

References

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This is a paper for discussion. This does not represent the views of the Committee and should not be cited.

Agency for Toxic Substances and Disease Registry (ATSDR). 2024. Toxicological Profile for Mercury. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service. [Mercury | Toxicological Profile | ATSDR](#)

Akagi, H., Grandjean, P., Takizawa, Y., & Weihe, P. (1998). Methylmercury Dose Estimation from Umbilical Cord Concentrations in Patients with **Minamata Disease**. **Environmental Research**, **77**(2), 98–103.
<https://doi.org/10.1006/enrs.1997.3822>

Ander, E. L., Johnson, C. C., Cave, M. R., Palumbo-Roe, B., Nathanail, C. P., & Lark, R. M. (2013). Methodology for the determination of normal background concentrations of contaminants in English soil. **Science of The Total Environment**, **454-455**, 604–618.
<https://doi.org/10.1016/j.scitotenv.2013.03.005>

Aschner, M., Eberle, N. B., Goderie, S., & Kimelberg, H. K. (1990). Methylmercury uptake in rat primary astrocyte cultures: The role of the neutral amino acid transport system. **Brain Research**, **521**(1), 221-228.

[https://doi.org/10.1016/0006-8993\(90\)91546-S](https://doi.org/10.1016/0006-8993(90)91546-S)

Atkinson A, Thompson SJ, Khan AT, et al. 2001. Assessment of a two-generation reproductive and fertility study of mercuric chloride in rats. *Food Chem Toxicol* 39(1):73-84. [https://doi.org/10.1016/S0278-6915\(00\)00096-X](https://doi.org/10.1016/S0278-6915(00)00096-X)

Bakir, F., Damluji, S. F., Amin-Zaki, L., Murtadha, M., Khalidi, A., Al-Rawi, N. Y., Tikriti, S., Dhahir, H. I., Clarkson, T. W., Smith, J. C., & Doherty, R. A. (1973). Methylmercury Poisoning in Iraq. **Science**, **181**(4096), 230-241.

<https://doi.org/10.1126/science.181.4096.230>

Bates, B., Collins, D., Jones, K., Page, P., Roberts, C., Steer, T., Swan, G. (2020). National Diet and Nutrition Survey Rolling programme Years 9 to 11 (2016/2017 to 2018/2019). [National Diet and Nutrition Survey](#)

Bates, B.; Cox, L.; Nicholson, S.; Page, P.; Prentice, A.; Steer, T.; Swan, G. (2016) National Diet and Nutrition Survey Results from Years 5 and 6 (combined) of the Rolling Programme (2012/2013 – 2013/2014) [National Diet and Nutrition Survey](#)

Bates, B.; Lennox, A.; Prentice, A.; Bates, C.; Page, P.; Nicholson, S.; Swan, G. (2014) National Diet and Nutrition Survey Results from Years 1, 2, 3 and 4 (combined) of the Rolling Programme (2008/2009 – 2011/2012). [National Diet and Nutrition Survey](#)

Björnberg, K. A., Vahter, M., Berglund, B., Niklasson, B., Blennow, M., & Sandborgh-Englund, G. (2005). Transport of Methylmercury and Inorganic Mercury to the Fetus and Breast-Fed Infant. **Environmental Health Perspectives**, **113**(10), 1381-1385. <https://doi.org/10.1289/ehp.7856>

Bocca, B., Ruggieri, F., Pino, A., Rovira, J., Calamandrei, G., Martínez, M. Á., Domingo, J. L., Alimonti, A., & Schuhmacher, M. (2019). Human biomonitoring to evaluate exposure to toxic and essential trace elements during pregnancy. Part A. concentrations in maternal blood, urine and cord blood. **Environmental Research**, **177**, 108599. <https://doi.org/10.1016/j.envres.2019.108599>

Bridges C. C., & Zalups R. K. (2017). Mechanisms involved in the transport of mercuric ions in target tissues. *Arch Toxicol* 91(1):63-81. <http://doi.org/10.1007/s00204-016-1803-y>.

Bridges, C. C., & Zalups, R. K. (2010). Transport of inorganic mercury and methylmercury in target tissues and organs. **Journal of Toxicology and Environmental Health. Part B, Critical Reviews**, **13**(5), 385–410.

<https://doi.org/10.1080/10937401003673750>

Budtz-Jørgensen, E., Grandjean, P., Keiding, N., White, R. F., & Weihe, P. (2000). Benchmark dose calculations of methylmercury-associated neurobehavioural deficits. *Toxicology Letters*, 112–113, 193–199. [https://doi.org/10.1016/S0378-4274\(99\)00283-0](https://doi.org/10.1016/S0378-4274(99)00283-0)

Budtz-Jørgensen, E., Keiding, N., & Grandjean, P. (1999). Benchmark Modeling of the Faroese Methylmercury Data. Final Report to USEPA, 1999; 1–13. [Benchmark Modeling of the Faroese Methylmercury Data](#)

Budtz-Jørgensen, E., Keiding, N., & Grandjean, P. (2001). Benchmark dose calculation from epidemiological data. **Biometrics**, **57**, 698–706. Available at: [Benchmark Dose Calculation from Epidemiological Data on JSTOR](#)

