



DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control
Atlanta GA 30333

April 1985

Dear Colleague:

Because community water fluoridation remains the most effective and practical means of preventing and controlling dental caries, the Dental Disease Prevention Activity continues to serve as the national focal point for fluoridation activities. Although efforts opposing fluoridation persist, the number of people served by community water containing dentally significant levels of fluoride continues to increase. Highlights of fluoridation activities are reported in this issue.

Two articles of interest have been reprinted from the Centers for Disease Control publication, Mortality and Morbidity Weekly Report (MMWR):

- o The prevalence of serology markers to hepatitis B in dental personnel increases with the length of service in the profession. The February 8 issue reports on cases and fatalities resulting from an outbreak of hepatitis B traceable to an individual dentist. Efforts to increase utilization of the hepatitis B vaccine by dental personnel early in their careers may have been hampered by unfounded reports of an association of hepatitis B vaccine with AIDS. Certainly there is under-utilization of this effective vaccine by dental personnel, which has been shown to be safe.
- o The February 15 issue reports on progress made toward the 1990 Fluoridation and Dental Health Objectives for the Nation and summarizes the current status of community water fluoridation in the United States.

The use of smokeless tobacco products has been increasing by 11 percent each year since 1974, most alarmingly among school-aged children. Currently, there are up to 22 million users of smokeless tobacco in the United States. Habitual use of smokeless tobacco products can produce serious health problems, including oral cancer. On February 6 and 7, the Massachusetts Division of Dental Health held hearings on smokeless tobacco in Boston. The recommended proposals include: (1) restricting the sale of smokeless tobacco to minors; (2) restricting the promotion of smokeless tobacco as a safe alternative to smoking; and (3) requiring warning labels on snuff. We have included a synopsis of information on smokeless tobacco in this issue.

State and local health agencies are continuing to implement sealant programs as an effective dental public health means to prevent and control the incidence of dental decay in pit and fissure surfaces. Included in this issue are descriptions of sealant materials that have been developed by two agencies to help educate the public concerning their safety and effectiveness. We encourage you to send educational materials to us, so that a national bibliography of sealant resources can be developed.

Your valuable contributions to our communication network continue to provide important information on the prevention of oral diseases. The sharing of information and data sources expands our knowledge base and increases our effectiveness. We solicit your comments and suggestions toward achieving the goal of improved oral health for all Americans.

Stephen B. Corbin, D.D.S, M.P.H.
Acting Chief
Dental Disease Prevention Activity
Center for Prevention Services

DDPA HAS NEW LOCATION, ADDITIONAL PERSONNEL

The offices of the DDPA have moved from Room 337 to Room 345 at the Freeway Office Park facility.

The address and telephone numbers remain the same: Dental Disease Prevention Activity, Center for Prevention Services, Centers for Disease Control, Atlanta, GA 30333. Telephone numbers: 404/329-1830 (FTS: 236-1830).

Margaret I. Scarlett, D.M.D., Dental Officer, has recently joined the staff of DDPA. Her duties include assisting with the development and implementation of strategies to increase the number of communities with fluoridated water supplies; providing liaison with other Federal agencies, State and local health departments, academic institutions, professional societies, and others on activities relating to dental disease prevention and oral health promotion; and assisting with the development of policy to prevent transmission of disease with oral health implications.

AMERICAN DIETETIC ASSOCIATION REAFFIRMS POLICY ON WATER FLUORIDATION

In October 1984, the House of Delegates of the American Dietetic Association reaffirmed its policy on fluoridation with the following statement:

"The American Dietetic Association is in complete accord with the findings of the American Dental Association, American Medical Association, American Public Health Association, and the U.S. Public Health Service and State departments of public health endorsing the fluoridation of community water supplies. Therefore, the American Dietetic Association, along with these health agencies and many other groups, endorses the fluoridation of public water supplies as a safe and efficient means of improving the dental health of the nation."

CALL FOR SEALANT MATERIALS

The DDPA is hoping to develop a bibliography of sealant materials to serve as a national resource for dental public health programs.

If your organization or agency has developed pamphlets or other educational literature on sealants, the DDPA would very much appreciate hearing about them.

Please forward samples to Dental Disease Prevention Activity, Center for Prevention Services, Centers for Disease Control, Atlanta, Georgia 30333.

For more information, call Cathy Backinger at 404/329-1830 or FTS: 236-1830.

BRAINERD, MINNESOTA LAWSUIT DISMISSED

A class action lawsuit filed by fluoridation opponents seeking sanctions against Minnesota Commissioner of Health Sister Mary Madonna Ashton has been dismissed.

