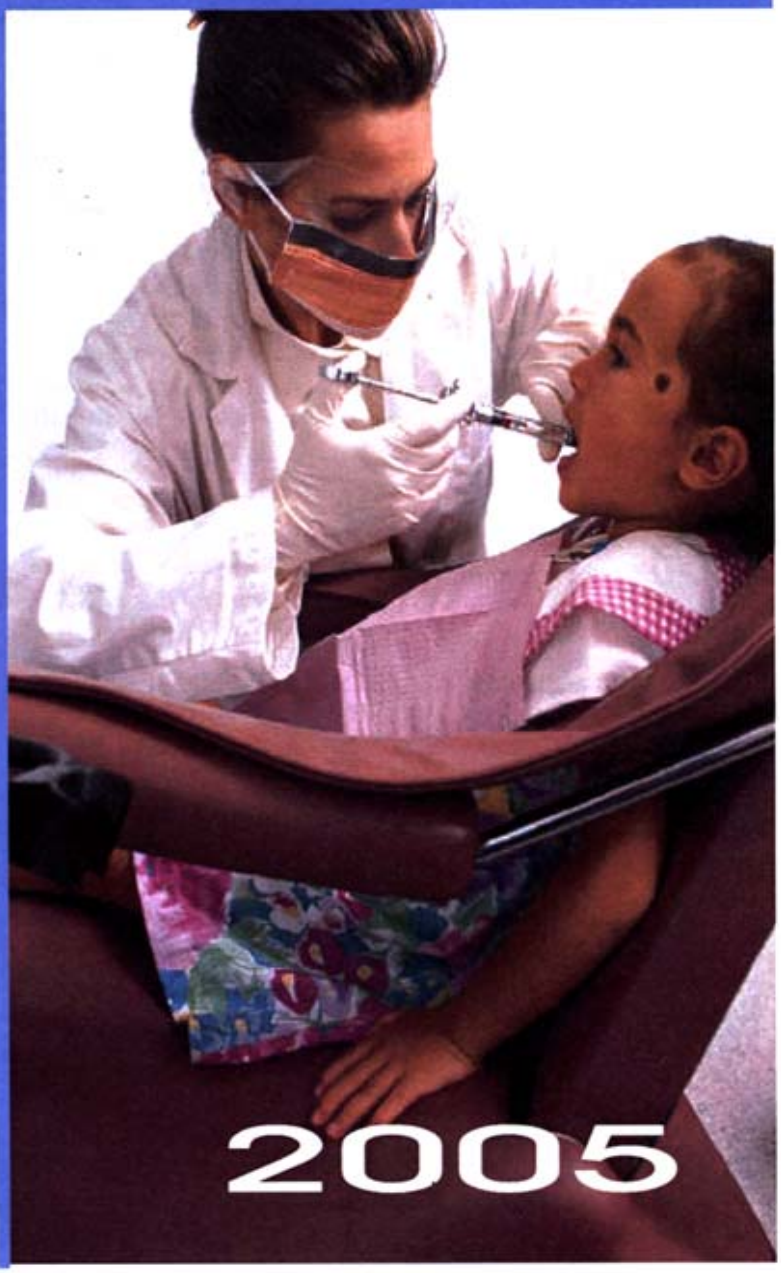
Financing Dental Education

Public Policy Interests, Issues and Strategic Considerations



U.S. Department of Health and Human Services
HRSA
Health Resources and Services Administration

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Executive Summary

Rationale

Recent publications including the first-ever United States Surgeon General's Report on Oral Health and emerging scientific literature underscore the inter-relatedness of oral health and general health, and the critical importance of broad access to basic dental services. Ironically, these findings come amidst an ongoing, decade-long decline in the United States dentist-to-population ratio, growing numbers of dental health profession shortage areas, rising student indebtedness, widespread dental school faculty vacancies and mounting financial pressures in U.S. dental schools. Renewed appreciation of these matters along with growing public concerns about disparities in oral health and access to care have raised questions about the adequacy of the supply and training of dentists. These concerns have spawned interest among State and Federal officials about the public policy aspects of dental education.

This report, produced for the U.S. Department of Health and Human Services, Health Resources and Services Administration (HRSA) by the National Conference of State Legislatures (NCSL), was developed to inform State and Federal officials about key issues concerning the structure and financing of dental education and, in particular, to highlight salient public policy considerations. The report's primary focus is on predoctoral dental education (i.e., programs that award D.D.S. or D.M.D. degrees to graduates of U.S. dental schools). However, efforts have been made to relate predoctoral dental education issues to broader workforce and access concerns, and to include discussion of the potential for dental residency programs to help prepare future practitioners to meet emerging population needs and expand access to dental services for underserved populations.

