

---

## Introduction to the Workshop

---

**Brian A. Burt, BDS, MPH, PhD**

Program in Dental Public Health

School of Public Health

University of Michigan

Ann Arbor, MI 48109-2029

### **Abstract**

*Public health administrators are forced to consider efficiency as a criterion in their choice of preventive programs because of the numerous programs to choose from, restricted budgets, and declining caries experience in children. Interest in cost effectiveness in dental prevention has risen considerably since the initial conference on this issue at the University of Michigan in 1978. This article introduces the goals of the workshop, the nature of the work groups, and the data they will use.*

---

Caries-preventive technology has developed to the point where directors of public programs now have an array of procedures to choose from. Public health administrators know that budgetary considerations force them to make such choices carefully, and the interests of purchasing groups and insurers have made value-for-money an issue in caries prevention in private practice. Efficiency, in health programs, is defined as the effects or end results achieved in relation to the effort expended in terms of money, resources, and time (1).

Interest in the efficiency of caries-preventive programs was sparked by a workshop held at the University of Michigan in 1978 (2). While the absence of economists led to some oversimplified methods at that workshop and much of its detail is now out of date, this exploratory meeting had the effect of making efficiency a well-accepted criterion for program choice. Since the 1978 meeting was exploratory in nature, this 1989 workshop should be seen as a first attempt to develop cost-effectiveness data in caries prevention.

What information there is on cost effectiveness in preventive programs, however, is increasingly obsolete. Much has changed since 1978: the caries decline among children was confirmed for the United States by the 1979-80 national survey of children (3), and was documented globally at the Forsyth conference in Boston in 1982. The caries decline was still in full swing through the 1980s, as evidenced by the announcement in the *New York Times* of June 22, 1988, that in the 1986-87 national survey 49.9 percent of schoolchildren were found to be caries-free. But while caries has declined in the child population, there is still a sizable minority affected, and adult caries is now better recognized, with clear evidence that caries is a lifetime disease (4-6). Similarly, a considerable

amount of cost information has been generated since the 1978 workshop: for example, the 1980 conference at the University of Minnesota on reducing the cost of dental care (7); the series of publications from the National Preventive Dentistry Demonstration Project, which began in 1979 (8); an FDI technical report on cost effectiveness of preventive procedures (9); and an FDI/WHO conference on fluoride programs, which included cost considerations, prior to the 1982 World Dental Congress in Vienna (10).

### **Goals of the Workshop**

The workshop is a first attempt to develop cost-effectiveness guidelines for the various preventive programs most used at state and local level in the United States. Intended outcomes are: (1) consensus views on the costs of water fluoridation; (2) costs and effectiveness of selected preventive programs, including water fluoridation; (3) cost-effectiveness ratios, insofar as they can be validly derived, for the selected preventive programs; and (4) specification of further research needs.

### **Background of the Workshop**

While some public and philanthropic clinics existed since the turn of the century, dental public health recognizably emerged in the United States during the 1930s. The high level of dental caries among children at the time prompted some state health departments to use Maternal and Child Health funds to relieve dental distress. Ever since then, the practice of dental public health has remained firmly identified with caries control in children. The steady growth of state and local dental public health programs in the period 1945-65, as well as the acceptance of dental public health as a specialty in 1950, owed much to the widespread acceptance of dental caries as a major public health problem in children.

At the time of these early developments, control of caries was restricted to operative and exodontic treatment. But since then, an impressive scientific base for preventive procedures has been developed, principally through the sponsorship of the National Institute of Dental Research. As a result, prevention rather than treatment is now the major focus of dental public health practice. While success in preventing caries in children seems to have come suddenly, it actually is the return on

the investment of over 50 years of research and program development. Ironically, when added to the drive to control costs in public agencies, success has led to cuts in some state and local programs (11).

Where caries control programs are needed for children today, the idea of "the more prevention the better" simply doesn't apply when so many of the target group are now free of disease. The old concept of blanket coverage has been replaced by the demands that prevention be cost effective, defined as the least expensive method, from among competing alternatives, of achieving a defined objective (12). This workshop is thus held against a background of declining caries in children, evidence that caries is a disease of adulthood, a cost-cutting mentality among public agencies, and acceptance of the philosophy of targeting programs to the most disease-susceptible.