Cediel Ulloa, A., Gliga, A., Love, T. M., Pineda, D., Mruzek, D. W., Watson, G. E., Davidson, P. W., Shamlaye, C. F., Strain, J. J., Myers, G. J., van Wijngaarden, E., Ruegg, J., & Broberg, K. (2021). Prenatal methylmercury exposure and DNA methylation in seven-year-old children in the Seychelles Child Development Study. **Environment International**, **147**, 106321. <https://doi.org/10.1016/j.envint.2020.106321>

COT Meeting 4th February 2025. Discussion paper on the effects of mercury on maternal health (TOX/2025/03). Available at [The effects of mercury on maternal health - Introduction and Background | Committee on Toxicity](#)

COT, (2004): Annex 3. Updated COT Statement on a survey of methylmercury in fish and shellfish: [fishreport200406.pdf](#)

COT, (2018). Statement on potential risks from methylmercury in the diet of infants aged 0 to 12 months and children aged 1 to 5 years: [cotstatementonmethylmercury.pdf \(food.gov.uk\)](#)

Dack, K., Wootton, R. E., Taylor, C. M., & Lewis, S. J. (2023). Prenatal Mercury Exposure and Infant Weight Trajectories in a UK Observational Birth Cohort. **Toxics**, **11**(1), 10. <https://doi.org/10.3390/toxics11010010>

Davidson, P., Myers, G., Cox, C., Axtell, C., Shamlaye, C., Sloane-Reeves, J., Cernichiari, E., Needham, L., Choi, A., Wang, Y., Berlin, C., & Clarkson, T. (1998).

Effects of Prenatal and Postnatal Methylmercury Exposure From Fish Consumption on Neurodevelopment Outcomes at 66 Months of Age in the Seychelles Child Development Study. **JAMA**, **280**, 701–707.

<https://doi.org/10.1001/jama.280.8.701>

De Paula, H. K., Love, T. M., Pineda, D., Watson, G. E., Thurston, S. W., Yeates, A. J., Mulhern, M. S., McSorley, E. M., Strain, J. J., Shamlaye, C. F., Myers, G. J., Rand, M. D., van Wijngaarden, E., & Broberg, K. (2023). *KEAP1* polymorphisms and neurodevelopmental outcomes in children with exposure to prenatal MeHg from the Seychelles Child Development Study Nutrition Cohort 2. **NeuroToxicology**, **99**, 177–183. <https://doi.org/10.1016/j.neuro.2023.10.008>

Dean, J. R., Deary, M. E., Gbafa, B. K., & Scott, W. C. (2004). Characterisation and analysis of persistent organic pollutants and major, minor and trace elements in Calabash chalk. **Chemosphere**, **57**(1), 21–25.

<https://doi.org/10.1016/j.chemosphere.2004.05.023>

Dyrssen, D., & Wedborg, M. (1991). The sulphur-mercury(II) system in natural waters. **Water Air & Soil Pollution**, **56**(1), 507–519.

<https://doi.org/10.1007/BF00342295>

EFSA Panel on Contaminants in the Food Chain (CONTAM), (2008). Mercury as undesirable substance in animal feed—Scientific opinion of the Panel on Contaminants in the Food Chain. **EFSA Journal**, **6**(4), 654.

<https://doi.org/10.2903/j.efsa.2008.654>

EFSA Panel on Contaminants in the Food Chain (CONTAM). (2004). Opinion of the Scientific Panel on contaminants in the food chain related to mercury and methylmercury in food. **EFSA Journal** **2004**; **2**(3):34, 14 pp. doi:

[10.2903/j.efsa.2004.34](https://doi.org/10.2903/j.efsa.2004.34)

EFSA Panel on Contaminants in the Food Chain (CONTAM). (2012). Scientific Opinion on the risk for public health related to the presence of mercury and methylmercury in food. **EFSA Journal** **2012**; **10**(12):2985, 241 pp. doi:

[10.2903/j.efsa.2012.2985](https://doi.org/10.2903/j.efsa.2012.2985).

Environment Agency. (2009). [Microsoft Word - 0901115 CLEA Report for publication.doc \(publishing.service.gov.uk\)](#). Accessed 20.04.22

Environment Agency. (2021). Mercury: challenges for the water environment. [Mercury: challenges for the water environment - GOV.UK](#) Accessed 2nd July 2025.

FAO/WHO. (1966). Specifications for the identity and purity of food additives and their toxicological evaluation: some emulsifiers and stabilizers and certain other substances: tenth report of the Joint FAO/WHO Expert Committee on Food Additives. WHO technical report series; 373.

FAO/WHO. (1970). Evaluation of food additives: specifications for the identity and purity of food additives and their toxicological evaluation, some extraction solvents and certain other substances: fourteenth report of the Joint FAO/WHO Expert Committee on Food Additives. WHO technical report series; 462.

FAO/WHO. (1972). Evaluation of certain food additives and the contaminants mercury, lead, and cadmium: Sixteenth report of the Joint FAO/WHO Expert Committee on Food Additives. WHO technical report series; 505.

FAO/WHO. (1978). Evaluation of certain food additives : twenty-second report of the Joint FAO/WHO Expert Committee on Food Additives. WHO technical report series; 631.