The report is organized into five sections:

- Part one provides an overview of dental education in the United States and relevant public policy interests.
- Part two highlights important features of dental education financing, trends in financing and emerging challenges.
- Part three examines dental workforce issues and emerging challenges along with limitations of traditional approaches.
- Part four offers considerations for addressing dental education and inherent public interests as matters of broad public policy. Examples from three States are highlighted.
- Part five presents a summary and recommendations.

Related data concerning dental education programs and States' dentist workforce profiles are included in an accompanying figure and tables.

Key Findings

- Public policy makers–particularly State policy makers–and the public at large have long-standing interests in dental education that relate to public safety, practitioner competency and general availability of basic dental services. Changes prompted by the landmark 1926 Gies Report fundamentally transformed dental education into the university-based system that still exists today. However, the ability of the prevailing educational model to adequately impart the knowledge and skills necessary for dental school graduates to meet the oral health needs of an increasingly diverse and expanding population has been questioned by leaders within academic dentistry, the dental profession and other interested parties.
- Predoctoral dental education[1] in the United States is provided in 56 dental schools–36 are part of public universities; 15 are private schools; and five are private, State-related. These 56 schools operate in 34 States plus the District of Columbia and Puerto Rico. Twenty States have relatively little or no direct public investment in financing basic dental education programs (i.e., dental schools); and 16 States have no direct means of educating dentists to serve their populations.
- U.S. dental school graduates increased from 3,775 in 1971, to roughly 5,300 per year during the latter half of the 1970s, to a high of 5,756 in 1983. However during the 1980s, the closure of seven private dental schools and significant downsizing in remaining schools eliminated the equivalent of 20 dental schools in the United States. By 1985-86, fewer than 5,000 dentists were graduating from U.S. schools; by 1990, graduation levels had dropped below 4,000 per year and have increased only slightly since.
- Total reported expenditures (excluding research) per full-time dental student equivalent for the 54 schools reporting data for FY2002 averaged $70,501 per year. Reported costs vary by type of school with reported average total expenditures of $78,010 per student per year for public schools, $58,222 for private schools, and $45,899 for private-State related schools. Clinical instruction is the major driver of dental education costs.
- Federal support for dental education was largely confined to short-term funding some 30-40 years ago and has been reduced significantly over the past 2 decades, to the point where less than 1 percent of predoctoral dental education revenues in 2001 came from Federal funds. State and local government support for dental education in public dental schools declined by 25 percent in recent years, from 66 percent of total dental school revenues in 1991 to 49 percent in 2001, and continues to fall. State and local government support for dental education in private dental schools declined from 10 percent in 1991 to less than 3 percent in 2001. Declines in public funding for dental education are widely viewed as a significant factor in the closing and downsizing of U.S. dental schools over the past two decades and an impending crisis in dental education.
- Loss of Federal support, declining State appropriations and limitations of student-generated clinical revenue has resulted in greater reliance on tuition and fees over the past 2 decades. The American Dental Education Association reports that indebtedness for dental school

[1] Unless otherwise noted, the terms "dental education" or "basic dental education" are used in this report to mean predoctoral dental education – i.e., programs of professional education provided by dental schools, which lead to the awarding of D.D.S. or D.M.D. degrees.

graduates averaged $118,720 in 2003, with public school graduates averaging $105,350 and private/State-related school graduates averaging $152,525. The primary driver of student indebtedness has been escalating tuition costs which now exceed $50,000 per year in some private dental schools and $25,000 for in-State tuition in some public dental schools.