### Conduct of the Workshop

The workshop consists of a keynote address, five position papers, work group sessions, and plenary meetings. Participants work in five groups, first to consider independently the costs and cost effectiveness of water fluoridation, and then to make similar assessments for five other preventive programs that each group selects. The first task of each work group will be to assess the costs of water fluoridation, using the data provided (Garcia's paper) as a starting point. The first plenary session is to compare results on this issue among the groups, something of a mini-consensus conference.

Each work group then selects five additional preventive programs and assesses their costs and effectiveness in a specific age group, as follows: group 1: aged 5-17; group 2: aged 18-44; group 3: aged 45-64; group 4: aged 65-and-over, ambulatory; and group 5: aged 65-and-over, institutionalized.

In the second plenary session, groups report on costs and cost-effectiveness ratios for all six programs they assessed. (Apart from water fluoridation, the programs do not necessarily need to be the same ones in all age groups considered.) The final discussion is intended to resolve (or identify) differences in the way results were achieved, their presentation, and specification of research needs.

The reason water fluoridation is selected for special consideration by all work groups is because it is the only public health measure under consideration that reaches the entire community; other programs are all targeted approaches requiring professional application or supervision. The impact of water fluoridation is felt across all age groups, and its mix of fixed and variable costs is more complicated than that found with the targeted approaches. It was judged that water fluoridation as a unique issue would almost certainly need extra time for consideration.

### Data for the Work Groups

Work groups are provided with data on costs of programs and caries incidence in various age groups. Garcia, in her background paper supplied to participants for use in the work groups, describes how these data were gathered. None were from "representative samples," but rather all that could be gathered. In the cost data, for example, many more programs were contacted than were able to provide data, so if there is a selection bias in the cost data, it is likely to be toward those with better accountancy. Caries incidence data were gathered from as many reports since 1978 as could be located, though there were few incidence studies in older age groups, and most of those were of special populations. These data are intended to be the bases for ranges of cost and caries incidence that groups can develop for their computations. The detailed instructions given to the work groups are provided in Appendix A.

The third area of information, the effectiveness of preventive procedures, is provided by the five speakers. Data are presented in ranges to allow groups to derive cost-effectiveness ratios for various levels of program cost and caries incidence.

### Choice of Preventive Procedures

With a large number of caries-preventive measures available, choices had to be made on which procedures were to be assessed at the workshop. Criteria were (a) efficacy must have been quantitatively demonstrated; and (b) the procedure must have been used in the United States, or at least have the potential for use in a state or local program. By those criteria, measures chosen are water fluoridation, school water fluoridation, dietary fluoride (F) supplements, F mouthrinsing, professionally and self-applied F gel, and pit and fissure sealants.

The most obvious procedure missing from this list is the use of fluoride toothpaste, though in fact it will be considered as a background issue for all procedures. The rationale is that fluoride toothpaste is used widely in the United States (13), but it is an individual action rather than a program operated by public health agencies. The efficacy of any of the listed procedures, however, must today be assessed against the background of fluoride toothpaste use rather than as a sole exposure to fluoride. For that reason, speakers have been given the challenging task of assessing program efficacy against this background of fluoride toothpaste use, as well as in certain other logical combinations of programs.

Several potential preventive measures were omitted from the list. Salt and milk fluoridation, for example, are not used in the United States, and seem unlikely to be used in the future. It was concluded at the 1978 workshop that there was no evidence to support prophylaxis, nor use of fluoride-containing prophylaxis paste, as effective caries-preventive measures in their own right, and no evidence to the contrary has emerged since then. Data on

the efficacy of formal programs of dental health education are equivocal. Diet and nutrition was a subject area at the 1978 workshop, but cost effectiveness of measures in this area could not be satisfactorily determined. Since then, longitudinal dietary studies (14,15) have shown that while caries incidence among the children studied was low, consumption of sugars was still high. Because in our study (14) the etiological role of sugars was only apparent with proximal caries, and proximal caries is being seen less and less (16), there seems little to be gained by including dietary measures as a subject in this workshop.

### Conclusions

There were many occasions during our preparations when the goal of clear-cut cost-effectiveness ratios seemed too ambitious. Whether a workshop setting is the right place to develop valid cost-effectiveness ratios remains to be seen, especially one in which multidisciplinary communications between the dental people and the economists are crucial to the outcome. But even if we do not achieve all those outcome goals specified, this workshop seems sure to result in a great deal of valuable information that will advance our understanding of this relatively new area in dental public health practice.

