

# Human Rights Impacts of Mercury Pollution



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## Impacts of Mercury Pollution on People

Though initially considered as an elixir to preserve life,<sup>1</sup> mercury has been established to pose adverse effects to humans, the environment and wildlife as well. Listed as one of the hazardous substances for “virtual elimination” by the United States Environmental Protection Agency (US EPA),<sup>2</sup> its designation is warranted as the health effects associated with the production, use and release of mercury to the environment is peppered with human rights implications.

In popular culture, mercury poisoning has often been associated with the *Alice in Wonderland* character, the Mad Hatter.<sup>3</sup> Inspired by the 19<sup>th</sup> century practice of using mercuric nitrate in the English hat-making industry, hat makers faced occupational exposure to mercury and suffered neurological symptoms—irritability, shyness, depression, tremors and slurred speech, thus the colloquialism “mad as a hatter”.<sup>4</sup> Perhaps the most alarming characteristic of this potent neurotoxin is its adverse impact on sensitive populations, specifically children, fetuses, and women of childbearing age.

- Mercury is a highly toxic element and there is no known safe level of exposure to which there is no adverse effects.<sup>5</sup> Ideally, neither children nor adults should have mercury in their bodies because it does not provide any physiological function. However, almost all people in the world have at least trace amounts of the organic form of mercury in their bodies,<sup>6</sup> reflecting its persistence in the environment.
- People can be poisoned by any form of mercury.<sup>7</sup> Elemental and inorganic forms of mercury can be found in many industrial workplaces, as well as in schools and homes where mercury-containing products are used. Approximately 80 percent of inhaled metallic (elemental) mercury vapor is absorbed by the respiratory tract or sinuses, enters the circulatory system, and is distributed throughout the body.<sup>8</sup> Chronic exposure by inhalation, even at low concentrations, has been shown to cause effects such as tremors, impaired cognitive skills, and sleep disturbance in industrial workers.<sup>9,10</sup> On the other hand, acute exposures to mercury salts (inorganic) can lead to corrosive damage of the gastrointestinal tract and cause significant kidney damage.<sup>11</sup>



- Methylmercury is the form of mercury that is mainly responsible for mercury pollution in fish, shellfish, and the birds and mammals that eat them.<sup>12</sup> Ingestion of contaminated food leads to the rapid absorption of methylmercury into the bloodstream. As such, populations that rely on subsistence fishing are regularly exposed to high levels of mercury.<sup>13</sup> For instance, between 1.5 to 17 out of 1,000 children in selected fishing populations in Brazil, Canada, China, Columbia and Greenland were found to have cognitive impairments caused by the consumption of fish-containing mercury.<sup>14</sup>
- Fetuses are most susceptible to developmental effects due to mercury exposure.<sup>15</sup> Impaired neurological development stems from a mother's consumption of fish and shellfish contaminated with methylmercury, even months after the mother's exposure.<sup>16</sup> A guidance document prepared by the World Health Organization (WHO) and the United Nations Environment Program (UNEP) states that fetal brain mercury levels tend to appear significantly higher than in the maternal blood, and that the developing fetal central nervous system demonstrates the greatest sensitivity to the toxic substance.<sup>17</sup> Cognitive thinking, memory, attention, language and fine motor and visual spatial skills may be affected in children who were exposed to methylmercury as fetuses. Children poisoned by mercury may also develop problems in their respiratory, gastrointestinal, hematologic, immune and reproductive systems.<sup>18</sup>
- Many international studies have been carried out to investigate the impact of various mercury sources on the health of children. A study in the US showed that an estimated 300,000 to 600,000 American children have reduced IQ as a result of exposure to industrial mercury emissions.<sup>19</sup> The loss of productivity due to loss of intelligence caused by methylmercury was pegged at an average 8.7 billion USD (US Dollars) annually, with emissions from American power plants accounting for 1.3 billion USD.<sup>20</sup> On the other hand another study assessing societal damages caused by methylmercury ingestion at the global level for the year 2020 estimated annual costs to be approximately 3.7 billion USD due to IQ loss.<sup>21</sup>
- Adults who have been exposed to mercury have symptoms such as irritability, shyness, tremors, changes in vision or hearing, and memory problems.<sup>22</sup> Short-term exposure to high levels of metallic mercury vapors may cause effects such as lung damage, nausea, vomiting, diarrhea, skin rashes, eye irritation and increases in blood pressure or heart rate.<sup>23</sup> For instance, a study among 274 Korean children revealed an association between urinary mercury concentration and an increase of cholesterol as a risk factor for myocardial infarction and coronary or cardiovascular disease.<sup>24</sup> Lastly, the International Agency for Research on Cancer (IARC) and the US EPA have classified methylmercury as a possible human carcinogen.<sup>25</sup>



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## Human Rights Implications

### *Right to life*

Article 6 of the International Covenant on Civil and Political Rights (ICCPR) state that, “*every human being has the inherent right to life. This right shall be protected by law*” and, “*no one shall be arbitrarily deprived of his life*”. Furthermore, Article 6 of the Convention on the Rights of the Child (CRC) recognizes that, “*every child has the inherent right to life*” and that the survival and development of the child is ensured to the “*maximum extent possible*”.