- Many are concerned about the impact of these changes on the affordability of dental education–particularly for economically disadvantaged students–and subsequent career and practice decisions. Dentists with substantial levels of student debt (as a result of rising tuition levels) are unlikely to participate in public programs such as Medicaid that generally provide relatively low levels of reimbursement. At least in the short term, dental schools are likely to continue to attract students because of the relatively good rate of return on investment in dental education. However, rising dental education costs that translate into rising levels of student indebtedness are likely to influence who attends dental school as well as the segments of the population that dentists are likely to treat upon graduation.
- Vacant budgeted full-time dental school faculty positions have increased since 1992 for both clinical and basic science positions. Vacant clinical science positions increased from 139 in 1992 to 245 in 2000–a 76.3 percent increase. Falling sources of revenue–including public support for dental education–and resultant declining faculty salaries compared to the incomes of dentists in private practice are viewed as major contributors to widespread vacant dental school faculty positions.
- Overall, 35 percent of the Nation's dentists are over the age of 55, with 9 percent over the age of 65. Furthermore, the proportion of practicing dentists who are women has risen from fewer than three percent in 1982 to 12 percent in 1990 and 13 percent in 1997, and is projected to increase to 22 percent by 2010 and 28 percent by 2020. Older dentists and women dentists tend to practice fewer hours than their younger, male counterparts. These workforce changes combined with projected increases in the U.S. population are likely to substantially exacerbate the challenge of providing broad access to dental services within the coming decade.
- The number of Dental Health Professions Shortage Areas designated by the Health Resources and Services Administration (HRSA), Bureau of Health Professions, grew from 792 in 1993 to 2,041 in 2002. In 1993, HRSA estimated that 1,400 dentists were needed to provide services to residents in designated underserved areas; by 2002, the number of dentists required to meet corresponding population service needs had grown to more than 8,000. Recent data indicate that more than 40 million people live in Dental Health Professions Shortage Areas.
- In 1995, the Institute of Medicine (IOM) called for the creation of a sufficient number of graduate dental education (residency) positions to accommodate all dental school graduates by 2005. The IOM recommendation stems from analyses conducted by an expert panel on dental education, and essentially parallels prior recommendations by leaders within academic dentistry. Implementation of universal requirements for dental residency training holds significant potential to address limitations inherent in current dental education programs, enhance the capacity of the future dental practitioners to meet the oral health care needs of an increasingly diverse U.S. population, and provide a mechanism for expanding access to care for underserved populations.
- Residency training as a prerequisite for practicing as a physician has been mandatory in medicine for some time, but State authorities generally have resisted taking this step for dentistry. However, Delaware has such requirements for dentistry; and New York has

enacted legislation that will require dentists to complete an accredited residency program as a prerequisite for initial dental licensure beginning in 2007. Other States have initiated or are considering allowing a dental residency experience as an alternative to a clinical board examination as a prerequisite for licensure.

Recommendations

The broad strategies for Federal and State policy development to enhance dental education and advance the public's interests in having access to safe, competent practitioners prepared to address the oral health needs of a broad range of individuals include the following:

1. Link public support for dental education to public policy concerns (using approaches similar to those that have been adopted in the three State examples highlighted in Section IV).
2. Expand Federal and State programs that address dental student indebtedness and faculty shortages.
3. Develop and support a national strategy for implementing universal dental residency (PGY-1) training in order to accelerate system changes that will better serve the public's interests.
4. Develop and maintain publicly available Federal and State data sources that adequately support workforce analyses and policy development.

Summary

The costs of acquiring dental education now far exceed the resources of the vast majority of United States families. At the same time, dental schools are struggling to cover the costs of providing dental education in the face of declining public support and business models that generate gross imbalances between predoctoral program clinic revenues and costs of operation. The result has been significant increases in tuition and fees and corresponding increases in student indebtedness over the past several years. Although the return on investment to acquiring a dental education remains favorable, the debt levels that most students now acquire to finance their education are likely to influence their career decisions in ways that do not bode well for expanding access to dental services for underserved and vulnerable populations. Proposals have recently surfaced for tying additional training to debt reduction through service to underserved populations; however the underlying vision has yet to be established in a broad public policy framework.

States and the Federal government have joint public interests in ensuring an adequate supply and distribution of qualified dental practitioners to meet the oral health care needs of the public. Of particular concern to public policy makers are those members of the public who face significant barriers to accessing services (i.e., those who traditionally have been underserved–individuals with low income, developmental disabilities or medically compromising conditions; young children and the elderly; and those in remote rural or many inner-city areas). The Nation also faces growing challenges in assembling an adequate dental workforce to provide dental services in military and public health facilities. Building new dental facilities (e.g., in community health centers) may be a necessary antecedent for expanding care for underserved populations; however, new facilities without an adequate supply of dentists will not produce the intended

results or prove to be a responsible use of public funds. State and Federal efforts to address this concern have been sporadic, uncoordinated and largely inadequate.

Therefore, salient public policy issues that merit consideration and have important consequences for the future of dental education and broad access to services in the United States include:

- The extent to which *dental education* constitutes a general public good that warrants broad, sustained Federal and State support and monitoring;
- The extent to which *dental services* are essential health care services that warrant inclusion in public benefits programs such as Medicaid, SCHIP, and Medicare; and
- Which public policy interventions are necessary to ensure the availability of essential dental services to underserved segments of the population.

Leaders in the field of dental education, dental practice and related health policy have reached a considerable degree of consensus about what needs to be done to make dental education function in a manner that serves the longstanding fundamental interests of the public. What remains is for leaders from the public policy domain–both at the Federal and State levels–to partner with professional leaders and vested stakeholders to purposefully address dental education as an essential National resource, as a National enterprise, and as a matter of broad Federal and State public policy.

