

Estimating Metal Intakes from Traditionally Harvested Fish from the Mushkegowuk Region

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Locally-harvested fish are an important part of the diet, culture, and food sovereignty of First Nations in Northern Ontario. While consuming fish has numerous health benefits, it is also a pathway for contaminants, such as methylmercury, to enter the body. Research has shown that, although mercury exposures typically remain below those linked with health risks, mercury levels in First Nations are often elevated relative to the general population. Consequently, risk communication efforts regarding fish contaminant levels inland lakes have long promoted whitefish due to its low mercury levels and nutrient density. However, despite high uncertainty regarding the toxicological relevance of total arsenic concentrations in fish tissues, consumption notices on whitefish have become more common, including on the Albany River, based on this measure. To better characterize mercury and arsenic exposures and risk from fish consumption in the Mushkegowuk Region, mercury and arsenic speciation data from three commonly-eaten freshwater fish species (Lake Whitefish, Cisco, Northern Pike) was analyzed. Arsenobetaine, which is generally regarded as non-toxic, was the predominant form of arsenic in each species while arsenite and arsenate went undetected in all samples. Site-specific analytical data was synthesized with trace element concentrations reported in the literature as well as Ecozone-specific Food Frequency Questionnaire data from the First Nations Food Nutrition and Environment Study. Probabilistic distributions for mercury (total and methylmercury), arsenic (total and inorganic) were generated using Crystal Ball (Oracle) and compared against Toxicological Reference Values. Results highlight the healthfulness of locally-harvested fish and the challenges associated with the application of screening threshold based on total arsenic concentrations in fish tissues. Sensitivity analyses from the Crystal Ball model are underway to prioritize future data collection efforts.