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Perspectives in Disease Prevention and Health Promotion Dental Caries in Schoolchildren -- Utah

During fall 1987, as part of routine surveillance of oral health status, the Dental Health Bureau, Utah Department of Health, surveyed Utah schoolchildren aged 8-12 years. The survey showed differences in histories of dental caries among three groups of children: those who had received optimal levels of systemic fluoride for their entire lives, for some portion of their lives, or not at all.

The stratified sample of 1507 children was selected so that all 12 health districts of the state were represented in percentages equal to the student population. Within each health district, classrooms were selected randomly. Parents completed consent forms that included questions about their children's residential history and other fluoride-related questions, e.g., daily use of supplements. The 957 children whose parents/guardians had completed consent forms (64% of all pupils in the selected classrooms) were examined by a dentist; for 938, sufficient information was available from the parents/guardians for investigators to estimate lifetime fluoride histories.

Children were categorized as having had lifetime fluoride, partial fluoride, and no fluoride. The 110 children in the lifetime-fluoride category reportedly had received optimally fluoridated water or a daily fluoride supplement at home for at least 6 months of every year of life or for all but 1 year of life. The 563 children in the partial-fluoride category reportedly had consumed fluoridated water or a daily fluoride supplement at home for as long as 6 months in a single year but not long enough to meet the criteria for the lifetime-fluoride category. The 265 children in the no-fluoride category reportedly had never received fluoridated water or a daily fluoride supplement at home for as long as 6 months in a single year.

One dentist completed all clinical examinations following the protocol and criteria used for prevalence surveys conducted by the National Institute of Dental Research (NIDR) (1). Using artificial light, compressed air, mirror, and explorer, the examiner assessed the decayed, missing, and filled surfaces of permanent teeth (DMFS) and the presence of dental sealants on occlusal surfaces of permanent teeth. A child was classified as having sealants if at least one permanent

tooth had an intact sealant.

Examination showed dental caries in the permanent dentitions of 477 (50%) of the children (Table 1). Of those who received no fluoride, 54% had experienced tooth decay, compared with 36% of those with lifetime fluoride exposure. Among those surveyed, children with no exposure to systemic fluoride were more likely to have had dental caries in permanent teeth than children with a lifetime exposure to fluoride (prevalence ratio (PR)=1.5, 95% confidence interval (CI)=1.1-1.9).

A similar pattern occurred when severity of dental disease was considered. Almost one third of the children with no systemic fluoride exposure but one fifth of children with lifetime exposure had experienced greater than or equal to 3 DMFS (PR=1.6, 95% CI=1.1-2.4). Mean DMFS for the no-fluoride group (2.2) was 41.5% greater than that for the lifetime-fluoride group (1.3). In the entire sample, 31% of the children had dental sealants on one or more permanent teeth.

For children aged 8, 10, and 12 years, caries prevalence was higher for Utah than for a national sample (Figure 1) (2). Utah children with lifetime fluoride were least likely to have had dental caries in their permanent teeth (Figure 2). Although children who had received fluoride for a portion of their lives had a higher prevalence of dental caries than the lifetime-fluoride group, their caries prevalence was lower than that of children who had never received systemic fluoride.

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Editorial Note

Editorial Note: Data from recent oral health surveys in national and state-based samples of children show a lower prevalence of dental caries than do those from similar earlier surveys (1-3; North Carolina Department of Human Resources, unpublished data). In general, the decreased prevalence has been attributed to increased use of fluorides, both systemic and topical, during the past several decades (4-6). As a public health measure, water fluoridation reaches all segments of the community cost-effectively.

In Utah, fluoridation of community water supplies is limited; only 2% of the population using public water supplies consumes optimally fluoridated water (7). For that reason, the Utah Department of Health urges physicians and dentists to prescribe fluoride supplements, which children should take daily during the first 14 years of life. In a recent survey, greater than 90% of responding physicians reported that they prescribed fluoride supplements for children (8).

The fluoride histories and oral health status of children without consent forms (one third of the original sample) remain unknown. Among Utah respondents, 12% of children reportedly received systemic fluoride for their entire lifetimes; this proportion included those who consumed optimally fluoridated water as well as those who reportedly received supplements routinely. Approximately 60% of the sample were classified in the partial-fluoride category, and 28% of the Utah children had not received systemic fluoride for as long as 6 months. Children in all three groups may have ingested fluoride by swallowing small amounts of fluoride toothpaste (4,9,10,) or by consuming soft drinks and other food products manufactured in optimally fluoridated areas.

It is likely that the prevalence of dental caries in Utah would be higher had the health department not emphasized the need for dental sealants. The proportion of Utah children with dental sealants

(31%) was higher than that found in recent surveys in Ohio (8%) (3) and North Carolina (10%) (North Carolina Department of Human Resources, unpublished data). Utah children without fluoride exposure were less likely to have sealants. Children from higher socioeconomic groups may be overrepresented in the lifetime-fluoride group because they would have been more likely to receive fluoride supplements throughout their lifetimes and to receive professional dental care, including the application of dental sealants.

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