

THE PRECAUTIONARY PRINCIPLE AND "EVIDENCE-BASED DENTISTRY"

SUMMARY: The precautionary principle as applied to minimize the risk of harmful health effects of fluoride requires that evidence-based dentistry should employ the best available evidence drawn from the widest array of research, methodology, and technology.

Keywords: Precautionary principle; Evidence-based dentistry; Water fluoridation.

For almost 40 years, this journal has published original peer-reviewed research reports, reviews, abstracts, editorials, and special articles on the ethical debates regarding dental and other aspects of fluoride and water fluoridation, both original and reprinted from other sources. Throughout, a cautionary approach has been strongly advocated. In November 2002, my review of "Thirty-five years of *Fluoride*," emphasizing this concept, was published as a guest editorial.¹

It therefore comes as a surprise that a recent article titled "What does the precautionary principle mean for evidence-based dentistry?" by J Tickner and M Coffin,² abstracted in this issue (p 69), does not cite a single report of relevant research published in *Fluoride*. In that part of their article devoted to what is termed "a case study on fluoride," Tickner and Coffin include 16 references, many of which are to organizations known to favor and promote water fluoridation, such as the US Centers for Disease Control, the American Dental Association, and the World Health Organization. Tickner and Coffin cite the paper by M Diesendorf on "The mystery of declining tooth decay," published 20 years ago in *Nature*, and reviews by B Hileman in *Chemical and Engineering News* (1989), S Begley in the *Wall Street Journal* (2005), and Chris Bryson's book, *The Fluoride Deception* (2004). They also refer to a statement from the Greater Boston Physicians for Social Responsibility (2000) and the website of the Fluoride Action Network (www.fluoridealert.org). Their failure to refer to primary sources for fluoride research is disturbing in that the above citations of reviews are not likely to convince the reader that the authors have actually examined original primary research reports dealing with the scientific aspects of their fluoride case study. This shortcoming is itself a serious breach of what they say is required of the researcher for a proper application of the precautionary principle.

The authors accept the US definition of the precautionary principle as set forth in the Wingspread statement of January 1998.³ They present a framework for the application of the precautionary principle and conclude that precautionary decisions should be based on the best available evidence drawn from the widest array of research methodology and techniques. Their failure to travel this route in regard to fluoride will lead many readers to conclude that the authors think that potential adverse impacts of fluoridation on health have yet to be uncovered as real entities in peer-reviewed studies.

A letter from P Webb and K Donald⁴ critical of a paper by M Diesendorf et al.,⁵ reprinted in *Fluoride*,⁶ pointed to the problems associated with evaluating an apparent association between a potentially toxic exposure and ill health. Webb and Donald declare that, in ecological studies where comparisons are made between

populations rather than individuals, it is almost impossible to rule out confounding factors as possible alternative explanations. Establishing a causal relationship depends on confidence that a real relationship does in fact exist. Perhaps it is this concern that clouds the thinking of Tickner and Coffin.

In the most prominent relationships dealing with possible adverse effects of fluoridation, published information shows repeated incidences (replication) and supportive evidence from controlled laboratory (animal) studies. Numerous examples of qualifying evidence on human exposure to fluoride can be found if a proper search is undertaken: hip fractures in the elderly; neurotoxicity, including lowered IQ; cancer, especially osteosarcoma in young males; thyroid disturbances; lowered fertility; and others.

Equipped with scientific information currently available, any researcher, or even a member of the general public for that matter, would feel concern about the safety of fluoridation. The precautionary principle argues that the benefit of doubt should be given to those at risk. In the words of the Wingspread statement already referred to: ". . . it is necessary to implement the Precautionary Principle: when an activity raises threats of harm to human health . . . precautionary measures should be taken *even if some cause and effect relationships are not fully established scientifically.*" (Emphasis added)

This in no way releases the researcher or parties concerned with establishing public health policy from the responsibility for observing the message of Webb and Donald that an evaluation of causality "takes into account all of the available scientific evidence."⁴ Tickner and Coffin, in their superficial treatment of the case study on fluoride, at the very least endangered their own credibility.

In applying the precautionary principle to fluoride, Tickner and Coffin begin their examination by looking at the alleged benefits of fluoridation. Without doubt, their analysis of their limited sources puts into question the lofty claims made by promoters. They write (references deleted):

"While there are many peer-reviewed studies supporting the efficacy of fluoridation, there are also many reputable sources questioning it. The National Institute of Dental Research, for instance, conducted the largest study of its kind in 1989 and found that there was little difference in the incidence of cavities between children receiving fluoride and those who were not. Further, studies have shown that the incidence of cavities has fallen throughout the western industrialized world regardless of fluoride use. Studies indicate that fluoride does not help to prevent pit and fissure decay, which is estimated to cause more than 85% of tooth decay in the United States, nor baby bottle tooth decay, which is prevalent in poor communities. Also, there is increasing evidence that fluoride provides its protective benefits through topical exposures, rather than by ingestion."²

Such a meager claim of dental benefit would seem to require very little evidence of harm to apply the precautionary principle to reject fluoridation outright. However, because of a lack of a thorough knowledge of the voluminous literature dealing with fluoride toxicity, Tickner and Coffin sadly fail to deliver a knockout

punch. To be generous, however, their superficial treatment and vague conclusions may be the result of insufficient access to the scientific literature and the pages of *Fluoride*.

This prospect returns us to final remarks in my editorial on the thirty-five years of *Fluoride* that *Medline/Pub Med* continues to exclude *Fluoride* from its journal coverage.¹ This exclusion of *Fluoride* deprives many physicians, dentists, and other interested researchers and individuals of a vast source of information concerning the effects of fluorides on humans, animals, and plants. However, there is now our website that can be consulted for free online access to *Fluoride*: www.fluorideresearch.org.

Moreover, the recent publication by the US National Research Council review of the Environmental Protection Agency's safe drinking water standards for fluoride⁷ will make it easier for many researchers who wish to use the precautionary principle to resolve the fluoridation debate. This 507-page document contains 1077 references from the scientific literature, including 57 studies published in *Fluoride*.

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