Financing Dental Education:
Public Policy Interests, Issues and Strategic Considerations

Introduction

Recent publications, including the United States Surgeon General's Report on Oral Health (HHS, 2000), and an emerging base of scientific literature underscore the inter-relatedness of oral health and general health and the critical importance of broad access to basic dental services. Ironically, these findings come amid an ongoing, decade-long decline in the dentist-to-population ratio, growing numbers of dental health profession shortage areas, and widespread faculty vacancies in dental schools. Renewed appreciation of these matters, along with growing public concerns about disparities in oral health and access to care, have raised questions about the adequacy of the supply and training of dentists. These concerns, in turn, have spawned interest among State and Federal officials about the public policy aspects of dental education.

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The report is organized into five sections. Part one provides an overview of dental education in the United States and relevant public policy interests. Part two highlights important features of dental education financing, trends in financing and emerging challenges. Part three examines dental workforce issues and emerging challenges along with limitations of traditional approaches. Part four offers strategies and policy considerations for addressing dental education and related public interests as matters of broad public policy. Part five presents a summary and recommendations. Related data summaries concerning dental education programs and States' dentist workforce profiles appear in the accompanying tables.

1. Dental Education in the United States and Related Public Policy Interests and Issues

Overview of Dental Education in the United States

Basic Dental School Curriculum: Since the 1920s, the education of dentists in the United States typically has consisted of 3 to 4 years of undergraduate (baccalaureate-level) university education, followed by 4 years of professional (predoctoral) training in dental school. The 4 years of dental school generally are organized into basic science and pre-clinical instruction in the first 2 years of the curriculum and clinical science instruction in the latter 2 years. Thus, the basic format for dental education, established shortly after the landmark Gies *Report on Dental Education in the United States and Canada*, (Gies, 1926) which highlighted the need for a separate (from medicine) university-based, science-grounded course of study for dentistry, has remained fundamentally unchanged for nearly 80 years.

Accelerating expansion of knowledge in the basic and clinical sciences and growing challenges in serving an increasingly diverse population has placed considerable pressure on dental schools to incorporate and translate new findings into the knowledge and skills that future practitioners need to meet the emerging needs of the population. Medicine has long accommodated these pressures through universal incorporation of residency training programs that allows predoctoral education to focus primarily on knowledge acquisition and exposure to an array of clinical experiences and career possibilities, while acquisition of advanced clinical skills and treatment of more difficult patients occur in residency programs. Dentistry has been reluctant to adopt universal residency requirements as a prerequisite for licensure (although some States are now moving in this direction). Despite the lack of a requirement for dental residency training, a substantial proportion of dentists (equivalent to roughly 65 percent of the number of United States dental school graduates) currently enroll in dental specialty or general dentistry residency programs (Haden NK et al., 2003).

U.S. Dental Schools: At present, basic (predoctoral) dental education[2] in the United States is provided in 56 dental schools. Thirty-six are part of public universities; 15 are private schools (meaning they receive no direct State aid); and 5 are private, but State-related (meaning they receive a per capita enrollment subsidy from the State). These 56 schools operate in 34 States plus the District of Columbia and Puerto Rico (Haden NK et al., 2003). Arizona, Massachusetts, and the District of Columbia have only private dental schools; Wisconsin has only a private State-related school; Pennsylvania has one private and two private State-related schools; and Puerto Rico has one public dental school. Of the remaining States, 20 have relatively little or no direct public investment in financing basic dental education programs (i.e., dental schools) and 16 have no direct means of educating dentists to serve their populations.[3]