The lawsuit was filed after Sister Mary Madonna refused to replace Brainerd's fluoridation system with an alternative dental health plan. (See September 1984 Dear Colleague letter.)

According to The Pioneer newspaper, Assistant Attorney General Richard Wexler said that Brainerd has been trying since 1972 to be exempted from a State law requiring fluoridation.

The newspaper quotes Wexler as saying "There's a legal principle that all litigation has a time when it should end and that time has passed."

The lawsuit charged that Sister Mary Madonna ignored information linking fluoride to cancer and that she never intended to fairly consider the alternative dental health plan.

Brainerd first fluoridated its water supply in 1980 in the face of a contempt citation. In 1983, the City Council at first refused to budget funds for fluoridation, but reconsidered after being threatened with court action. The City Council then offered an alternative dental health plan to fluoridation which was rejected by Sister Mary Madonna after considering a broad array of evidence on the matter.

COMMISSION UNABLE TO REQUIRE FLUORIDATION

The Pennsylvania Public Utility Commission has ruled it does not have the authority to make fluoridation a condition for approval of a rate increase.

Instead, the Commission said the decision about fluoridation rests with the Department of Health and the Department of Environmental Resources, agencies which have a more primary concern about water quality.

The decision was prompted by a formal complaint filed against the Philadelphia Suburban Water Company by Pennsylvania dentist Sheldon R. Rovin, charging the company with providing substandard service by not fluoridating the water.

Many dentists, testifying before the Commission at a rate increase hearing last year, argued that the lack of fluoridation has a direct bearing on rate increases, since nonfluoridated water does not meet usual quality standards and therefore has less value. (See January 1985 Dear Colleague for more information.)

COMMITTEE ASKS ILLINOIS COURT TO RECONSIDER

The Pure Water Committee, Inc. of Alton has asked the Illinois Supreme Court to reconsider its decision upholding the State's mandatory fluoridation law.

In the fall of 1984, the Illinois Supreme Court reversed the judgment of the circuit court of Madison County, which in 1982 struck down the 1967 law as

unconstitutional, saying forced fluoridation was unconstitutional because it forced people to take health risks.

The Supreme Court blocked that decision until it could consider the case.

As a result, John Yiamouyiannis, Ph.D., Director of the Center for Health Action, accused the Court of causing more than 2,000 cancer-related deaths in Illinois, which he says were caused by fluoridation.

A study cited by Yiamouyiannis which compares cancer-related death rates in communities with and without fluoridated water was criticized by the State attorney general's office for not taking into consideration environmental or other factors that could explain the differences.

NEW POSTER AVAILABLE FROM MAINE

A new color poster depicting mild, moderate, and severe cases of Nursing Bottle Mouth Syndrome has been developed by the Maine Department of Human Services, Office of Dental Health.

The 12" x 16" poster, which has "WARNING!" stamped across the top, is addressed to parents and offers suggestions to help save children's teeth from decay.

Suggested areas of display include dentist and pediatrician reception areas, dental clinics, WIC, EPSDT and Well Child Clinic sites, rural health centers, OB-GYN wards, and Lamaze classes.

The cost of the poster is one dollar. Checks or money orders should be made out to "Treasurer, State of Maine."

Order posters from:

Maine Department of Human Services
Office of Dental Health
State House, Station 11
Augusta, ME 04333

SEALANT MATERIAL DEVELOPED BY MASSACHUSETTS

A coloring book and brochure are two methods being used by the Massachusetts Department of Public Health, Division of Dental Health, to disseminate information about dental sealants.

Both materials were developed as joint projects by the Massachusetts Department of Public Health and the Massachusetts Health Research Institute, Inc.; both were supported by the Bureau of Health Care Delivery and Assistance, Maternal and Child Health Division.

The coloring book, designed by Jane A. Weintraub and illustrated by Susan Sophia, features Molly and Michael Molar in illustrations which depict the procedures for applying sealants. Rhymed captions under the pictures explain the procedures in simple terms.

A letter to parents on the inside front cover of the coloring book provides some background information on sealants, including why they are an important part of an overall personal dental health program.

The brochure, done in the same purple and buff colors as the coloring book, is oriented toward parents and presents information about sealants and their applications in question-and-answer form.

On the back of the coloring book and the brochure is a round picture of a seal with the message "Save teeth. Seal them." The seal picture is also available on peel-off stickers.

In addition to the above-mentioned materials the Division has devoted one of its Dental Health Fact Sheets to information on dental sealants.

For more information, contact:

Massachusetts Department of Public Health
Division of Dental Health
150 Tremont Street
Room 8M20
Boston, MA 02111

617/727-0732

ADULTS NEED FLUORIDE, TOO

The Division of Dental Health in Massachusetts has published a pamphlet explaining why fluoridation is good for adults as well as children.

