Linking Global Mercury Releases to Local Human Health Outcomes

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Methylmercury exposure is associated with long-term neurodevelopmental delays in children, and reduced cardiovascular health in adults, among other adverse impacts. This presentation will provide an overview of our work linking all-time mercury releases from human activity to bioaccumulation in marine fisheries globally, and impacts on exposures and risks of local populations. Our global modeling work indicates the vast majority of mercury in the ocean can be attributed to cumulative anthropogenic Hg releases since antiquity. Thus, fish methylmercury levels largely reflect an anthropogenic contamination problem rather than natural sources. We show that interannual variability in ocean biogeochemistry can have a large influence on methylmercury levels in food webs and marine mammals, tending toward an overall increase in methylmercury in marine food webs as the result of climate change. We use this work to assess present and future methylmercury exposure risks for vulnerable populations in the Arctic and Subarctic, subsistence fishers, and U.S. women of childbearing age. Our work quantifies the flow of methylmercury in fisheries and health risks associated with reduced consumption of traditional foods in northern populations, where seafood provides essential fatty acids and nutrients and access to other hgih quality foods is low. The presentation will also discuss implications of rising contaminant levels in fisheries for food security of other subsidence populations.