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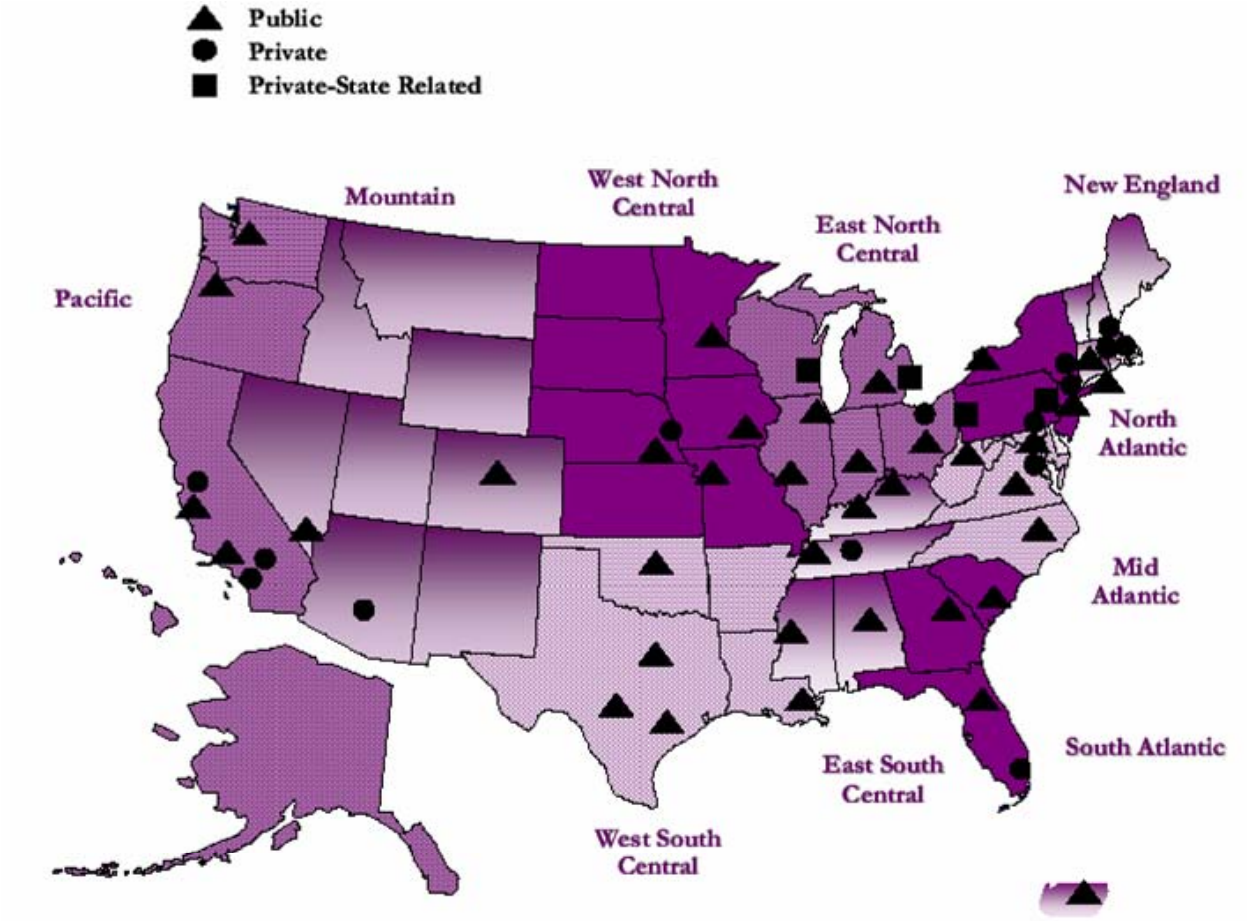
[2] Unless otherwise noted, the terms "dental education" or "basic dental education" are used in this report to mean predoctoral dental education–i.e., programs of professional education, typically 4 years in length, provided by dental schools, which lead to the awarding of D.D.S. or D.M.D. degrees that, in turn, confer eligibility to take State or regional examinations that enable individuals to become licensed to practice dentistry.

[3] Seven dental schools have agreements to accept a limited number of students from 11 States that have no dental schools and many States have dental residency programs for advanced training in dental specialties or general dentistry.

During the latter half of the 1900s, the number of U.S. dental schools increased from 42 in 1950 to 47 in 1960, to 53 in 1970, and to 60 in 1980; however, between 1985 and 1995, the number of dental schools declined to 54 due to the closure of 6 private dental schools. Moreover, reductions in class sizes in schools that remained open, combined with the closures noted above, resulted in the equivalent of 20 average-size schools being closed between the early 1980s and 1990s (out of a total of 60 schools). Accordingly, the supply of U.S. dental school graduates decreased from a high of 5,756 in 1982 to 3,778 in 1993. One additional private school has closed during the last decade, while 3 new private schools have opened–resulting in the current level of 56 schools and approximately 4,200 graduates. Meanwhile, the U.S. population has continued to expand, age, and become more diverse throughout the entire period.

Figure 1 shows the location of the Nation's dental schools and whether they are public, private or State-related. A detailed chronology of the numbers of United States dental schools and dental school enrollees and graduates can be found in table 1.

Figure 1. Location of United States Dental Schools, by Type of School, 2003



Source: American Dental Association (ADA), Health Policy Resources Center, *The Economics of Dental Education* (Chicago: American Dental Association, 2004a).