Fluoridated water helps prevent cavities on roots exposed, as a result of receding gums, in adults who develop periodontal disease.

The brochure also discusses other life-long benefits of fluoride, such as its ability to help retain calcium and thus help to prevent osteoporosis, and the financial savings realized by adults who enjoy improved dental health as a result of drinking fluoridated water.

In addition to the brochure, the Division has devoted one of its Dental Health Fact Sheets to information about sources of fluoride and the benefits of fluoridation for both adults and children.

For more information, contact:

Massachusetts Department of Public Health
Division of Dental Health
150 Tremont Street
Room 8M20
Boston, MA 02111

617/727-0732

WASHINGTON STATE BROCHURE EXPLAINS SEALANT USE

The role of sealants in preventing tooth decay is the focus of a Washington State brochure.

In addition to written information and illustrations about tooth decay and sealants, the brochure names the American Dental Association and the National Institute of Dental Research as two organizations which accept sealants as safe and useful in the prevention of tooth decay.

Sealants are listed as part of an overall preventive dental health program which also includes brushing, flossing, and fluoride.

For more information, contact:

Dental Health Unit
Washington State Dept. of
Social & Health Services
Health Services Division
M.S. LC-12-A Olympia Airport
Olympia, WA 98504

206/753-5469

FLUORIDE SUIT FILED IN CANTON, OHIO

In a new battle in a continuing 25-year fight against fluoridation, six Canton residents have filed suit against the U. S. Environmental Protection Agency (EPA) for allegedly failing to require Ohio to conform to Federal law.

The claimants allege that the State law requiring fluoridation violates the Federal Safe Drinking Water Act of 1974.

However, an EPA spokesman, according to an Associated Press report, says the EPA function is to prevent contaminants from getting into the water and that "fluoride is not a contaminant."

According to the Akron Beach Journal newspaper, a Federal judge in Cleveland and the Federal appeals court in Cincinnati last year dismissed a suit filed by Canton residents seeking to block fluoridation of the city's water supply.

The newspaper reports that Canton fluoridated its water from 1952 to 1959, but stopped after residents voted against it. Voters rejected it a second time in 1962.

A 1969 State law required fluoridation in municipalities with more than 5,000 residents unless residents turned it down after the law's passage.

In 1973, a law was passed requiring fluoridation throughout Ohio, but a State appeals court ruled that the 36 communities exempt from the first law also were exempt from the second law, the newspaper said.

According to the newspaper, Canton sued the State over the court's ruling, arguing that if fluoridation is considered so important for public health, it should be required of everyone. The city also claimed that giving municipalities only one chance to reject fluoridation was unfair.

SMOKELESS TOBACCO CAN BE SERIOUS HEALTH THREAT

Available evidence shows that chronic long-term use of smokeless tobacco, in close contact with oral tissues, produces changes in these tissues that could have serious consequences, including oral cancer. Much of this evidence indicates that chronic, long-term use of smokeless tobacco can produce thickenings and white plaque of the lining of the mouth and defects in the tissues that support the teeth. In addition, the high sugar content of the tobacco carries an increased risk of decay to an already highly susceptible group of teen users.

Chronic, long-term use of smokeless tobacco is clearly harmful. Increased use of smokeless tobacco presents potentially serious health hazards for the public at large. Of particular concern is the sale of this potentially habituating product to minors, especially those below the age of 12. Advertising aimed at particularly vulnerable age groups, such as those influenced by sports heroes, also generates concern.

Smokeless tobacco includes both snuff and the different forms of chewing tobacco. Chewing tobacco can be purchased in three forms: plug, twist, or loose leaf. A plug is a kind of flat tobacco cake composed of leaf tobacco with a sweet flavoring. A twist is tobacco which has been twisted and sweetened. Loose leaf tobacco is shredded tobacco, which may be obtained flavored or plain.

Snuff can be purchased in a dry or moist form that is sweetened, scented, or flavored. A pinch is placed between the lip and gum space. It can also be inhaled through the nose.

Sales of these products have increased dramatically over the past 15 years, coinciding with the aggressive advertising, frequently involving athletes. All 50 states and the District of Columbia tax cigarettes. Currently, only 21

States tax smoking tobacco; 20 States tax chewing tobacco; and 18 States tax snuff. In some of the States, sales to minors are not restricted.

More data are needed on users of smokeless tobacco. The patterns are changing, but previously the traditional smokeless tobacco market was rural, blue collar, or occupational workers, such as coal miners, who work where smoking is not allowed. At present, use among urban youth, particularly athletes, is of increasing concern.