Perhaps the most famous example of the direct impact of mercury pollution to the people’s right to life is the acute mercury contamination which occurred in the fishing villages along the shores of Minamata Bay in Japan. Considered to be one of the top 10 environmental disasters in the world,<sup>26</sup> the pollution was caused by the discharge of wastewater from Chisso Corp., a chemical company that used mercury sulfate and mercury chloride as catalysts in the production of acetaldehyde and vinyl chloride.<sup>27</sup> Methylmercury, a by-product of the acetaldehyde production process, accumulated in the fish and shellfish in the bay, thereby contaminating the staple food of the local villages. The resulting mercury poisoning incidences is called Minamata disease, first diagnosed in 1956.<sup>28</sup> Patients who suffered from the disease showed loss of peripheral sensation and restriction of the visual field, atrophy of the brain, ataxic gait, tremors and violent convulsions.<sup>29</sup> The burden of the pollution continued to haunt the people of Minamata bay, when the village children were born bearing the disease.<sup>30</sup> Local doctors and medical officials recorded an unusually high frequency of cerebral palsy and other infantile disorders in the area. Autopsies of 2 dead children helped the doctors conclude that the children suffered from a congenital form of Minamata disease, along with 16 others.<sup>31</sup> As of 2009, 2,271 victims have been officially certified, and more than 10,000 people had received financial compensation.<sup>32</sup> Yet, in spite of these efforts there are many unrecognized victims of the mercury poisoning.

Another example of the Minamata disease occurred in 1970s Iraq, when 73,201 tons of mercury-coated wheat grain and 22,262 tons of barley were shipped from the US and Mexico and distributed to farmers.<sup>33</sup> An estimated 10,000 people died, while 100,000 people were severely and permanently brain damaged through the consumption of mercury contaminated food.<sup>34</sup>





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### *Right of children and adults to the highest attainable standard of health*

Article 12 of the International Covenant on Economic, Social and Cultural Rights (CESR) states that *“The States Parties to the present Covenant recognize the right of everyone to the enjoyment of the highest attainable standard of physical and mental health”*. Furthermore, the covenant also recognizes the right of workers to healthy working conditions.

With respect to the rights of children, Article 24 of the CRC recognizes, *“the right of the child to the enjoyment of the highest attainable standard of health [...] taking into consideration the dangers and risks of environmental pollution”*. Article 10 of the CESCR also calls for *“special measures of protection and assistance to be taken on behalf of all children and young persons without any discrimination”*.

The right to health and protection of children implications of mercury can be clearly seen in rural communities in gold rich areas in many developing countries. In these areas mercury is used to extract gold from ore. Mercury exposure caused by mining practices is a serious health hazard impeding the achievement of just standards for physical and mental health not only for the workers and local communities, but also the population at-large. Several environmental and health assessment studies have confirmed severe mercury contamination in artisanal and small-scale gold mining (ASGM) communities, as well as the high incidence of symptomatic mercury intoxication to the workers. For instance, airborne mercury concentration over an 8-hour time-weighted average (TWA) in Venezuela ranged from 0.1 to 6,315  $\mu\text{g}/\text{m}^3$ , with a mean of 183  $\mu\text{g}/\text{m}^3$ .<sup>35</sup> Twenty percent of the TWA measurements were above the National Institute for Occupational Safety and Health (NIOSH) recommended exposure limit of 50  $\mu\text{g}/\text{m}^3$ , and 26 percent exceeded the American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit value (TLV) of 25  $\mu\text{g}/\text{m}^3$ .<sup>36</sup> In addition to that, 55 percent and 62 percent of highly burdened workers (amalgam smelters) in the islands of Sulawesi and Kalimantan, Indonesia, respectively, were diagnosed of chronic mercury intoxication in ASGM studies.<sup>37</sup>

### *Right to Food*

According to Article 25 of the Universal Declaration of Human Rights and Article 11 of CESCR *“Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food”*. The right to adequate food and water is established also in the Food and Agriculture Organization (FAO) Voluntary Guidelines to support the Progressive Realization of the Right to Adequate Food in the Context of National Food Security,<sup>38</sup> and the *“access to, and consumption of, adequate, safe and nutritious food”* (emphasis added) has also found protection under the Food Assistance Convention.<sup>39</sup>



Unfortunately, mercury pollution of water bodies is widespread, and threatens a very important source of high quality protein—fish and shellfish. A study by the US Geological Survey (USGS) sampled predatory fish in streams at 291 locations through the United States. The researchers found that mercury was present in all of the fish sampled, and that 27 percent of the samples even exceed the US EPA human health criterion of 0.3 micrograms of methylmercury per gram of wet weight.<sup>40, 41</sup> Restricting fish consumption may not be a realistic option, as a large portion of the developing world population traditionally relies on these foods as their main sources of protein. The United Nations Food and Agriculture Organization (UN FAO) estimates that fish provide more than 2.9 billion people with at least 15 percent of their average per capita animal protein intake.<sup>42</sup> Thus, some people cannot simply reduce their fish consumption without facing hunger or starvation, even though their protein source is contaminated with mercury.

