number of mutagenicity assays and has been negative for clastogenicity in genotoxicity studies. IARC has not classified the carcinogenicity of monochloroacetic acid.

Monochlorobenzene

Releases of monochlorobenzene (MCB) to the environment are thought to be mainly due to volatilization losses associated with its use as a solvent in pesticide formulations, as a degreasing agent and from other industrial applications. MCB has been detected in surface water, groundwater and drinking-water; mean concentrations were less than 1 µg/l in some potable water sources (maximum 5 µg/l) in Canada. The major source of human exposure is probably air.

Reason for not establishing a guideline value	Occurs in drinking-water at concentrations well below those of health concern, and health-based value would far exceed lowest reported taste and odour threshold
Assessment date	2003
Principal reference	WHO (2004) *Monochlorobenzene in drinking-water*

MCB is of low acute toxicity. Oral exposure to high doses of MCB results in effects mainly on the liver, kidneys and haematopoietic system. There is limited evidence of carcinogenicity in male rats, with high doses increasing the occurrence of neoplastic nodules in the liver. The majority of evidence suggests that MCB is not mutagenic; although it binds to DNA in vivo, the level of binding is low.

A health-based value of 300 µg/l can be calculated for MCB on the basis of a TDI of 85.7 µg/kg body weight, based on neoplastic nodules identified in a 2-year rat study with dosing by gavage, and taking into consideration the limited evidence of carcinogenicity. However, because MCB occurs at concentrations well below those of health concern, it is not considered necessary to derive a formal guideline value. It should also be noted that the health-based value far exceeds the lowest reported taste and odour threshold for MCB in water.

MX

MX, which is the common name for 3-chloro-4-dichloromethyl-5-hydroxy-2-(5H)-furanone, is formed by the reaction of chlorine with complex organic matter in drinking-water. It has been identified in chlorinated humic acid solutions and drinking-water in Finland, the United Kingdom and the USA and was found to be present in 37 water sources at levels of 2–67 ng/l. Five drinking-water samples from different Japanese cities contained MX at concentrations ranging from less than 3 to 9 ng/l.

Reason for not establishing a guideline value	Occurs in drinking-water at concentrations well below those of health concern
Assessment date	2003
Principal references	IPCS (2000) *Disinfectants and disinfectant by-products* WHO (2003) *MX in drinking-water*

MX is a potent mutagen in bacteria and in cells in vitro and has undergone a lifetime study in rats in which some tumorigenic responses were observed. These data indicate that MX induces thyroid and bile duct tumours. IARC has classified MX in Group 2B (possibly carcinogenic to humans) on the basis of rat tumorigenicity and its strong mutagenicity.

A health-based value of 1.8 μg/l can be calculated for MX on the basis of the increase in cholangiomas and cholangiocarcinomas in female rats using the linearized multistage model (without a body surface area correction). However, this is significantly above the concentrations that would be found in drinking-water, and, in view of the analytical difficulties in measuring this compound at such low concentrations, it is considered unnecessary to propose a formal guideline value for MX in drinking-water.

Nickel

Nickel is a naturally occurring element, which is used mainly in the production of stainless steel and nickel alloys. Food is the dominant source of nickel exposure in the non-smoking, non-occupationally exposed population; water is generally a minor contributor to the total daily oral intake. However, the nickel contribution from water may be significant where there is heavy pollution, where nickel that occurs naturally in groundwater is mobilized, or where nickel leaches from nickel- or chromium-plated taps or stainless steel devices or materials that are in contact with water. The primary source of nickel in drinking-water is leaching from metals that are in contact with drinking-water.

Guideline value	0.07 mg/l (70 μg/l)
Occurrence	Concentration in drinking-water are typically less than 25 μg/l, although concentrations may be elevated (up to 5 mg/l) where nickel is released from metal alloys that are in contact with drinking-water, such as fittings, including taps, or as a result of anthropogenic contamination or mobilization from natural deposits
Basis of guideline value derivation	The guideline value is based on achievability by available source control measures and treatment technologies, measurability by analytical methods and toxicology. Reproductive toxicity (increased incidence of rat litters with post-implantation loss) was considered the most sensitive end-point and is therefore the basis for the TDI derivation of 13 μg/kg body weight. An uncertainty factor of 100 was applied to account for interspecies differences (10) and intraspecies variation (10) to the BDML10 of 1.3 mg/kg bw per day, from a two-generation study in rats. Although the 2021 risk assessment supports a health-based value of 80 μg/l based on this TDI, the guideline value was retained at 70 μg/l considering the above factors. Further, 80 μg/l is only slightly higher than the previous guideline value of 70 μg/l (established in 2014); factoring in the imprecision inherent in risk assessment procedures, this difference is not judged significant enough to warrant a revised, minimally relaxed guideline value.
Limit of detection	0.5–5 μg/l for ICP-MS, ICP-AES and graphite furnace AAS; 0.1 mg/l for flame AAS