Dental Caries

Dental caries, also called "tooth decay" or "cavities," is the most prevalent chronic infectious disease among children in the United States according to the Centers for Disease Control and Prevention.[1] The US Surgeon General reported in 1996 that 58.6% of youth ages 5-17 years in the US had had a dental caries, making dental caries more than 5 times more common than asthma, and 7 times more common than hay fever.[2]

Dental caries is caused by specific tooth-adherent bacteria (cariogenic bacteria) which metabolize sugars and other carbohydrates to produce acid. Over time, the acid causes the tooth to decay, which, if untreated, can lead to infection, pain, swelling, abscess, and the spread of infection through the bloodstream.[2-4] These bacteria can be transmitted from one person who hosts the bacteria to another. The transmission of cariogenic bacteria from mother to infant has been well-documented.[3] Dental caries are considered a chronic disease.[5] Oral hygiene practices and dental care seek to delay the transmission of cariogenic bacteria from mother (or other caregiver) to infant, and manage the impact of the bacteria on teeth and oral tissue from the first eruption of primary teeth and throughout an individual's life.

Dental caries is the most prevalent chronic infectious disease among children in the United States. Fortunately, dental caries is both preventable and manageable.

Tooth decay has significant consequences for children, their families, and communities. Dental caries in primary teeth put a child at higher risk of future caries in both primary and permanent teeth and can affect children's physical growth and development.[3,6] Tooth decay, which can lead to pain and swelling, can limit a child's ability to eat and speak, and create problems which distract from a child's ability to learn. The pain and discomfort diminishes a child's quality of life.[4,6] Untreated decay can also result in potentially life-threatening infection.[3] Families must also cope with increased treatment costs for advanced decay including oral surgery, hospitalizations, and emergency room visits.[6] Fortunately, dental caries is both preventable and manageable.

Dental disease is the greatest unmet health need of children.[4] From 1999-2004, 23.8% of US children aged 3-5 years had untreated dental decay in at least one primary tooth.[7] A number of factors put some children at greater risk of developing dental caries, particularly low socioeconomic status and minority race/ethnicity.[2] In North Carolina, 14% of children in kindergarten (ages 5-6) had untreated dental decay in at least one primary care tooth, and 3% of fifth grade students (ages 10-11) had untreated dental decay in at least one permanent tooth.[a] Among children ages 2-9 in the United States, poor Mexican American children have the highest proportion of untreated decayed primary teeth (70.5%) followed by non-Hispanic black children (67.4%). This is in contrast to 37.3% of non-poor, non-Hispanic white children.[2] The trend

a King, Rebecca. Section Chief, Oral Health Section, Division of Public Health, North Carolina Department of Health and Human Services. Written communication May 31, 2013.

continues among adolescents ages 12-17 years, with 47.2% of poor Mexican American adolescents, 43.6% of non-Hispanic black adolescents, and 12.1% of non-poor non-Hispanic white adolescents with untreated decay in permanent teeth.[2] The American Academy of Pediatric Dentistry (AAPD) reports that infants who are of low socioeconomic status, who consume a diet high in sugar, and whose mothers have a low education level are 32 times more likely to develop early childhood caries.[3] Children of low-income families have five times more untreated caries than children from higher income families.[8]

Oral Health from Young Children through Adolescence

Dental caries, which can lead to pain and swelling, can limit a child's ability to eat and speak, and create problems which distract from a child's ability to learn.

Tooth decay can begin as early as the eruption of an infant's first teeth. Both inadequate oral hygiene and inappropriate feeding practices contribute to the development of dental caries, which can be especially damaging in vulnerable primary teeth under the age of 6 years.[2,4,9] Caries before the age of six has been termed early childhood caries, but in the past has been referred to as "nursing bottle caries" or "baby bottle tooth decay" due to the risk factor posed by infant feeding practices that allow prolonged exposure of teeth to carbohydrates or sugars. Specifically, prolonged feeding, use of a bottle past the 1st year of life, and sleeping with a bottle prolong the exposure of teeth to milk sugar. Early childhood is an optimal time for parents to establish lifelong positive oral hygiene and dietary habits. Professional preventive dental care through the establishment of a dental home at age one is also ideal for good oral health. A dental home is the "ongoing relationship between the dentist and the patient, inclusive of all aspects of oral health delivered in a comprehensive, continuously accessible, coordinated and family-centered way.[9,10]"

