

It Matters Where You Live

States that are reporting the highest levels of mercury emissions also have the highest rates of developmental disorders including autism.

Dr. John Palmer

A two-year study of mercury accumulation in the town of Steubenville, Ohio, by federal EPA researcher Matt Landis and the University of Michigan disputes the basic EPA policy on mercury; showing emissions to be much more concentrated in local areas around power plants than thought before. The EPA contends only about 8% of the mercury from coal-burning plants, incinerators and boilers settles to the ground locally. The Steubenville study contends nearly 70% of the mercury found in the Steubenville area came from local sources.[i]

What this means is that it is dangerous to live anywhere near coal-burning plants, incinerators and boilers. If mercury spreads widely, as presumed by the model commonly used by the EPA, communities near coal-fired plants face no greater risk than those elsewhere. If large amounts of mercury from those plants settle within 60 to 120 miles of a plant, then local communities face much larger risks.

This is terrible news for many people for large populations in certain areas of the United States are exposed to multiple sources of mercury. Every year these plants spill out millions of tons of pollution into the air and this alone is provoking a health crisis. Different institutions have measured the impact of this pollution in terms of increased premature death, heart attacks and other negative health impacts. You can see exactly the increased risks to you and your family, depending on where you live, at the following site: <http://www.cleartheair.org/dirtypower/map.html> It allows you to zero in on your state and will show you all the points of exposure for air pollution in general.

The news offered by Dr. Palmer from the University of Texas and a Harvard Research team is that the mercury in the air is having its direct effect on our children, playing its part in the devastating epidemic of neurological disorders including autism. It is not just the fish, the vaccines or the dental amalgam that are saturating our bodies with mercury. Americans and people around the world are going to have to wake up to the fact that mercury is in the air they breathe, in the soil they plant in, and in the water they drink.

The world is facing massive poisoning, similar to that which India and Bangladesh are already facing with heavy concentrations of arsenic in their ground water. Yet people are skeptical because the poisoning is slow in coming on. Arsenic is not something you drink and you instantly fall ill, this is something that affects your body over years. It's the same with mercury poisoning and most of the principle chemicals that are now firmly implanted in our environment. One does not have to be bitten by a snake or spider and fall over dead immediately to consider one poisoned.

Recently researchers from the Northeastern Ecosystem Research Cooperative[ii] have, for the first time, documented elevated mercury levels in non-aquatic and non-fish-eating animals, including songbirds that live in mountaintop forests of the northeastern part of the United States. "Mercury's reach in our environment is much greater than we ever imagined," said Felice Stadler of the National Wildlife Federation. The most troubling discovery to researchers was the mercury found in the blood of songbirds. The songbird data show that methylmercury is also forming in drier, forested areas, raising new questions about the extent of environmental damage. The birds exhibited the following problems from non-aquatic environmental exposure to mercury:

Fewer eggs produced, lower reproductive success, offspring less responsive to maternal calls, reduced chick survival, and decreased egg volume, compromised embryonic development, less likely to hunt, seek shade, less time flying, walking or pecking. Exaggerated response to fright stimulus. Brain lesions, spinal cord degeneration, central nervous system dysfunction, tremors, difficulty flying,

walking and standing. Inability to coordinate muscle movement, reduced feeding, weight loss and progressive weakness in wings and legs.

It takes no stretch of the imagination to understand that what is happening to these songbirds is happening to our children. Mercury is getting into everything and even birds and land animals like us are being blanketed with this nerve poison. The same study found similar problems in Mink and Otters, showing us what is on the way for human beings and their offspring.

Mercury is not an ordinary air pollutant nor is it classified as such. Because it is a neurotoxin that causes neurological problems, it is considered a hazardous air pollutant, which gives it a different legal status. This is a very polite way of saying that mercury is a nerve poison, which even at the lowest concentrations imaginable causes problems for the young. We are only in the beginning phases of becoming aware of the tremendous problem with thousands of tons of mercury being poured into the air each year. If one gram of mercury can pollute a 20-acre lake or kill a child, imagine what 8 to ten billion grams of it would do.[iii]

A fraction of a teaspoon can render all the fish in a 20-acre lake unsafe to eat.

