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Spec Care Dentist 22(3):11S-25S, 2002

ORAL HEALTH AND DENTAL CARE ACCESS CHALLENGES

Because of their developmental dependency, young children constitute a special population requiring the attention and consideration of society and its governmental policymakers. Oral health is an essential and leading component of children's overall health, functional capacity, and social welfare. This chapter focuses on young children's oral health by highlighting disparities in both health status and dental care, recognizing demographic trends that will shape policies addressing their needs, describing barriers to their care, and suggesting fruitful opportunities to enhance their oral health, particularly through health professions training.

EARLY CHILDHOOD CHARACTERISTICS AND DEMOGRAPHY

Early childhood is the period of life from birth to age 6 that encompasses the neonatal, infant, toddler, and preschool periods. It is a time of tremendous growth in size; development in function, capacity, and sophistication; and acquisition of fundamental knowledge, attitudes, beliefs, and behaviors that largely shape an individual's subsequent life experience. While early childhood is a time of tremendous promise, it is also a time when disturbances in health or social welfare can take a toll that is expressed throughout life. It is also a period when missed opportunities to establish positive health and healthcare conditions can initiate chronic dysfunction or disability. In short, early childhood constitutes a period that starts with helplessness and ends with a dawning capacity to appreciate, organize, and confront the role of self in the larger worlds of family, community, and society.

While all young children are dependent and therefore vulnerable, there is a wide spectrum of family empowerment and advantage into which children are born. As President George W. Bush reminded the country in his inaugural address in referring to children of poverty, "children at risk are not at fault." His message defines the rightful role of government in caring for the needs of children and can serve as the basis for aggressively addressing disparities that limit some children's capacities to achieve.

Young Children at Risk

Social determinants that correlate highly with young children's health and healthcare include family income, racial and ethnic status, parental employment status, and level of parental educational attainment. Additional factors that correlate with

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many aspects of health include geographic location, family structure, sex, and age. Children of impoverished, minority, immigrant, or migrant families, and those who are homeless are particularly vulnerable because their families are often less able to provide the essential determinants of health attainment.

Another distinct group of young children who are particularly vulnerable are "children with special healthcare needs" (CSHCN), those with physical, mental, and emotional disabilities. For many of these children, every endeavor is more complex and demanding than for their less-challenged peers.

Impact of Demography

The demography of children in the United States is a critical factor in addressing oral health and dental care because oral disease and dental treatment vary significantly by sociodemographic and general health variables. With roughly 4 million children born each year, the U.S. population under age 18 is about 72.0 million. Of these, 23.7 million are under the age of 6.¹

Diversity among young children is well described in the following excerpt from the U.S. Surgeon General's Workshop on Children and Oral Health.¹

According to March 1999 Current Population Survey data, children under the age of 6 comprise 9% of the population, and 39% of young children are of racial/ethnic minority status (which includes Black, Hispanic, Asian/Pacific Islander (API), American Indian), higher than any other age group. First generation immigrant children represent only 1.5% of young children, but young children of immigrants (second generation) represent 20.4% greater than the percentage of Black or Hispanic young children, 15% and 18% respectively. More racial and ethnic minority young children live in poverty than do majority White children. Children are considered as living in poverty if they reside in a household with a gross annual income below the federal poverty level (FPL). The FPL, which is determined annually, is currently \$17,650 for a family of four.² While 13% of White and 17% of API young children live in poverty, 38% of Hispanic children and 41% of Black young children are poor.

One-parent households are often unable to provide the same level of resources for children as two-parent households, with the deficiencies generally worse for female-headed rather than male-headed households. A majority of Black children ages birth through 17 years (54%) live in female-headed households versus 26% for Hispanic children and only 15% for

White and API children. The more children in a household, the greater level of competition for food, clothing, shelter and health care. Black and Hispanic children tend to live in households with more children, as do first-generation immigrant children.

Race/ethnic and generational differences for household incomes are dramatic, with median incomes for White and API children exceeding \$50,000 whereas those for Black and Hispanic children are below \$30,000. Household income also progresses upwards for immigrants from first to second to third or higher generations. Black and Hispanic children are more likely to live below the poverty line as API children (2 times) and White children (3 times). Parents of Black and Hispanic children are less likely to be highly educated or even obtain a high school diploma. Children of immigrants are 3-4 times more likely to have a high school dropout parent than children of natives.

Non-Hispanic White children have the highest proportion reporting excellent or very good health, followed by API, Hispanics, and then Blacks. While 11% of White children are without health insurance, that proportion is higher for API (16 percent), Black (20%), and Hispanic (30%) children.

In the next ten years, there will be only a slight increase in the number of children under age 18 (72 million), but racial composition of children will change. Rapid growth will occur among Hispanic and API children over the next 25 years. The new racial/ethnic composition by 2025 is estimated at 54 percent White non-Hispanic (compared to 63% in 1999), 14% Black (compared to 16% in 1999), 25% Hispanic (compared to 16% in 1999) and 7 percent API (compared to 4% in 1999). The new demography has implications for health. Intergenerational competition for health resources may intensify as there will be fewer working-age adults to provide public financing for supporting the elderly population. This may result in decreased public resources devoted to the health of America's children.

Of particular importance to oral health, the groups of children that bear the highest levels of disease burden are the same groups that are expanding most rapidly. In particular, Hispanic and API children demonstrate higher levels of dental caries than White or Black children.³ As the proportion of children in the U.S. population who are Hispanic and API increases, total disease burden in young children can be expected to increase commensurately. Therefore, temporal declines in dental caries noted over the last two decades can be expected to reverse.

Seventy percent of all children are generally healthy while 20 percent require regular medical treatments for some reason and 10 percent live with chronic disease requiring more intensive healthcare.⁴ The small numbers of chronically ill children represent a major challenge to the dental profession. Unmet need for dental care as reported by parents on the National Health Interview Survey is far higher for ill children than for their peers. While 7.3 percent of all parents report that their child is in need of dental treatment that has not been obtained, 24 percent of parents of children with special healthcare needs report such unmet need.⁵

Dental Care Considerations for Young Children

For all young children, oral health is an essential component of overall health and dental care is an essential health service.

Oral health and dental care are important and consequential for young children because sound oral function is required for effective eating, speech development, and emergence of a positive self image and because oral and dental conditions can predispose children to significant oral and systemic consequences. These consequences include dental pain⁶ and associated distracted and negative behaviors,⁷ infection of the oral tissues and face, failure-to-thrive,⁸ as well as aggravation of concomitant medical conditions such as diabetes or human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS). Additionally, early onset dental decay is a strong predictor of dental caries progression throughout life.^{9,10}

Professional dental care is only one determinant of oral health status. Oral health is at least as dependent on parental caregiving. Health behaviors including diet and use of fluorides are also major determinants of oral health. Yet dental care remains an essential health service both for oral health promotion and for repair of damaged structures.

Oral Health of Young Children

Early childhood is marked by tremendous growth and development of the face, mouth, and dentition, all of which may require the attention of a dental professional. Among the more common oral conditions of early childhood are dental caries (tooth decay), oral mucosal infections, accidental and intentional dental and oral trauma, developmental disturbances associated with teething or tooth formation, and developmental clefts of the lip and/or palate. Additionally, parents frequently request information on additional concerns including sucking habits, tooth alignment, timing and order of tooth eruption, and tooth coloration.