The prevalence of dental caries increases with age.[2] According to the AAPD, more than 40% of children have caries by the time they reach kindergarten, and the prevalence of caries in poor children under the age of 5 is increasing.[3] Older children experience the loss of primary teeth and the eruption of permanent teeth. It is an important time to reinforce appropriate oral hygiene and dietary habits for caries prevention. Additional preventive treatments include sealants as the permanent molars erupt.[9] As children age and enter adolescence, increased exposure to foods high in sugar and increased independence and responsibility for oral hygiene often put them at higher risk for dental caries. Among 17-year olds, the proportion of youth with dental caries increases to 77.9%.[2] In addition, risk of injury to the mouth during play and organized sports, and the detrimental impact of tobacco use and eating disorders, such as bulimia, on oral health become a greater focus in preventive oral health education for adolescents.[9]

Dental Care Covered by Medicaid and NC Health Choice

In North Carolina, 46% of children ages 1-20[b], or approximately 1.2 million children, receive health care coverage through Medicaid or NC Health Choice, North Carolina's State Children's Health Insurance Program.[11-13] Children ages 0-5 who have family incomes below 200% of the federal poverty level (FPL)[c] are eligible to enroll in Medicaid. Children ages 6-18 with family incomes below 100% of FPL are eligible to enroll in Medicaid and those with family incomes between 100-200% FPL are eligible to enroll in NC Health Choice.[1] In addition, young adults ages 19-20 are eligible for Medicaid if their income is less than approximately 50% FPL. In North Carolina, 65,026 young adults ages 19-20, or 22%, received health care coverage through Medicaid in FFY 2012.[12,13] Both programs are administered by the Division of Medical Assistance (DMA) within the North Carolina Department of Health and Human Services.

This Task Force focused on increasing the utilization of preventive services by children enrolled in Medicaid and NC Health Choice.

Medicaid and NC Health Choice provide coverage for preventive care, diagnostic services, restorative care, endodontic care, periodontal care, dentures, extractions and other oral surgeries, and medically required orthodontics. In 2012 Medicaid and NC Health Choice dental expenditures for children totaled $254 million in North Carolina.[14] The federal government pays approximately 66% of the cost of care for Medicaid enrollees and 76% of the cost of care for NC Health Choice enrollees. The state covers the rest of the costs.[15,16]

This Task Force focused on increasing the utilization of preventive services by children enrolled in Medicaid and NC Health Choice. Medicaid and NC Health Choice define preventive care as including cleanings and fluoride treatments; sealants for primary teeth (patients under age 8) and permanent molars (patients under age 16) once per lifetime per tooth; and space maintainers.[14] Medicaid and NC Health Choice cover preventive care with no copays or coinsurance required. Most preventive services must be provided by dental professionals, however, North Carolina's Into The Mouths of Babes (IMB) program trains primary care providers to deliver preventive dental care services including oral evaluation, parent/caregiver education, and fluoride varnish application to children enrolled in Medicaid.[17]

In federal fiscal year (FFY) 2012, 45% of children enrolled in Medicaid received at least one preventive dental service.[12] In 2010, among children and young adults ages 2-20 who were continuously enrolled in Medicaid for 11 out of 12 month, 56% utilized oral health services provided by dentists. By including the number of children receiving fluoride varnishes by primary care providers this percentage increases to 60%. It is estimated that approximately 58% of children

b In this report, we will use the term children to refer to the population ages 1-20 unless otherwise noted.

c In 2013, the federal poverty level for a family of four is $23,550. 200% of the federal poverty level is $47,100. (Office of the Assistant to Secretary for Planning & Evaluation. US Department of Health and Human Services. 2013 Poverty Guidelines. http://aspe.hhs.gov/poverty/13poverty.cfm. Accessed June 6, 2013.)

ages birth-20 with private dental insurance plans utilize oral health services during the year.[14] In FFY 2012, 17% of eligible children ages 6-9 enrolled in Medicaid received a sealant and 19% of eligible children enrolled in NC Health Choice ages 6-9 received a sealant.[12,14]

Preventive Oral Health Services

As noted earlier, Medicaid and NC Health Choice cover certain preventive services, including cleanings, fluoride treatment, sealants, and space maintainers. These services are described in more detail below:

Medicaid and NC Health Choice cover certain preventive services, including cleanings, fluoride treatment, sealants, and space maintainers.