The United States government's estimate of the health benefits of reducing mercury emissions vastly understates the total problem because it does not take into account the direct effect of having thousands of tons of nerve poison in the atmosphere that people breathe.

The Harvard study that was stripped from public documents by EPA officials estimated health benefits from mercury reductions at 100 times the level used by the EPA.(iv) The government is not paying attention to the presence of mercury in the water people drink or that it is getting into the soil and thus into our dry foods. If one takes even a curious glance at the bottom of the above graph we see visually that mercury is a quickly rising tide having in a few short years polluting the majority of our waterways. What doctors and scientists have not seen is that this same process is being repeated on land.

Part of the airborne mercury deposited in the United States originates from abroad and this highlights the entire question about mercury. It's everywhere, coming from everywhere. Nothing demonstrates our current state of globalization better than the international nature of mercury air pollution. From 1990 to 1999, even as total airborne emissions of mercury in the United States supposedly dropped, worldwide emissions have soared into the stratosphere.

Ice core studies have shown that we have already increased environmental mercury levels by a factor of 20 over the last 270 years.[v]

Mercury is making its presence felt more in the soil and is entering the food chain via our crops. Recent evidence suggests that mercury is responsible for a reduction of micro-biological activity vital to the terrestrial food chain in soils over large parts of Europe " and potentially in many other places in the world with similar soil characteristics. Critical limits to prevent ecological damage due to mercury in organic soils have been set at 0.07-0.3 mg/kg for the total mercury content in soil.[vi] The Swedish Chemicals Inspectorate is reporting that the mercury levels are increasing by about 0.5% per annum in the topmost layer of its forest soils and southern Sweden is already above the levels which have been shown to affect biological process and organisms in the soil. [vii]

University of Nevada researchers in December of 2004 let be known that we have a similar unlooked for problem on land. "Based on previous studies, what we originally thought was that mercury in soil would be absorbed through a tree's roots, then released through the tree's leaves into the air," Esaid Jody Ericksen, a Nevada graduate student who studied the contaminant for her master's degree in Environmental Science and Health. "We were wrong. What happened is that the plants absorbed the mercury from the air." According to Nevada researchers, once a tree's leaves contain mercury, those leaves eventually fall off, decay and mercury goes back into the soil, air and, ultimately, water.[viii] This has huge implications, darkening the mercury story considerably. As we learn more we see the huge error human-

ity has made. Understanding is dawning that mercury is not going away. It is just being recycled and fortified as it goes organic. Even the mercury we all excrete everyday from our bodies is going into the environment.

According to the National Institute of Environmental Health Sciences between the late 1970s and late 1980s, the average level of mercury in biosolids (inevitable by-product of the sewage treatment plants) that are used as fertilizers for farm lands increased from 2.8 mg/kg to 5.2 mg/kg, and arsenic levels from 6.7 mg/kg to 9.9 mg/kg while levels of lead, nickel, cadmium decreased.[ix] And as early as 1999 reports found mercury levels in rain over Chicago Illinois that are as high as 42 times EPA safe levels; Detroit, Michigan rain with 65 times safe levels; and rain along the Illinois/Wisconsin border as high as 56 times safe levels.[x]

Of our nearly 1,900 lakes and rivers officially classified as “impaired” under standards set by the U.S. Environmental Protection Agency, mercury is responsible in two cases out of three.

State of Minnesota[xi]

Power plants in the US put 48 tons of mercury a year into the atmosphere through burning coal.[xii] China spews 600 tons of mercury into the air each year, accounting for a great part of the world’s non-natural emissions. And the volume is rising quickly with more coal fired energy plants now under construction in China than exists in the entire country of England. China all by itself is bringing on a mercury crisis. By 2020, China will have nearly 1,000 gigawatts of total electricity-generating capacity, more than twice the current amount, according to the State Power Economic Research Center.