Among these conditions, dental caries is the preeminent concern because of its tremendous prevalence and consequences. Dental caries is the single most prevalent chronic disease condition of childhood,¹¹ 5 times greater than asthma.¹² Overall, nearly one in five (18.7 percent) U.S. children ages 2 to 4 have experienced visually evident tooth decay.¹³ Decay experience is closely tied to the level of social advantage with poor children more likely to develop caries. Poor children under age 5 are 5 times more likely to have cavities than children from families with incomes 3 times the poverty level. In the National Health and Nutrition Examination Survey III (NHANES III), caries was visually evident in 30 percent of 2- to 5-year-old children in poverty, 24 percent of near-poor young children, 12 percent of middle income young children and only 6 percent of young children from families with incomes at least 3 times the poverty level. Children of poverty also experience more extensive dental disease than their higher-income peers. Children living in households below 2 times the poverty level have 3.5 times more decayed teeth than young children from more affluent families. The percentages of young children of various income levels who have experienced dental repair is far more consistent across income groups. However, since low-income children experience more disease, their unmet need remains higher than that of more affluent children. In fact, 79 percent of the decayed teeth of poor 2- to 5-year-old children were unfilled while 45 percent of decayed teeth in the highest income group were unfilled. This finding suggests both that high-income children do not access dental treatment sufficient

to meet their needs and that low-income children suffer from significant disparities in dental care. Similar statistics are reported across a wide variety of state surveys.¹⁴

Among all U.S. children under age 6, an estimated 21.5 percent experienced a dental visit. Slightly, but not statistically significantly more girls than boys had a visit, a finding that remains consistent over all ages in the United States. White children were 1.5 times more likely to have a dental visit than non-White children. High-income children (>400 percent FPL) were twice as likely to have a dental visit than poor and near-poor children.¹⁵ Among young children who had a dental visit in 1996, there was little association between income or race and the number of visits obtained. This finding is unique to children under age 6. For older children, social advantage correlates strongly with larger numbers of visits even though social advantage is also highly correlated with lower levels of disease. In interpreting these data, the authors suggest that "this observation may reflect the fact that very young children are more likely to be seen episodically and experience only sufficient numbers of visits to address their clinical complaint." Since the majority of dentists are generally not well prepared by predoctoral dental education to manage the oral health care of young children, the authors believe that dentists tend to address only the primary reason the preschooler presents for care. As income levels increase, dental pathology decreases.¹⁵ Thus, it is not surprising that over one-fifth (21.5 percent) of nonpoor children ages 2 to 6 who had a dental visit in 1996 were provided with a preventive service while only 8.9 percent of poor children obtained a preventive service at their visit (R. Manski, D.D.S., personal communication, December 1999).

Low-income children are far more likely to obtain dental care because of pain or "something bothering the child" than are nonpoor children. Nearly one in five (19.4 percent) poor children who obtained a dental visit in a year did so because of symptoms while only one in ten (9.7 percent) nonpoor children did. Similar disparities are evident by race and ethnicity and parental education. More Black (1.6 times) and Hispanic (1.7 times) children obtained dental care because of symptoms than White children. More children whose parents have less than high school education (2.3 times) or only high school education (1.6 times) obtained dental care because of symptoms than children whose parents had more than a high school education.¹⁶

The Department of Housing and Urban Development reports that families with children constitute an estimated 38 percent of the U.S. homeless population and that children account for one-quarter of the homeless.¹⁷ Like other poor children, homeless children were only one-fourth as likely to have a dental visit as a medical visit. While no data are available specific to young children, a study of homeless 5 to 9 year olds in Boston revealed that 96 percent were in need of dental care and 44 percent had evident pain or infection at the time of examination (M. Ramos, D.M.D., personal communication, March 2001).

Role of Public Insurance Programs

Almost all low-income U.S. children are eligible for comprehensive dental coverage under Medicaid and its "Early and Periodic Screening, Diagnosis, and Treatment" (EPSDT) program.¹⁸ Medicaid mandates coverage for all children under age 5 in families with incomes up to at least 133 percent of the

FPL as well as for children from age 5 to 6 from families with incomes up to at least 100 percent of the FPL. Many states extend Medicaid coverage to children from families with higher incomes. Comprehensive dental care is also generally provided to near-poor children under governmental programs in all states but Colorado through the State Child Health Insurance Program (SCHIP). Both Medicaid/EPSDT and SCHIP insurance programs prohibit or sharply limit treatment costs to parents. Both programs mandate access to care. However, dentists' familiarity with these programs and participation in them are limited, and access to care falls far short of coverage. The Department of Health and Human Services Inspector General determined in a 1996 report that only one in five Medicaid-enrolled children obtained a dental visit in a year while four in five obtained a medical visit.¹⁹ In no state did more than half of children obtain a dental visit, and in nearly three-quarters of the states less than 30 percent did so. These failures to provide dental care to the most vulnerable children suggest, in part, that health professionals who attend to young children need to integrate their services and develop the capacity to address the special needs of young disadvantaged children.

SUMMARY

In sum, young children as a class constitute a population of special concern to the health professions because of their vulnerability, lack of autonomy, and the significance of their experiences in shaping their futures. Gross disparities among young children in the existence, extent, and consequence of oral disease further substantiate that low-income, minority, immigrant, and other socially disadvantaged children bear a disproportionate burden of disease. Yet these children with greatest need access dental care at considerably lower rates decayed teeth,¹³ twice the extent of decay when they have disease,¹³ twice the dental pain experience,¹⁶ more than twice the dental insurance coverage (R. Manski, D.D.S., personal communication, February 2001), but fewer dental visits than their higher-income peers.¹⁵ Low-income and other socially disadvantaged children often present unique challenges to the dental delivery system and its workforce. Assuring that these children can access care at least to the same degree as nonpoor children and that such dental care is sufficient to comprehensively meet their needs is a significant challenge to health professions training.

IMPEDIMENTS TO MAINTAINING AND IMPROVING ORAL HEALTH OF YOUNG CHILDREN

Barriers to improving oral health and dental care for young and low-income children have been extensively reviewed by federal agencies,²⁰⁻²¹ the dental profession,²² the U.S. Congress,^{23,24} multiple states,²⁵⁻³⁰ groups of state policymakers including the National Conference of State Legislatures,³¹ National Governors Association,³² Association of Maternal and Child Health Programs,³³ and National Association of State Medicaid Directors³⁴ public interest attorneys,³⁵ child advocates (including the Children's Defense Fund, Families USA and the National Parents Consortium) and the press.³⁶

Barriers are multiple, multifaceted, and often complex. They arise from all concerned—families, providers, payers, government, and healthcare systems. This chapter focuses on

these barriers from the perspective of medical and dental providers and recommends proposed solutions to many of the most frequently cited or best substantiated barriers.

Barriers Related to Systems Integration and Medical Systems of Care

All who engage young children in health, nutrition, or education programs can play a significant role in promoting oral health and eliminating barriers to care.^{37,38} Appropriate providers include lay health workers, nurses and nurse-practitioners, physicians, dental hygienists, and dentists (particularly pediatric, public health, and advanced practice general dentists). Other professionals who can promote oral health include teachers, Head Start and Women, Infants, and Children (WIC) program workers, social workers, and nutritionists.

