

Children's Oral Health Services: Organization and Financing Considerations

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This article highlights prominent issues concerning children's oral health and provides an overview of the structure, organization, and financing of dental services for children in the United States. The size, composition, characteristics, and distribution of the dental workforce and the arrangements that facilitate the delivery and financing of dental services are discussed. Features of the current dental care delivery system are examined within the context of primary care. Suggestions for creating meaningful change to enhance access through expanded, integrated systems are presented as part of a concluding challenge.

KEY WORDS: children; health systems; oral health

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Americans spent roughly \$60 billion, or \$220 per capita, on dental services in 2000 and made over 500 million dental visits.¹ Nevertheless, millions of US children continue to suffer needlessly from preventable oral diseases and have limited access to basic dental services. Data from *Healthy People 2000* monitoring activities also demonstrate lack of progress toward national goals related to children's oral health and access to care.² For example, from 1986 to 1995, the percentage of children who had untreated cavities increased from 28% to 31% (vis-à-vis the year 2000 target of 20%). During that same period, the percentage of children who saw a dentist before kindergarten declined from 66% to 63% (vis-à-vis the year 2000 target of 90%).

Although 80% of US children experience dental caries (tooth decay) by the age of 17, children from low- and modest-income households are disproportionately affected. (In this article, a low-income household is defined as a household with an aggregate income between 0% and 100% of the federal poverty level [FPL], or roughly \$16,000 per year for a family of 4. A modest-income family is defined as a household with an aggregate income between 101% and 200% of the FPL. Many children from these households are eligible for Medicaid and the Children's Health Insurance Program [CHIP]. A middle-income household is defined as a household with an aggregate income between 201% and 300% of the FPL. A high-income household is defined as a household with an aggregate income over 300% of the FPL.) Vargas and colleagues³ analyzed data from the Third National Health and Nutrition Examination Survey (NHANES III) and

found that Medicaid-eligible children aged 2-5 years were 2.5 times more likely than children from high-income households to have tooth decay. They also found that low-income children aged 6-14 years and low-income adolescents aged 15-18 years were, respectively, 2.1 and 1.6 times more likely to have tooth decay than were high-income children. Within each age group, children from low-income households experienced higher levels of untreated decayed teeth.

Despite having broad publicly financed dental coverage, low-income children suffer the most from dental disease and have the least access to dental care. In 1996, the Office of the Inspector General of the US Department of Health and Human Services reported that of the children who were eligible for Medicaid in 1993, only 1 in 5 received routine preventive dental services.⁴ The recently released US Surgeon General's Report on Oral Health⁵ highlighted these and other issues concerning children's oral health and called for a national plan to improve the oral health of the nation and reduce oral health disparities.

Improving children's oral health and access to services requires an understanding of the prominent features of the current system as well as relevant trends and an appropriate framework for assessing and structuring new approaches. Toward that end, this article examines salient aspects of the organization, delivery, and financing of dental services within the context of the emerging US health care system.

STRUCTURE AND ORGANIZATION

Structural aspects of the health care delivery system include the size, composition, characteristics, and distribution of the workforce and arrangements that facilitate the delivery and financing of services. Because the vast majority of dental services for children are provided on an outpatient basis, the scope of this section is limited to ambulatory care settings and to services in primary care settings.

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Table 1. Dentists and US Resident Population: Selected Years, 1982–2000*

Year	US Resident Population	Practicing Dentists	Population per Dentist	Population <18 y	Population <18 y per Dentist
1982	231 664 000	116 208	1994	62 800 000	540
1995	262 765 000	141 396	1858	68 400 000	484
2000	281 421 906	144 823	1943	72 293 812	499

*Source: American Dental Association and US Bureau of the Census.

Dental Workforce—Number of Dentists

The American Dental Association (ADA) reported that in 1995, 141 396 US dentists were engaged in either full- or part-time private practice.⁶ That number translates into a ratio of 1858 persons per actively practicing dentist or 484 children per active dentist in 1995 (Table 1). The vast majority (82%) of dentists are general dentists who provide the bulk of primary care dental services to children and adults.⁷ Approximately 3500 dentists, or 2.5% of all US dentists, are trained and practice in the primary dental care specialty of pediatric dentistry. Collectively, these 2 groups comprised the approximately 120 000 dentists providing primary dental care services in 1995, which translates into roughly one primary care dentist per 2200 persons and one primary care dentist for every 575 children.