The World Health Organization labeled snuff as a carcinogen in November 1984. Currently, no State requires the labeling of smokeless tobacco products with a warning similar to that found on cigarette packages. Hearings were held in Massachusetts in February to require labeling in that State. (CDC provided testimony as to the health risks.) Surgeon General C. Everett Koop has stated, "Although the published reports of adverse health effects are fewer than for smoking tobacco, it is our position that smokeless tobacco, including snuff, does indeed pose a cancer threat and is associated with certain other pathological oral conditions."

FOR YOUR INFORMATION

The DDPA Dear Colleague letter is produced by Technical Information Services for the Dental Disease Prevention Activity, Center for Prevention Services, Centers for Diseases Control, Atlanta, Georgia 30333. If you have materials or ideas you would like to submit for publication, please send them to the above address.

For more information, contact Caffilene Allen at 404/329-1819 (FTS: 236-1819).

SELECTED FLUORIDATION BIBLIOGRAPHY

(Note: These articles are not available through CDC. Please consult your local library.)

Ainamo J, Parviainen K, Murtomaa H: Reliability of the CPITN in the epidemiological assessment of periodontal treatment needs at 13-15 years of age. *Int Dent J* 1984 Sep;34(3):214-8.

Anonymous: Plaque. Current approaches to prevention and control. *J Am Dent Assoc* 1984 Nov;109(5):690-702.

Bakdash MB, Lange AL, McMillan DG: Periodontal public service announcements: whom they reach and their effectiveness. *Northwest Dent* 1984 Sep-Oct;63(5):26-30.

Bruun C, Thylstrup A: Fluoride in whole saliva and dental caries experience in areas with high or low concentrations of fluoride in the drinking water. *Caries Res* 1984;18(5):450-6.

Chace R Jr: The periodontal patient: a rationale for alternating recalls. *J Dent Pract Adm* 1984 Oct-Dec;1(4):171-4.

Chudakov BK: Sugar in medications: the covert contributor to dental disease. *Can Dent Assoc J* 1984 Aug;50(8):612-4.

Collins EM, Segreto VA: Urinary fluoride levels of children residing in communities with naturally occurring fluorides in the drinking water. *ASDC J Dent Child* 1984 Sep-Oct;51(5):352-5.

Davis P: Prevention and control of periodontal disease at the community level: is it feasible? Reaction: consensus and contention. *NZ Dent J* 1984 Oct;80(362):125-7.

Edelman E, Shapira J, Houpt M: The retention of fissure sealants using twenty-second etching time. *ASDC J Dent Child* 1984 Nov-Dec;51(6):422-4.

Entwistle B: Private practice preventive dentistry for the special patient. *Spec Care Dentist* 1984 Nov-Dec;4(6):246-52.

Friis-Hasche E, Bergmann J, Wenzel A, et al: Dental health status and attitudes to dental care in families participating in a Danish fluoride tablet program. *Community Dent Oral Epidemiol* 1984 Oct;12(5):303-7.

Greenstein G: Shortcomings of the Keyes methodology. *Compend Contin Educ Dent* 1984 Oct;5(9):774-6.

Horowitz HS, Meyers RJ, Heifetz SB, et al: Eight-year evaluation of a combined fluoride program in a nonfluoride area. *J Am Dent Assoc* 1984 Oct;109(4):575-8.

Jerrell RG, Bennett CG: Utilization of sealants by practicing pedodontists. J Pedod 1984 Summer;8(4):378-86.

Koop CE: Dental sealants. J Public Health Dent 1984 Summer;44(3):126.

Kunzel W: Effects of comprehensive preventive programs on oral health in children and juveniles in congested industrial areas. Int Dent J 1984 Sep;34(3):161-5.

Luoma H, Seppa L, Koskinen M, Syrjanen S: Effect of chlorhexidine-fluoride applications without and with Sr and Zn on caries, plaque, and gingiva in rats. J Dent Res 1984 Oct;63(10):1193-6.

Ngim CH, Peterson DR, Milgrom P: Epidemiologic study of dental emergencies among utilizers in an insured population in Washington, USA. Community Dent Oral Epidemiol 1984 Oct;12(5):337-42.

Poulsen S, Kirkegaard E, Bangsbo G, Bro K: Caries clinical trial of fluoride rinses in a Danish Public Child Dental Service. Community Dent Oral Epidemiol 1984 Oct;12(5):283-7.

Ripa LW, Leske GS, Sposato A, Varma A: Effect of prior toothcleaning on bi-annual professional acidulated phosphate fluoride topical fluoride gel-tray treatments. Results after three years. Caries Res 1984;18(5):457-64.