FAO/WHO. (1988). Evaluation of certain food additives and contaminants : thirty-third report of the Joint FAO/WHO Expert Committee on Food Additives. WHO technical report series; 776.

FAO/WHO. (2004). Evaluation of certain food additives and contaminants: Sixty-first report of the Joint FAO/WHO Expert Committee on Food Additives. WHO technical report series; 922.

FAO/WHO. (2007). Evaluation of certain food additives and contaminants: sixty-seventh report of the Joint FAO/WHO Expert Committee on Food Additives. WHO technical report series; 940.

FAO/WHO. (2011). Safety evaluation of certain contaminants in food: Prepared by the seventy-second meeting of the Joint FAO/WHO Expert Committee on Food Additives. WHO technical report series; 959.

Farris F.F., Kaushal A., Strom J. G. (2008). Inorganic mercury pharmacokinetics in man: A two-compartment model. *Toxicol Environ Chem* 90(3):519-533.
<http://doi.org/10.1080/02772240701602736>.

Fawcett, E. J., Fawcett, J. M., & Mazmanian, D. (2016). A meta-analysis of the worldwide prevalence of pica during pregnancy and the postpartum period. **International Journal of Gynaecology and Obstetrics: The Official Organ of the International Federation of Gynaecology and Obstetrics**, 133(3),

277–283. <https://doi.org/10.1016/j.ijgo.2015.10.012>

Food & Environment Research Agency (FERA), (2015). Total Diet Study of metals and other elements in food. Report for the UK Food Standards Agency (FS102081). [Total diet study: metals and other elements | Food Standards Agency](#)

García-Esquinas, E., Pérez-Gómez, B., Fernández, M. A., Pérez-Meixeira, A. M., Gil, E., Paz, C. de, Iriso, A., Sanz, J. C., Astray, J., Cisneros, M., Santos, A. de, Asensio, A., García-Sagredo, J. M., García, J. F., Vioque, J., Pollán, M., López-Abente, G., González, M. J., Martínez, M., Bohigas P. A., Aragonés, N. (2011). Mercury, lead and cadmium in human milk in relation to diet, lifestyle habits and sociodemographic variables in Madrid (Spain). **Chemosphere**, **85**(2), 268–276. <https://doi.org/10.1016/j.chemosphere.2011.05.029>

Golding, J., Taylor, C., Iles-Caven, Y., & Gregory, S. (2022). The benefits of fish intake: Results concerning prenatal mercury exposure and child outcomes from the ALSPAC prebirth cohort. **NeuroToxicology**, **91**, 22–30. <https://doi.org/10.1016/j.neuro.2022.04.012>

Grandjean, P., Weihe, P., White, R. F., Debes, F., Araki, S., Yokoyama, K., Murata, K., Sørensen, N., Dahl, R., & Jørgensen, P. J. (1997). Cognitive Deficit in 7-Year-Old Children with Prenatal Exposure to Methylmercury. **Neurotoxicology and Teratology**, **19**(6), 417–428. [https://doi.org/10.1016/S0892-0362\(97\)00097-4](https://doi.org/10.1016/S0892-0362(97)00097-4)

Haynes, W. M., Lide, D. R., & Bruno, T. J. (2016). **CRC Handbook Of Chemistry And Physics: a ready-reference book of chemical and physical data**. 2016–2017, 97th Edition / Boca Raton, Florida, CRC Press. <https://doi.org/10.1201/9781315380476>

Heath, J. C., Abdelmageed, Y., Braden, T. D., Nichols, A. C., & Steffy, D. A. (2009). The effects of chronic mercuric chloride ingestion in female Sprague–Dawley rats on fertility and reproduction. **Food and Chemical Toxicology**, **47**(7), 1600–1605. <https://doi.org/10.1016/j.fct.2009.04.007>

Heath, J. C., Abdelmageed, Y., Braden, T. D., & Goyal, H. O. (2012). The Effects of Chronic Ingestion of Mercuric Chloride on Fertility and Testosterone Levels in Male Sprague Dawley Rats. **BioMed Research International**, **2012**(1), 815186. <https://doi.org/10.1155/2012/815186>

Hibbeln, J. R., Davis, J. M., Steer, C., Emmett, P., Rogers, I., Williams, C., & Golding, J. (2007). Maternal seafood consumption in pregnancy and

neurodevelopmental outcomes in childhood (ALSPAC study): An observational cohort study. **The Lancet**, **369**(9561), 578–585. [https://doi.org/10.1016/S0140-6736\(07\)60277-3](https://doi.org/10.1016/S0140-6736(07)60277-3)

Huang, C. F., Liu, S. H., Hsu, C. J., & Lin-Shiau, S. Y. (2011). Neurotoxicological effects of low-dose methylmercury and mercuric chloride in developing offspring mice. **Toxicology Letters**, **201**(3), 196–204. <https://doi.org/10.1016/j.toxlet.2010.12.016>

IARC. 1993. Mercury and mercury compounds. IARC monographs on the evaluation of carcinogenic risks to humans. Volume 58. Beryllium, cadmium, mercury, and exposures in the glass manufacturing industry. Lyon, France: International Agency for Research on Cancer. 239-345. <https://publications.iarc.fr/76>. November 11, 2020.