ADA data indicate that the number of practicing dentists rose by nearly 22% from 1982 to 1995; however, the bulk of the increase was accounted for by a doubling of part-time dentists (from 16 496 to 33 668), with only an 8% increase in the number of full-time dentists.⁸ The aggregate result of these increases and changes in the average time spent actually treating patients was a modest gain in the total number of treatment hours available to address the dental care needs of Americans. The US population increased by more than 13% during that same interval, including a 10% increase in the pediatric population or those children less than 18 years old.⁹

In the past 20 years, the number of students graduating from dental schools has declined significantly from a high of 5756 graduates in 1983 to about 4000 annually beginning in 1990.⁹ These reductions, combined with projected increases in the US population and the number of dentists retiring from practice, are likely to change the dynamics of the market for dental services over the next 2 decades in ways that could adversely affect access to services for low-income children.

If the current proportions of general dentists and pediatric dentists persist, projected changes in the number of practicing dentists and in the US population will result in population-to-primary care dentist ratios that are on the order of 20% greater than current ratios by 2020. Existing data, in fact, indicate that the proportions of general practitioners and pediatric dentists may decrease because the number of training positions for specialists (ie, those other than general dentists) has remained essentially constant since the 1970s, whereas the number of dental graduates has declined remarkably.¹⁰ Hence, the ratio of population to dentists providing primary dental care services in 2020 may be even higher than the current projections.

Demographic Characteristics

Since the 1970s, the proportion of women dentists has grown substantially. Women have constituted approximately 35% of graduates from US dental schools since the mid-1980s. They now account for about 20% of dentists less than 40 years old.¹¹ The impact of this substantive change is currently being assessed.

The proportion of racial and ethnic minorities who enter dental schools has grown slowly over the past 2 decades; however, most of the increase has been accounted for by Asians. Little change has been observed in the numbers of other racial and ethnic minorities, including African Americans, Hispanics, and Native Americans, who collectively now comprise about 11% of all first-year dental school enrollees.¹¹

Allied Personnel

Currently, about 100 000 dental hygienists practice in the United States.¹² The number of students enrolled in dental hygienist programs grew during the 1960s and 1970s, declined in the 1980s, and grew again during the 1990s. First-year enrollment in these programs now stands at approximately 6000 students per year.¹² In response to an increasing demand for dental care, employment of dental hygienists is expected to grow much faster than the average for all occupations in the near future.¹² An estimated 200 000 dental assistants and 70 000 dental laboratory technicians comprise the other 2 major categories of allied dental personnel.¹³

DELIVERY SYSTEM

Treatment Facilities

In contrast to medicine, the dental care delivery system has changed relatively little during the past several decades. In general, dental services are provided in an array of small, highly independent, privately owned, free-standing clinical facilities. Of the nation's dentists, approximately 90% provide services in the private sector of the dental care delivery system. This system is composed overwhelmingly of independent practitioners (92%) in privately owned solo or 2-person practices.⁵ Safety-net facilities such as dental schools, community-based clinics, migrant and rural health centers, comprehensive school-based programs, and mobile van programs that target underserved populations in primarily inner-city and rural areas are relatively few in number. In fact, the Health Resources and Services Administration reports that only half of federally supported community and migrant health centers include dental care.¹⁴

Distribution of Dentists

The distribution of dentists varies considerably across states and regions and is projected to change somewhat over the next 20 years. The New England and mid-Atlantic regions are expected to average 10–15 more dentists per 100 000 persons than the national average through the year 2020.¹⁵ The ratio for the South Atlantic region is expected to increase to the national average by the year 2010, and the Pacific region is expected to go from higher than average to below the national average.

The Health Resources and Services Administration reported that there were 1036 dental Health Professional Shortage Areas, which required 3984 dentists, in 1998.⁵ A declining dental workforce and the population's growing demand for dental services are likely to exacerbate access problems for historically underserved segments of the population in the future.

