

Briefing on *Fluoride in drinking water*

The World Health Organization has recently published *Fluoride in drinking water* (Fawell *et al.* 2006), the latest in a series of WHO monographs which address the management of chemicals in drinking water. The monograph documents the extent and effects of excessive levels of fluoride from natural geological sources in public drinking water, and provides guidance about analysis techniques and methods to reduce fluoride levels.

This problem of excessive naturally occurring levels of fluoride in drinking water supplies has been one of long standing concern to the medical and dental professions. Indeed much of the early research on fluoride in drinking water was concerned with the effects of excessive and high levels (Dean and Elvore 1937; Dean *et al.* 1938; Dean 1933; Leone *et al.* 1954). However, this early work led eventually to the discovery of the benefits to dental health of an appropriate concentration of fluoride in drinking water.

Since at least 1958 the World Health Organization has commented, in its published standards for drinking water, on both the possible adverse dental and skeletal effects of fluoride in drinking-water, and the dental benefits - originally in its *International Standards for Drinking-water*, and since 1984, in its *Guidelines for drinking water quality*, now in its 3rd edition (World Health Organization 1984; 1993; 2004; 2006). The early *International standard*, stated that fluoride concentrations in drinking-water in excess of 1.0-1.5 mg per litre may give rise to mild dental fluorosis, and much high concentrations may result in skeletal damage in both children and adults. Importantly however, they also stated that some community water supplies were fluoridated to bring the fluoride concentration to 1.0 mg/litre to improve dental health.

The first formal WHO Guideline for fluoride in drinking water was established in 1984 in the first edition of its *Guidelines for drinking water quality*. (The World Health Organization defines the Guideline Value as "*the concentration that does not result in any significant risk to health over a lifetime of consumption*"). A guideline value of 1.5 mg/litre was set for fluoride. All subsequent editions have retained 1.5 mg/litre as the guideline value for fluoride.

Guidelines for drinking water quality recommends that:

"In setting national standards for fluoride or in evaluating the possible health consequences of exposure to fluoride, it is essential to consider the

intake of water by the population of interest and the intake of fluoride from other sources (e.g., from food, air and dental preparations). Where the intakes from other sources are likely to approach, or be greater than, 6 mg/day, it would be appropriate to consider setting standards at a lower concentration than the guideline value."

Furthermore it acknowledges that:

"In areas with high natural fluoride levels in drinking-water, the guideline value may be difficult to achieve, in some circumstances, with the treatment technology available."

However, for optimal dental health WHO suggests a lower level of fluoride of between 0.5 and 1.0 mg/litre, and recommends that where caries rates are moderate to high, or where there is evidence of increasing caries rates, fluoride levels should be increased to this optimal level (World Health Organization Expert Committee on Oral Health Status and Fluoride Use 1994).

It is important for the dental profession to work closely with public health workers and with water engineers to ensure that consumers obtain good quality water with the appropriate levels of fluoride.

References

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