In order to anticipate and prevent oral and dental pathologies, interventions must begin very early—preferably prenatally by including oral health screening and maternal dental services in routine pregnancy care. This is advantageous both because active periodontal disease in pregnant women has been related to the poor birth outcomes of prematurity and low birth-weight³⁹ and because maternal dental health correlates strongly with dental caries risk in their offspring.⁴⁰

Integrated Systems of Care

The American Academy of Pediatric Dentistry's "Filling the Gaps" work group on Community Integrated Systems of Care has adopted the model described in Table 1 to characterize opportunities of various health professionals to intervene at various prevention and disease management levels. These levels include anticipatory guidance, primary prevention, and disease suppression as well as dental repair for those not effectively reached through prevention. Table 1 presents potential roles for various types of health care providers in addressing dental caries in young children at various stages of disease progression. The suggested roles assume that the provider type be adequately educated and trained to deliver the particular procedure noted. The work group identified a dentist-based early dental intervention effort in Washington State entitled the "ABCD" or "Accessing Baby and Children's Dentistry" program and a pediatrician-based early dental intervention effort in North Carolina, "Into the Mouths of Babes." The work group is now developing a best practice model that would combine and integrate favorable attributes of both programs. Approaches to early childhood oral health promotion and services integration through pediatric medical care are also currently underway in California, South Dakota, and West Virginia with funding under Medicaid demonstrations and the Health Resources and Services Administration (HRSA) Office of Rural Health programs.

Raising awareness among medical providers, integrating services between medical and dental delivery systems, and demonstrating preventive strategies that engage medical as well as dental providers have been widely suggested. Such concepts have been promoted conceptually by federal agencies^a discussed at stakeholder meetings and conferences^b and enacted as new programs by Congress.^c Moving services integration from concept to reality will require significant advancement of both science and infrastructure. These efforts will include workforce preparation, improved funding of

services through Medicaid, development of information and referral systems, and funding evaluation programs that determine effectiveness. A planned Spring 2001 caries management "Consensus Development Conference" at the National Institute for Dental and Craniofacial Research may provide the health professions with an expanded scientific rationale and armamentarium for these early integrated interventions.

Science has provided a clear understanding that tooth decay is an infectious and transmissible disease⁴¹ acquired by toddlers from their mothers shortly after the first teeth erupt.^{40,42} This single finding indicates that true primary prevention must begin in the first to second year of life. Nonetheless, leading health professional organizations differ on the recommended age for a first dental visit. The Bright Futures consortium representing 28 child health organizations⁴³ as well as dental and public health groups including the American Academy Pediatric Dentistry (AAPD), American Dental Association (ADA), American Dental Hygienists Association, and American Public Health Association all endorse initiating formal dental care at age 12 months.⁴⁴ In contrast, the American Academy of Pediatrics maintains a standard of referral at age 3 in its periodicity schedule, claiming that pediatricians can provide appropriate oral health guidance until that age. A recent study of pediatricians⁴⁵ confirms that pediatricians demonstrate willingness to provide oral health guidance but that they have little formal training or clinical knowledge of pediatric oral health. Similarly, studies of nurses⁴⁶ suggest that their preparation for providing dental services is also profoundly inadequate. Accreditation standards and typical curricula for educating dentists and hygienists also fail to provide substantial information and training to assure that even dental professionals are prepared to address the unique needs of young children. Within dentistry, care for young

- a. Among federal agency programs and activities that promote shared concern by physicians and dentists for young children's oral health are the HRSA/Maternal and Child Health Bright Futures project and Community Integrated Services Systems grant program, the HRSA/Bureau of Primary Care efforts to provide "one-stop" integrated health care in community health centers, the HRSA/Bureau of Health Professions primary care training programs, the HRSA/Office of Rural Health and Health Care Financing Administration (HCFA) early childhood caries demonstration grants and a National Institute of Dental and Craniofacial Research Centers grant program to eliminate oral health disparities.
- b. Among meetings that have considered these linkages are the 1998 "Building partnerships to Improve Children's Access to Medicaid Oral Health Services" conference convened by HRSA, HCFA and the National Center for Education in Maternal and Child Health, the 1999 Head Start-WIC-Maternal and Child Health Bureau (MCHB) conference on oral health of preschoolers, a 1999 National Institutes of Health (NIH) ethics symposium on oral health of young children, the 1999 "Achieving Improvement in Medicaid" conference convened by the American Dental Association, the 2000 "Policy Academy on Children and Oral Health" convened by the National Association and a 2000 U.S. Surgeon General's Workshop and Conference on Children and Oral Health. Additionally many state oral health summits have considered these linkages.
- c. The Child Health Act of 2000 establishes a new early childhood caries prevention program and Congressional appropriators

Table 1 Potential provider roles for addressing dental caries in children

Level of Caries Intervention	Procedure	Pediatric Dentists	General Dentists	Dental Hygienists	Pediatricians/ Family MDs	Nurses/ Nurse Practitioners	Obstetricians ^a	Dental Assistants	Lay Health Workers
Risk Assessment	Parent interview and visual screening of the child's mouth (If high risk, a complete dental diagnostic examination by a dental professional is required.)	•	•	•	•	•	-	•	•
Anticipatory Guidance	Education and preemptory counseling appropriate to the child's level of risk	•	•	•	•	•	•	•	•
Primary Prevention	Oral hygiene instruction	•	•	•	•	•	-	•	•
	Dietary counseling	•	•	•	•	•	-	•	•
	Application of topical fluorides	•	•	•	• ^b	• ^c	-	• ^d	-
	Application of dental sealants	•	•	• ^e	• ^f	• ^g	-	• ^h	-
Dental Prophylaxis	Mechanical removal of deposits and accretions on the child's teeth	•	•	•	-	-	-	• ⁱ	-
Disease Suppression	Tailored fluoride regimes, dietary interventions, plaque management and use of topical antimicrobial agents	•	•	•	•	•	-	•	-
Atraumatic Restorative Technique (ART)	Mechanical removal of carious tooth structure and placement of bioactive dental restorative materials	•	•	-	-	-	-	-	-
Cavity Repair	Restorative surgical	•	• ^j	-	-	-	-	-	-

Key

- Appropriate role for the provider type.
- Appropriate for the provider type under conditions specified.
- Not an appropriate role of the provider type.
- a Obstetricians can provide anticipatory guidance to pregnant women but have no direct role with young children's oral health.
- b Physicians require training to appropriately place topical fluorides.
- c Nurses require training to appropriately place topical fluorides.
- d Dental assistants' authority to place topical fluorides varies by state.
- e Hygienists' legal authority to place sealants varies by state.
- f Primary-care physicians are not trained or equipped to place sealants and doing so may be outside their legal authority.
- g Primary-care nurses are not trained or equipped to place sealants and doing so may be outside their legal authority.
- h Dental assistants' authority to place sealants varies by state.
- i Dental assistants' authority to provide prophylaxis varies by state.
- j General dentists can provide definitive reparative care to the extent of their individual technical skills and expertise.

children is generally considered the providence of pediatric dental specialists who today comprise less than 3 percent of all U.S. dental practitioners. With so few pediatric dentists, the ratio of the pediatric dentist to young child population is estimated at one pediatric dentist to more than 6000 children under the age of 6.