Use of Non-Dentist Personnel in Clinical Practice

The dental care delivery system has been relatively conservative in its use of allied clinical personnel. Most states allow dental hygienists to provide a limited scope of preventive services, usually under the supervision of a licensed dentist. A small number of states allow expanded-duty personnel with additional training to participate in the delivery of basic restorative procedures. In light of changing disease patterns, workforce and population trends, and concerns about access for low-income children, public health officials will surely focus additional attention on the optimal use of various types of health care personnel to deliver oral health services in more diverse settings in the future.^{16,17} As an example, some states have started to engage physician practices to provide oral health assessments and preventive services for children covered by public programs.

FINANCING

The general trend for financing health care in the United States is to use private or public funds to pay for benefits that are administered by third parties as part of government-administered programs or commercial health plans. Dental care benefits generally are financed and administered through entirely separate arrangements rather than being integrated into comprehensive health plan coverage. Consequently, only about half of the US population has any type of third-party coverage for dental services. Approximately 100 million people have commercial dental coverage, usually through employment, which pays for roughly 50% of all dental expenditures.⁵ In stark contrast to most other health care services, only a small proportion (less than 5%) of dental services are funded through public expenditures.¹⁸

Payment for dental services is currently based predominantly on fee-for-service reimbursement. Commercial indemnity and preferred provider organization (PPO) plans, which comprise over 80% of the commercial coverage market, typically pay a portion of dentists' fees and are structured with copayments and annual or lifetime limits.

Approximately 18%, or 26 million people, are covered by other types of managed care or pre-paid arrangements.⁵

Medicaid provides coverage for a fairly comprehensive scope of dental services for children. By law, Medicaid payments constitute "full payment" for required services for children, although reimbursement rates are generally significantly less than prevailing market fees and often less than the costs of providing services.¹⁹ Nearly all states have also incorporated dental benefits into their Child Health Insurance Programs (CHIP).¹⁹ However, in many instances these benefits have not translated into access and use of services, in part because of financial factors that are examined in the next section.

Funding Levels for Public Dental Programs for Children

The financing of public dental programs for children varies from state to state. With few exceptions, funding and reimbursement levels are widely regarded as inadequate.¹⁸

Ready sources of data have only recently become available to guide policy makers and program administrators toward identifying the level of program funding that is necessary to provide low- to moderate-income children with access to appropriate dental care. Commercial third-party databases historically have had limited applicability because they generally reflect the care provided to children from households with incomes above the national median. Children from these households tend to have good access to comprehensive dental services and use these services on a regular basis. However, children from these upper-income households have significantly lower incidences of dental disease and treatment needs than do children from lower-income households.³ Conversely, data from public programs (eg, Medicaid) reflect the use of dental services by low-income children who have relatively high levels of disease and treatment needs but who have not had adequate access to dental services. The problem of using raw data from publicly funded programs is further confounded by historically low levels of program funding that, in turn, are reflected in reimbursement rates that engage only a small portion of dentists (typically 10% or less). In the absence of suitable existing data sources, concerned parties have turned to actuarially based models to develop program financing and cost estimates for publicly funded pediatric dental programs.

American Academy of Pediatrics Analysis

The American Academy of Pediatrics (AAP)²⁰ recently commissioned the firm of Towers Perrin to develop actuarial estimates of the costs of providing comprehensive health benefits, including dental services, for children covered by CHIP. The firm's actuaries calculated per-member-per-month (PMPM) estimates and determined what states should expect to pay insurers for services outlined in the AAP policy statement—*Scope of Health Care Benefits for Newborns, Infants, Children, Adolescents, and Young Adults Through Age 21 Years*. The AAP study included cost estimates for inpatient facility use, outpa-

tient facility use, physician services, vision services, hearing aids, dental services, and pharmacy services based on regional utilization statistics. The analysis demonstrated that providing a comprehensive benefits package, which is essential to children's optimal health and well-being, is not cost prohibitive (national average was calculated to be \$101.47 PMPM) and can be accomplished for roughly 60%–70% of the cost of providing similar benefits to the general population as a whole.