### *Right to access information*

Under Article 19 of the ICCPR, *“everyone has the freedom to seek, receive and impart information and ideas of all kinds”*. Gaining access to information is especially essential when human rights are violated due to unwarranted exposure to toxic chemicals. Several countries have recognized the people’s right to know about the toxic chemicals in the environment where they live and work in. For example, the US enacted the Emergency Planning and Community Right to Know Act (EPCRA) to establish requirements regarding emergency planning and “community right to know” reporting on hazardous and toxic chemicals to further increase the public’s awareness and access to information on chemicals at individual facilities, their uses and releases into the environment.<sup>43</sup> In addition, the ILO’s Chemicals Convention (c.170) recognizes that workers have right to information about the hazards of chemicals used in the workplace, and employers have a duty to inform workers in this regard.<sup>44</sup> Under Article 17 of the CRC, State Parties *“shall ensure that the child has access to information and material from a diversity of national and international sources, especially those aimed at the promotion of his or her ... physical and mental health.”*

Labeling products is also an important tool to inform consumers at the point of purchase that a product contains toxic chemicals, such as mercury, and may require special handling at end of life. In the states of Connecticut, Louisiana, Maine, Massachusetts, Minnesota, New York, Rhode Island, and Vermont the sale of mercury-added products is prohibited unless they have a label indicating that the product contains mercury and information concerning proper disposal.<sup>45</sup>

In countries where concrete right to know policies are lacking or absent, end of life management of mercury-containing products continue to be problematic. In the Philippines, 88 percent of households dispose of their mercury containing lamps with domestic wastes, while 1 percent sells them to the informal waste recycling sector which employs archaic methods of recovering economically valuable parts in the lamps.<sup>46</sup> The disposal and waste management problem extends to other products which contain mercury, such as cosmetics, pesticides, biocides, paints, non-electronic measuring devices (i.e. thermometers, sphygmomanometers, etc.) and dental amalgam among others.<sup>47</sup> Improper disposal of this type of wastes due to lack of knowledge on their composition contributes to the release of mercury to the environment. In fact, the burning of mercury-added products in wastes adds 200 tons of mercury to the atmosphere annually.<sup>48</sup>



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### Workers Rights

In addition to the rights of workers mentioned previously, including the right to information, under Article 18 of ILO c.170 “[w]orkers shall have the right to remove themselves from danger resulting from the use of chemicals when they have reasonable justification to believe there is an imminent and serious risk to their safety or health.” In addition, workers also have the right to “information on the identity of chemicals used at work, the hazardous properties of such chemicals, precautionary measures, education and training.”

With regards to workers’ rights, Thor Chemicals, a British firm operating the largest mercury recycling facility in the world in the 1980’s constitutes a well know case. The facility, located in Kwazulu-Natal, South Africa, employed untrained and unskilled Zulu-speaking labour to manage the tonnes and tonnes of mercury waste imported from other countries.<sup>49</sup> Within a year the local health board found high levels of mercury in a nearby river. From there, incidences of worker death and poisoning emerged. In 1992 three workers were found to be suffering from repeated, long-term mercury exposure; within months, one had died and another was in a coma.<sup>50</sup> The third could no longer talk or walk. Another 27 workers were injured by mercury poisoning while working. In response to rapidly-mounting public pressure, South African officials initially ordered Thor to clean up the pollution; in the end the plant closed leaving a wide-swath of contamination in its wake and highlighting a major global toxic trade case.<sup>51</sup>

### ILO Convention on the Worst Forms of Child Labor

Article 3(d) of the ILO Convention on the Worst Forms of Child Labor specifies such labor as including “work which, by its nature or the circumstances in which it is carried out, is likely to harm the health, safety or morals of children”.

ILO estimates report that up to 1 million children are involved in some kind of mining.<sup>52</sup> Tens of thousands of children can be found in the small-scale mines of Africa, Asia and South America, working both above and below ground.<sup>53</sup> Many children begin working and have immediate contact to mercury from the very early age of 7.<sup>54</sup> Studies conducted in Indonesia and Zimbabwe examined 166 children for mercury. Compared with control groups, children working in ASGM were found to have high levels of mercury in the various biomonitorers—exhibiting typical symptoms of mercury intoxication, such as ataxia.<sup>55</sup> Thus, immediate action is needed to reduce mercury exposure in ASGM communities. More importantly, child labor with hazardous substances such as mercury must be stopped.



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