Assuring that families can best care for their young children's oral health and utilize dental services effectively requires a seamless network of systems that already exists but that are often independent, redundant, or uncoordinated. Beyond pediatric and dental services, several other systems hold potential to enhance oral health. These include financing

funded an early childhood caries demonstration project. systems; care coordination and case management systems; disease management systems; information systems capable of supporting evaluation, accountability, and feedback; and communication systems that can provide timely and accurate support to both beneficiaries and providers. Additional systems that can interphase with these health components include educational systems, Head Start, nutrition systems including WIC, social welfare systems including Title V Maternal and Child Health (MCH) programs, and prevention community systems including faith-based organizations and community organizing agencies. Successfully networking these systems requires competency development and adequate resources.

Some of these components are appropriately the role of government and others are appropriately developed and maintained by the professions, charitable organizations, local and national businesses, educators, the press, and community-based organizations. Toward that end, the W.K. Kellogg Foundation is supporting development of the "Public-Private-Partnership on Children's Oral Health" that works with multiple federal agencies to coordinate activities between their programs and these private-sector groups.

Hallmarks of a successful, integrated system of dental care for vulnerable young children include the following:

Accessibility

A successful, integrated system will meet targeted children and their families where they live (i.e., in their communities) through agencies (e.g., social service/day care/educational/nutritional/early childhood home visitation programs, peers), and activities they typically engage (e.g., church attendance/recreation/scouts/parent-teacher associations) so that awareness (about oral health and availability of dental care) information (about what to do), and facilitation (about how to do it) are readily available.

Provider Engagement

A successful, integrated system will meet targeted public and private sector healthcare providers (dentists, hygienists, dental assistants, office staff, physicians, nurses, home health workers, lay health workers) within their professional and work environments (e.g., at their offices, through their local/state/national professional associations, through their literature and continuing education programs, from their peers) so that awareness of the problem and efforts to solve it, information about how they can engage in addressing need, and facilitation (e.g., enhancing technical and cultural competencies, working with financing / information / communication / business systems) are readily available.

Resources

A successful, integrated system will assure that sufficient physical (e.g., dental offices and clinics, transportation, computer networks), financial (e.g., payment streams from Medicaid, SCHIP, MCH-Title V, state/local programs, charitable foundations, businesses), and personnel (e.g., appropriately trained health professionals, educators, social workers, administrators) resources are available to meet these awareness, information, facilitation, and care delivery

functions.

Infrastructure "Glue"

Components of a successful system are meshed and held together by efficient information and communication systems that ensure coordination. These functions link targeted children and their families, available providers, and available resources so that redundancy and duplication are reduced, the network becomes seamless to utilizers, and feedback is assured. An example of a glue component is a referral system that effectively and efficiently links toddlers identified to be at high risk of dental caries by their medical primary care provider to a competent dental provider so that the parent's need to shift from the medical care system to the dental care system works with ease.

Accountability

A successful system will hold each component accountable by clarifying roles, establishing performance goals, and providing regular and up-to-date feedback on performance and will hold the components of the network accountable for performance.

Barriers Related to Health Professional Workforce

Barriers related to the health professional workforce are manifold and include issues of numbers, distribution, diversity, and competency of dentists, hygienists, and primary care health professionals. Of particular concern is the supply of dental educators to meet the training needs of current health profession trainees.

Numbers of Providers

The absolute number of dentists is in decline. HRSA describes a 5 percent decline in the number of U.S. dentists between 1991 and 1998.⁴⁷ Combined with U.S. population increases, the declining numbers of dentists accelerate a reduction in the dentist-to-population ratio. The American Dental Education Association (ADEA) reports that dental school enrollment peaked in the 1970s under a HRSA-stimulated "capitation program" at 6301 graduating students and then declined steadily until the early 1990s when about 4000 dentists began graduating annually. Addressing the dental care needs of young children will certainly require an adequate number of dentists, but increasing numbers alone may not improve access. A 1995 Institute of Medicine review of the dental workforce⁴⁸ and the Pew Commission on the Health Professions study⁴⁹ both failed to identify a relationship between increased numbers of dentists and improvements in access for underserved populations.⁵⁰

Dental education introduces students to the care of young children but generally provides little experience doing so according to initial findings of an AAPD taskforce (S. Seale, D.D.S., personal communication, March 10, 2001). Young children with advanced treatment needs are rarely managed by the predoctoral student. The likelihood of treating young children is greater in postdoctoral training but only 38 percent of dental school graduates pursue advanced training in either general dentistry or one of the seven dental specialties.⁵¹

In reviewing the role of the pediatric as well as general dentists with advanced training beyond dental school,⁵⁰ states that pediatric dentists are highly trained to serve the full

spectrum of the pediatric population, particularly infants, toddlers, and young children with dental disease who often present with difficult behavioral, restorative, and social needs. While there have been increases in the number of advanced general dentistry positions and the number of pediatric dentistry positions increased in 1999 to 200 (up from 180), there is continuing need to promote and increase training opportunities in these programs to further expand the core of dentists capable of serving the special needs of children.

AAPD reports that pediatric dentistry training opportunities have increased by 34 percent during the period 1989 to 2001, from 142 new trainees per year to 191 (S. Litch, J.D., personal communication, March 2001). In 1999, HRSA first awarded Title VII training grants to pediatric dentistry programs.

HRSA has recently developed but not yet released an interactive workforce model that allows states to estimate the numbers of general and pediatric dentists required to serve the dental treatment needs of children covered by Medicaid and SCHIP. The model was developed based on a series of assumptions from the ADA, AAPD, and American Society of Dentistry for Children (ASDC). The model assumes that low-income children under age 6 generally require care by pediatric dentists. As such, the model estimates a major shortfall of pediatric dentists. Even if general dentists were empowered to treat young children more effectively through advanced education programs in general dentistry, this subpopulation presents extreme challenges in clinical care that may require the specialized services of a pediatric dentist. Based on caries epidemiology, an estimated 4 to 5 million U.S. children suffer dental disease severe enough to impact their daily function.⁵² These children more often require the specialists' care.

In contrast to dentists and dental schools, the number of dental hygienists and dental hygiene training programs is increasing. The American Dental Hygienists' Association (ADHA) reports that there are more than 100,000 registered dental hygienists in the United States with 5,000 new hygienists graduating annually from over 250 programs (A. Battrell, R.D.H., personal communication, January 2001). Dental hygienists are dental professionals who provide preventive dental services including education, instruction, and clinical preventive treatments such as dental scaling and polishing. In 15 states, hygienists are authorized to perform services only in the physical presence of dentists although 35 states allow for "general supervision." Some states, notably California, Colorado, Connecticut, Oregon, New Mexico, and New Hampshire, have developed less restrictive supervision requirements allowing hygienists to practice preventive dentistry more independently. Medicaid statutes and regulations allow direct payment to hygienists for services provided within their scope of practice in those states that authorize unsupervised hygiene practice. These efforts to expand hygienists availability, however, do not change the nature of hygienists' services. The hygiene scope of practice is determined by the nature of the profession and the content of training. For this reason, the reparative and surgical needs of young children who have cavities, broken teeth, developmental disturbances, or other existing pathologies cannot be met by hygienists. However, as preventive modalities that address disease initiation and progression are further developed and refined, hygienists can play an essential and expanded role in

delivering preventive care.