The cost of providing coverage for preventive, diagnostic, and rehabilitative dental services (with orthodontic services limited to those deemed to be medically necessary) for children eligible for CHIP was estimated at \$20.35 PMPM, or approximately 20% of the cost of overall child health care. Separate cost estimates for urban and rural areas for all 50 states and Puerto Rico were also developed as part of the AAP analysis.

Reforming States Group Analysis

The Reforming States Group (RSG), with support from the Milbank Memorial Fund, commissioned PriceWaterhouse Coopers to develop an actuarial model that states can use to develop program funding requirements and cost estimates for dental benefits for children enrolled in public programs, such as CHIP and Medicaid.²¹ As part of this project, the actuaries used data for the California Dental Medicaid (Denti-Cal) program to determine the costs of pediatric dental services at market-based fees (ie, dentists' charges discounted by 20%) for a population of children whose use of services mirrored those enrolled in the California Medicaid program. The results using this approach indicate that approximately \$14.50 PMPM should be allocated to cover the costs of dental services for children in public programs.

The AAP and RSG figures are not directly comparable. The AAP estimate reflects what states should expect to pay plans in the way of premiums, including program administration costs, which typically range between 10% and 15%, whereas the RSG figure reflects the costs of dental services only. The data and methods used to derive the estimates also differed. The AAP/Towers Perrin study started with data from commercially insured children and adjusted for additional treatment needs of CHIP enrollees based on epidemiological data from the National Health and Nutrition Examination Survey, 1988–94.³ The RSG/PriceWaterhouse Coopers figure reflects use of services by California Medicaid enrollees without adjustments for unmet treatment needs. Thus, the figure represents a conservative estimate of funding requirements. In spite of their differences, these models define a fairly narrow and consistent range of cost estimates, approximately \$17 to \$20 PMPM for premium costs, using a 15% program administrative cost estimate.

Historic Levels of Funding for Public Pediatric Dental Care Programs

Funding requirements and cost estimates derived from the actuarial models highlighted above are generally consistent with estimates derived from a more general model

developed by the ADA and government surveys of actual expenditures for children not covered by public programs. These sources indicate that 20%–30% of pediatric health care expenditures in the private sector are attributable to dental care. Historic funding levels for public pediatric dental care programs stand in stark contrast to these figures. For example, Medicaid expenditures for pediatric dental services have only represented slightly more than 2% of Medicaid pediatric health care expenditures—roughly one tenth of the resources provided for non-Medicaid children.

PRIMARY CARE: A UNIFYING CONCEPT TO IMPROVE CHILDREN'S ORAL HEALTH CARE AND TO REDUCE DISPARITIES

A renewed emphasis on primary care has developed in the US health care system in response to concerns about access, fragmentation, duplication, overspecialization of physicians, and escalating costs. Proponents of primary care believe it has considerable potential for balancing major health services system goals—optimizing the health of a population and allocating resources to minimize disparities.²²

Dentists generally are not recognized as primary care providers in a health policy context^{22,23}; however, primary dental care providers (general dentists and pediatric dentists) are considered to be important members of “the primary care team” for 2 principal reasons. First, the general model for the care they provide embodies the fundamental components of primary care: first point of contact, continuity of care, emphasis on prevention, and coordinated, comprehensive services. Second, the majority of the services they provide are not available from other types of health care practitioners.

The vast majority of dental services, especially for children, arguably are primary health care services. The general utilization model for dental services emphasizes continuity of care with regular periodic assessments (ideally adjusted for each individual's level of risk for disease); a broad scope of diagnostic, preventive, and treatment services delivered in a single facility; and early treatment to limit disease progression and restore function. However, significant access problems for growing segments of the population suggest the lack of an effective, equitable primary care system for providing dental services. The following section uses essential components of primary care to examine the current system and relevant trends in other health care sectors.