China uses more coal than the United States, the European Union and Japan combined. And it has increased coal consumption 14 percent in each of the past two years in the broadest industrialization ever. Every week to 10 days, another coal-fired power plant opens somewhere in China that is big enough to serve all the households in Dallas or San Diego. To make matters worse, India is right behind China in stepping up its construction of coal-fired power plants

China will this year burn about 1.9 billion tons of coal, a 12% increase from last year, and consumption is expected to keep rising. In fifteen years we can expect China to be pumping 1,400 tons of mercury into the air or approximately 60 additional tons a year as new capacity comes online.[xiii] This is a huge number and will join the already enormous amount of mercury bellowing up from China’s more than 2,000 coal-fired power plants. This mercury soars high into the atmosphere and then around the globe on what has become a transcontinental conveyor belt of mercury polluted air. And as we can see from the chart below China has over the last fifteen years has tripled its power making capacity thus its mercury polluting capacity.

In the U.S. hospitals that burn their wastes put 20 tons a year into the air and potentially upwards of 200 tons are lost into the environment because that is how much Hg is ordered into hospitals to repair sphygmomanometers.[xiv] Every plastic manufacture pours it out and every new car is laden with its fumes. Much attention though is being focused on the nation’s heavy reliance on coal.

Emissions from electric utility plants represent the single largest unregulated industrial source of mercury emissions in the US, according to the EPA. Some 500 power plants pump out 60 percent of the 75 tons of mercury released into the air by all industries in 2001, according to the EPA’s Toxic Release Inventory.

A medical waste incinerator near Baltimore’s industrial waterfront has violated limits for mercury, soot and other air pollutants more than 400 times over the past two years, prompting three state legislators and a city councilman to demand that the state shut it down.

Baltimore Sun 12/2004

According to the U.S. Environmental Protection Agency, medical waste incinerators are the fourth-largest source of mercury re-entering the environment. In addition, the EPA estimates that mercury fever thermometers contribute about 17 tons of mercury disposed of in solid waste landfills annually.

Actually there is no real way to estimate how many tons are actually being put into the environment and how much really has entered the environment in the last fifteen years. Between 1990 and 2000, energy-related carbon dioxide emissions grew by 69 percent in India, 57 percent in Brazil and 33 percent in China indicating a pace of development that includes increased mercury emissions. "If India, China and Brazil replicate our pattern of fossil-intensive development, the game is over," Esaid Alden Meyer, director of the U.S.-based Union of Concerned Scientists. Scientists seem more concerned with the warming effect of all this growth and not as concerned with the poisoning effect. India is estimated to be now dumping 77.91 tonnes of mercury per year into the atmosphere, 59 tons of which are from its coal fired plants. India's coal carries concentrations of mercury in the area of about 0.272 ppm, which is considerably higher than American grade coal. When other industrial uses are factored in, like the production of chlorine, India raises high in the rankings of mercury polluters.

Mercury has spread out into the atmosphere and into the oceans where it gains strength and toxicity through the process of methylation. Radioactivity tends, with the passing of many years, to lower in toxicity but mercury runs up the hill to more toxic levels with the help of fish, mammals and bacteria. Mercury bio-accumulates and under goes bio-magnification. The term bioaccumulation refers to the net accumulation over time of metals within an organism from both biotic (other organisms) and abiotic (soil, air, and water) sources. The term bio-magnification refers to the progressive build up of some heavy metals (and some other persistent substances) by successive trophic levels " meaning that it relates to the concentration ratio in a tissue of a predator organism as compared to that in its prey.

According to biologist Dr. Sandra Steingraber, "top predatory fish, like a tuna, can easily have sequestered in its flesh methylmercury levels that are a million times higher than the water it swam in." The huge tonnage of mercury put into the environment each day is adding to an already critical situation. Considering that mercury is an accumulative poison with delayed effects or a lag time measured in years, we can see that humanity has created a time bomb that is ticking while even more mercury is added. Tomorrow we will all wake up to a world with about twenty tons more mercury in the environment. In a world rapidly approaching some saturation point with mercury these twenty tons are significant. The longer medical and governmental authorities deny the full mercury story the higher the tide will rise as concentrations increase on land, sea and air.