Ikegaya K, Nokihara K, Yasuhara T. 2010. Characterization of sulfhydryl heterogeneity in human serum albumin and recombinant human serum albumin for clinical use. *Biosci Biotechnol Biochem* 74(11):2232-2236. <http://doi.org/10.1271/bbb.100423>.

Iwai-Shimada, M., Satoh, H., Nakai, K., Tatsuta, N., Murata, K., & Akagi, H. (2015). Methylmercury in the breast milk of Japanese mothers and lactational exposure of their infants. **Chemosphere**, **126**, 67–72. <https://doi.org/10.1016/j.chemosphere.2014.12.086>

Julshamn, K., Andersen, A., Ringdal, O., & Mørkøre, J. (1987). Trace elements intake in the Faroe Islands I. Element levels in edible parts of pilot whales (*Globicephalus meleanus*). **Science of The Total Environment**, **65**, 53–62. [https://doi.org/10.1016/0048-9697\(87\)90160-4](https://doi.org/10.1016/0048-9697(87)90160-4)

Kaneko, J., & Ralston, N. (2007). Selenium and Mercury in Pelagic Fish in the Central North Pacific Near Hawaii. **Biological Trace Element Research**, **119**, 242–254. <https://doi.org/10.1007/s12011-007-8004-8>

Kerper, L. E., Ballatori, N., & Clarkson, T. W. (1992). Methylmercury transport across the blood-brain barrier by an amino acid carrier. **American Journal of Physiology-Regulatory, Integrative and Comparative Physiology**, **262**(5), R761–R765. <https://doi.org/10.1152/ajpregu.1992.262.5.R761>

Kershaw, T. G., Clarkson, T. W., & Dhahir, P. H. (1980). The relationship between blood levels and dose of methylmercury in man. **Archives of Environmental Health**, **35**(1), 28–36. <https://doi.org/10.1080/00039896.1980.10667458>

Khan, A. T., Atkinson, A., Graham, T. C., Thompson, S. J., Ali, S., & Shireen, K. F. (2004). Effects of inorganic mercury on reproductive performance of mice. **Food and Chemical Toxicology**, **42**(4), 571-577.

<https://doi.org/10.1016/j.fct.2003.10.018>

Laaroussi, M., Boukholda, K., Essaidi, O., Berroug, L., Malqui, H., Anarghou, H., Fetoui, H., & Chigr, F. (2025). Multigenerational impact of chronic exposure to mercury chloride on maternal care, puberty, fertility, and hypothalamic function in female mice. *Environmental Research*, 264, 120396.

<https://doi.org/10.1016/j.envres.2024.120396>

Lederman, S. A., Jones, R. L., Caldwell, K. L., Rauh, V., Sheets, S. E., Tang, D., Viswanathan, S., Becker, M., Stein, J. L., Wang, R. Y., & Perera, F. P. (2008). Relation between Cord Blood Mercury Levels and Early Child Development in a World Trade Center Cohort. **Environmental Health Perspectives**, **116**(8), 1085-1091. <https://doi.org/10.1289/ehp.10831>

Lee, B.-E., Hong, Y.-C., Park, H., Ha, M., Koo, B. S., Chang, N., Roh, Y.-M., Kim, B.-N., Kim, Y.-J., Kim, B.-M., Jo, S.-J., & Ha, E.-H. (2010). Interaction between GSTM1/GSTT1 Polymorphism and Blood Mercury on Birth Weight. **Environmental Health Perspectives**, **118**(3), 437-443. <https://doi.org/10.1289/ehp.0900731>

Li, H., Lin, X., Zhao, J., Cui, L., Wang, L., Gao, Y., Li, B., Chen, C., Li, Y. (2019). Intestinal methylation and demethylation of mercury. *102*(5):597-604. <http://doi.org/10.1007/s00128-018-2512-4>.

Love, T. M., Wahlberg, K., Pineda, D., Watson, G. E., Zareba, G., Thurston, S. W., Davidson, P. W., Shamlaye, C. F., Myers, G. J., Rand, M., van Wijngaarden, E., & Broberg, K. (2022). Contribution of child ABC-transporter genetics to prenatal MeHg exposure and neurodevelopment. **NeuroToxicology**, **91**, 228-233. <https://doi.org/10.1016/j.neuro.2022.05.019>

Lukačínová, A., Rácz, O., Lovásová, E., & Ništiar, F. (2011). Effect of lifetime low dose exposure to heavy metals on selected serum proteins of Wistar rats during three subsequent generations. **Ecotoxicology and Environmental Safety**, **74** (6), 1747-1755. <https://doi.org/10.1016/j.ecoenv.2011.04.017>

Lynch, M. L., Huang, L.-S., Cox, C., Strain, J. J., Myers, G. J., Bonham, M. P., Shamlaye, C. F., Stokes-Riner, A., Wallace, J. M. W., Duffy, E. M., Clarkson, T. W., & Davidson, P. W. (2011). Varying coefficient function models to explore interactions between maternal nutritional status and prenatal methylmercury toxicity in the Seychelles Child Development Nutrition Study. **Environmental**

Research, **111**(1), 75–80. <https://doi.org/10.1016/j.envres.2010.09.005>

Major-Smith, D., Heron, J., Fraser, A., Lawlor, D. A., Golding, J., & Northstone, K. (2023). The Avon Longitudinal Study of Parents and Children (ALSPAC): A 2022 update on the enrolled sample of mothers and the associated baseline data.