Table 1. Number of Dental Schools, Students, and Graduates, Selected Academic Years: 1950-51 to 2000-01

Academic Year	Number of Dental Schools	Total Number of Students	Number of First Year Students	Number of Graduates*
1950-51	42	11,891	3,226	2,830
1960-61	47	13,580	3,616	3,290
1970-71	53	16,553	4,565	3,775
1980-81	60	22,842	6,030	5,550
1981-82	60	22,621	5,855	5,371
1982-83	60	22,235	5,498	5,756
1983-84	60	21,428	5,274	5,337
1984-85	60	20,588	5,047	5,353
1985-86	60	19,563	4,843	4,957
1986-87	59	18,673	4,554	4,744
1987-88	59	17,885	4,370	4,581
1988-89	58	17,094	4,196	4,312
1989-90	58	16,412	3,979	4,233
1990-91	56	15,951	4,001	3,995
1991-92	55	15,882	4,047	3,918
1992-93	55	15,980	4,072	3,778
1993-94	54	16,250	4,100	3,875
1994-95	54	16,353	4,121	3,908
1995-96	54	16,552	4,237	3,810
1996-97	54	16,570	4,255	3,930
1997-98	55	16,926	4,347	4,041
1998-99	55	17,033	4,268	4,095
1999-2000	55	17,242	4,314	4,171
2000-01	55	17,349	4,327	NA

Note: *Graduate data are for the ending year of the academic year.
Source: American Dental Association, Council on Dental Education. Dental Students' Register. 2000/01 Survey of Predoctoral Dental Education. Academic Programs, Enrollment, and Graduates, Vol 1 (Chicago: ADA, 2002). Prior annual reports were also used.

Dental Residency Programs: Dental residency programs provide advanced education for dentists who wish to become dental specialists or acquire additional training in general dentistry.[4] A recent American Dental Education Association report (ADEA, 2004) identified 727 dental residency training programs in the United States in 2003, 355 at dental schools and 372 at sites other than dental schools, (e.g., hospitals). These programs include 421 dental specialty programs, 204 general practice residency (GPR) programs, and 95 advanced education in general dentistry (AEGD) residency programs. Total first-year resident positions in these programs number 2,838, roughly equivalent to two-thirds of the current number of graduating dentists (although some resident positions are occupied by non-United States dental graduates, i.e., foreign-trained dentists). Residency training is required to practice in any of the nine recognized specialties of dentistry, but, somewhat ironically, is not required (except as noted below) for the predominant mode of practice that has the broadest potential scope of services–general dentistry.

For some time, Delaware alone has required graduation from a dental residency as a prerequisite for licensure. However, New York has recently enacted legislation that will require dentists to complete an accredited postdoctoral general practice or specialty dental residency program of at least 1 year's duration (often referred to as PGY-1) as a prerequisite for initial licensure in New York State beginning in 2007 (NYSDA, 2004). Thus, new State legislation will eliminate clinical examinations in favor of universal residency training as a requirement for dental licensure in New York. Other States (e.g., California, Connecticut, and Minnesota) have initiated or are considering allowing a dental residency or PGY-1 experience as an alternative to a clinical board examination as a prerequisite for licensure.

Differences Between Dental and Medical Education and Routes to Professional Practice: With the exceptions noted above, most States allow graduates of U.S.-accredited dental schools to sit for State or regional board examinations that are needed to obtain a license to practice dentistry (i.e., without first completing a residency). Medicine has long required residency training as a prerequisite for practicing as a physician; for the most part, however, dentistry and State licensing agencies have resisted taking this step. Nevertheless, there appears to be growing acceptance and appreciation–at least among many educators and public policy makers–of the value of a residency experience with respect to preparing practitioners to meet the future oral health needs of the population.

The lack of a residency requirement for dentistry has meant that basic dental school curricula have been structured heretofore to attempt to prepare students for direct entry into practice upon graduation. The limitations of this approach, cited in major critiques of dental education programs (IOM, 1995; Kennedy and Crall, 1992), are beginning to be more widely acknowledged. Concerns about the limitations of the traditional approach to educating dentists, which has remained fundamentally unchanged since the early part of the 20th century, include:

- Growing difficulties in incorporating an expanding basic and clinical science knowledge base and the range of clinical experiences necessary to serve the needs of an aging and increasingly diverse population within the constraints of dental school curricula;
- Growing disparities between the extent of clinical competencies afforded by dental school curricula and the scope of procedures performed by practicing dentists;

[4] General dentistry is not a recognized dental specialty.

- Difficulties in converting clinical training components that focus primarily on the acquisition of technical/procedural skills into programs that focus on comprehensive patient care and utilization of allied dental personnel;
- Limited exposure to diverse patient populations in diverse clinical settings (especially in community-based settings outside dental schools);
- An inordinate emphasis on preparing students to pass clinical board examinations at the expense of patient-centered care; and
- Little or no opportunity for selective focus on areas of interest outside essential competencies in the predoctoral dental curriculum (Kennedy and Crall, 1992; Kennedy and Tedesco, 1999).

Additional consequences of the failure to adopt residency training as a prerequisite for practice include:

- The need to assess professional competencies for entry into clinical practice after a limited period of clinical education (generally 2 years or less in many schools);
- Licensure examinations that generally rely on criteria relevant to general dentistry even though over 20 percent of dentists practice as dental specialists;
- A reliance on using patients for dental licensure examinations;
- Failure to adequately define an essential core set of clinical competencies (skills) for graduates of all predoctoral dental education programs; and
- Failure to recognize the predominant mode of dental practice–general dentistry–as a legitimate specialty of dentistry, with the attendant failure to develop a valid academic discipline and faculty base to serve as the foundation for basic professional education in general dentistry.