### Acknowledgments

I'd like to acknowledge the major efforts put into the preparation of this workshop by Dr. Isabel Garcia, who is carrying out her residency in the Program in Dental Public Health during 1988-89, and also by my secretary Jan Troczynski. Both Isabel and Jan put in countless hours of thought and hard work with a great deal of constant attention to detail. My planning group of eight was marvelous. Their support, good ideas, and frank criticism were invaluable; so, thanks to Chet Douglass, Bob Isman, Dushanka Kleinman, Dennis Leverett, Mark Siegal, Phil Swango, Jane Weintraub, and Ardell Wilson. It should be noted that the planning group carried out all its deliberations on a computer conference set up for the purpose, probably a first for dentistry. The process by and large worked well; it permitted immediate group discussions on issues that needed discussion, and it did so much quicker and less expensively than meetings or conference telephone calls. I must also acknowledge my Panel of Economic Advisers within the School of Public Health: Ken Warner, Will Manning, and Jack Wheeler. They gave generously of their time in the development of the procedural details,

and their down-to-earth advice made me cautiously optimistic that the workshop had a reasonable chance of achieving its goals. Finally, the group leaders and recorders deserve special mention for the extra efforts they were called upon to make.

### References

1. World Health Organization. Statistical indicators for the planning and evaluation of public health programmes. Geneva: World Health Organization Technical Report, Series 472, 1971.
2. Burt BA, ed. The relative efficiency of methods of caries prevention in dental public health. Ann Arbor: University of Michigan, 1979.
3. US Public Health Service, National Institute of Dental Research. The prevalence of dental caries in United States children. Bethesda, MD: NIDR pub no 82-2245, 1981.
4. US Public Health Service, National Institute of Dental Research. Oral health of United States adults. Bethesda, MD: NIDR pub no 87-2868, 1987.
5. Hand JS, Hunt RJ, Beck JD. Incidence of coronal and root caries in an older adult population. *J Public Health Dent* 1988 Winter;48:14-9.
6. Ismail AI, Burt BA, Brunelle JA. Prevalence of tooth loss, dental caries, and periodontal disease in Mexican-American adults: results from the Southwestern HHANES. *J Dent Res* 1987 June;66:1183-8.
7. Kudrle RT, Meskin L, eds. Reducing the cost of dental care. Minneapolis: University of Minnesota Press, 1983.
8. Klein SP, Bohannon HM. The first year of field activities in the National Preventive Dentistry Demonstration Program. Santa Monica: Rand, pub no R-2536/1-RWJ, 1979.
9. Horowitz HS, et al. Cost-effectiveness of community fluoride programs for caries prevention. FDI Technical Report no 13. Chicago: Quintessence, 1981.
10. Murray JJ, ed. Appropriate use of fluorides for human health. Geneva: World Health Organization, 1986.
11. Evans CA, Jr. A national survey of dental public health services in local health departments: a report of findings. *J Public Health Dent* 1984 Summer;44:112-9.
12. Warner KE, Luce BR. Cost-benefit and cost-effectiveness analysis in health care. Ann Arbor, MI: Health Administration Press, 1982.
13. Ismail AI, Burt BA, Hendershot GE, Jack S, Corbin SB. Findings from the Dental Care Supplement of the National Health Interview Survey, 1983. *J Am Dent Assoc* 1987 May;114:617-21.
14. Burt BA, Eklund SA, Morgan KJ, Larkin FE, Guire KE, Brown LO, Weintraub JA. The effects of sugars intake and frequency of ingestion on dental caries increment in a three-year longitudinal study. *J Dent Res* 1988 Nov;67:1422-9.
15. Rugg-Gunn AJ, Hackett AF, Appleton DR, Jenkins GN, Eastoe JE. Relationship between dietary habits and caries increment assessed over two years in 405 English schoolchildren. *Arch Oral Biol* 1984;29:983-92.
16. Ripa LW, Leske GS, Varma AO. Longitudinal study of the caries susceptibility of occlusal and proximal surfaces of first permanent molars. *J Public Health Dent* 1988 Winter;48:8-13.