Abstract

Recent policies attempting to reduce adverse effects of methylmercury exposure from fish consumption in the U.S. have targeted reductions in anthropogenic emissions from U.S. sources. Objectives: To analyze the prospects for future North American and international emissions controls, we assess the potential contributions of anthropogenic, historical and natural mercury to exposure trajectories in the U.S. population over a 40-year time horizon. Methods: We use models that simulate global atmospheric chemistry (GEOS-Chem); the fate, transport and bioaccumulation of mercury in four types of freshwater ecosystems; and mercury cycling among different ocean basins. We consider effects on mercury exposures in the U.S. population based on dietary survey information and consumption data from the sale of commercial market fish. Results: While North American emissions controls may reduce mercury exposure by up to 50% for certain highly-exposed groups such as indigenous peoples in the Northeast, their potential effects on populations consuming marine fish from the commercial market are less certain due to limited measurements. Conclusions: Despite uncertainties in the exposure pathway, results indicate that a combination of North American and international emissions controls with adaptation strategies are necessary to manage methylmercury risks across various demographic groups in the U.S.