plumes

Eric Edgerton, Ben Hartzell, and John Janusz
Lithuania, Lithuania, July 2, 2004. SO2 was used as a tracer in experimental studies of mercury chemistry and dynamics in several southeastern coal-fired power plants...

Impact of Reduction of 67% Hg(II) to Hg(0) in Total Hg Deposition

Chicago, Chicago, June 2004. Hg particles washed from rooftops (Chemosphere, Volume 52, pp. 1277-1283, pp. 449B-450B (2002)).
Connecticut (Chemosphere, Volume 45, pp. 1033-1043, pp. 449B-450B (2002)).
Synnec, NY (Neurotoxicology, Volume 17, pp. 279-90, 1996).

Recent Publications Find Excess Hg Deposition in Urban Areas

While many of the concerns about mercury in the environment focus on remote and relatively pristine areas like the Arctic, several recently published publications in the atmospheric literature focus on urban areas...

Recent Publications Find Excess Hg Deposition in Urban Areas

Our Comment: Because of the much higher urban population densities, contamination of fish from urban waters may warrant more attention than local deposition effects would suggest...

REVIEWS, EDITORIALS, AND OPINIONS

Reviews of Health Effects

Neurotoxic and Molecular Effects of Methyl mercury in Humans
Ana Carolina, Teresa Cocca, and Sergio Marchese (Environmental Health Perspectives, Volume 115, pp. 19-26) (2003).

Prenatal methyl mercury exposure and developmental effects. An evidence-based review

Aune Spangos, University of Birmingham, United Kingdom.
Presented at the 7th International Conference on Mercury as a Global Pollutant, Stockholm, July 2004.

Environmental factors associated with a spectrum of neurodevelopmental deficits

P-Monells, S. Selevan, S. Grier, D. U.S. Environmental Protection Agency, Research Triangle Park, NC.
Mental and emotional and Developmental Disability Research Review, Volume 8, pp. 188-97 (2003).

Contending with contradictory data in a risk assessment context: the case of methyl mercury

Joseph Jacobson, Wayne State University, Detroit, MI.
Neurotoxicology, Volume 24, pp. 667-705 (2003).

Editorializing

The Mercury Scandal

Paul Krugman, New York Times, p. A23, April 6, 2004.
"Silfur dioxin, its light, and travels long distance; power plants in the Midwest can cause acid rain in Maine. So a cap on total national emissions makes sense...

Grappling with Mercury

Jeff Johnson, Chemical and Engineering News, pp. 19-20, July 12, 2004.
"EPA estimates that some 630,000 children are born each year with learning difficulties by mercury exposure. EPA also warns that the EPA regulatory proposals do not address mercury 'hot spots'...

Opinions (Correspondence and Commentary)

Exceeding the Methyl Mercury Reference Dose: How Dangerous Is It?

Deborah Scholten, Consultant/Scientist, Water, Longueuil, Quebec, Canada.
Environmental Health Perspectives, Volume 112, p. A337, 2004 (commentary).
This letter refers to the research article by John Osterloh (volume 111, pp. 604-608, 2003), which described Hg blood levels in a group of general practice patients...

Do recent data from the Seychelles Islands alter the conclusions of the NRC report on the toxicological effects of methyl mercury?

Alan Stern, Joseph Jacobson, Lyman Ryan, Thomas Burke (members of the NRC Environmental Health, Volume 3, p.2, 2004) (commentary).
Stern et al. consider aspects of the Seychelles study and correspondence following a recent publication that found no adverse effects and conclude that none of these findings provides them to consider that only by setting a "safe" response level for the United States...