

## Dioxin Exposure and Health Outcomes

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The term 'dioxin' refers to a group of environmentally persistent chemicals that share similar chemical structures and toxicity mechanisms. There have been many studies about dioxin but much about its toxicity to humans is unknown. The most well-studied is TCDD. It has been classified as a human carcinogen since 1997. Animal studies show cancer, immune, reproductive, and developmental effects but the evidence of non-cancer effects in humans is limited. Animal studies have been used internationally to establish health-based guidelines for human exposure to dioxins in soil, air and food.

At high doses, dioxin may cause a severe acne-like skin condition known as chloracne and cancer. In animals, dioxin is a promoter and weak initiator of carcinogenesis. This means carcinogenesis following dioxin exposure may depend on exposure to other carcinogens. Most data suggest that dioxin is not genotoxic; there is some evidence it may have an indirect genotoxic effect.

The Institute of Medicine of the National Academy of Sciences in the United States of America biennially reviews all the published toxicological and epidemiological evidence on exposure to herbicides used in Vietnam such as 2,4,5-T and any of their components or contaminants such as dioxin. From this review, it publishes a list of conditions that it accepts as being associated with exposure to dioxin. The conditions are categorised according to the strength of evidence. It does not determine causation between exposure and the health conditions.

The Institute of Medicine accepts the following conditions as having sufficient evidence of an association with dioxin exposure: Hodgkin's disease, non-Hodgkin lymphoma, soft tissue sarcoma, chronic lymphocytic leukaemia, and

chloracne. Conditions in this category have a demonstrated positive association with exposure. Entry into this category is based on evidence from studies where chance, bias, and confounding can be ruled out with reasonable confidence.

There is limited or suggestive evidence that exposure is associated with respiratory cancers (lung, bronchus, larynx and trachea), prostate cancer, multiple myeloma, early onset transient peripheral neuropathy, porphyria cutanea tarda, Type II diabetes, hypertension, AL amyloidosis, and spina bifida in off-spring. These conditions have some evidence to suggest an association between exposure and the health condition but this association may also be explained by chance, bias, and/or confounding.

### Is there a medical test for dioxin exposure?

In the blood, dioxins bind to lipids and lipoproteins. Serum TCDD levels are highly correlated with adipose tissue TCDD levels. Serum dioxin testing involves taking about 90 millilitres of whole blood. The serum must be extracted from whole blood within 30 minutes of it being taken before being sent to a technical testing laboratory. Test results are expressed on a lipid weight basis.

Serum dioxin testing is not usually recommended. Results can tell a person what the level of dioxin in their blood is today but it is an unreliable way to measure their past exposure to dioxin. Dioxin has a generally accepted average half-life of between 7 and 11 years; however half-life varies depending on age at exposure, gender, amount of body fat, breastfeeding, and dose. Any dioxin present will naturally decrease over time although at varying rates.

Also, serum dioxin testing:

- cannot give a likely cause or prognosis for a current health condition
- cannot reliably help to estimate a person's current health risks
- could mislead a person about their past exposure to dioxin
- could mislead a person about their current health risks.

Serum dioxin tests are not routinely done. They have previously been used most frequently as part of research studies. Because of the highly specialised nature of the serum dioxin test and the small number of service providers, serum dioxins tests are very expensive.

### **Are there any treatments for dioxin exposure?**

There is no generally accepted treatment to get rid of dioxins now in people. Everyone has some dioxins in their body although levels in the general population are decreasing. Previous studies of the New Zealand population show that dioxin levels have dropped by as much as 70 percent in the ten years from the late 1980s. It is estimated that 90 percent of New Zealanders' exposure comes from the food chain. Reduction in the amount of animal fat in the diet reduces dioxin exposure but it is not recommended that all fat be eliminated from the diet because a moderate amount is part of a healthy balanced diet. Not smoking and not burning rubbish, particularly plastics or driftwood, all help to reduce individual exposures. As emissions to the environment decline New Zealanders' exposure will continue to be reduced.

### **What if I have a patient who is concerned about dioxin exposure?**

Individuals who think that they have been exposed to dioxin from the manufacture of the herbicide 2,4,5-T at the former Ivon Watkins Dow factory in Paritutu, New Plymouth, will be able to apply for the Health Support Service for Dioxin Exposed People. You can refer your patient to the following number for more information: 0800 288 588.

### **Where can I get more information?**

You can get more information about dioxin exposure, its health effects, and the Health Support Service for Dioxin Exposed People from the Ministry of Health. Our contact details are:

Ministry of Health  
PO Box 5013  
Wellington

Email: [emailmoh@moh.govt.nz](mailto:emailmoh@moh.govt.nz)

Telephone: 0800 288 588

Website: [www.moh.govt.nz](http://www.moh.govt.nz)

Specific technical questions can be directed to 0800 288 588. These questions will be forwarded on to an appropriate expert for response. We expect to return a response to you with 5 working days.