

# **Rolling Revision of the WHO Guidelines for Drinking-Water Quality**

**Draft for review and comments  
(Not for citation)**

## **Dichloroacetic acid in drinking-water: Summary statement**



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## Dichloroacetic acid

Chlorinated acetic acids, including dichloroacetic acid (DCA), are formed from organic material during water chlorination.

<b><i>Provisional guideline value</i></b>	0.05 mg/litre The guideline value is designated as provisional because the data are insufficient to ensure that the health-based value of 40 µg/litre is technically achievable in a wide range of circumstances. Difficulties in meeting a guideline value must never be a reason to compromise adequate disinfection.
<b><i>Occurrence</i></b>	Found in groundwater and surface water distribution systems at concentrations up to about 100 µg/litre, with mean concentrations below 20 µg/litre
<b><i>Basis of guideline derivation</i></b>	Using tumour prevalence data from male mice, the point of departure (POD) is the lower-bound confidence limit on the benchmark dose of 2.1 mg/kg of body weight per day, derived from the fit of the multi-stage model using human equivalent doses from the key study. Extrapolation from the POD to low dose was performed by assuming a linear dose–response curve between the POD and the origin. The slope factor (which does not include a body weight correction) is 0.007 (mg/kg of body weight per day) <sup>-1</sup> .
<b><i>Limit of detection</i></b>	<0.1–0.4 µg/litre by GC with ECD; practical quantification level 1 µg/litre
<b><i>Treatment achievability</i></b>  <b><i>Additional comments</i></b>	Concentrations may be reduced by installing or optimizing coagulation to remove precursors and/or by controlling the pH during chlorination. The concentration associated with a 10 <sup>-5</sup> upper-bound excess cancer risk is 40 µg/litre. However, it may not be possible to adequately disinfect potable water and maintain DCA levels below 40 µg/litre, so the provisional guideline value of 50 µg/litre is retained.

### ***Toxicological review***

IARC recently reclassified DCA as Group 2B, possibly carcinogenic to humans, in the absence of data on human carcinogenicity and on the basis of sufficient evidence of its carcinogenicity in experimental animals. This classification was based primarily on findings of liver tumours in rats and mice. Available data are not sufficient to establish a cancer mode of action with reasonable certainty, especially at the very low exposure levels expected to apply to humans ingesting chlorinated drinking-water. Although there are a number of studies that provide some information on the mode(s) of action by which DCA may increase cancer incidence in animals, insufficient data are available to conclusively identify a single mode of action as the only or the most important pathway leading to carcinogenesis. Further, the possibility exists that different modes may be

acting in different species, or even in the same species at different doses. The number of metabolic pathways and species differences in metabolism are still not known, nor has the ultimate toxic substance been identified. Genotoxicity data are considered to be inconclusive, particularly at lower doses.

***History of guideline development***

The 1958, 1963 and 1971 WHO *International Standards for Drinking-water* and the first edition of the *Guidelines for Drinking-water Quality*, published in 1984, did not refer to dichloroacetic acid. In the 1993 Guidelines, a provisional guideline value of 0.05 mg/litre was derived for dichloroacetic acid; the guideline value was designated as provisional because the data were insufficient to ensure that the value was technically achievable. This guideline value was brought forward to the third edition.

***Assessment date***

The risk assessment was conducted in 2004.

***Principal reference***

WHO (2004) *Dichloroacetic acid in drinking-water. Background document for preparation of WHO Guidelines for drinking-water quality*. Geneva, World Health Organization (WHO/SDE/WSH/04.08/121).