

# Chlorinated Dibenzo-*p*-Dioxins (CDDs) - ToxFAQs™

## What are CDDs?

CDDs are a family of 75 chemically related compounds commonly known as dioxins. One of these compounds is called 2,3,7,8-tetrachlorodibenzo-*p*-dioxin, also known as 2,3,7,8-TCDD. It is one of the most toxic of the CDDs and is the one most studied. In the pure form, CDDs are crystals or colorless solids.



CDDs are not intentionally manufactured by industry except for research purposes. They (mainly 2,3,7,8-TCDD) may be formed during the chlorine bleaching process at pulp and paper mills. CDDs are also formed during chlorination by waste and drinking water treatment plants. They can occur as contaminants in the manufacture of certain organic chemicals. CDDs are released into the air in emissions from municipal solid waste and industrial incinerators.

## What happens to CDDs in the environment?

- When released into the air, some CDDs may be transported long distances, even around the globe.
- When released in wastewaters, some CDDs are broken down by sunlight and some evaporate to air, but most attach to soil and settle to the bottom sediment in water.
- CDD concentrations may build up in the food chain, resulting in measurable levels in animals.

**CDDs enter the environment as mixtures containing a number of individual components.**

## How can I be exposed to CDDs?

- Eating contaminated food, primarily meat, dairy products, and fish, makes up more than 90% of the intake of CDDs for the general population.
- Breathing contaminated air or drinking contaminated water may also result in exposure to low levels of CDDs.
- You may also be exposed to low levels of CDDs in consumer products.
- People living near an uncontrolled hazardous waste site containing CDDs or incinerators releasing CDDs may be exposed to CDDs.
- Working in industries involved in producing certain pesticides containing CDDs as impurities, working at paper and pulp mills, or operating incinerators.

## How can CDDs affect my health?

The most noted health effect in people exposed to large amounts of 2,3,7,8-TCDD is chloracne. Chloracne is a severe skin disease with acne-like lesions that occur mainly on the face and upper body. Other skin effects noted in people exposed to high doses of 2,3,7,8-TCDD include skin rashes, discoloration, and excessive body hair. A number of other effects have been found in studies of people exposed to CDDs; however, the findings are not consistent. Some of these other effects include damage to the immune system, alterations in fertility, and adverse effects on the developing fetus.

In certain animal species, 2,3,7,8-TCDD is especially harmful and can cause death after a single exposure. Exposure to lower levels can cause a variety of effects in animals, such as a weakened immune system,

# Chlorinated Dibenzo-*p*-Dioxins (CDDs)

a decrease in the system's ability to fight bacteria and viruses, liver damage, and disruption of the reproductive system. Some animal species exposed to CDDs during pregnancy had miscarriages and the offspring of animals exposed to 2,3,7,8-TCDD during pregnancy often had birth defects including skeletal deformities, kidney defects, neurological effects, reproductive effects, and weakened immune responses.

## Can CDDs cause cancer?

Increases in cancer risks have been observed in some workers. Several types of cancer, including liver, thyroid, and lung cancer, have been observed in animals exposed to 2,3,7,8-TCDD. Liver cancer has also been observed in animals exposed to hexachlorodibenzo-*p*-dioxins (HxCDDs) and 2,7-dichlorodibenzo-*p*-dioxins (2,7-DCDD).

The [U.S. Department of Health and Human Services \(DHHS\)](#) considers 2,3,7,8-TCDD as a known human carcinogen.

The [U.S. Environmental Protection Agency \(EPA\)](#) has classified a mixture of 1,2,3,6,7,8-HxCDD and 1,2,3,7,8,9-HxCDD as a probable human carcinogen.

The [International Agency for Research on Cancer \(IARC\)](#) has classified 2,3,7,8-TCDD as carcinogenic to humans. IARC also concluded that other CDDs are not classifiable as to their carcinogenicity in humans.

## Can I get a medical test to check for CDDs?

Tests are available to measure CDD levels in body fat, blood, and breast milk, but these tests are not routinely available. Most people have low levels of CDDs in their body fat and blood, and levels considerably above these levels indicate past exposure to above-normal levels of 2,3,7,8-TCDD. Although CDDs stay in body fat for a long time, tests cannot be used to determine when exposure occurred.

## How can I protect myself and my family from CDDs?

- Children should avoid playing in soils near uncontrolled hazardous waste sites.
- Discourage children from eating dirt or putting toys or other objects in their mouths.
- Everyone should wash hands frequently if playing or working near uncontrolled hazardous waste sites.
- For new mothers and young children, restrict eating foods from the proximity of uncontrolled sites with known CDDs.
- Children and adults should eat a balanced diet, preferably containing low to moderate amounts of animal fats including meat, dairy products, and fish that contain lower amounts of CDDs and eat larger amounts of fruits, vegetables, and grains.

## For more information:

Call **CDC-INFO** at 1-800-232-4636, or submit your question online at <https://wwwn.cdc.gov/dcs/ContactUs/Form>

Go to ATSDR's Toxicological Profile for Chlorinated Dibenzo-*p*-Dioxins (CDDs): <https://wwwn.cdc.gov/TSP/substances/ToxSubstance.aspx?toxid=63>

Go to ATSDR's Toxic Substances Portal: <https://wwwn.cdc.gov/TSP/index.aspx>

Find & contact your ATSDR Regional Representative at [http://www.atsdr.cdc.gov/DRO/dro\\_org.html](http://www.atsdr.cdc.gov/DRO/dro_org.html)