Wellcome Open Research, **7**, 283.

<https://doi.org/10.12688/wellcomeopenres.18564.2>

McSorley, E. M., van Wijngaarden, E., Yeates, A. J., Spence, T., Mulhern, M. S., Harrington, D., Thurston, S. W., Love, T., Jusko, T. A., Allsopp, P. J., Conway, M. C., Davidson, P. W., Myers, G. J., Watson, G. E., Shamlaye, C. F., & Strain, J. J. (2020). Methylmercury and long chain polyunsaturated fatty acids are associated with immune dysregulation in young adults from the Seychelles child development study. **Environmental Research**, **183**, 109072.

<https://doi.org/10.1016/j.envres.2019.109072>

McSorley, E. M., van Wijngaarden, E., Yeates, A. J., Spence, T., Mulhern, M. S., Harrington, D., Thurston, S. W., Love, T., Jusko, T. A., Allsopp, P. J., Conway, M. C., Davidson, P. W., Myers, G. J., Watson, G. E., Shamlaye, C. F., & Strain, J. J. (2020). Methylmercury and long chain polyunsaturated fatty acids are associated with immune dysregulation in young adults from the Seychelles child development study. *Environmental Research*, **183**, 109072.

<https://doi.org/10.1016/j.envres.2019.109072>

Miao, D., Young, S. L., & Golden, C. D. (2015). A meta-analysis of pica and micronutrient status. **American Journal of Human Biology**, **27**(1), 84–93.

<https://doi.org/10.1002/ajhb.22598>

Miklavčič, A., Casetta, A., Snoj Tratnik, J., Mazej, D., Krsnik, M., Mariuz, M., Sofianou, K., Špirić, Z., Barbone, F., & Horvat, M. (2013). Mercury, arsenic and selenium exposure levels in relation to fish consumption in the Mediterranean area. **Environmental Research**, **120**, 7–17.

<https://doi.org/10.1016/j.envres.2012.08.010>

Miklavčič, A., Cuderman, P., Mazej, D., Snoj Tratnik, J., Krsnik, M., Planinšek, P., Osredkar, J., & Horvat, M. (2011). Biomarkers of low-level mercury exposure through fish consumption in pregnant and lactating Slovenian women.

Environmental Research, **111**(8), 1201–1207.

<https://doi.org/10.1016/j.envres.2011.07.006>

Mokrzan, E. M., Kerper, L. E., Ballatori, N., & Clarkson, T. W. (1995).

Methylmercury-thiol uptake into cultured brain capillary endothelial cells on

amino acid system L. **The Journal of Pharmacology and Experimental Therapeutics**, **272**(3), 1277–1284.

Myers, G. J., & Davidson, P. W. (1998). Prenatal methylmercury exposure and children: Neurologic, developmental, and behavioral research. **Environmental Health Perspectives**, **106**(Suppl 3), 841–847.

<https://doi.org/10.1289/ehp.98106841>

National Research Council (US) Committee on the Toxicological Effects of Methylmercury. (2000). **Toxicological Effects of Methylmercury**. National Academies Press (US). <http://www.ncbi.nlm.nih.gov/books/NBK225778/>

Newland, M. C., Reed, M. N., LeBlanc, A., & Donlin, W. D. (2006). Brain and blood mercury and selenium after chronic and developmental exposure to methylmercury. **NeuroToxicology**, **27**(5), 710–720.

<https://doi.org/10.1016/j.neuro.2006.05.007>

NTP (National Toxicology Program). (1993). Toxicology and Carcinogenesis Studies of Mercuric Chloride (CAS No. 7487-94-7) in F344 Rats and B6C3F1 Mice (Gavage Studies). **National Toxicology Program Technical Report Series**, **408**, 1–260: [Abstract for TR-408](#)

NTP. 2016. Mercury. 14th Report on carcinogens. National Toxicology Program: [2016 Annual Report \(PDF\)](#).

Oken, E., Østerdal, M. L., Gillman, M. W., Knudsen, V. K., Halldorsson, T. I., Strøm, M., Bellinger, D. C., Hadders-Algra, M., Michaelsen, K. F., & Olsen, S. F. (2008). Associations of maternal fish intake during pregnancy and breastfeeding duration with attainment of developmental milestones in early childhood: A study from the Danish National Birth Cohort. **The American Journal of Clinical Nutrition**, **88** (3), 789–796. <https://doi.org/10.1093/ajcn/88.3.789>

Oskarsson, A., Schütz ,Andrejs, Skerfving ,Staffan, Hallén ,Ira Palminger, Ohlin ,Birgit, & and Lagerkvist, B. J. (1996). Total and Inorganic Mercury in Breast Milk and Blood in Relation to Fish Consumption and Amalgam Fillings in Lactating Women. **Archives of Environmental Health: An International Journal**, **51** (3), 234–241. <https://doi.org/10.1080/00039896.1996.9936021>

Otte P., Lijzen J., Otte J., Swartjes F., Versluijs C., (2001). Evaluation and revision of the CSOIL parameter set. RIVM Report 711701021. Bilthoven: National Institute of Public Health and Environment.

