Tooth decay affects more children than any other chronic infectious disease, yet it is almost entirely preventable [1]. The Oral Health Section of the North Carolina Division of Public Health stresses the importance of prevention and promotes opportunities for citizens to achieve good oral health as part of total health.

Although the overall oral health of the nation has improved dramatically in the last 60 years, a segment of society has been left behind. People with low incomes, minorities, immigrants, those with special health care needs, and people living in rural areas have difficulty accessing care and maintaining good oral health [1]. Oral diseases and conditions can be prevented and controlled at reasonable cost through personal and population-based preventive interventions. Only through prevention—not treatment—can the burden of dental disease, especially among North Carolina’s most vulnerable populations, be reduced.

Need for Additional Prevention

Tooth decay (cavities) starts as a reversible white spot on the tooth. At this early-stage, tooth decay can remineralize (repair itself) under the right conditions. These early-stage cavities respond best to preventive dental interventions such as preventive dental sealants and fluorides (eg, community water fluoridation, fluoride varnish and other topical treatments such as fluoride toothpaste, and fluoride mouthrinse). Without preventive intervention, white spots progress to visible irreversible tooth decay that can lead to tooth loss, pain, and suffering. The 2003-2004 Statewide Dental Survey of North Carolina School Children, conducted by the Oral Health Section (OHS) of the North Carolina Division of Public Health, looked at both obvious tooth decay and early-stage tooth decay. Results showed that the true amount of tooth decay in the North Carolina population is underestimated, probably by about 35% to 40% based on the exclusion of noncavitated lesions alone. Non-cavitated lesions are responsive to fluoride therapy and other preventive interventions, which reinforces the need to enhance preventive strategies so these early cavities do not progress and require treatment [2].

Despite dramatic improvements in decay rates in permanent teeth, we have not seen such improvements in primary (baby) teeth. When North Carolina’s children enter kindergarten, 37% of them have already been affected by tooth decay in their primary teeth [3], which is a strong predictor of tooth decay in permanent teeth. Emerging evidence demonstrates that early preventive dental services are effective and significantly reduce the need for expensive dental treatment services later in life [4].

North Carolina’s Interventions

The OHS provides or facilitates a variety of community-based preventive interventions and educational services across the state that are targeted to high-risk children. Most services are aimed at reducing preventable dental disease, as spelled out in both the national Healthy People 2020 [5] and the state-level Healthy North Carolina 2020 [6] oral health promotion and disease prevention objectives. In addition, the OHS works toward eliminating disparities in oral health by using community water fluoridation and school-based dental sealant programs. These are promoted by the Association of State and Territorial Dental Directors, the Centers for Disease Control and Prevention, and the Community Preventive Services Task Force as two very effective public health measures [7-9].

The OHS has a staff of 52, including 4 public health dentists and 39 public health dental hygienists, plus health educators and support staff. Most reside in the communities they serve, work in cooperation with local health departments, and provide community-based services, reaching an estimated 220,000 children during state FY 2010-2011.

In the effort to reduce the amount of dental disease, the OHS and some local health departments provide the services listed below. Smart Start and the Blue Cross and Blue Shield of North Carolina Foundation also provide local funding for some early intervention dental services targeting young children.

Prevention. Community water fluoridation continues to be the most cost-effective method of preventing tooth decay.
decay. It also is an equitable method of disease prevention, meaning all people benefit regardless of their income, educational level, age, or ability to get dental treatment. The CDC reports that in larger communities, for every $1 spent on community water fluoridation, at least $38 is saved in treatment costs for tooth decay [10]. Eighty-six percent of North Carolina citizens served by municipal water supplies now receive fluoridated water [11]. The OHS provides technical assistance and uses federal grant funds to provide financial assistance to fluoridate water systems.

School-based dental sealant programs help students without a source of dental care receive preventive dental services. Sealants are effective at preventing dental decay when delivered to populations at high risk for tooth decay, such as children in low-income households [12]. The OHS promotes the use of dental sealants through dental health education and health promotion. OHS staff also conduct sealant placement projects in elementary schools or other suitable locations, targeting children at high risk for developing tooth decay and assisting with sealant projects performed by our community partners.

In addition, the OHS conducts a weekly fluoride mouth-rinse (FMR) program for almost 52,000 children in targeted high-risk elementary schools. Data from the OHS’s most recent statewide children’s dental survey indicate that children in high-risk schools may experience substantial caries-preventive benefits from long-term (3 or more years) FMR participation. This, in turn, reduces the disparity between the amount of tooth decay experienced by children of high-income families compared with children of low-income families. Each participating child uses the fluoride rinse once a week during the school year. Decay reduction benefits increase each year the child participates, and supplies for the program cost less than $5 per child per year.

