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## **Testimony before the Senate Environmental Resources and Energy Committee Mercury Effects on Human Health**

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Good Morning Chairwoman White, Chairman Musto and Members of the Senate Environmental Resources and Energy Committee. I am Calvin B. Johnson, Secretary of Health for Pennsylvania and a Pediatrician by profession. Thank you for inviting me to discuss the harmful effects that mercury emissions have on children. Please let me also take a moment to commend the Committee for recognizing this issue as a public health matter. The issue of mercury exposure to humans is not new to the Department, which has been actively engaged in discussions through representation on the Environmental Quality Board, participating in the Mercury Rule Work Group that was convened by Pennsylvania Department of Environmental Protection (DEP), participation in a contingency workgroup on fish advisories and partnering closely with DEP to address the public's concerns on mercury as a whole. I will keep my remarks brief and to the point by explaining what mercury is, how it harms the human body, particularly children and pregnant women, and touch on the issue of mercury in vaccines that you may have come across in your research and information gathering.

### **What is Mercury and How it is Ingested**

Without going into too much scientific detail, mercury is an element that is found throughout the earth, occurring in liquid (elemental) inorganic and organic forms. Mercury is a toxicant that can impact the neurological and developmental behaviors of humans, primarily affecting the brain, spinal cord, kidneys and liver. The organic forms of mercury are more easily absorbed when ingested and the human body has a more difficult time expelling organic mercury than the inorganic forms of mercury. Methylmercury, which, as I understand it, has been the topic of concern before this Committee, is the organic form of mercury that can accumulate in the aquatic food chain and is easily absorbed by humans through ingestion.

While methylmercury can enter the body through a number of food stocks other than fish, consumption of contaminated fish is the major source of human exposure to methylmercury in the United States. Methylmercury can accumulate up the food chain in aquatic systems and lead to high concentrations of methylmercury in fish which, when consumed by humans, can result in an increased risk of adverse health effects.

The more important issue in front of us, however, is the impact that mercury ingestion has on the body, particularly children and pregnant women. Recent data suggest that the umbilical-cord blood mercury concentration may, on average, be 70-percent higher than the maternal blood mercury concentration. The danger of mercury exposure arises from chronic exposure rather than acute exposure. Once methylmercury enters the blood stream, it rapidly moves to human tissue and readily enters the brain. Exposure to methylmercury is more dangerous to young children than to adults because of its ability to pass into a developing brain and interfere with and, in worst cases, harm the developmental process. In addition to children being a high risk group, pregnant women also are highly vulnerable to the adverse affects of mercury exposure. Methylmercury in the blood of a pregnant woman will easily move into the blood of the unborn child and then into the child's body tissues and brain. Methylmercury is also passed to the child through breast milk. After its conversion in the body to inorganic mercury, the body slowly excretes the mercury over a period of several months.

### **The Harmful Effects of Mercury**

A study by the National Academy of Sciences (NAS) concluded that human exposure to methylmercury from eating contaminated fish and seafood is associated with adverse neurological and developmental health effects. This further confirms that women of childbearing age and pregnant women represent sensitive populations. NAS found that chronic low dose prenatal methylmercury exposure has been associated with poor performance on neurobehavioral tests in children, measured by language ability, fine motor skills, and intelligence. Adults can be affected by high mercury exposures as well, with effects on the nervous system and impaired vision and hearing. Also, there are two published studies showing an association between low level methylmercury exposure and cardiovascular effects. One of these studies reported, based on an investigation of 1,000 seven year-old children in the Faroe Islands, mercury ingestion increased the diastolic and systolic blood pressures by 13.0 and 14.6 mm Hg, respectively, as the cord-blood mercury increased from 1 to 10 micrograms/liter. The other study showed that 1,833 Finnish men with hair mercury levels of 2 parts per million or higher had twice the risk of acute myocardial infarction than the rest of the study population.

The Environmental Protection Agency (EPA) recommended a safe intake level (referred to as the reference dose and defined as that dose that can be absorbed daily for a lifetime without a significant risk of adverse effects) of 0.1 µg methylmercury /kg body weight/day. The NAS has endorsed this level as being a scientifically appropriate level for the protection of public health.

A recent study by the Centers for Disease Control and Prevention found that approximately eight-percent of women of childbearing age in the U.S. had mercury levels exceeding the level considered safe by EPA for protecting the fetus. In the U.S., this translates to approximately 600,000 babies born each year at risk of developmental harm due to mercury exposure in the womb. The scientific and clinical information is quite clear in describing the negative health effects that mercury ingestion can have on the human body.

## **Mercury and Vaccines**

I would be remiss if I did not address the issue of mercury in vaccines. You and your colleagues may have heard reports about certain childhood vaccines containing mercury contents and whether or not adverse health affects have occurred as a result of receiving the vaccine. For the past 50 years, thimerosal, a preservative that contains a form of mercury called ethylmercury, was used in very small amounts as a preservative in certain vaccines to protect multi-dose vials from bacterial contamination. Some parents and researchers expressed concerns about a potential link between vaccines with thimerosal and health problems, particularly autism. Although no evidence documents harm caused by the small amounts of thimerosal in vaccines, vaccine manufacturers began the removal of the preservative from the majority of routinely recommended childhood vaccines in 1999, primarily because of the public's concern about the health effects of mercury exposure. Eliminating mercury from vaccines reduces an infant's total exposure to mercury in a world where other environmental sources of exposure are more difficult or impossible to eliminate, for example, the aforementioned fish and seafood. Today, with the exception of a majority supply of influenza vaccine, none of the routinely recommended childhood vaccines used in the U.S. to protect preschool children against 14 preventable diseases contain thimerosal as a preservative.

The newly formulated childhood vaccines now contain less than three-micrograms of mercury in all vaccines recommended during the first six months of life, which is the maximum total exposure. Based on guidelines established by the federal Food and Drug Association, the EPA and the Agency for Toxic Substances and Disease Registry, no child will receive excessive mercury from childhood vaccines regardless of whether or not they receive the influenza vaccine containing thimerosal as a preservative.

As you have heard over the past few weeks and in my testimony this morning, methylmercury exposure has the potential to create serious health conditions among humans. While those conditions can occur at different levels over a period of time, the impact on human health due to methylmercury exposure cannot be discounted as the debate on mercury emissions continues. I commend this Committee for acknowledging the importance of this and for taking such an in-depth look into this extremely complex and serious issue. Thank you for this opportunity to provide you with information on mercury and its negative health effects on humans. I would be happy to answer any questions the Committee might have at this time.