Mercury is a basic fact; it's a reality that has to be taken into account by doctors. Though mercury is accompanied by tens of thousands of other chemicals in the environment none are as toxic or as prevalent. Human destiny is on a collision course with mercury. It is already poisoned huge numbers of people who are suffering from its chronic effects.

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[i] <http://msnbc.msn.com/id/13140004/>

[ii] Mercury Connections is a summary of the major findings reported in a series of 21 papers. These papers are published in: Biogeographical patterns of environmental mercury in northeastern North America. 2005. Ecotoxicology. Volume 14, numbers 1 and 2. This project was undertaken as part of The Northeastern Ecosystem Research Cooperative (NERC). NERC is an initiative to promote collaboration among ecosystem research scientists in the northeastern U.S and eastern Canada. <http://www.briloon.org/mercury/BRIMercury.pdf>

[iii] The world is 510 million square kilometers and 71 percent of that is ocean. One gram of mercury poured into eighty million liters of water would be cause for concern under federal human health standards for drinking water, enough to contaminate a typical mid-western lake. Thus one gram pollutes a typical 20 acre lake and 20 acres equals .081 square kilometers. One ton of mercury contains 1 million grams which would thus pollute 81,000 square kilometers of lakes. One thousand tons would pollute 81 million square kilometers, so 7,000 tons of mercury would pollute a lake the size of the world.

The world is not a lake, so the one gram rule does not quite work, but it offers us a good reference point. The oceans are quite deep and the atmosphere also holds a vast capacity to hold mercury, as does the soil. But over the last five hundred years we have dug up and used approximately 1 million tons of mercury. That is 1,000,000,000,000 grams (a trillion) or enough to blanket each 20 acres on earth with over 149 grams. It is these 149 grams that is responsible for mercury levels increasing by a factor of 20 times over the last 3 centuries.

[iv] Retrograde on Mercury. Boston Globe. April 1, 2005

http://www.boston.com/news/globe/editorial_opinion/editorials/articles/2005/04/01/retrograde_on_mercury/

[v] Science News, May 1, 2002 Ice cores open new window on mercury deposition.

[vi] UNEP. Position Paper on Mercury

[vii] Kemi Report. Mercury "Investigation of a general ban. Report by the Swedish Chemicals Inspectorate. 3.1

[viii]

<http://www.innovations-report.de/html/berichte/studien/bericht-38075.html>

[ix] National Institute of Environmental Health Sciences.

EHP Online. <http://ehp.niehs.nih.gov/qa/105-1focus/focusbeauty.html>

Last visited on December 5, 2004

[x] Clean the Rain, Clean the Lakes: Mercury in Rain Is

Polluting The Great Lakes. Reported by Environmental News Service.

<http://www.uwsp.edu/geo/courses/geog100/ENS-Mercury.htm>

[xi] Star Tribune. December 31, 2004

<http://www.startribune.com/stories/561/5161906.html>

[xii] DEP Commissioner Bradley Campbell statement about national emission levels. Associated Press. Fri, Nov. 05, 2004

[xiii] Wall Street Journal. Invisible Export A Hidden Cost Of China's Growth: Mercury Migration

December 17, 2004

[xiv] Colquitt, Phillip J. Labelling all sphygmomanometers. Using the reported 9 Kg/year of Hg ordered in

to repair sphygmomanometers in one large Australian hospital without evidence of Hg spill retrieval[16], together with the estimated 24,000 hospitals in the USA reported in Goldberg et al[11], potentially upwards of 200 tons of Hg are being ordered into hospitals to repair sphygmomanometers in USA each year. If used hospital Hg is unaccounted for, as is reported to be the case in Quebec hospitals [17], then the unaccounted for Hg may be assumed to have polluted the immediate hospital environment, thence to pollute the greater environment.

<http://www.cmaj.ca/cgi/eletters/168/1/78#221>

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