Distribution of Providers

The geographic distribution of dental providers is increasingly problematic in meeting the needs of underserved populations including young children. HRSA recognizes 1233 dental health professional shortage areas (HPSAs) and acknowledges that far more could be recognized if states endeavored to substantiate them (J. Anderson, D.D.S., personal communication, March 2001). Since many states lack full-time dental directors to engage in HPSA designations and dental HPSA processes are demanding, there has been little effort in most states to identify shortage areas. Nonetheless, the HRSA Office of Rural Health reports that a disproportionate share of dental HPSAs are in rural areas (K. Hayes, D.D.S., personal communication, March 2001). States including Maine, Texas, and Illinois have considered legislation or enacted programs to attract dentists to underserved areas through loan repayment or academic debt forgiveness. Others, including Michigan and Montana, have considered tax incentives while Maryland and Delaware have looked to licensure changes to facilitate care in underserved areas.

Race, Ethnicity, and Gender of Providers

Racial and ethnic diversity of dental providers also constitutes a barrier to care for underserved young children. A recent report by Brown, Wagner, and Johns⁵³ substantiates that minority dentists provide a greater percentage of their care to minority patients than do White dentists. ADEA's Executive Director reports⁵⁰ that nearly one-third of all entering dental students in 1998 were identified as being part of a minority group, up from only about 13 percent in 1980. However, the primary increase has been among Asian/Pacific Islander students, from about 5 percent of first-year enrollees in 1980 to nearly 25 percent in 1998. At the same time, the proportion of underrepresented minorities has shown only a small 2 percentage point increase since 1980, from about 8 to nearly 10 percent of first-year enrollment. The percentage of enrolled students from each of these groups is significantly lower than the percentage of each group in the U.S. population. In 1998, the percentage of first-year enrollees was 4.4 percent for Black/African Americans, 4.9 percent for Hispanic/Latino, and 0.4 percent for Native Americans /Alaskan Natives. The U.S. population in 1998 was about 12 percent Black/African American, 11 percent Hispanic/Latino, and 0.9 percent Native American/Alaskan Natives. Since 1990 there has been a 23 percent decline in the number of dental school enrollees from underrepresented minority groups. Since 1985, the percentage of Black/African American dental school graduates has shown a slight decrease to about 5 percent. Hispanic/Latino graduates have remained at about 5 percent. And the percentage of Native American graduates has always been less than 0.5 percent.

Racial and ethnic diversity is even less evident among dental hygienists. ADHA reports that 89.8 percent of hygienists are White, 2.6 percent are Black, 4.6 percent are Hispanic, 3.2 percent are API and 0.6 percent are Native American (A. Battrell, R.D.H., personal communication, January 2001). Since underrepresented minorities constitute a larger percentage of young children than the U.S. population at large, the lack of Black, Hispanic, and Native American dental practitioners is

Gender diversity may impact service availability for more vulnerable young children if women dentists elect to serve more young children than their male counterparts have in the past. The gender of hygienists likely has less impact on the provision of dental services to young children since hygienists rarely determine the patient pool they will treat, but their gender and racial/ethnic characteristics may impact on the cultural competency of the profession. Hygienists are overwhelmingly female (97.8 percent) (A. Battrell, R.D.H., personal communication, January 2001).

Nondental Providers

The potential contribution of nondental health professionals to advancing the oral health of young children is substantial. The supply of pediatricians, family practitioners, and primary-care nurses who see young children⁴⁷ is considerably greater than the supply of pediatric dentists and general dentists who see young children. Because primary-care physicians and nurses see children earlier and more regularly during critical periods of their development, they could significantly engage in oral health promotion. Because they have so little knowledge about oral health, their effective engagement will require considerable training.

Dental Educators

The supply of dental educators is of particular concern to shaping future capacity of health professionals. The cadre of educators is shrinking faster than the overall supply of dentists. ADEA reports that almost 300 funded teaching slots are currently unfilled in the nations' 54 dental schools.⁵⁴ Dental educators are aging and are overwhelmingly White and male.

SUMMARY

In sum, the supply of dentists is aging and shrinking and comprises few Black and Hispanic dentists but is experiencing a rapid increase in Asian-Americans. It is predominantly male but moving toward one-third female. Unless productivity gains can offset reductions in supply, or the demand for services decreases markedly, the nation is likely to experience an overall shortage of dentists, particularly in rural and inner-city areas where vulnerable populations are concentrated.

Barriers Related to Health Professional Training

Barriers related to health profession training extend to dental and medical providers at both the pre- and postdoctoral levels. Accreditation educational guidelines for predoctoral dental education⁵⁵ are very general and do not specify any requirements regarding children under age 6. Pediatric dental experience in predoctoral education varies considerably across dental schools with some schools offering care only to children 6 years of age or older and others providing hands-on training in infant oral healthcare. Programs vary widely in age of child patients treated by predoctoral students and many do not see children under age 4. Similarly, dental hygiene accreditation standards provide little guidance and no requirements regarding care for children under age 6.

Postdoctoral training is not required for licensure in dentistry. For the majority of dental graduates (those who do not elect postdoctoral training or do not compete successfully for postdoctoral positions), there is no opportunity beyond elective continuing dental education to

learn about care of young children. Postdoctoral general dental education is available to approximately 1600 trainees each year through dental school-based (Advanced Education in General Dentistry) and hospital-based (General Practice Residencies) programs. These programs vary widely in addressing children at all, let alone young children or young children who are vulnerable because of health, social, or economic status.

Postdoctoral specialty pediatric dental education provides extensive and intensive training in management of infants, toddlers, and preschoolers. These programs typically bring the trainee into direct and continuous contact with poor, minority, and immigrant populations. Postdoctoral training programs in pediatric dentistry are typically 2 years in length. Roughly one-third of the 62 programs are hospital-based with an emphasis on primary care dentistry for well and ill children. The remaining two-thirds are based in dental schools (S. Litch, J.D., personal communication, March 2001).

Training programs, particularly those located in hospitals, provide a major resource for young vulnerable children in acute pain. A recent study of "emergency" dental visits in the 56 pediatric training programs showed that 37 percent of the children who presented for such care were under the age of 6. Children in pain were largely poor (54 percent) or near poor (31 percent) and from single-parent or nontraditional families (47 percent). One in five had experienced pain for longer than a week and 65 percent were reported by parents to have a functional impairment from their dental problem.⁵⁶

Pediatric dentists as a group provide a disproportionate amount of care to young low-income and vulnerable children.⁵⁷ Although other primary-care dentists are legally authorized to provide care to young children, many generalists are not comfortable treating young children. The lack of pre- and postdoctoral training and experience in early childhood dental care combined with the unique social, communication, and behavioral demands of these patients as well as special procedures needed to provide definitive care all combine to limit many dentists' sense of competency to manage young children.

Barriers Related to Insurance Coverage and Safety Net Resources

Dental insurance for young children may be private or public. Private insurance is typically employer-based while publicly funded dental insurance is primarily through Medicaid or SCHIP. Private dental plans vary widely in coverage, costs, and limitations. Many plans do not routinely pay for care of children under age 3 without a "report" from the attending dentist justifying the visit. Some plans impose limits on specific dental procedures, e.g., dental prophylaxis (cleaning) or periodic examinations, provided to young children.

