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# How Are We Doing? The Mercury Story

By William J. Walsh / Feb 14, 2013

The late Ed Koch (former mayor of New York) famously used to ask his constituents “How am I doing?” Answering this question is also prudent (if not required) in evaluating environmental policies. Probably the most relevant measure of how we are doing for mercury is the level of total mercury in blood (which primarily reflects recent methylmercury levels in blood). The EPA’s recently released 2013 Report on Children’s Health and the Environment in America concluded that the median concentration of total mercury in the blood of U.S. child-bearing age women (16 to 40 years old) is 0.8 millionths of a gram per liter ( $\mu\text{g/l}$ ) (based on the latest Centers for Disease Control (CDC) total mercury blood data, 2009 to 2010). Thus, half of the women had measured levels above this concentration and half below. Also, 95 percent of the total mercury blood concentrations measured in this group were at or below 4.2  $\mu\text{g/l}$ . Total mercury blood levels were lower for children and males.

For most chemicals, there is no generally accepted blood concentration to use for regulatory purposes. However, the EPA used a risk-based mercury blood level of 5.8  $\mu\text{g/L}$  to derive its methylmercury non-cancer reference dose daily exposure level.<sup>1</sup> The EPA’s reference dose is the level that is used to set regulatory levels and support actions based on non-cancer effects). Therefore, the median concentration of mercury in the blood of women of child-bearing age is a factor of ten times lower than the methylmercury blood level used by the EPA to derive its regulatory risk-based reference dose level. Even the measured total mercury blood level in more than 95 percent of this population was less than the EPA’s risk-based concentration of 5.8  $\mu\text{g/L}$ . Interestingly, the CDC’s own fact sheet explaining the meaning of the mercury blood data that it collects compares the measured methylmercury blood levels to the 58  $\mu\text{g/L}$  benchmark dose level calculated by the National Academy of Sciences for the EPA,<sup>2</sup> not the 5.8  $\mu\text{g/L}$  utilized by the EPA, and highlights the fact that the highest measured individual blood level (33  $\mu\text{g/L}$ ) was below 58  $\mu\text{g/L}$ .

This good news on the level of exposure to methylmercury is probably due, in part, to the fact that the use of mercury in the United States has decreased by 95 percent from the 1970s to 2010, deposition from mercury air emission sources within the United States have also decreased significantly since the 1960s, and federal regulations have reduced or will reduce mercury emissions from various industrial sources by 75 percent to 85 percent by 2016 (from 1990 levels, with the higher reductions being achieved if the utility Cross-State Air Pollution and Mercury and Air Toxics Standards (MATS) coal-fired electric utility rules are upheld and implemented). Furthermore, the recently negotiated international mercury treaty is likely to further reduce mercury uses, with future emissions occurring primarily outside of the industrialized nations.

In summary, the measured level of mercury in the U.S. population demonstrates considerable success in lowering mercury below regulatory levels. The mercury blood levels will never be zero because of significant naturally occurring releases of mercury, background concentrations of mercury in food, and the likelihood of occasional exposures in excess of regulatory limits and/or uses that are allowed (for cultural reasons or because of net societal benefits). In the future, the critical regulatory question (including perhaps even in the court cases that are pending) remains whether the incremental benefit from further regulation is justified in light of the additional regulatory costs.

## Endnotes

1 This is the level of exposure to methylmercury “that is likely to be without an appreciable risk of deleterious effects,” based on noncancer effects.

2 For the details on the derivation of the EPA methylmercury reference dose see EPA IRIS. EPA, Methylmercury, Integrated Risk Information System, Reference Dose for Chronic Oral Exposure (available at <http://www.epa.gov/iris/subst/0073.htm>) (Methylmercury IRIS) (oral RfD replaced on July 31, 2001, last edited April 4, 5, 2011). The derivation of the benchmark dose level can be found in National Academy of Sciences, Toxicological Effects of Methylmercury at 8 (2000).

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