Oulhote, Y., Coull, B., Bind, M.-A., Debes, F., Nielsen, F., Tamayo, I., Weihe, P., & Grandjean, P. (2019). Joint and independent neurotoxic effects of early life exposures to a chemical mixture: A multi-pollutant approach combining ensemble learning and G-computation. **Environmental Epidemiology**, **3**(5), e063.

<https://doi.org/10.1097/EE9.0000000000000063>

Rahola T, Aaran RK, Miettinen JK. 1972. Half-time studies of mercury and cadmium by whole-body counting. *Assess Radioactiv Contam* March:553-562.

Rahola T, Hattula T, Korolainen A, Miettinen JK. 1973. Elimination of free and protein-bound ionic mercury $^{203}\text{Hg}^{2+}$ in man. *Ann Clin Res* 5(4):214-219.

Ralston, N. (2008). Selenium Health Benefit Values as Seafood Safety Criteria. **EcoHealth**, **5**, 442–455. <https://doi.org/10.1007/s10393-008-0202-0>

Ralston, N. V. C., & Raymond, L. J. (2010). Dietary selenium's protective effects against methylmercury toxicity. **Toxicology**, **278**(1), 112–123.

<https://doi.org/10.1016/j.tox.2010.06.004>

Ralston, N., Blackwell, J., & Raymond, L. (2007). Importance of Molar Ratios in Selenium-Dependent Protection Against Methylmercury Toxicity. **Biological Trace Element Research**, **119**, 255–268. <https://doi.org/10.1007/s12011-007-8005-7>

Reed, M. N., Banna, K. M., Donlin, W. D., & Newland, M. C. (2008). Effects of Gestational Exposure to Methylmercury and Dietary Selenium on Reinforcement Efficacy in Adulthood. **Neurotoxicology and Teratology**, **30**(1), 29–37.

<https://doi.org/10.1016/j.ntt.2007.10.003>

Reed, M. N., Paletz, E. M., & Newland, M. C. (2006). Gestational exposure to methylmercury and selenium: Effects on a spatial discrimination reversal in adulthood. **NeuroToxicology**, **27**(5), 721–732.

<https://doi.org/10.1016/j.neuro.2006.03.022>

Rice, D. C., Schoeny, R., & Mahaffey, K. (2003). Methods and Rationale for Derivation of a Reference Dose for Methylmercury by the U.S. EPA. **Risk Analysis**, **23**(1), 107–115. <https://doi.org/10.1111/1539-6924.00294>

Roberts, C.; Steer, T.; Maplethorpe, N.; Cox, L.; Meadows, S.; Page, P.; Nicholson, S.; Swan, G. (2018) National Diet and Nutrition Survey Results from Years 7 and 8 (combined) of the Rolling Programme (2014/2015 – 2015/2016) [National Diet and](#)

Nutrition Survey

SACN (2011), The influence of maternal, fetal and child nutrition on the development of chronic disease in later life. [SACN Early Life Nutrition Report.pdf](#)

SACN (2018), Feeding in the First Year of Life. [SACN report on Feeding in the First Year of Life.pdf](#)

Sakamoto, M., Chan, H. M., Domingo, J. L., Koriyama, C., & Murata, K. (2018). Placental transfer and levels of mercury, selenium, vitamin E, and docosahexaenoic acid in maternal and umbilical cord blood. **Environment International**, **111**, 309–315. <https://doi.org/10.1016/j.envint.2017.11.001>

Sakamoto, M., Kubota, M., Matsumoto, S., Nakano, A., & Akagi, H. (2002). Declining risk of methylmercury exposure to infants during lactation. **Environmental Research**, **90**(3), 185–189. [https://doi.org/10.1016/S0013-9351\(02\)00011-7](https://doi.org/10.1016/S0013-9351(02)00011-7)

Shamlaye, C., Davidson, P. W., & Myers, G. J. (2020). The Seychelles Child Development Study: Two decades of collaboration. **NeuroToxicology**, **81**, 315–322. <https://doi.org/10.1016/j.neuro.2020.09.023>

Simmons-Willis, T. A., Koh, A. S., Clarkson, T. W., & Ballatori, N. (2002). Transport of a neurotoxicant by molecular mimicry: The methylmercury-L-cysteine complex is a substrate for human L-type large neutral amino acid transporter (LAT) 1 and LAT2. **Biochemical Journal**, **367**(Pt 1), 239–246. <https://doi.org/10.1042/BJ20020841>

Smith J.C., Allen P.V., Turner M.D., Most B., Fisher H. L., Hall L. L. (1995). The kinetics of intravenously administered inorganic mercury in humans. In: Subramanian KN, Wastney ME, eds. Kinetic models of trace element and mineral metabolism. Boca Raton, FL: CRC Press, 265-280. <https://doi.org/10.1006/taap.1994.1204>

