MERCURY AND DEVELOPMENTAL DISABILITIES IN MINNESOTA'S CHILDREN

A Briefing Paper from the
State Environmental Leadership Program
and The Institute for Agriculture & Trade Policy

OVERVIEW

The American public is warned on a regular basis that mercury is a major public health threat. Less recognized is the significant contribution to mercury pollution from power company smoke stacks. The danger posed by mercury is of greatest concern for pregnant women and the risk of developmental disabilities in their offspring. W**hat has not yet been discussed is that pregnant women and children in certain states – including Minnesota – may face an above-average risk of unsafe mercury levels and resulting childhood learning problems.** This briefing paper explores what is understood about mercury and the danger posed to Minnesota's children.

THE EXTENT OF THE MERCURY PROBLEM IN THE U.S.

The Center for Disease Control and Prevention (CDC) conducted a recent study that for the first time measured mercury levels in the blood of women of childbearing age across the country. The Environmental Protection Agency's (EPA) analysis of these data reveals that that about one in six –nearly 16 percent – of women of childbearing age have mercury levels above what is considered safe. This translates to an estimated 630,000 newborns at risk for developmental disabilities each year in the U.S. *Mahaffey, K, 2004. Presentation at National Forum on Fish Contaminants, January 2004.*

Mercury is a potent brain toxin. Even small amounts of mercury can affect fetuses and young children, whose brains are still developing. A mother's consumption of too much contaminated fish can contribute to learning or behavior problems in her children. The National Academy of Sciences National Research Council stressed the impact of in utero exposure to mercury. "The population at highest risk is the children of women who consumed large amounts of fish and seafood during pregnancy. The committee concludes that the risk to that population is likely to be sufficient to result in an increase in the number of children who have to struggle to keep up in school and who might require remedial classes or special education." *National Academy of Sciences. Toxicologic effects of methylmercury. Washington DC: National Research Council. 2000.*

About 17% of school age children in the U.S. -- or 12 million in number -- suffer from some type of learning or developmental disability. It is estimated that 5-10 % of public

school children have a learning disability and 3-6% have ADHD (attention deficit hyperactivity disorder). *Schettler, T et al, 2000, In Harm's Way: Toxic Threats to Child Development, Greater Boston Physicians for Social Responsibility.*

Personal and societal impacts of developmental disabilities are significant. Special education programs alone are costly. National data show that the average annual cost to educate a child in a special education program is double that of a student in the regular education program. ($12,274 versus $6,556 per year) *Special Education Expenditure Project, June 2004. What are we spending on special education services in the United States, 1999-2000? Center for Special Education Finance, available at http://csef.air.org/pub_seep_national.php#1*. These costs are increasing, due to increasing need for these services. Nationwide, the number of children in special education programs with learning disabilities increased 191% between 1977 and 1994. *Kavale KA & Forness RR, 1998. Co-variants in learning disability and behavior disorders: an examination of classification and placement issues. Advances in Learning and Behavioral Disabilities 12: 1-42.* Special education students comprise a growing percentage of students in public schools. For example, in Minneapolis Public Schools, the proportion of students in special education programs grew form 12.7% in 1997 to 14.7% in 2003. *Minneapolis Public Schools, Department of Special Education.*

Although specific data linking exact numbers of developmentally disabled children with mercury exposure are lacking, mounting evidence points to mercury as a significant contributor to these problems.

WHY THE CONCERN ABOUT MERCURY IN MINNESOTA?

