

Biomonitoring Study Chemicals

This table describes the chemicals that will be measured in the biomonitoring study of a tribal community living in the Lake Superior Basin. The majority of information about health effects in this table comes from laboratory animal studies and/or studies of workers exposed to high levels of the chemicals. Most people are exposed to very low levels of these chemicals in the environment. **The potential for health effects at these low levels of exposure is not well understood by scientists.**

Environmental Chemical	What is it? How am I exposed? How can it affect my health?
Cadmium	<p>A metal and a natural part of the earth. Cadmium enters soil, water, and air from mining, industry, and burning coal and household wastes. Fish, plants, and animals take up cadmium from the environment. Eating foods with high levels of cadmium (shellfish, liver, and kidney meats) and smoking cigarettes are the primary sources of exposure to cadmium. Cadmium is known to damage the lungs and bones, and causes cancer in humans.</p> <p>http://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=15 http://www.afn.ca/uploads/files/env/ns_-_toxic_metals_-_cadmium.pdf</p>
Mercury	<p>A metal that is found in many rocks including coal. When coal is burned, mercury is released into the air. Coal-burning power plants are the largest human-caused source of mercury emissions in the U.S. Mining is also a source of mercury in the Lake Superior Basin. Mercury in air eventually settles into water or onto land. Methylmercury can be formed in water and build up in fish. Larger and older fish tend to have the highest levels of mercury. It can harm an unborn child's developing brain at levels that would not affect an adult. In adults, higher levels can harm the brain, heart, kidneys, lungs, and immune system.</p> <p>http://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=24 http://www.niehs.nih.gov/news/newsletter/2012/8/spotlight-dartmouth/index.htm http://www.afn.ca/uploads/files/env/ns_-_toxic_metals_-_mercury.pdf</p>
Lead	<p>A metal that occurs naturally in the earth. It is still used to make many products. There are many ways people can be exposed to lead. Lead may be found in drinking water, chipped/peeling paint in and around older homes, in game meat shot with lead rounds, at certain job sites (such as construction or steel welding), and in cigarette smoke. Babies and young children are most sensitive to the effects of lead. It can harm a child's developing brain at levels that would not affect an adult. In adults, lead can increase blood pressure, decrease kidney and brain function, and cause reproductive problems.</p> <p>http://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=22 http://www.hc-sc.gc.ca/hl-vs/alt_formats/pdf/iyh-vsv/environ/lead-plomb-eng.pdf http://www.afn.ca/uploads/files/env/ns_-_toxic_metals_-_lead.pdf</p>
Mirex	<p>A man-made chemical (banned in 1978) that was used as a pesticide and flame retardant. Mirex breaks down slowly in the environment and stays for years in soil or in sediments on the bottom of lakes and rivers. It can build up in fish or other animals. Exposure occurs by eating contaminated fish or animals. Mirex damages the stomach, liver, kidneys, thyroid, and the nervous and reproductive systems. Mirex may cause cancer in humans.</p> <p>http://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=118 http://www.epa.gov/pbt/pubs/mirex.htm</p>

Environmental Chemical	What is it? How am I exposed? How can it affect my health?
Hexachlorobenzene (HCB)	<p>A man-made chemical (banned in 1965) that was used as a pesticide and to make fireworks, ammunition, and synthetic rubber. HCB still enters the environment today as an inadvertent by-product in the production of certain products and pesticides. HCB remains in the environment for a long time, mainly in soil and particles on the bottom of lakes and rivers. High levels can build up in fish, marine mammals, and animals that eat fish. Exposure is mainly from eating low levels in food, primarily meat, dairy, poultry, and fish. Exposure to HCB damages bones, kidneys, and blood cells, harms the immune, endocrine, and nervous systems, and may cause cancer.</p> <p>http://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=626&tid=115 http://www.atsdr.cdc.gov/phs/phs.asp?id=625&tid=115</p>
DDT and DDE	<p>A pesticide (banned in 1972) that is still used in some countries. Until it was banned, DDT was used widely in the U.S. to control insects in agriculture and insects that carry disease such as malaria. DDT breaks down to DDE in the environment and in the human body; both remain in the environment for a long time. Levels of DDT and DDE build up in fish, birds, and other animals. Exposure occurs primarily through eating contaminated foods. DDT affects the nervous and endocrine systems. DDT and DDE may cause cancer in humans.</p> <p>http://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=20</p>
Toxaphene	<p>A pesticide (banned in 1990) that was used primarily in the southern states to control insect pests on cotton. Toxaphene stays in the environment for a long time and accumulates in fish and animals. Exposure is mainly from eating fish. Toxaphene may damage the kidneys, liver, lungs, and adrenal gland, the immune and nervous systems, and may cause cancer in humans.</p> <p>http://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=99 http://www.epa.gov/pbt/pubs/toxaphene.htm</p>
Polychlorinated biphenyls (PCBs)	<p>A group of industrial chemicals (banned in 1977) used in plasticizers, adhesives, and as an insulator in electrical equipment. PCBs are persistent in the environment and build up in fish. PCBs accumulate in animals and humans. Exposure is mainly through food, particularly fish. Exposure to PCBs may damage the liver, kidney, and thyroid, and increases the risk for cancer.</p> <p>http://www.atsdr.cdc.gov/dt/pcb007.html http://www.afn.ca/uploads/files/env/examplesbiomonitoring.pdf</p>
1-Hydroxypyrene (PAHs)	<p>One in a group of chemicals called polycyclic aromatic hydrocarbons (PAHs). Sources include wood and garbage burning; gasoline fuel exhaust; coal tar and asphalt; and cigarette smoke. Exposure may occur from smoking cigarettes, breathing indoor and outdoor air, and eating char-broiled meat. PAHs are also contaminants of concern at nearby Superfund sites. PAHs damage the immune system and may cause developmental and reproductive effects. It may cause cancer in humans.</p> <p>http://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=25</p>
Bisphenol A (BPA)	<p>A chemical found in plastics, food and beverage can linings, and dental sealants. Most exposure is thought to be from the leaching of BPA into food or drinking water from cans and bottles. BPA may damage the endocrine system.</p> <p>http://www.chemicalsubstanceschimiques.gc.ca/fact-fait/bisphenol-a-eng.php</p>