First-Contact Care

First-contact care implies accessibility to and use of services for problems or episodes for which people usually seek care.²² First-contact care is also linked to the concept of providing care for a defined population. Evidence suggests that access to and use of dental services for school-aged children in middle- and upper-income households is adequately provided by private-practice primary care dentists.³ Access and use of services for preschool children and those covered by public programs are substantially

less because far fewer private practitioners are providing care for these groups. A relative paucity also exists of safety-net facilities that provide primary care dental services in underserved areas.²⁴

Longitudinality

Longitudinality presupposes a regular source of primary care and its use over time.²² Analogous concepts include continuity of care and the notion of a medical or dental "home." Potential benefits of longitudinal care include less use of services (by avoiding duplication), better preventive care, more timely care, reduced levels of preventable diseases, greater satisfaction, and lower total costs. General and pediatric dental practices are geared to providing longitudinal care for the majority of their patients. Comprehensive school-based programs and some community health centers also may provide a significant degree of longitudinality.

Continuity of care is often problematic for Medicaid enrollees and individuals without third-party coverage. However, Lave and associates²⁵ recently reported that providing substantive commercial dental coverage to previously uninsured low-income children significantly increased the number with a regular source of care and resulted in more appropriate use of services. Similar results have been demonstrated with innovative CHIP and Medicaid programs in Michigan. Case management programs also have proven to be helpful in increasing longitudinality for some groups that historically have had difficulty in achieving continuity of care. Electronic information systems that link providers in multiple sites represent another recent innovation that has the potential to contribute to longitudinality when care is provided by groups of practitioners.

Comprehensiveness

Comprehensiveness implies that primary care facilities must be able to arrange for all types of health care services (diagnostic, preventive, and treatment), including those not provided efficiently within the facility, such as referrals for consultations or definitive management of conditions.²² General dentists comprise roughly 80% of the dental workforce and provide the bulk of dental services to children. Pediatric dentists also function as primary care practitioners for children but are trained to provide care for a broader segment of the pediatric population, including young children and children who are more difficult to treat because of behavioral, developmental, or medical conditions. Programs, plans, practitioners, and facilities that are not capable of providing or arranging for the bulk of children's dental needs should not be viewed or assigned responsibility as primary care providers.

Coordination

Coordination (integration) of care requires some form of continuity, either by practitioners or medical records or both, as well as recognition and management of potentially diverse problems. Without coordination, longitudinality loses much of its potential; comprehensiveness is

problematic; and the first-contact function becomes purely administrative.²¹ Coordination is particularly important for patients with multiple problems (such as children with special health care needs) or advanced levels of disease. Good records and information systems for tracking patient care are critical to the process of care coordination.

MEETING THE CHALLENGES

In spite of the many positive features of the current dental care delivery system, the fact remains that millions of low-income American children lack adequate access to effective oral health services and suffer the consequences of untreated dental disease. Providing adequate oral health services to a growing and increasingly diverse pediatric population while adapting to increasing demands for accountability, efficiency, and evidence-based practice will no doubt require innovative adaptations of the present system. Improvements in financing are considered to be essential; however, other system features also will need to receive attention as part of efforts to improve access.

Substantial changes already are underway in other areas of primary care. For example, there have been dramatic increases in the numbers and types of nonphysician clinicians capable of providing primary medical care services in recent years, with many of these clinicians being granted a relatively high degree of autonomy while working within defined systems of care.²⁶ It remains unclear whether these changes are promoting the goals of primary care or leading to a pluralism that has the potential to further fragment the US health care system.²⁷ Likewise, early efforts to create new mechanisms for financing and administering health benefits (ie, managed care arrangements) have created considerable concerns about the balance between fiscal restraint and elements of care that are valued by patients.

Whether or how changes of this nature will affect the delivery of oral health services for children remains to be seen. In constructing meaningful change, the fundamental challenge is to preserve the many positive aspects of the current system while extending reasonable geographic access through new expanded and integrated systems that embody the essential elements of primary care to all American children. In the words of Dr Harold Hillenbrand, a former leader of the dental profession in America more than 2 decades ago, "*Real solutions must be found in the unselfish collaboration of dentists, the other health professions, the dental auxiliaries, social and behavioral scientists, epidemiologists, educators, statisticians, government and public health officials, consumers, and a whole host of others. There are enough problems to challenge and plague us all.*"²⁸

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