Stokes-Riner, A., Thurston, S. W., J. Myers, G., Duffy, E. M., Wallace, J., Bonham, M., Robson, P., Shamlaye, C. F., Strain, J. J., Watson, G., & Davidson, P. W. (2011). A Longitudinal Analysis of Prenatal Exposure to Methylmercury and Fatty Acids in the Seychelles. *Neurotoxicology and Teratology*, **33**(2), 325–328. <https://doi.org/10.1016/j.ntt.2010.11.003>

Strain, J. J., Davidson, P. W., Thurston, S. W., Harrington, D., Mulhern, M. S., McAfee, A. J., van Wijngaarden, E., Shamlaye, C. F., Henderson, J., Watson, G. E.,

Zareba, G., Cory-Slechta, D. A., Lynch, M., Wallace, J. M. W., McSorley, E. M., Bonham, M. P., Stokes-Riner, A., Sloane-Reeves, J., Janciuras, J., Wong, R., Clarkson, T. W., Myers, G. J. (2012). Maternal PUFA Status but Not Prenatal Methylmercury Exposure Is Associated with Children's Language Functions at Age Five Years in the Seychelles¹². **The Journal of Nutrition**, **142**(11), 1943–1949. <https://doi.org/10.3945/jn.112.163493>

Strain, J., Love, T. M., Yeates, A. J., Weller, D., Mulhern, M. S., McSorley, E. M., Thurston, S. W., Watson, G. E., Mruzek, D., Broberg, K., Rand, M. D., Henderson, J., Shamlaye, C. F., Myers, G. J., Davidson, P. W., & van Wijngaarden, E. (2021). Associations of prenatal methylmercury exposure and maternal polyunsaturated fatty acid status with neurodevelopmental outcomes at 7 years of age: Results from the Seychelles Child Development Study Nutrition Cohort 2. **The American Journal of Clinical Nutrition**, **113**(2), 304–313. <https://doi.org/10.1093/ajcn/nqaa338>

Straka, E., Ellinger, I., Balthasar, C., Scheinast, M., Schatz, J., Szattler, T., Bleichert, S., Saleh, L., Knöfler, M., Zeisler, H., Hengstschläger, M., Rosner, M., Salzer, H., & Gundacker, C. (2016). Mercury toxicokinetics of the healthy human term placenta involve amino acid transporters and ABC transporters. **Toxicology**, **340**, 34–42. <https://doi.org/10.1016/j.tox.2015.12.005>

Szász, A., Barna, B., Gajda, Z., Galbács, G., Kirsch-Volders, M., & Szenté, M. (2002). Effects of continuous low-dose exposure to organic and inorganic mercury during development on epileptogenicity in rats. **Neurotoxicology**, **23**(2), 197–206. [https://doi.org/10.1016/s0161-813x\(02\)00022-0](https://doi.org/10.1016/s0161-813x(02)00022-0)

Suda, I., Totoki, S., Uchida, T., & Takahashi, H. (1992). Degradation of methyl and ethyl mercury into inorganic mercury by various phagocytic cells. **Archives of Toxicology**, **66**(1), 40–44. <https://doi.org/10.1007/BF02307268>

Sundberg, J., Ersson, B., Lönnnerdal, B., & Oskarsson, A. (1999). Protein binding of mercury in milk and plasma from mice and man—A comparison between methylmercury and inorganic mercury. **Toxicology**, **137**(3), 169–184. [https://doi.org/10.1016/S0300-483X\(99\)00076-1](https://doi.org/10.1016/S0300-483X(99)00076-1)

Tanaka, T., Naganuma, A., & Imura, N. (1992). Routes for renal transport of methylmercury in mice. *European Journal of Pharmacology: Environmental Toxicology and Pharmacology*, **228**(1), 9–14. [https://doi.org/10.1016/0926-6917\(92\)90005-W](https://doi.org/10.1016/0926-6917(92)90005-W)

Tanaka-Kagawa, T., Naganuma, A., & Imura, N. (1993). Tubular secretion and reabsorption of mercury compounds in mouse kidney. **The Journal of Pharmacology and Experimental Therapeutics**, **264**(2), 776–782.

U.S. EPA. Exposure Factors Handbook (1997, Final Report). U.S. Environmental Protection Agency, Washington, DC, EPA/600/P-95/002F a-c, 1997. [Exposure Factors Handbook \(1997, Final Report\) | IRIS | US EPA](#)

Ursinyova, M., & Masanova, V. (2005). Cadmium, lead and mercury in human milk from Slovakia. **Food Additives & Contaminants**, **22**(6), 579–589.
<https://doi.org/10.1080/02652030500135201>

Vahter, M., Åkesson, A., Lind, B., Björs, U., Schütz, A., & Berglund, M. (2000). Longitudinal Study of Methylmercury and Inorganic Mercury in Blood and Urine of Pregnant and Lactating Women, as Well as in Umbilical Cord Blood. **Environmental Research**, **84**(2), 186–194.
<https://doi.org/10.1006/enrs.2000.4098>