Environmental Chemical	What is it? How am I exposed? How can it affect my health?
Perfluorinated compounds (PFCs)	<p>A group of chemicals used in products to resist heat, stains, or moisture. Many chemicals in this group do not break down in the environment and build up in wildlife and people. Exposure occurs through food, drinking water, and contact with consumer products. In animal tests, PFCs may damage the liver and thyroid and cause reproductive and developmental effects. In humans, PFCs may increase the risk of pregnancy-induced hypertension, ulcerative colitis, and thyroid disease. PFCs may cause cancer in humans.</p> <p>http://www.afn.ca/uploads/files/env/examplesbiomonitoring.pdf http://www.c8sciencepanel.org/index.html</p>
Triclosan	<p>An antibacterial chemical used in consumer products such as soaps, deodorants, lotions, creams, toothpastes, and dishwashing liquids. Triclosan can also be added to many materials, such as plastics or textiles, to make them resistant to bacterial growth. Exposure is mainly from use of consumer products. Triclosan may harm the endocrine system.</p> <p>http://www.chemicalsubstanceschimiques.gc.ca/fact-fait/glance-bref/triclosan-eng.php</p>
Cotinine	<p>A chemical formed in the body after exposure to nicotine. People are exposed to nicotine from smoking or chewing tobacco, or through breathing second hand smoke. Cotinine levels will be used to determine if PAHs, cadmium, and other chemicals in the body are from tobacco products or other environmental sources. Use of commercial tobacco increases the risk for lung cancer and heart disease. In children, exposure to environmental tobacco smoke increases the risk for sudden infant death syndrome, asthma, bronchitis, and pneumonia.</p> <p>http://www.cdc.gov/biomonitoring/cotinine_factsheet.html</p>
Used by Doctors to Check Your Health or Diet	
Selenium	<p>A mineral that is released to the environment by both natural and industrial processes. A small amount of selenium is needed for good health. The main source of exposure for most people is food. Fish can be high in selenium.</p> <p>http://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=152&tid=28</p>
Polyunsaturated (heart healthy) fatty acids	<p>Beneficial chemicals in fish and plant/nut oils. Two fatty acids in this group, EPA and DHA, are primarily found in fish. EPA and DHA are essential for brain function and normal growth and development. They are also important for cardiovascular health. These chemicals provide information about the health benefits of eating fish.</p> <p>http://www.cdc.gov/nutritionreport/pdf/second%20nutrition%20report%20fatty%20Acids%20factsheet.pdf#zoom=100</p>
Creatinine	<p>A natural by-product in the body. Used to standardize the levels of chemicals in urine across study participants.</p> <p>http://www.cdc.gov/nchs/tutorials/environmental/critical_issues/adjustments/</p>
Hemoglobin A1C	<p>A measure of how much sugar is in a person's blood. People who have diabetes or other conditions that increase blood sugar levels have more hemoglobin than normal. This test is being offered as a health benefit to study participants.</p> <p>http://www.cdc.gov/diabetes/pubs/tcyd/appendix.htm#bloodglucose</p>

Environmental Chemical	What is it? How am I exposed? How can it affect my health?
Total cholesterol	A measure of both good and bad forms of a waxy material in the blood. High cholesterol can lead to heart disease. This test is being offered as a health benefit to study participants. http://www.cdc.gov/cholesterol/docs/consumered_cholesterol.pdf

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