Young children with extensive dental disease often require dental rehabilitation under general anesthesia in a medical facility. Since hospital care and general anesthesia are often covered by medical rather than dental policies, insurance coverage for these procedures is an important determinant of parental costs. A growing number of states, currently 31 (P. Reggiardo, D.D.S., personal communication, March 2001), mandate that medical plans provide coverage for dental-related hospital care. In states that do not assure this coverage, lacking this benefit creates a significant financial barrier to families

whose children require dental rehabilitation.

While the Medicaid program mandates comprehensive dental coverage along with comprehensive medical coverage, some parents are not familiar with the dental benefit or are unable to access dental care. Low-income families who are generally eligible for Medicaid report higher levels of medical than dental coverage⁵⁸ and 4 times as many Medicaid-enrolled children obtain medical than dental visits.¹⁹ Although Medicaid provides ideal dental coverage from birth, the program is widely recognized as a failure in meeting beneficiaries' needs.³ This is in large part because the participation of private-sector dentists is so low. A 1998 survey by the National Conference of State Legislatures suggests that fewer than one in five dentists participate in Medicaid at all and that only a fraction of these dentists provide more than \$10,000 in billings per year.⁵⁹ Almost all Medicaid programs are out of compliance with EPSDT law and regulations according to the HCFA.²¹

Children from families with modest incomes above the Medicaid threshold are eligible for the SCHIP. Under this program, each state establishes its own dental benefit. Yet, the majority of states have elected reasonably comprehensive coverage—often modeled on Medicaid. Children who lack dental coverage but have private medical coverage are ineligible for SCHIP. Since there are 2.6 children who lack dental coverage for every child who lacks medical coverage,⁵⁸ millions of children are excluded from SCHIP dental coverage because they are medically insured.

The dental safety net is considerably smaller than the medical safety net and comprises school-based programs, dental facilities in migrant and community health centers (CHCs), 54 dental schools,¹² and 62 pediatric dentistry training programs (L. Scully, AAPD, personal communication, April 2001), as well as mobile dental programs. Generally community hospitals, which constitute the backbone of the medical safety net, do not provide definitive dental care at all and would be particularly stressed to provide dental care to young children. While community hospitals typically provide for a dentist-on-call who is often an oral surgeon, they rarely maintain dental facilities or provide treatments for acute dental presentations beyond prescription of analgesics and antibiotics. Proponents of migrant and CHCs suggest that services integration, particularly for disadvantaged populations, is facilitated by "one-stop shopping" where comprehensive health services are available at one accessible site. However, HRSA's Bureau of Primary Health Care (BPHC) reports that only 58 percent of grantees and a far smaller percentage of individual CHC sites offer on-site (collocated) dental services.⁶⁰ Demand for dental services in CHCs is so high that routine care is often displaced by emergency care. Few CHCs and other safety-net facilities employ pediatric dental specialists. Lack of available specialists further reduces capacity to address the needs of this special population. Because the overwhelming majority of U.S. dentists practice in privately owned and operated dental offices, assuring accessible and competent care will require active engagement of the private sector.

Barriers Related to Caretakers and Patients

As dependents, young children rely upon their parents and their parents' circle of health advisors to ensure appropriate oral health care at home, at day care, at the physician's office,

and—should they be one of the few to see an oral health professional—at the dentist's office. Yet few of these resource are well informed about infant oral health and oral health promotion for toddlers and preschoolers. As a result, parents may obtain contradictory and confusing advice, or no advice at all.

Magazines, parenting guides, and advertising aimed at young parents provide another resource for parents. Through the American Academy of Pediatric Dentistry's efforts to promote knowledge of the age-one dental visit, these resources have increasingly recommended early professional care.³⁸ A generational shift is underway on professional recommendations for dental care so that the idea of a "first dental visit at the first birthday" is still widely unexpected, unknown, and questioned by many who advise young parents including grandparents, primary medical care providers, and even dental professionals. The public has had few opportunities to learn that tooth decay is established as a disease process even as the first teeth are coming into the mouth and long before lesions are evident. The public may also be largely unaware that early trauma to the primary teeth can cause damage to the permanent teeth, that early fluoride use must balance protection with the risk for fluorotic speckling of the permanent teeth, that positive oral health behaviors need to be established early, and even that the primary teeth are important for function. Few appreciate that primary teeth remain in place until early adolescence and that these teeth are therefore critical for alignment of their successors. "They are only baby teeth" is a statement still heard often by dental providers even among parents whose children have obvious decay. A growing number of young children are cared for by people other than their parents. It is likely that the knowledge, values, and health behaviors of these supplemental caretakers will influence young children's risk of dental pathology.

Dental care and fear or anxiety have been long linked in popular culture. This linkage reflects fundamental characteristics of much dental treatment—that many procedures are essentially minor surgical procedures performed on awake patients. Equivalent medical procedures, e.g., placement of ear tubes or excision of skin lesions, are routinely performed under general anesthesia. Yet dentistry has advanced the provision of surgical care, even for most young children, in the outpatient setting using local anesthesia. While this approach eliminates risks associated with general anesthesia, it can be very demanding on the child, parent, and dentist. This approach requires intentional cooperation of patients. Dental procedures are often unpleasant to the senses with their loss of physical sensation from local anesthesia, imposing noise, unusual flavors and odors, atypical sights, and distorted visual perspective. The physical positioning of patient and dentist or hygienist is intimate and is often regarded by young children as imposing. Young children coming to dental treatment with few prior expectations can find the totality of these sensory stimuli threatening. Yet most young children are able to abide treatment for short periods of time if approached in a sensitive and supportive way.

Dental care can elicit anxiety among parents or primary caretakers. This anxiety is often evident to young children and can elicit negative expectations of dental care. Parental anxiety can occasionally translate into threats. Statements like,

“behave yourself or I’ll take you to the dentist”, are still heard by dental professionals. Threats reinforce the notion that dental care is to be avoided if at all possible.

Good personal hygiene and a healthy diet are two essential components of oral and general health. Young children have not yet developed the fine motor coordination to effectively provide self-care with toothbrush and floss. They begin mimicking parental toothbrushing as toddlers but cannot be granted full responsibility for their personal hygiene until late childhood or early adolescence. Although flossing can be particularly challenging, it is an essential element of oral hygiene wherever teeth are in physical contact with one another. Among personal hygiene practices, effective dental hygiene is perhaps the one that requires the longest period of parental supervision and intervention. During early childhood, children become increasingly engaged in dietary choices. Dietary determinants of dental disease include the quantity of sugar a child ingests as well as the frequency, timing, and duration of those “exposures.” For young children, diet and eating can fundamentally influence dental and oral health.⁶¹ For this too, young children are dependent upon the knowledge and concern of their parents and caretakers.

APPROACHES TO IMPROVING YOUNG CHILDREN’S ORAL HEALTH AND ACCESS TO DENTAL CARE

The goal of policies that address young children’s oral health is to eradicate disparities—to allow children who now suffer from preventable disease to be as healthy as their more fortunate and empowered peers. Accomplishing this goal is inordinately complex because it involves everything from parental knowledge and values to the capacity of dental delivery systems, from the appropriate use of toothpaste to the availability of dental insurance. Five categories of activities for improving both oral health and access to care are: public education, prevention, Medicaid and SCHIP reform, systems capacity, and workforce.

