Characterizing the potential health risks from dioxin exposures has challenged toxicologists and epidemiologists for decades. Some of the very early work on the potential health effects from dioxins was done by The Dow Chemical Company (Dow), where, for instance, the first long term animal bioassay and first cohort mortality study on trichlorophenol workers exposed to 2,3,7,8-TCDD were conducted. Since these early studies, Dow has continued to play an active role in furthering the science of assessing health risks from dioxins.

Over the past 30 years, Dow epidemiologists have updated the original cohort mortality study four times and have improved exposure assessment through the use of serum dioxin measurements on a sample of exposed workers. Dow scientists have also examined other health effects in these workers, including male-mediated reproductive outcomes, blood chemistries, morbidity, self-reported symptoms, and chloracne. Other than chloracne and possibly soft tissue sarcoma, no health effect have been found to be related to 2,3,7,8-TCDD.

Recently, a university group working with Dow scientists completed a study of former trichlorophenol workers at a Dow site in New Zealand. This investigation also employed a serum dioxin analysis to estimate past exposures to 2,3,7,8-TCDD, and concluded that there was no increased risk of any cause of death related to dioxin exposures. Using the same serum analysis methods, Dow scientists also studied effects of higher chlorinated dioxins, such as 1,2,3,4,7,8-HxCDD, 1,2,3,6,7,8-HxCDD, 1,2,3,7,8,9-HxCDD, 1,2,3,4,6,7,8-HpCDD, and OCDD, which are found in pentachlorophenol manufacture. These investigations likewise failed to find a correlation between worker mortality rates for any cause of death and workplace dioxin exposures. On the other hand, they did detect an increased risk of non-Hodgkin lymphoma in exposed workers that was not related to dioxin levels.

Dioxin exposure estimates in these studies benefitted from the availability of complete work history records and detailed industrial hygiene monitoring, which were validated by serum dioxin measurements and further corroborated at the US Dow location by the presence of chloracne among 12% of the workers. Chloracne findings are consistent with serum-derived exposure estimates of some US site workers that may have been 1,000 times above background. The use of serum analyses in these studies was valuable in reducing exposure misclassification and providing confidence in the modeling of the exposure-response. The US study is known to have the longest follow-up of any dioxin study ever done, 36 years on average and in some cases, up to 62 years. The use of serum measurements, the
quality of work history records, the extended length of follow-up, the variety of measured outcomes, and the demonstrated high levels of exposure combine to make these some of the most definitive studies ever conducted on dioxin-related health effects in chlorophenol workers. Other than the known chloracne relationship, Dow workers show little evidence of ill effects from dioxin exposures.

In their Dioxin Reassessment, the EPA concludes that TCDD is carcinogenic in humans. They claim the conclusion is based in part on "(m)ultiple occupational epidemiology studies showing strong evidence of an association between TCDD exposure and increased mortality from all cancer…" and "(e)pidemiology studies showing an association between TCDD exposure and certain cancers in individuals accidently exposed to TCDD in Seveso…", Dow’s experience with its intensely-studied populations of exposed workers do not support the conclusions reach by the EPA.
References