Public Interests in Dental Education

Safety and Competency of Practitioners: Public policy makers–particularly State policy makers–and the public at-large have longstanding interests in dental education that relate to public safety, practitioner competency and general availability of dental services. Prior to the late 1800s, no special educational prerequisites existed for the study of dentistry and practically no legal restrictions on its practice (Gies, 1926). Beginning in 1886, however, States began to regulate dental practice and place educational restrictions on individuals who sought to practice dentistry within their jurisdictions. These changes led to increased enrollment in dental schools and the opening of many new schools–a good number of which were proprietary commercial operations of dubious quality. Changes brought about by recommendations contained in the landmark 1926 Gies Report (Gies, 1926) fundamentally transformed dental education into the university-based system that exists today. However, the ability of the prevailing model (which allows dental school graduates to enter general practice without additional residency training) to adequately impart the knowledge and skills necessary to meet the oral health needs of an increasingly diverse and challenging population has been the subject of considerable debate.

Access to Services: States and the Federal government also have joint public interests in ensuring an adequate supply and distribution of qualified dental practitioners to meet the oral health care needs of the general public. Of particular concern to public policy are those members of the public who face significant barriers to accessing services and have been underserved–

individuals with low incomes, developmental disabilities or medically compromising conditions; young children and the elderly; and those in many rural or inner-city areas. The extent and effectiveness of Federal and State policies and programs to achieve the goals of adequate distribution of providers and broad access to basic dental services has been modest.

Salient Public Policy Issues

The situation with respect to the number and distribution of dental schools in the United States is decidedly different from that which prevails for medical education, where all but 4 States have at least one medical school[5] and every State has numerous medical residency programs. Not only do 16 States have no direct means to educate dentists to serve their populations, but several States have no dental residency programs. This difference may reflect historical perspectives that have not regarded dental services and dental education as broad public policy interests. Three salient public policy considerations that lead to that conclusion are summarized below.

Public Support for Dental Education: Although dental education plays a crucial role in preparing dentists and other health practitioners to meet the oral health needs of the public, a review of the history and financing of dental education in the United States suggests little regard for dental education as a matter of broad public policy. For example:

- Federal funding for dental education has been highly variable and has significantly declined during the past 2 decades, to the point where less than 1 percent of predoctoral dental education revenues in 2001 came from Federal funds (ADA, 2004a).
- State and local government support for dental education in the Nation's 36 public dental schools declined by 25 percent in recent years. Support declined from 66 percent of total dental school revenues in 1991 to 49 percent in 2001 (ADA, 2004a), and continues to fall.
- State and local government support for dental education in private dental schools declined from 10 percent in 1991 to less than 3 percent in 2001 (ADA, 2004a).

Declines in public funding for dental education are widely viewed as a significant factor in the closing and downsizing of United States dental schools during the past 2 decades and as an impending crisis in dental education.

Public Support for Dental Services: Access to health services is a major public policy issue for both State and Federal governments, one that continues to receive considerable attention. However, similar to the situation with respect to dental education, a review of Federal and State involvement concerning access to dental services suggests little regard for access to oral health services as a matter of broad public policy. Examples include:

- Dental services for children enrolled in Medicaid are designated as "optional services" and are required only by virtue of Early and Periodic Screening, Diagnostic and Treatment (EPSDT) provisions (CMS, 2004).
- The Federal legislation authorizing the State Children's Health Insurance Program (SCHIP) designates dental services as "optional". And, although, 49 States have

[5] There currently are 125 allopathic medical schools operating in 45 States plus the District of Columbia and 24 osteopathic medical schools operating in 20 States.

included dental benefits in their SCHIP programs, recent history suggests that State budget pressures can lead to erosion or elimination of SCHIP dental benefits.

- Dental coverage for adults enrolled in Medicaid is essentially at the discretion of individual States and is nonexistent or extremely limited in more than 40 States.
- Medicare does not provide coverage for dental services, except in relatively rare circumstances.

Dental Workforce Issues: The availability of dentists is critical to ensuring the full range of services that are essential to meet the basic oral health needs of the public, and thus represents a broad public policy interest. However, Federal and State involvement in matters concerning the adequacy of the dental workforce has been intermittent, uncoordinated, and inconsistent.

