



## **Harvard Center for Risk Analysis Seminar Series**

Wednesday 5 November 2008      1:30 – 3:30 p.m.      Landmark 414A  
*Refreshments will be served. All welcome.*

### ***Global Health Impacts and Costs due to Mercury Emissions***

***Ari Rabl, Ph.D.***

***Centre d'Energétique of the Ecole des Mines de Paris***

Since much of the emission is in the form of metallic Hg whose atmospheric residence time is long enough to cause nearly uniform mixing in the hemisphere, much of the impact is global. This talk presents an estimate of global average neurotoxic impacts and costs by defining a comprehensive transfer factor for ingestion of methyl-Hg as ratio of global average dose rate and global emission rate. For the dose-response function (DRF) we use recent estimates of IQ decrement as function of Hg concentration in blood, as well as correlations between blood concentration and Hg ingestion. The cost of an IQ point is taken as \$18,000 in the USA and applied in other countries in proportion to per capita GDP, adjusted for purchase power parity. The mean estimate of the global average of the marginal damage cost per emitted kg of Hg is about \$1,500/kg, if one assumes a dose threshold of 6.7 mg/day of methyl-Hg per person, and \$3,400/kg without threshold. The average global lifetime impact and cost per person at current emission levels are 0.02 IQ points lost and \$78 with and 0.087 IQ points and \$344 without threshold. These results are global averages; for any particular source and emission site the impacts can be quite different. An assessment of the overall uncertainties indicates that the damage cost could be a factor 4 smaller or larger.

Ari Rabl is Senior Scientist at the Centre d'Energétique of the Ecole des Mines de Paris. He received a Ph.D. in physics from Berkeley in 1969, and has worked at Argonne National Laboratory, at the National Renewable Energy Laboratory, and at the Center for Energy and Environmental Studies of Princeton University. His specialty is the assessment of environmental impacts and health risks of pollution.

**Directions:** The Landmark Center is at the intersection of Brookline Avenue and Park Drive, between Fenway Park and the Longwood medical area, in Boston. A parking garage is attached to the building, enter from Brookline Avenue. The Fenway stop on the Green D subway line is next to the building. Take West Elevators to the fourth floor and follow the signs to 414A. For more information, see <http://www.hsph.harvard.edu/landmark/location.html>.

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From Cambridge the M2 shuttle bus departs Lamont Library at, for example, 2:45 or 3:15 p.m. Exit the M2 at the Fenway bus stop and walk across the street to the Landmark Center. For more information, see [http://www.masco.org/transit/ptsM2\\_WeekdaySchedule.htm](http://www.masco.org/transit/ptsM2_WeekdaySchedule.htm).



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### ***Fish Consumption and Mercury Exposure among Recreational Anglers in Coastal Louisiana***

***Rebecca Lincoln, Doctoral Candidate  
Department of Environmental Health, Harvard School of Public Health***

Mercury exposures in the US vary greatly by region, and depend at least partially on the availability of fresh fish, on regional dietary preferences, and on regional patterns of recreational and commercial fishing. This talk will describe a study, completed in 2006, which characterized fish consumption and mercury exposure among recreational anglers in coastal Louisiana. Anglers completed a questionnaire detailing how frequently they consumed 88 different types of fish and shellfish and gave a hair samples which was analyzed for total mercury. Anglers' median hair-mercury concentration was 0.81  $\mu\text{g/g}$  (range: 0.02-10.7  $\mu\text{g/g}$ ), and was significantly associated with consumption of fish from all sources. Hair-mercury concentration was also associated with anglers' estimated mercury intake, as calculated from questionnaire data and regionally specific existing data on levels of mercury in each type of fish consumed. Our data suggest that anglers in coastal Louisiana are more highly exposed to Hg than the general US population, and that their consumption of a wide variety of fish species, including species caught recreationally in the Gulf of Mexico, contributes to this exposure. Assessments of exposure and risk in this and similar groups should account for local consumption patterns and regionally specific fish mercury levels.

Rebecca Lincoln is a doctoral candidate in the Environmental Health department at the Harvard School of Public Health. Her dissertation research focuses on the use of established and novel biomarkers to estimate heavy metals exposures in a variety of highly exposed communities. She received her BA in Geology and Mathematics from Oberlin College.

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