Ripa LW, Leske GS, Varma A: Effect of mouthrinsing with a 0.2 per cent neutral NaF solution on the deciduous dentition of first to third grade school children. Pediatr Dent 1984 Jun;6(2):93-7.

Saparamadu KD: Prevention of oral diseases in developing countries. Int Dent J 1984 Sep;34(3):166-9.

Seppa L, Tuutti H, Luoma H: Post-treatment effect of fluoride varnishes in children with a high prevalence of dental caries in a community with fluoridated water. J Dent Res 1984 Oct;63(10):1221-2.

Silversin J, Kornacki MJ: Acceptance of preventive measures by individuals, institutions and communities. Int Dent J 1984 Sep;34(3):170-6.

Wefel JS, Harless JD: Topical fluoride application and lesion progression in vitro. J Dent Res 1984 Nov;63(11):1276-8.

Wilton JM: Future control of dental disease by immunization: vaccines and oral health. Int Dent J 1984 Sep;34(3):177-83.

Wright JT, Retief DH: Laboratory evaluation of eight pit and fissure sealants. Pediatr Dent 1984 Mar;6(1):36-40.

Epidemiologic Notes and Reports

Hepatitis B among Dental Patients — Indiana

Between April 1, and December 30, 1984, nine cases of clinical hepatitis B (HB) occurred in a rural Indiana county (population 35,000); this was nine times the normal yearly HB incidence for the past decade. Two of the cases resulted in fatal fulminant hepatitis; an additional case was complicated by polyarteritis nodosa, mononeuritis multiplex, and paralysis. All cases except one had been treated by a dentist in the county.

In mid-September, the dentist, who had practiced general family dentistry in the county for 20 years and saw between 100 and 150 patients per week, noted that all three of the cases to date had been his patients. Because of his possible involvement, he was tested for hepatitis B surface antigen (HBsAg) and found to be positive. He then voluntarily suspended his practice and notified health authorities. Initial investigation by the Indiana State Board of Health and CDC revealed that seven patients who had developed clinical HB between April 1 and October 1 were among the dentist's patients. All were positive for HBsAg, subtype *ad*, and all of six available sera were positive for the IgM fraction of hepatitis B core antibody (anti-HBc IgM), indicating probable recent infection. Although the dentist had no known history of HB infection, his serum was positive for HBsAg, subtype *ad*, and hepatitis e antigen (HBeAg) but negative for anti-HBc IgM.

The dentist did not routinely wear gloves when treating patients but denied lacerations or dermatitis on the hands. He gave no history of hepatitis and had no knowledge of HB carriers in his practice. Other than practicing dentistry, he denied all risk factors for HB. He was not a blood donor and had never been tested serologically for hepatitis. On April 25, and May 30, 1984, he had received his first two doses of HB vaccine.

Further investigation of the outbreak by CDC in late October concentrated on case-finding and interviews of the dentist, his assistants, and the known HB patients and their families. Appropriate blood specimens were also taken. A comparison of the dentist's 1984 patient list with reported HB cases in Indiana uncovered no new cases. However, a review of county residents rejected for blood donation because of HBsAg-positivity found one patient, who, asymptomatic at the time, had been treated by the dentist several times between May and July and was rejected for blood donation in August. Since she had donated blood in March, her HB infection was considered outbreak-related. Clinical disease, however, did not develop until November 13, nearly 3 months after she became antigen-positive.

The spouse of one HB patient was found to be HBsAg positive, serotype *ad*, HBeAg positive, and anti-HBc IgM negative. He had not been treated by the dentist within the last 2 years but had other risk factors for HB. No other patient's family member had positive HB markers. The patients had no histories of risk factors for HB except traumatic dental work (procedures that produced bleeding) by the dentist 3-5 months before onset of symptoms. None of the HB patients were taking hepatotoxic drugs. Antibody and antigen tests for delta virus were negative on the dentist and all seven of the HB patients tested.

In mid-December, a large seroprevalence study was carried out on the dentist's patients in an attempt to determine the degree of subclinical transmission; results of this study are pending. The dentist has not resumed his practice.

Reported by RH Hamm, MD, RB Peare, MD, WL Painter, KC Allman, M Hamilton, K Cutting, CL Barrett, MD, State Epidemiologist, Indiana State Board of Health; Hepatitis Br, Div of Viral Diseases, Center for Infectious Diseases, CDC.