**Prevention for very young children.** Trends in primary tooth decay emphasize the need for expanding dental prevention programs for high-risk preschool children and prompted the OHS to collaborate with the University of North Carolina (UNC)-Chapel Hill Gillings School of Global Public Health, the UNC-Chapel Hill School of Dentistry, the North Carolina Division of Medical Assistance, the North Carolina Pediatric Society, the North Carolina Academy of Family Physicians, the North Carolina Dental Society, and other partners to address this problem by creating the Into the Mouths of Babes (IMB) program. This Medicaid-reimbursed program addresses early childhood tooth decay in very young children. Because visits by infants and 1-year olds to physicians outnumber those to the dentist by 250 to 1 [13], the OHS provides training and support for physician-based practices and local health departments serving young children. The providers are trained to provide preventive dental services (i.e., counseling for the parent on how to care for their child’s teeth, fluoride varnish application, and oral evaluation and risk assessment with referral for dental treatment if necessary) for Medicaid-covered infants and toddlers in a medical setting. Medicaid reimburses the medical providers up to 6 times before the child reaches age three and one-half years of age. Last year, almost 134,400 preventive dental encounters were provided to high-risk children in medical settings. Recent North Carolina Medicaid data show that 43% of Medicaid-covered children who have a well-child visit receive at least 1 IMB service package during a given year. Analysis by the Gillings School of Global Public Health shows that the program works. Children who had 4 to 6 IMB visits while they were 6 to 72 months of age show a 17% reduction in caries-related treatment needs [4].

The Priority Oral Health Risk Assessment Tool (PORRT) is an extension of IMB that is aimed at helping to ensure that children who need to see a dentist are appropriately referred. This provider-friendly risk assessment tool was developed jointly by the Gillings School of Global Public Health, UNC-Chapel Hill School of Dentistry, Division of Medical Assistance, OHS, and privately practicing pediatricians and dentists who tested the tool. Based on a systematic literature review, the assessment identifies risk factors that place infants and toddlers at high risk for tooth decay. Medical providers are assisting with further evaluation to identify and refer the youngest high-risk children to dental homes.

The OHS also partners with the Gillings School of Global Public Health in the Zero Out Early Childhood Tooth Decay Project (ZOE) by providing oral health education to Early Head Start staff in 25 programs across North Carolina.

Because of the extensive collaborations in our state, North Carolina is considered a national leader in innovative collaborations between medicine and dentistry to address the challenges of tooth decay and accessing dental care for the preschool population.

**Access to dental care.** The OHS also works to improve access to dental care for underserved populations through referral and follow-up to dental screenings. These services are targeted primarily toward children in kindergarten and fifth grades (and other selected grades as needs and resources permit). Follow-up and referral to local oral health care providers is given to children identified during assessments as needing dental care. Last year, more than 145,000 children were screened; over 15,000 were found to be in need of dental care, and staff were able to find care for almost 6,000 children. In addition, OHS staff support and assist with the annual Give Kids a Smile! promotion sponsored by the American Dental Association and the North Carolina Dental Society. During this promotion, dental professionals volunteer to provide free dental services for at-risk children.

The past decade has seen substantial growth across the state in non-profit safety net dental clinics. There have also been improvements in Medicaid reimbursement rates for services primarily affecting children, so access for children has improved. However, access to dental care for indigent adults continues to be a challenge.
Health promotion/education. Education about tooth decay, prevention, and oral health is a critical component of all OHS activities. Last year, the OHS provided educational services for more than 131,000 children and 10,600 adults who influence the health of children, including health care providers. To support educational efforts, there are OHS dental health exhibits on 9 topics. The OHS also has printed educational materials, some of which are available on the Web site at http://www.oralhealth.ncdhhs.gov.

Also as part of its education efforts, the OHS provides a Dental Public Health Residency program accredited by the American Dental Association. The residency trains dentists to practice the specialty of dental public health in an array of health care settings.

Monitoring the public’s oral health. North Carolina has one of the most comprehensive oral health surveillance systems in the nation. OHS has a standardized screening technique, which is conducted annually as part of the kindergarten and fifth grade screening program. This standardized technique allows for a simple but accurate and reliable measurement of decayed and filled teeth. This gives an indication of both the oral health status and treatment needs of public school children in kindergarten and fifth grades statewide, as well as the level of dental disease within each county. In 2008-2009, 17% of kindergarten children and 4% of fifth graders had untreated decay. Forty-four percent of fifth graders had dental sealants [3].

North Carolina is the only state with a series of statewide oral epidemiological surveys dating back to the early 1960s; the OHS conducts these detailed statewide dental surveys approximately every 15 years, subject to the availability of outside funding.

Conclusion

Although the last 60 years have seen dramatic reductions in the prevalence of tooth decay, oral health disparities and difficulties in accessing dental care still exist in North Carolina. Too many citizens, particularly children from low-income families and minorities, continue to experience preventable oral diseases. Unfortunately, service numbers and counties served by the OHS are declining due to budget cuts and position eliminations. Budget challenges continue and vacant positions remain unfilled. For example, as a result, the ratio of public health dental hygienists to the elementary school population has decreased from 1:13,500 in 2006-2007 to 1:18,000 in 2011-2012.

Addressing the oral health of North Carolina’s children is paramount to child development and lifetime health. Children experiencing pain from infected teeth and gums cannot eat well or sleep well at night, and they suffer from reduced self-esteem and perform poorly in school. The OHS’s preventive dental efforts to reduce tooth decay help ensure that all North Carolina citizens achieve oral health as part of total health, resulting in an enhanced quality of life.

Rebecca S. King, DDS, MPH section chief, Oral Health Section, Division of Public Health, North Carolina Department of Health and Human Services, Raleigh, North Carolina.

C. Jean Spratt, DDS, MPH dentist supervisor, Oral Health Section, Division of Public Health North Carolina Department of Health and Human Services, Raleigh, North Carolina.

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