COMMITTEE ON TOXICITY OF CHEMICALS IN FOOD, CONSUMER PRODUCTS AND THE ENVIRONMENT

STATEMENT ON CHLORINATED DRINKING WATER AND REPRODUCTIVE OUTCOMES

Introduction

At the request of the Drinking Water Inspectorate, the Committee was asked to consider the evidence linking the consumption of chlorinated tapwater and adverse reproductive outcomes. The Committee has not previously considered the health effects of chlorinated water or the by-products of chlorination. However, the Committee on Carcinogenicity of Chemicals in Food, Consumer Products and the Environment (COC) did review cancer epidemiology data in 1992. At that time the COC concluded that the 1986 opinion of CASW, the DH Committee on the Medical Aspects of Air, Soil and Water, (that there was no sound reason to conclude that the consumption of by-products of chlorination in drinking water increased the risk of cancer in humans) was adequately founded and that more recent studies did not alter that conclusion.[1] COC are currently reviewing additional relevant epidemiological studies of cancer published since the 1992 evaluation.

The request to the Committee followed the recent publication of two prospective epidemiological studies conducted in three geographic regions of California, USA. One study reported a weak to moderate association between high consumption of tapwater and the incidence of spontaneous abortion, albeit in only one of the three regions.[2] The second study, taking data from all three regions together, reported a weak to moderate association between high exposure to certain chlorination by-products in tapwater and spontaneous abortion.[3]

As most of the drinking water in the United Kingdom is chlorinated and similar levels of certain chlorination by-products could occur in UK tapwaters, the Committee was asked to comment on the relevance of these data for public health in the UK.

Consideration of the epidemiological and toxicological data

The Committee considered available epidemiological information on the association of chlorination by-products in drinking water and a range of adverse reproductive outcomes.

Of the seventeen reviewed studies concerned with consumption of drinking water, eight have paid attention to a potential association with chlorinated water or chlorination by-products in the tapwater. Of these, particular attention was focused upon the study from California [3] which the Committee considered to be a particularly well-designed and well-conducted study available for the evaluation of a possible association.

This study, taking data from all three regions together, reported a weak to moderate association (adjusted odds ratio 3.0, 95% confidence interval 1.4-6.6) between high exposure to certain chlorination by-products in tapwater and spontaneous abortion. Nevertheless, the study does not exclude unidentified biases and other confounding factors and the findings, along with information from earlier studies, do not provide persuasive evidence of a causal association between exposure to chlorination by-products in drinking water and adverse reproductive outcomes.

Exposure to chlorination by-products could be not only through drinking but also through showering, bathing etc., especially for the more volatile compounds; also these would tend to be removed by boiling.

In addition, available reproductive toxicity studies with some of the individual chlorination by-products indicate that the levels of exposure to these substances in drinking water are about four orders of magnitude (ie 10,000 times) lower than levels at which adverse effects may occur in animals.

Conclusions

We *consider* that there is insufficient evidence to conclude that the presence of chlorination by-products in tapwater increases the risk of adverse reproductive outcomes. We *recommend*, however, that the claimed associations between patterns of drinking-water intake and the incidence of adverse reproductive outcomes be investigated further, since any causal association would be of significant public health concern. We therefore *consider* that efforts to minimise exposure to chlorination by-products by individuals and water authorities remain appropriate, providing that they do not compromise the efficiency of disinfection of drinking water.

COT/1999/01 May 1999

References

1. Committee on Carcinogenicity of Chemicals in Food, Consumer Products and the Environment (1993). 1992 Annual Report of the Committees on Toxicity Mutagenicity Carcinogenicity of Chemicals in Food, Consumer Products and the Environment. London:HMSO.

2. Swan SH, Waller K, Hopkins B, Windham G, Fenster L, Schaefer C, Neutra RR (1998). A prospective study of spontaneous abortion: relation to amount and source of drinking water consumed in early pregnancy. *Epidemiology*, 9:126-133.

3. Waller K, Swan SH, DeLorenze G, Hopkins B (1998). Trihalomethanes in drinking water and spontaneous abortion. *Epidemiology*, 9:134-140.