

HISTORY OF GUIDELINE DEVELOPMENT

Manganese

The 1958 WHO *International Standards for Drinking-water* suggested that concentrations of manganese greater than 0.5 mg/L would markedly impair the potability of the water. The 1963 and 1971 International Standards retained this value as a maximum allowable or permissible concentration. In the first edition of the *Guidelines for Drinking-water Quality*, published in 1984, a guideline value of 0.1 mg/L was established for manganese, based on its staining properties. The 1993 Guidelines concluded that although no single study is suitable for use in calculating a guideline value, the weight of evidence from actual daily intake and toxicity studies in laboratory animals given manganese in drinking-water supports the view that a provisional health-based guideline value of 0.5 mg/L should be adequate to protect public health. It was also noted that concentrations below 0.1 mg/L are usually acceptable to consumers, although this may vary with local circumstances. The third edition of the Guidelines, published in 2004, established a guideline value of 0.4 mg/L for manganese. The fourth edition of the Guidelines, published in 2011, concluded that as the calculated health-based value (retained as 0.4 mg/L) is well above concentrations of manganese normally found in drinking-water, it was not necessary to derive a formal guideline value. The first addendum to the fourth edition of the Guidelines, published in 2017, reconfirmed the recommendations of the fourth edition, clarifying that the health-based value is also well above concentrations normally causing acceptability problems in drinking-water.

The fourth edition of the Guidelines incorporating the first and second addenda, published in March 2022 (based on the 2021 assessment as a background document to the Guidelines), noted that a guideline value was warranted based on emerging evidence supporting the oral route as a potentially important route of exposure for manganese toxicity. This reassessment considered more recent epidemiological data that indicated the potential for adverse effects in populations exposed to lower concentrations of manganese in drinking-water compared to the previously established health-based value. The health-based value was therefore amended to a provisional guideline value of 0.08 mg/L based on neurological effects in rats. This updated guideline value was designated as provisional due to the high level of uncertainty in the database, as reflected in the composite uncertainty factor of 1000 applied to derive the guideline value.