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Prenatal fish, mercury and age 3 cognition: US data

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Background and hypothesis: Few studies of prenatal mercury (Hg) exposure have incorporated measures of maternal fish intake or n-3 fatty acids. We hypothesized that maternal fish intake would on balance benefit child cognition.

Methodology: We studied 379 mother-child pairs in Project Viva, a US cohort. At 26-28 weeks gestation, we assessed maternal fish consumption and assayed erythrocytes for DHA+EPA and total Hg. We administered to 3-year-old children the Peabody Picture Vocabulary Test (PPVT) and Wide Range Assessment of Visual Motor Ability (WRAVMA), which includes subtests on visual-spatial (matching), visual-motor (drawing), and fine-motor skills (pegboard). We used linear regression, adjusting for child's sex, age, fetal growth, gestational age, breastfeeding, and language; and mother's demographics, smoking, and PPVT score.

Results: Maternal fish intake (mean 1.5 svg/wk) was correlated with erythrocyte DHA+EPA (mean = 4.8 % of fatty acids, $r=0.18$, $p=0.0005$) and Hg (mean = 3.8 ng/g, $r=0.33$, $p<0.0001$). On multivariate analysis, fish intake was associated with WRAVMA drawing [Beta (95% CI): 0.99 (0.21, 1.77)] and less strongly with pegboard [0.77 (-0.02, 1.55)], but not with matching [0.05 (-1.03, 1.13)] or PPVT [0.16 (-0.76, 1.08)]. Hg was inversely associated with PPVT score [-0.39 (-0.72, -0.06)], but not with any WRAVMA scores. Mutual adjustment influenced results minimally, and DHA+EPA levels were not associated with any outcome.

Implications: In this US population, increased maternal fish intake during pregnancy was associated with modestly enhanced child development in some domains, although there was also evidence for a mild detrimental effect of the attendant increase in Hg.