

Dioxin: A Fact Sheet

by Center for Health, Environment & Justice (CHEJ)

What is dioxin?

Dioxin is the name given to a group of persistent, very toxic chemicals. The most toxic form of dioxin is 2,3,7,8-tetrachlorodibenzo-p-dioxin or TCDD. TCDD is more commonly recognized as the toxic contaminant found in Agent Orange and at Love Canal, New York and Times Beach, Missouri.

Where does it come from?

Dioxin is not deliberately manufactured. Rather, it is the unintended by-product of industrial processes that use or burn chlorine. The burning chemical at the Koppers wood treatment facility that created dioxins in the 1987 fire was pentachlorophenol (PCP).

Garbage incinerators and medical waste incinerators are two of the largest sources of dioxin identified by the U.S. Environmental Protection Agency. Dioxin released from these and other sources has been found to travel long distances in the atmosphere. Some of the highest levels of dioxin in people have been found in the Arctic, even though there are no sources within hundreds of miles.

How can I be exposed?

According to the EPA, over 96 percent of human exposure occurs through the diet, primarily foods derived from animals. Dioxin in air settles onto soil, water, and plant surfaces. It does not readily break down in the environment and over time accumulates in the grazing animals that eat these plants. People then ingest the dioxin contained in meat, dairy products and eggs. Some exposure also results from eating dioxin-contaminated fish. Dioxin exposure of the general population is a problem of emissions from many sources that all add up.

What are the health effects?

Dioxin causes a variety of damage in both animals and humans. Dioxin is a potent cancer-causing agent and is considered to be a “human carcinogen” by the World Health Organization’s International Agency for Research on Cancers and the U.S. Department of Health and Human Services’ National Toxicology Program.

Dioxin also causes a wide range of non-cancer effects including reproductive, developmental, immunological, and endocrine effects in both animals and humans. Animal studies show that dioxin exposure is associated with endometriosis, decreased fertility, inability to carry pregnancies to term, lowered testosterone levels, decreased sperm counts, birth defects, and learning disabilities. In children, dioxin exposure has been associated with IQ deficits, delays in psychomotor and neurodevelopment, and altered behavior including hyperactivity. Studies in workers have found lowered testosterone levels, decreased testis size, and birth defects in offspring of Vietnam veterans exposed to Agent Orange.

Effects on the immune system of the developing organism appear to be among the most sensitive endpoints studied. Animal studies show that dioxin decreased immune response, and increased susceptibility to infectious disease. In human studies, dioxin was associated with immune system depression and alterations in immune status leading to increased infections. Dioxin can also disrupt the normal function of hormones—chemical messengers that the body uses for growth and regulation. Dioxin interferes with thyroid levels in infants and adults, alters glucose tolerance, and has been linked to diabetes.