Editorial Note: HB is a significant health risk for dental professionals (1,2) but is only rarely associated with transmission from dentist to patient. Seven HB outbreaks traced to dentists or oral surgeons have been reported. In each instance, the dental professional was a chronic carrier of HB virus and was HBeAg positive, indicating high titers of HB virus in blood. None used gloves when treating patients. Transmission of HB virus was thought to occur by transfer of infective serum from the dentist's hands into the patient's mouth through small abrasions, lacerations, or dermatitis. When subclinical transmission was studied, the overall rate of infection ranged from 1.5 infections per 100 patients screened to 11.1/100. The risk of transmission correlated with the amount of trauma involved in the dental procedure. For those dentists who remained carriers and returned to work, wearing gloves was usually successful in preventing further transmission (3).

The present outbreak illustrates again that HBsAg-positive dentists can unknowingly transmit infection to patients. Available epidemiologic and serologic data suggest that the Indiana dentist was infected before January 1984, too early to be affected by HB vaccine started in April, and that he probably obtained his infection while treating an HB-carrier patient. The dentist and the HB patients had matching antigenic subtypes. However, since *ad* subtype is extremely common in the United States, this does not prove that the dentist was the source of the outbreak as convincingly as the time/place clustering in his practice and the lack of other risk factors among the HB patients.

The 22% case-fatality rate in this outbreak is much higher than the usual rate of 1% of hospitalized HB patients. Furthermore, one patient suffered severe polyarteritis nodosa, a complication seen in no more than 1 of 500 cases. Neither coinfection with delta virus nor the use of hepatotoxic drugs explain the unusual amount of severe disease in this outbreak. CDC is continuing to investigate the possibility that a non-B hepatitis virus could be a cofactor in the outbreak.

This is the first reported outbreak of HB traceable to a dentist that has involved deaths. It illustrates an uncommon but serious consequence of HB infection in the dental profession. Outbreaks of this type should reinforce efforts to deliver HB vaccine to dental professionals early in their careers.

References

1. Mosley JW, Edwards VM, Casey G, Redeker AG, White E. Hepatitis B virus infection in dentists. *N Engl J Med* 1975;293:729-34.
2. Smith JL, Maynard JE, Berquist KR, Doto IL, Webster HM, Sheller MJ. From the Center for Disease Control. Comparative risk of hepatitis B among physicians and dentists. *J Infect Dis* 1976;133:705-6.
3. Ahtone J, Goodman RA. Hepatitis B and dental personnel: transmission to patients and prevention issues. *J Am Dent Assoc* 1983;106:219-22.

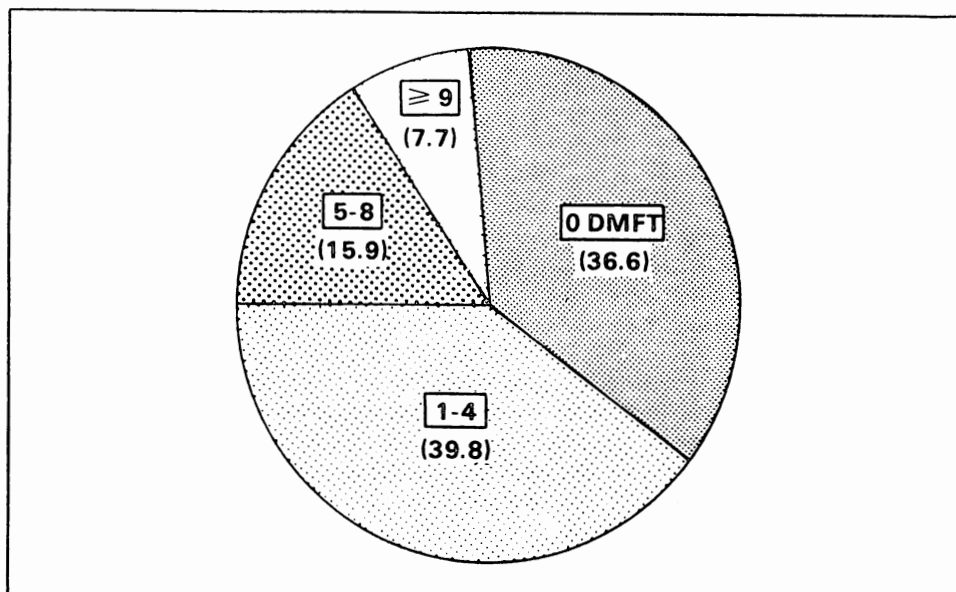
Perspectives in Disease Prevention and Health Promotion

**Dental Caries
and Community Water Fluoridation Trends — United States**

One of the 12 fluoridation and dental health objectives identified in the U.S. Public Health Service's Objectives for the Nation (1) states: **By 1990, the number of 9-year-old children who have had caries in their permanent teeth should be decreased to 60% (40% would be caries-free).** In 1971-1973, 71% of these children had caries in their permanent teeth. The National Caries Prevalence Survey, conducted by the National Institute of Dental Research (NIDR) in 1979-1980 (2), reported that 49% of these children have had decay in their permanent teeth, demonstrating this objective has been achieved. The survey also reported that 89% of 17-year-olds have had dental caries (2). Although 37% of children aged 5-17 years were caries-free, approximately 24% of children in the same age group have had five or more decayed, missing (due to caries), and/or filled permanent teeth (Figure 1).