Categories of Activities

Public Education

To act in its own best interest, the public needs to engage pediatric oral health issues at both a policy and a personal level. Policy-level involvement translates this little-known public health problem into a political agenda by raising awareness and perception of the problem and bringing it to the attention of public officials. For example, dental insurers, academic policy analysts, and grassroots organizations in Washington State are currently engaged in a policy campaign entitled “Watch Your Mouth” that seeks to energize public sentiment around children’s oral health. Once raised, this focus can influence a range of public policies including public investment in training more dental professionals. Similarly, fluoridation campaigns engage the public in ways that both inform people and empower them to act through public referenda. At the personal level, public information campaigns are employed to promote essential oral health behaviors including quitting smoking, rejecting “spit tobacco,” eating healthy, consuming sufficient calcium (“Got Milk?”), using fluorides properly, practicing

good oral hygiene, and taking young children to their first dental visit at age 1.^{62,44}

Prevention

Disease prevention holds great promise for attaining and maintaining oral health. Because dental caries is established as a disease process during infant and toddler years, there is a strong justification for starting dental treatment at age 1.⁶² Preventive approaches are generally cost effective, can be provided by a range of lay and professional advisors, and tend to benefit general as well as oral health. Tailoring the intensity of preventive interventions to a child’s risk for disease can maximize cost-benefit and effectiveness.⁶³ Strategies to assess caries risk in young children can be based on previous caries experience, presence of precavitated “white spot” lesions, visible plaque in young children, and the perception of experienced examiners.⁶⁴ Recommended preventive strategies for young children include daily toothbrushing using fluoridated toothpaste, application of fluoride varnishes, use of antimicrobials to reduce cariogenic flora, and placement of dental sealants in high-risk locations.⁶⁴ Effective implementation of this approach, however, requires extensive education and training of lay and professional health advisors, widespread acceptance of early dental interventions, acknowledgement of the utility and methods of assessing risk, and development of risk-specific preventive clinical protocols.

Medicaid and SCHIP Reform

High-risk young children are generally from low-income families and are therefore eligible for dental coverage through Medicaid and SCHIP. Unless these programs become more functional and widely accepted by dental providers so that enrolled children can readily access care, opportunities to improve beneficiaries’ oral health will be stymied. The U.S. Surgeon General reports¹² that “Medicaid has not been able to fill the gap in providing dental care to poor children. Fewer than one-in-five Medicaid-covered children received a single dental visit in a recent year-long study period.”

When young children do obtain dental care, many present with advanced disease that requires treatment under general anesthesia. HCFA estimates that Medicaid expends at least \$100 million annually for hospitalization costs associated with dental treatment of young children (D. Schneider, D.D.S., personal communication, February 2001). Linking meaningful and timely preventive care to an effective Medicaid program that assures access could markedly reduce these necessary but avoidable expenditures.

Systems Capacity

Low-income young children often obtain health care services in “safety-net” facilities described above. These sites often lack a dental program. The HRSA Bureau of Primary Health Care is now actively supporting expansion of these facilities. As these facilities increase in number, it is important to assure that their professional staffs have the capacity to treat young children.

The public-sector dental delivery system similarly also lacks a robust supply of pediatric dentists and the capacity to manage young children. The inequitable geographic distribution of dental care providers results in logistical barriers for many vulnerable families. Few practitioners are trained in infant dental care or are experienced in treating children under

the age of 6. The ADA 1990 Survey of Dental Practice reports that only 2.6 percent of all patients seen by dentists are under the age of 5.⁶⁵

Workforce

As detailed above, shortcomings in dentist workforce numbers, geographic distribution, diversity, and competency to manage young children constitute a structural barrier to enhancing dental care for young children. Although the dental hygiene workforce is growing, hygienists cannot function like nurse practitioners providing comprehensive primary care because their professional scope of practice is limited to preventive services. Hygienists may play an increasingly important role in capitalizing on the preventive potential to limit disease burden if they become well trained in infant oral health care. Successfully engaging primary care physicians and nurses will similarly require extensive education and training as well as incentives to incorporate oral health counseling, risk assessment, and effective referrals in standard medical practice.

Improving Quality of Life

Any strategy that successfully reduces disease occurrence, progression, or consequences will improve young children's quality of life. By limiting children's experience of dental pain and infection, their capacity to function well, grow normally, and engage in normal activities will be enhanced.

Bringing Dental Care to Vulnerable Children

Bringing comprehensive dental care to young children can be logistically challenging. Mobile vans, dental facilities in or near Head Start and WIC centers, and dental facilities in neighborhood schools can enhance geographic access.⁴⁴ Young children often need to be treated early in the day when both they and their dental providers are more resilient. Many of these facilities are of necessity smaller than typical dental offices and CHC clinics. The time required to comply with infection control requirements can markedly limit the efficiency of small facilities.

An alternative approach is to "link" dental services to places where high-risk young children congregate. Head Start and WIC programs provide locations where screenings, risk assessments, and preventive education can be provided. Children in need of more extensive care can then be referred to or transported to suitable locations. Case management services required by Medicaid can provide the social and logistic support needed to connect the child with care.

When dealing with young children, it is particularly important to involve parents both to provide assurance to the child and to capitalize on an opportunity to encourage parents to ensure appropriate home care, diet control, and use of fluorides. Bringing care to children should be arranged in a way that does not exclude parents and limit the potential to engage them in their children's oral health.

Primary-care medical providers including nurses, nurse practitioners, pediatricians, and family practitioners should become a major resource for risk identification and timely referral, especially for high-risk children. For their referrals to be effective, however, requires that parents are carefully informed about where and how to obtain care. Referrals need to be tracked in order to determine whether children actually

obtain care. States may consider EPSDT tracking systems linked to case management services in order to effect successful referrals.

Special Measures to Accommodate Young Children

A great advantage of providing dental care to young children is that no special armamentarium is required. To accomplish an effective examination, nothing more than good illumination and a dental mirror is required. The child can be effectively positioned on the parent's or dentist's lap,⁶⁶ eliminating even the need for a dental chair. When more intensive dental treatment is required, the equipment and materials employed are the same as for older children and adults. It is the capacity of the provider to relate to and successfully engage the young child, not the physical equipment, that is critical.

Necessary Training for Providers and Families

Significant training in oral health is needed by both medical and dental providers since health professional education to date has generally ignored the dental component of early childhood. Needed are new curricula and educational experiences for dentists, hygienists, physicians, and nurses in training at both the pre- and postprofessional degree level. Also needed are continuing education programs for existing providers. Core educational elements include components on common oral diseases of young children, risk assessment, anticipatory guidance, conducting an oral examination, preventive interventions, and disease suppression strategies. For dentists, additional training is needed in management of common dental presentations and customizing care to very young children. Dentists also need information and practical training regarding young children's development and communications skills as well as issues of cultural competency.

Increasing public awareness that early dental care is important in limiting lifelong oral disease will require significant education of families. Adoption of the "age-one dental visit" as promoted by the Bright Futures coalition and professional groups will require a fundamental change in widely accepted public norms. The idea of individualized oral health care that tailors intensity of treatment to a child's level of risk is also novel and will require acceptance to be effective. Balancing the benefits and risks of home therapies including use of topical and systemic fluorides or use of prescribed antimicrobial agents will require that parents acquire sophisticated information. Prevention can be significantly enhanced if the public can become better informed about the impact of dietary and hygienic choices, use of protective devices to limit accidents, and impact of maternal oral health on the health of young children.