While no research has been done to show the percentage of pregnant women with unsafe mercury levels in Minnesota, there are a number of reasons to be concerned that this national problem may pose an above-average risk in this state. Consider the following factors:

- ***Mercury from power plants and other sources is released into the atmosphere and settles into our lakes, rivers and streams, where it becomes part of the food chain.*** Forty-six percent of Minnesota's mercury emissions come from coal-fired power plants. About one gram (1/70th of a teaspoon) of mercury is deposited to a 20-acre lake each year from the atmosphere. This seemingly small amount is responsible for virtually all of the mercury contamination of fish in Minnesota. *Minnesota Pollution Control Agency.*

- ***All Minnesota lakes are subject to mercury pollution. This is not a theoretical problem for Minnesota.*** In August 2004, the U.S. Environmental Protection Agency (EPA) confirmed again that mercury pollution in Minnesota is a serious problem statewide. The Minnesota Department of Health has issued statewide fish consumption advisories due to mercury contamination, advising women of childbearing age and young children not to eat larger walleye and pike and to restrict consumption of other fish to prevent adverse effects on developing brains.

- ***People who fish – and family members and others who catch the fish they eat – are in a high-risk category when it comes to mercury.*** In its 1997 Mercury Study Report to Congress, the EPA stated that sport anglers, Native Americans, the urban poor and children are "subpopulations of particular concern because of (mercury) exposure patterns." The EPA report surveyed many studies and concluded, "Data on fish consumption for these groups indicate that exposures for these subgroups exceed those of the general population of adults." *U.S. Environmental Protection Agency. Mercury Study Report to Congress. December 1997.*

- ***Minnesota faces an above-average risk of mercury exposure since it has an above-average share of the population that fishes.*** US Fish & Wildlife surveys show that in certain states more people are engaged in recreational and subsistence fishing and therefore, are likely to eat more locally caught fish from mercury-contaminated waters. The FWS 2001 statistics show that 16 percent (16 years or older) of all people in the nation fish, compared to the higher level of 31.5 percent in Minnesota. *U.S. Department of Interior Fish and Wildlife Service and U.S. Department of Commerce, U.S. Census Bureau. 2001 National Survey of Fishing, Hunting and Wildlife-Associated Recreation.*

HEALTH WOES POSED TO MINNESOTA'S CHILDREN

It has been recognized for many decades that mercury is a potent neurotoxin, meaning that it affects the brain and nervous system, especially those of the fetus, infants and young children. The EPA, Centers for Disease Control and Prevention, National Academies of Sciences and World Health Organization all agree that mercury exposure can present an unacceptable public health risk to certain segments of the population. The primary source of mercury exposure is through eating fish. Developing fetuses are at greatest risk when their mothers eat fish while pregnant. However, the brain continues to develop in children up to approximately 15 years old, so children from birth through age 15 are advised to watch their fish consumption.

The most severe effects of mercury on the development of the brain in humans were documented in two catastrophic mercury poisoning episodes in Japan and Iraq. In these cases children exposed to mercury in utero suffered effects including mental retardation, cerebral palsy, deafness, blindness and dysarthra (a speech impediment). Although high exposures like these are unusual, lower exposures over time as through fish consumption can also affect one's health. Fetuses and young children are at greatest risk. Two large, long-term studies found that children exposed to mercury in utero, due to their mother's fish consumption, later displayed reduced attention spans, impaired language development, reduced fine motor function and reduced memory abilities. *National Academy of Sciences. Toxicologic effects of methylmercury. Washington DC: National Research Council. 2000.*

The March of Dimes reports that "At high ingested doses, (mercury) can disrupt organization of nerve cells in the brain before and after birth, leading to severe mental retardation, blindness, deafness, and chronic seizure disorders. Chronic, moderate to low-level methyl mercury exposure before birth is associated with developmental delays and decreases in attention, memory, intelligence, language ability and motor skills." *March of Dimes. March of Dimes Urges EPA to Cut Mercury Emissions. March of Dimes Website.*

DIETARY RECOMMENDATIONS FOR (STATE) WOMEN

Although everyone should reduce their intake of high mercury fish, women of childbearing age and children under age 15 are cautioned to pay particular attention to fish consumption. In general, smaller younger fish are safer. Predator fish like Walleye and Northern Pike have higher mercury levels.

For specific advice on fish consumption, go to www.iatp.org/foodandhealth or http://www.health.state.mn.us/divs/eh/fish/index.html