When the NIDR survey is compared with an earlier, similar survey by the National Center

FIGURE 1. Percentage distribution of children aged 5-17 years, by DMFT* status — United States, 1979-1980



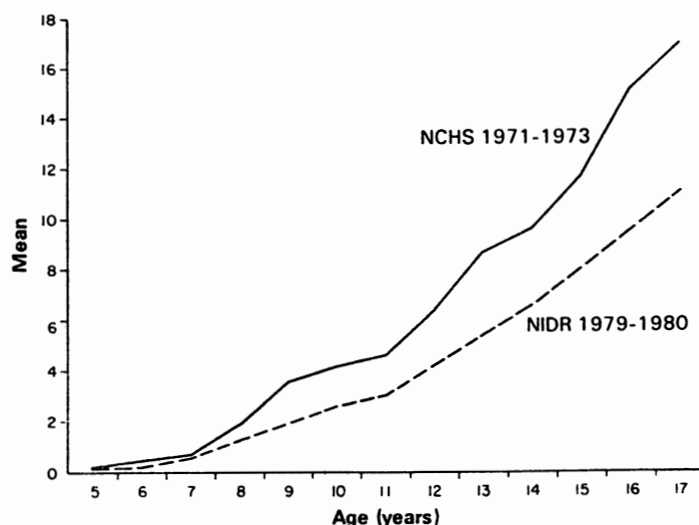
*Decayed, missing (due to caries), and/or filled permanent teeth.

for Health Statistics, the prevalence of dental decay among school-aged children appears to have been significantly reduced since 1973 (Figure 2) (2,3). The availability of fluorides from a number of sources, including community and school water fluoridation, fluoride tablets and drops, fluoride rinses and dentifrices, and clinically applied fluorides, have contributed to the decline in dental caries. It is difficult to attribute this decline to one specific modality, and the effects are not arithmetically additive. However, the combination of systemic and topical fluorides has contributed greatly to improved oral health in the United States. In 1985, approximately 20,000 employed adults and 5,000 older adults at senior citizen centers will be surveyed as part of an NIDR National Survey of Adult Dental Health. Oral health status and data on treatment needs from this survey will be available in 1987.

Although community water fluoridation remains the most effective and practical means of preventing and controlling dental caries, nearly half the U.S. population still does not have access to optimally fluoridated water. The optimal amount of fluoride necessary to reduce the most dental decay, with the least amount of risk of dental fluorosis (discoloration of the enamel), is 0.7-1.2 mg/l (0.7-1.2 parts fluoride per 1 million parts water) (4). Fluoride occurs naturally in most waters but usually at less than optimal levels. Since it is assumed that people in warmer climates drink more water than people in colder climates, the optimal level is lowest in the southernmost part of the United States. Therefore, the optimal fluoride level is calculated based on the annual average of maximum daily air temperature (5).

Since the introduction in 1945 of the practice of adjusting fluoride levels in community water systems, the number of people with access to water with dentally significant levels of fluoride (0.7 parts per million [ppm] or higher) has increased steadily to an estimated 123 million in 1983—approximately 52.2% of the total U.S. population (6,7). It is impractical to expect 100% coverage, because a portion of the population is not served by public water sup-

FIGURE 2. Mean DMFS* for children aged 5-17 years — United States†



*Decayed, missing (due to caries), and or filled permanent tooth surfaces.

†From the 1971-1973 National Center for Health Statistics (NCHS) Survey and the 1979-1980 National Institute of Dental Research (NIDR) Survey.

plies (approximately 6% in 1983) (6,8). However, in some of these water supplies, fluoride occurs naturally at optimal levels, and the number of people served by naturally fluoridated water has remained fairly constant at approximately 10.7 million (Figure 3) (6,7). Excluding this portion, the estimated percent of the population on public water supplies receiving fluoridated water was 56.5% in 1983.