Valent, F., Mariuz, M., Bin, M., Little, D., Mazej, D., Tognin, V., Tratnik, J., McAfee, A. J., Mulhern, M. S., Parpinel, M., Carrozzi, M., Horvat, M., Tamburlini, G., & Barbone, F. (2013). Associations of Prenatal Mercury Exposure From Maternal Fish Consumption and Polyunsaturated Fatty Acids With Child Neurodevelopment: A Prospective Cohort Study in Italy. **Journal of Epidemiology**, **23**(5), 360–370.
<https://doi.org/10.2188/jea.JE20120168>

Vigeh, M., Nishioka, E., Ohtani, K., Omori, Y., Matsukawa, T., Koda, S., & Yokoyama, K. (2018). Prenatal mercury exposure and birth weight. **Reproductive Toxicology**, **76**, 78–83. <https://doi.org/10.1016/j.reprotox.2018.01.002>

Wahlberg, K., Love, T. M., Pineda, D., Engström, K., Watson, G. E., Thurston, S. W., Yeates, A. J., Mulhern, M. S., McSorley, E. M., Strain, J., Smith, T. H., Davidson, P. W., Shamlaye, C. F., Myers, G., Rand, M. D., van Wijngaarden, E., & Broberg, K. (2018). Maternal polymorphisms in glutathione-related genes are associated with maternal mercury concentrations and early child neurodevelopment in a population with a fish-rich diet. **Environment International**, **115**, 142–149.
<https://doi.org/10.1016/j.envint.2018.03.015>

Watanabe, C., Yin, K., Kasanuma, Y., & Satoh, H. (1999b). In Utero Exposure to Methylmercury and Se Deficiency Converge on the Neurobehavioral Outcome in Mice. **Neurotoxicology and Teratology**, **21**(1), 83–88.
[https://doi.org/10.1016/S0892-0362\(98\)00036-1](https://doi.org/10.1016/S0892-0362(98)00036-1)

Watanabe, C., Yoshida, K., Kasanuma, Y., Kun, Y., & Satoh, H. (1999a). *In Utero Methylmercury Exposure Differentially Affects the Activities of Selenoenzymes in the Fetal Mouse Brain*. **Environmental Research**, **80**(3), 208–214.

<https://doi.org/10.1006/enrs.1998.3889>

Weihe, P., & Grandjean, P. (2012). Cohort studies of Faroese children concerning potential adverse health effects after the mothers' exposure to marine contaminants during pregnancy. **Acta Veterinaria Scandinavica**, **54**(1), S7.

<https://doi.org/10.1186/1751-0147-54-S1-S7>

Wesolowska, M., Yeates, A. J., McSorley, E. M., Watson, G. E., van Wijngaarden, E., Bodin, N., Govinden, R., Jean-Baptiste, J., Desnousse, S., Shamlaye, C. F., Myers, G. J., Strain, J. J., & Mulhern, M. S. (2024). Dietary selenium and mercury intakes from fish consumption during pregnancy: Seychelles Child Development Study Nutrition Cohort 2. **NeuroToxicology**, **101**, 1–5.

<https://doi.org/10.1016/j.neuro.2023.12.012>

WHO & International Programme on Chemical Safety (IPCS). (1990). Methylmercury / published under the joint sponsorship of the United Nations Environment Programme, the International Labour Organisation, and the World Health Organization. **World Health Organization**. [Methylmercury / published under the joint sponsorship of the United Nations Environment Programme, the International Labour Organisation, and the World Health Organization](#)

WHO, (2017). Mercury and health Fact Sheet. Available online: [Mercury](#), accessed July 2024.

Xu, Y., Wahlberg, K., Love, T. M., Watson, G. E., Yeates, A. J., Mulhern, M. S., McSorley, E. M., Strain, J. J., Davidson, P. W., Shamlaye, C. F., Rand, M. D., Myers, G. J., van Wijngaarden, E., & Broberg, K. (2019). Associations of blood mercury and fatty acid concentrations with blood mitochondrial DNA copy number in the Seychelles Child Development Nutrition Study. **Environment International**, **124**, 278–283. <https://doi.org/10.1016/j.envint.2019.01.019>

Yeates, A. J., Zavez, A., Thurston, S. W., McSorley, E. M., Mulhern, M. S., Alhamdow, A., Engström, K., Wahlberg, K., Strain, J. J., Watson, G. E., Myers, G. J., Davidson, P. W., Shamlaye, C. F., Broberg, K., & van Wijngaarden, E. (2020). Maternal Long-Chain Polyunsaturated Fatty Acid Status, Methylmercury Exposure, and Birth Outcomes in a High-Fish-Eating Mother–Child Cohort. **The Journal of Nutrition**, **150**(7), 1749–1756. <https://doi.org/10.1093/jn/nxaa131>

Zareba, W., Thurston, S. W., Zareba, G., Couderc, J. P., Evans, K., Xia, J., Watson, G. E., Strain, J. J., McSorley, E., Yeates, A., Mulhern, M., Shamlaye, C. F., Bovet, P., Van Wijngaarden, E., Davidson, P. W., & Myers, G. J. (2019). Prenatal and recent methylmercury exposure and heart rate variability in young adults: The Seychelles Child Development Study. **Neurotoxicology and Teratology**, **74**, 106810. <https://doi.org/10.1016/j.ntt.2019.106810>

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