

Science for Environment Policy

Cuts in mercury pollution could bring major economic benefits through higher IQ

Cutting mercury pollution could save Europe €8-9 billion per year by protecting children's brain development, suggests a recent study. A third of babies in Europe are estimated to be exposed to unsafe levels of mercury before they are born, when in the womb, which may reduce their IQ and, in turn, restrict their educational and working achievements over their lifetime. This has long-term implications for society and the economy.

Methylmercury, a type of mercury which is formed in the environment from mercury emissions, is known to be toxic to the brain and can lower IQ. Exposure of unborn children in the womb to methylmercury is of particular concern as it has a greater impact on fetuses than for adults. Adults in Europe are exposed to methylmercury mainly through eating certain fish, such as tuna and swordfish, and pregnant women can pass the toxicant onto their unborn child. The mercury that accumulates in these fish mainly comes from industrial processes, such as coal-burning power production, [waste](#) incineration, and uses in dentistry.

The new study calculated the exposure of babies in Europe (specifically, the EU-27, Croatia, the Faroe Islands, Norway and Switzerland) to methylmercury and estimated the economic implications of this permanent, damaging impact of this exposure on their IQ.

The researchers first gathered data from the DEMOCOPHES¹ project, which measured mercury levels in samples of hair taken from 1875 people in 17 European countries. Hair had been taken from children and their mothers, during 2011 and 2012. One third of samples contained over 0.58 micrograms (μg) of methylmercury per gram of hair, the level considered to be safe by the most recent scientific studies. By extending these results to all 31 countries studied, it was estimated that 1.8 million of the 5.4 million babies born each year in Europe could be affected by methylmercury levels above the 0.58 $\mu\text{g}/\text{g}$ limit.

The researchers then converted the effects of this excessive methylmercury exposure into IQ points. Previous research in the Faroe Islands has indicated that each 1 μg of methylmercury per gram of hair for a mother is associated with an average loss of 0.465 IQ points in her child. Combining this information with the DEMOCOPHES results, the researchers estimated that controlling mercury pollution, in order to bring average exposure below the 0.58 $\mu\text{g}/\text{g}$ limit, would contribute an additional 600,000 IQ points per year across the European population.

Higher IQ points are more likely to lead to a higher income, and the monetary benefits of reduced mercury pollution on IQ are estimated to be €8,000 to €9,000 million per year. This was calculated by assuming a value of €17,363 for each IQ point over their lifetime, based on US data.

Mercury levels varied across Europe and were lowest in Eastern Europe and highest in Southern Europe. In Spain, where fish consumption is high, 88% of hair samples were found to be above the 0.58 $\mu\text{g}/\text{g}$ level.

Cutting mercury emissions will see delayed, long-term [health](#) benefits. In the short-term, dietary advice is needed, especially for pregnant women, the study recommends. For example, smaller fish that are low in the food chain, such as sardine, herring, mackerel and salmon, could be recommended for consumption as they are highly nutritious and low in mercury. Reduced consumption of large, overfished species, such as bluefin tuna, will also have ecological benefits.



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www.ehjournal.net/content/12/1/3/abstract

Contact: martine.bellanger@ehesp.fr

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