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Study Determines Mercury Pollution Costs Millions in Lost Earning Potential in Developing and Transition Countries

First ever peer-reviewed study on the economic burdens of mercury exposure near sources named in the Minamata Convention

<http://www.ncbi.nlm.nih.gov/pubmed/27594689>

Göteborg, Sweden: Developing and transition countries stand to lose millions of dollars in earning potential every year due to mercury contamination, according to a new study published in *The Journal of Environmental Management*.¹ The analysis, led by noted researcher Dr. Leonardo Trasande, MD, MPP, is the first peer-reviewed study to estimate economic losses due to diminishing IQ resulting from mercury contamination in these countries.

The study evaluated mercury concentrations in hair samples from 236 participants from 17 sites in 15 countries, and estimated an annual loss of \$77 - \$130 million USD to these specific communities. All study participants lived near highly toxic mercury sources named in the Minamata Convention, the international treaty that obligates parties to take actions to minimize and eliminate mercury pollution to protect human health and the environment. On May 18th, the Convention reached the 50-country ratification milestone and will become international law August 16th.

The study, say researchers, represents the tip of the iceberg of the economic costs associated with mercury pollution. The research determines that annual financial losses due to mercury pollution range from \$16,400 USD for a small community near an abandoned chlor-alkali and PVC plant in Albania, to \$54.7 million USD in Douala, Cameroon, where mercury pollution originates from a variety of sources. An annual \$699,000 USD in lost income burdens affected communities in the Cook Islands, where mercury contamination is not from direct industrial sources but rather from consumption of mercury-contaminated fish. According to UN Environment, coal-fired power plants are a primary source of mercury releases into the atmosphere. Atmospheric mercury deposits into the world's oceans, where it accumulates in fish.

“Mercury pollution comes with a steep price tag,” said Joe DiGangi, PhD, IPEN Science and Technical Advisor, and a co-author of the study. “That’s why the Minamata Convention needs to be ratified and fully implemented to prevent the tragic health impacts and lost earning potential in thousands of communities like the ones in this study. Mercury is a serious global threat to human health and this study shows that it also imposes additional burdens on the economy.”

Sixty-one percent of study participants had mercury levels greater than 1 part per million (ppm), the US Environmental Protection Agency (EPA) reference dose.² The proportion of people with high mercury levels increased to nearly three out of four participants (73 percent) when analyzed using a 0.58 ppm standard, which has been proposed in light of data suggesting harmful effects of mercury at even lower levels of exposure.³

“This study reveals the importance of biomonitoring mercury pollution,” said David Evers, PhD, Executive Director at Biodiversity Research Institute and a study co-author. “This is the first time a globally coordinated, standardized analysis of these particular sites was conducted to determine the severity of the problem. It is critical that we continue biomonitoring efforts in order to track the potential impacts on local communities and on the environment.”

The economic impact study measured the amount of mercury in hair samples collected from individuals living near small-scale gold mining sites and industrial sites—including chlor-alkali plants (which produce the common industrial chemicals chlorine and sodium hydroxide), coal-fired power plants, waste incinerators, non-ferrous metal smelting facilities, cement plants— and other contaminated sites with mixed sources of mercury pollution.

Mercury exposure damages the nervous system, kidneys, and cardiovascular system, and renders the most profound effects during fetal and early childhood development. According to the World Health Organization, mercury causes neurological damage and impacts cognitive thinking, memory, attention, language, and fine motor and visual spatial skills; affecting children who were exposed to methylmercury in the womb. Human exposure to mercury occurs primarily through the consumption of contaminated fish. Contaminated rice and direct exposure to mercury vapor are pathways to exposure and damage as well.

References

¹ Trasande L, DiGangi J, Evers D, Petrlik J, Buck D, Samanek J, Beeler B, Turnquist MA, Regan K (2016) *Economic implications of mercury exposure in the context of the global mercury treaty: hair mercury levels and estimated lost economic productivity in selected developing countries*, Journal of Environmental Management 183:229 - 235, doi: 10.1016/j.jenvman.2016.08.058

<http://www.ncbi.nlm.nih.gov/pubmed/27594689>

² Daily intake below the Reference Dose is assumed to be without appreciable risk of harmful effects during a lifetime.

³ Grandjean P, Budtz-Jorgensen E. Total imprecision of exposure biomarkers: implications for calculating exposure limits. Am J Ind Med. 2007;50(10):712–719. doi: 10.1002/ajim.20474

Hair samples for the study were collected through a standardized hair sampling protocol by public interest organizations in the IPEN network in participating countries. Biodiversity Research Institute Mercury Laboratory provided the analysis of the samples.

IPEN is a network of non-governmental organizations working in more than 100 countries to reduce and eliminate the harm to human health and the environment from toxic chemicals and heavy metals. www.ipen.org

Biodiversity Research Institute is a nonprofit ecological research group whose mission is to assess emerging threats to wildlife and ecosystems through collaborative research, and to use scientific findings to advance environmental awareness and inform decision makers. www.briloon.org