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Risks and benefits of seafood intake in regard to neurobehavioural development

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Background: The effects of methylmercury exposure from the diet may be ameliorated to some degree by beneficial effects of nutrients. We have examined this issue in a mercury-exposed birth cohort from the Faroe Islands.

Methodology: A cohort of 1022 children was recruited at birth in 1987 and 1988. The children's prenatal methylmercury exposure was determined from mercury concentrations in maternal hair and cord blood. At 7 and 14 years, the children underwent detailed neurobehavioral examinations. We used structural equation modelling to include allowance for the beneficial effect of seafood intake, while at the same time adjusting for imprecise exposure assessments.

Results: Outcome variables were grouped into motor functions and verbally-mediated functions, each joined into a latent variable in the structural equation. Both groups of tests showed significant mercury-associated deficits. After adjustment for fish intake, mercury toxicity was augmented, especially in regard to motor skills, and fish intake showed a beneficial effect. Because fish intake was based only on maternal recall of the frequency of fish dinners, it was an imprecise indicator of the true intake of beneficial nutrients. Sensitivity analyses showed that non-directional imprecision of this confounder added to the underestimation of both beneficial and toxic effects.

Implications: The findings suggest that, without mutual adjustment for beneficial and toxic effects, and without allowance for imprecision, the opposite effects of mercury and nutrient intakes from seafood are both underestimated. Assessment of adverse effects caused by toxicants therefore needs to adjust for both confounding and imprecision of the exposure variables.