Committee on Fluoride in Drinking Water, National Research Council
Fluoride in Drinking Water: A Scientific Review of EPA's Standards
ISBN: 0-309-10128-X,

Fluoride is added to drinking water to prevent dental caries. In practice fluoride concentrations exceed to recommended levels and may cause harm to teeth and bones.

This review concludes that a lower level of exposure is needed in order to prevent children from developing severe enamel fluorosis and to reduce the lifetime accumulation of fluoride into bone [and its increased risk of bone fracture and possibly skeletal fluorosis]

From the report:

Maximum Contaminant Level Goal

The MCLG is a health goal set at a concentration at which no adverse health effects are expected to occur and the margins of safety are judged "adequate."

In light of the collective evidence on various health end points and total exposure to fluoride, the committee concludes that EPA's MCLG of 4 mg/L should be lowered. Lowering the MCLG will prevent children from developing severe enamel fluorosis and will reduce the lifetime accumulation of fluoride into bone that the majority of the committee concludes is likely to put individuals at increased risk of bone fracture and possibly skeletal fluorosis, which are particular concerns for subpopulations that are prone to accumulating fluoride in their bones.

Secondary Maximum Contaminant Level

SMCL is a guideline for managing drinking water for aesthetic, cosmetic, or technical effects.

The prevalence of severe enamel fluorosis is very low (near zero) at fluoride concentrations below 2 mg/L. From a cosmetic standpoint, the SMCL (2 mg/L) does not completely prevent the occurrence of moderate enamel fluorosis. EPA has indicated that the SMCL was intended to reduce the severity and occurrence of the condition to 15% or less of the exposed population. The available data indicate that fewer than 15% of children will experience moderate enamel fluorosis of aesthetic concern (discoloration of the front teeth) at that concentration. However, the degree to which moderate enamel fluorosis might go beyond a cosmetic effect to create an adverse psychological effect or an adverse effect on social functioning is not known.

Comment

Recommended fluoride concentrations are in the range 0.7 to 1.2 mg/L; the aim is to reduce the rate of dental caries. Reducing fluoride concentrations to this range should reduce the risk of fluorosis. Fluorosis develops before 8 years of age. Fluoride intake is determined, largely, by drinking water intake [the contributions from toothpaste and beverages are usually small in comparison].