- *Cleanings (Dental Prophylaxis).* Dental cleanings typically include the removal of plaque, calculus, and stains from the teeth through scaling and polishing.
- *Fluoride Treatment.* Fluoride is a mineral that helps prevent cavities and promote remineralization of teeth. Most children receive fluoride systemically through fluoridated community water sources. Fluoride is also applied to teeth topically at the dental or medical office in gel or varnish form.
- *Pit-and-Fissure Sealants.* Though brushing and flossing help to clean the smooth surfaces of teeth, toothbrush bristles cannot reach all the way into the grooves on the chewing surfaces of teeth to remove food particles and plaque.[18] Pit-and-fissure sealants protect these vulnerable areas by providing a physical barrier to inhibit the collection of microorganisms and food particles in the grooves, or pits and fissures, of the teeth.[18,19] The predominant available sealant materials are resin-based sealants and glass ionomer cements. The material bonds directly to the tooth and hardens into a protective barrier that prevents both the development and progression of dental decay. Research demonstrates the effectiveness of sealants in reducing the incidence of caries in children and adolescents. However sealants must remain intact or be reapplied in order to be effective.[19]
- *Space Maintainers.* Space maintainers are used to help hold space for permanent teeth when a primary tooth is lost prematurely, before the permanent tooth is ready to erupt.[20]

Why North Carolina is Developing an Oral Health Action Plan

Nationally, there is great variation in utilization of preventive dental services by children enrolled in public health insurance programs—from a low of less than 15% of eligible children in Florida to a high of more than 50% of eligible children in Vermont and Idaho.

This variation and the fact that only two states have utilization rates over 50% led the Centers for Medicare and Medicaid Services (CMS), which oversees

Table 2.1
Percentage of Children Receiving Any Preventive Dental Services (2009)

State	Percentage of Children Receiving Any Preventive Dental Services (2009)	State	Percentage of Children Receiving Any Preventive Dental Services (2009)
Florida	14%	Utah	37%
Wisconsin	24%	Colorado	37%
Montana	24%	Arizona	37%
Missouri	24%	Tennessee	37%
North Dakota	27%	Kansas	38%
California	29%	West Virginia	38%
Oregon	29%	Virginia	38%
Pennsylvania	29%	South Dakota	38%
Kentucky	31%	Oklahoma	39%
Nevada	31%	Indiana	39%
New York	31%	Illinois	40%
Alaska	32%	Rhode Island	40%
New Jersey	33%	New Mexico	42%
Michigan	33%	Alabama	42%
Maryland	34%	Massachusetts	43%
Delaware	34%	North Carolina	44%
Minnesota	34%	Iowa	44%
Louisiana	34%	South Carolina	44%
Connecticut	34%	Nebraska	44%
Ohio	34%	Texas	44%
Maine	35%	Washington	45%
Mississippi	35%	Arkansas	45%
Georgia	35%	New Hampshire	46%
Hawaii	35%	Vermont	52%
Wyoming	35%	Idaho	53%
District of Columbia	36%		

Source: Mouden, Lynn. CMS Oral Health Initiative: The Road to Better Oral Health for Children. Presented to: Task Force on Children's Preventive Oral Health Services; February 22, 2013; Morrisville, NC.

both Medicaid and the Child Health Insurance Programs (CHIP) in all states,[d] to launch an oral health initiative aimed at increasing the percentage of children enrolled in Medicaid or CHIP who receive preventive dental services (see Chapter 3) and dental sealants (see Chapter 4). Specifically, CMS asked each state to develop an oral health action plan to:[21]

d NC Health Choice is North Carolina's Child Health Insurance Program.

1. Increase the proportion of children ages 1-20 enrolled in Medicaid or CHIP (enrolled for at least 90 days) who received any preventive dental services by 10 percentage points.
2. Increase the proportion of children ages 6-9 enrolled in Medicaid or CHIP (enrolled for at least 90 days) who receive a dental sealant on a permanent molar tooth by 10 percentage points.

As part of the oral health action plan, CMS asked all states to identify what activities the state intends to undertake in order to achieve these dental goals and to document and assist states in documenting their current activities and collaborations to improve access. This report was developed by the Task Force on Children's Preventive Oral Health Services to document North Carolina's oral health action plan.

This report was developed by the Task Force on Children's Preventive Oral Health Services to document North Carolina's oral health action plan.

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