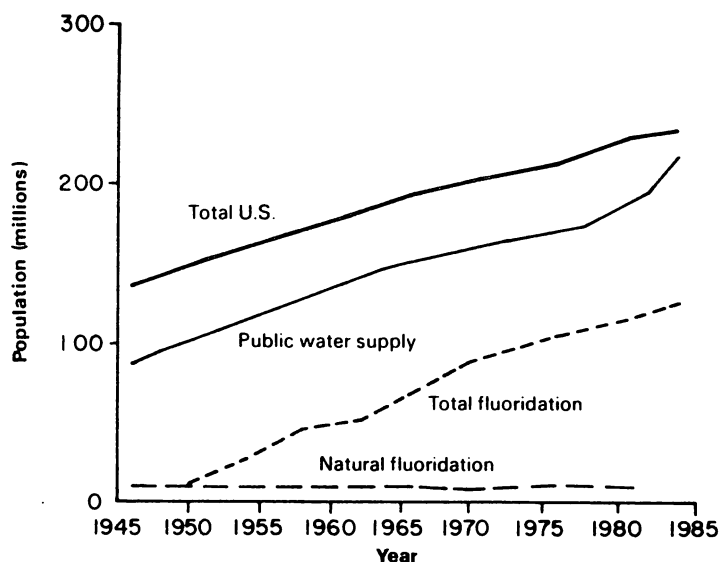
However, the number of people served by public water supplies is increasing (Figure 3). This trend can be explained by increased urbanization of the U.S. population. The population served by public water supplies varies from state to state and ranges from 29% in Oregon to 99% in Illinois and Maryland. The population served by public water supplies in Washington, D.C., is 100% (6,8).

Another national fluoridation and dental health objective for 1990 states: **At least 95% of the population on community water systems should be receiving the benefits of optimally fluoridated water.** Of the 60,000 public water supplies in the United States, only about 8,000 are fluoridated (6,8). Approximately 46,000 of these systems serve populations of under 1,000, and 150 systems serve populations of more than 100,000 (6,8). The public water systems of nine of the 50 largest cities in the United States are not fluoridated: Los Angeles, San Diego, and San Jose, California; Phoenix, and Tucson, Arizona; San Antonio, Texas; Portland, Oregon; Honolulu, Hawaii; and Newark, New Jersey (9). Past experience has shown that the length of time needed to implement fluoridation in a given community is not necessarily related to the size of the community but rather to other factors, such as how the decision to fluoridate is made (e.g., city council, referendum), and the effectiveness of public health education programs about the benefits of fluoridation.

The maintenance of the optimal level of fluoride is critical once a water system is fluoridated. It has been shown that the dental benefits from fluoridated water are significantly reduced if fluoride levels drop below the optimal concentration (10-12).

The results of the National Preventive Dentistry Demonstration Program conducted by The Robert Wood Johnson Foundation indicate that, "At an estimated cost of less than \$1 per child per year, fluoridation remains society's least expensive and most effective caries preventive measure" (13).

FIGURE 3. Fluoridation growth, by population — United States, 1945-1984



Reported by Dental Disease Prevention Activity, Center for Prevention Svcs, CDC.

References

1. U.S. Public Health Service. Promoting health/preventing disease: objectives for the nation. Washington, D.C.: U.S. Department of Health and Human Services, 1980.
2. National Institutes of Health, National Institute of Dental Research, National Caries Program. The prevalence of dental caries in United States children, 1979-1980; the national caries prevalence survey. Washington, D.C.: U.S. Public Health Service, 1981. (NIH publication no. 82-2245).
3. National Center for Health Statistics, National Health Survey, 1971-1973. Unpublished data, 1978.
4. Galagan DJ, Vermillion JR. Determining optimum fluoride concentrations. Public Health Rep, 1957;72:491-3.
5. Galagan DJ. Climate and controlled fluoridation. Am Dent Assoc J 1953;47:159-70.
6. CDC. Fluoridation census, 1980. June 1984.
7. CDC. Unpublished data.
8. U.S. Environmental Protection Agency. Facilities and population by primary water supply source. Washington, D.C.: U.S. Environmental Protection Agency, 1984.
9. CDC. Over 115 million people on fluoridated water supplies in U.S. as of December 31, 1980. Atlanta, Georgia: Centers for Disease Control, April 1984.
10. Chrietberg JE, Lewis JE. Effect of modifying sub-optimal fluoride concentration in public water supply. Ga Dent Assoc J, July 1962:12-7.
11. Sweeney EA, Murphy TJ, Steinhurst J, Taylor FB. Experiences in maintaining fluoride concentrations at optimal level in Massachusetts public water supplies. Mass Dent Soc J, Summer 1978:147-55.
12. American Dental Association. Omaha's fluoridation from .6 to 1 ppm reduces caries 44%. Am Dent Assoc News, 1980.
13. The Robert Wood Johnson Foundation. Special report: national preventive dentistry demonstration program. Chicago: Robert Wood Johnson Foundation, 1983.