Expanding Dental Insurance Coverage

Dental insurance coverage is important because it helps reduce financial barriers to care.⁴ Many children, even those who enjoy medical coverage, do not benefit from dental coverage.⁵⁸ Even when commercial dependent dental coverage is available, it may not be extended to very young children. Dental benefits are comprehensive for low-income young children covered by Medicaid or SCHIP, but these children frequently have difficulty accessing care. Dental coverage is generally not coordinated with medical coverage under private- and

employer-based plans. As a result, many medical plans have refused coverage for physician and hospital services related to dental care. This problem has been increasingly addressed by modifying state law to mandate that medical services ancillary to dental treatment be covered.

Strategically Improving Title VII and VIII Programs

The Health Professions Training Act provides funding for a variety of programs to improve education and training in the service of disadvantaged populations. To date, this program has not been focused on preparing the health workforce to effectively manage oral health needs of young children but many opportunities could be pursued.

DENTISTS AND HYGIENISTS

Approaches that can enhance training of dentists and hygienists include the following listed below.

Predoctoral Pediatric Dentistry Training

Analogous to the "Undergraduate Medical Education for the 21st Century" ("UME 21") program, a UDE 21-type predoctoral program can prepare future dentists in infant oral health, increase cultural competency, address the care of children with special healthcare needs, and assure a more extensive grounding and experience in clinical pediatric dentistry.

Postdoctoral Training Availability for All Dentists

Learning to provide technical dental services for young children is more readily accomplished after the new dentist becomes reasonably familiar with dental procedures. Only after technical comfort is attained by working with cooperative and passive patients can the dentist shift focus to the patient whose behavior or developmental competencies are more distracting and demanding. Thus, the postdoctoral training period provides an especially rich time for teaching dentists to treat young children. However, with less than half of dental students pursuing postdoctoral training, it will be necessary to significantly increase the number of training slots to accommodate a majority of dental trainees.

"PGY 1" Pediatric Dentistry Training

Not all first year postgraduate education programs (PGY1) in general dentistry provide significant training in pediatric dentistry and many may not address young children at all. To develop a workforce competent to treat young children, Title VII-funded primary care dental programs need to mandate significant experience in pediatric dentistry including encounters with young children.

Postdoctoral Pediatric Dentistry Training Expansion

Because young children will always present age-specific challenges to dentists, meeting the needs of young children will require a substantial increase in the number of qualified pediatric dentists. Title VII programs began funding pediatric dentistry training in 1999 and will need to considerably expand the program while leveraging its commitment with other funding sources so that the specialty can grow commensurate to need and demand.

Creating Incentives for Academic and Research Careers

Even more alarming than shortcomings in preparing dentists to treat young children is the paucity of academic dentists to train the next generation.⁵⁴ In the last 6 months alone, nearly one in four dental schools has advertised to fill a vacant pediatric dentistry position (S.Litch, J.D., personal communication, March 2001).

Continuing Dental Education

The majority of potential dentists and hygienists available to treat young children are established practitioners who are often unprepared to manage their needs. Use of health profession straining resources to "retrofit" existing practitioners with skills needed to treat young children may be an effective approach to enhancing care availability.

Curriculum and Faculty Development

All of the above approaches to enriching the availability of providers require development of curricula and faculty capable of implementing these novel teaching materials.

Diversity Incentives

Evidence⁵³ that minority providers treat higher percentages of minority patients suggests that dental access for predominantly minority low-income young children will be improved by training more minority dentists. Extensive efforts to recruit minority candidates to dental school suggest that programs need to begin at least at the level of high school if not earlier.⁵⁴

Team Education

The greatest potential to improve children's oral health lies in coordinated systems of care that reach children early with effective primary prevention. This approach requires competency of dentists and hygienists as well as physicians and nurses. Title VII and VIII programs should be designed to encourage team education that focuses on the overall health care of young, vulnerable children and includes a fully integrated oral health component.

Promotion of a Hygienist-Caries Manager

The growing disciplines of caries management, caries suppression, and risk-based individualized dental preventive care all suggest increasing opportunities for dental prevention professionals to expand their knowledge and skills to better serve young children. Health professions training programs need to consider how to bolster the transfer of science to practice while generating incentives for hygienists who can function as "disease managers" by providing preventive and suppressive care. One evident opportunity is to develop curricula for baccalaureate-level dental hygiene programs so that the 2 years customarily committed to liberal arts education can be focused on coursework in education, early childhood development, microbiology and caries pathology, and caries management.

NONDENTAL PERSONNEL

Additional opportunities to enhance oral health services for young children through health professions training programs should be targeted to nondental personnel. The goal of such

training will be to enhance the capacity of nondental providers to assess risk, examine the oral cavity, make and assure referrals, and provide basic counseling. Opportunities include those listed below:

Educational Infrastructure

Curriculum development, faculty development, and training experiences for primary-care physicians, nurses including nurse practitioners, and physicians assistants.

Team Training

Team-based education that extends beyond dentists and hygienists to include the range of primary-care medical providers.

Cross-Training during Residencies

Both pediatric and family medicine residents could learn experientially about young children's oral health by rotating through a pediatric dentistry clinic as an integral portion of their training program. Providing support for medical rotations by pediatric dentists in training would similarly enhance pediatric dentists' capacities to deal with the complex medical problems of the chronically ill and handicapped.

Innovative Integration Models

Title VII funding could challenge medical and dental schools, hospital residencies, CHCs, and other training sites to develop innovative models of health services integration. Development of functional models could lead to identification of "best practices" that could be widely replicated with federal or private support.

SUMMARY

Although the majority of America's children enjoy remarkably good oral health, a significant subset of low-income, minority, medically and developmentally compromised, and socially vulnerable children continue to suffer significant and consequential dental and oral disease. Most of this inequitably distributed disease burden is preventable through early and individualized preventive care. Yet the primary-care medical and dental workforce is ill-prepared to manage the oral health needs of young children.

Demographic trends suggest that the problem of disparities in both oral health status and access to competent dental services will continue to worsen for young children. Impediments to improving the oral health of young children include barriers between medical and dental systems of care, paucity of private and safety-net facilities and providers in many areas where vulnerable children reside, and dysfunctional Medicaid insurance programs. Barriers are generated by parents, providers, payers, and systems of care as well as by the age-appropriate behaviors of young children. Vulnerable families often do not access the case management services and disease control information needed to effectively address their young children's needs.

Approaches to improving the oral health of young children therefore include enhancing public education about oral health, the appropriateness of early and periodic dental care, and

primary prevention. Improvements in workforce numbers, distribution, diversity, and competency are needed. Attention to delivery systems and public insurance capacities are also necessary to effectuate improvements.

HRSA's Title VII and VIII health professions training programs could potentially address many of these barriers and shortcomings. Training enhancements for predoctoral, postdoctoral, and graduate dentists and hygienists as well as for primary-care medical providers hold the key to marked improvements in the oral health of young children. Enhanced training of health care providers is the necessary if not sufficient condition to children whose daily life experiences are compromised by dental and oral diseases that are overwhelmingly preventable.

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