- Substantial Federal funding initiated in the late 1960s to modernize dental school facilities and stimulate increases in the production of dentists resulted in a significant, albeit short-term, increase in dental school graduates from the mid-1970s to the early-1980s. During that period, the number of U.S. dental school graduates increased from 3,775 in 1971, to roughly 5,300 per year during the latter half of the 1970s, to a high of 5,756 in 1983.
- However, subsequent reductions in Federal funding for dental education combined with weak economic conditions and declining State support for dental education during the 1980s contributed to significant reductions in the production of dentists thereafter. Seven private dental schools closed their operations. Moreover, a report issued by the Institute of Medicine (IOM, 1995) noted that dental school closures and downsizing during this period eliminated the equivalent of 20 dental schools in the United States.
- By 1985-86, fewer than 5,000 dentists were graduating from U.S. schools; by 1990, graduation levels had dropped below 4,000 per year and have increased only slightly since then (ADA, 2004a).

Thus Federal efforts to influence the quantity of dentists in the United States were largely confined to short-term investments some 30 to 40 years ago.

Federal and State efforts to influence the geographic distribution of dentists to ensure ready access to dental services by all segments of the population also have been inconsistent and only marginally effective. For example, the Surgeon General's Report on Oral Health (HHS, 2000) noted that, in FY 1999, the National Health Service Corps (NHSC) provided only 139 dental loan repayment awards at a time when there were approximately 1,200 designated dental health professions shortage areas in the United States. Meanwhile, the U.S. population continues to expand, age, and become more diverse; the demand for dental services continues to rise; and public concerns are mounting about oral health disparities and access to basic dental services for growing numbers of children, adults and senior citizens throughout the United States.

Summary: Emerging evidence that underscores the importance of oral health and access to basic dental services and concerns about disparities make this an auspicious time for State and Federal policymakers to exert leadership in this area.

Salient public policy issues that merit consideration and have important consequences for the future of dental education and broad access to services in the United States include:

- The extent to which dental education constitutes a general public good that warrants broad, sustained Federal and State support and monitoring;
- The extent to which dental services are essential health care services that warrant inclusion in public benefits programs such as Medicaid, SCHIP and Medicare; and
- Which public policy interventions are necessary to ensure the availability of essential dental services to underserved segments of the population.

2. Dental Education Financing and Emerging Challenges

Dental Education Financing: Trends and Outlook

Dental Education Costs: Preparing dentists to enter professional practice is an expensive, labor-intensive undertaking. Reported total expenditures for 4-year programs that educate dentists average $312,040 per dental student equivalent (DDSE[6]) for public schools, $232,888 for private schools, and $183,596 for private-State related schools [ADA, 2004b].[7] These figures exclude expenditures for research, but represent other categories of expenditures (e.g., residency training) for which expenses are not reported separately.[8] Problems associated with making direct comparisons of these and other figures based on DDSE as the unit of analysis are addressed elsewhere in this report.

Although the time allotted to the two major dental school curricular components is comparable, costs of providing clinical science instruction are, on average, about five times the costs of basic science instruction. Basic science costs account for 9.4 percent of total expenditures on average in public schools, 6.8 percent in private schools, and 7.9 percent in State-related schools. Physical plant and library costs add another 14.8 percent on average. By far the largest category of expenditures, however, is clinical science instruction and clinic operations (excluding faculty practice), reported to be 41.6 percent of total expenditures overall and ranging from 39.5 percent in private schools to 42.1 percent in public schools. Revenues generated from clinical services provided in student clinics help offset about one-third of these costs, leaving dental schools with a substantial financial deficit for this major portion of the curriculum.

The primary reason for the high relative cost of clinical instruction in dental education is that it: a) involves teaching a broad array of diagnostic, preventive, restorative and surgical procedures to individuals who start with no prior clinical experience; and b) takes place in clinics operated by dental schools primarily for the instruction of students. This model for clinical education is very different from medicine, where most clinical instruction takes place after medical school

[6] DDS Undergraduate Equivalent (DDSE) is a unit of analysis used in reports issued by the American Dental Association as part of its series of surveys on predoctoral dental education. DDSE is defined as (1.0 x undergraduate DDS enrollment) + (1.7 x advanced specialty enrollment) + (0.5 x allied enrollment) + (1.0 x non-specialty graduate enrollment). Problems inherent in this unit of analysis, which mixes data from different types of educational programs, are discussed in other sections of this report.

[7] Average total expenditures calculated by multiplying average total expenditures per DDSE (excluding research) by 4 (the typical length of a dental school curriculum).

[8] Dental schools also receive income from other sources, most notably funds for sponsored research and residency training. However, because revenues from these sources are used to offset research and residency program costs and cannot be used to offset basic dental education expenses, they are not germane to this report or to predoctoral dental education program financing.

(i.e., in residencies) in facilities operated by other entities primarily for delivering clinical services–e.g., hospitals or ambulatory care facilities.

Major Sources of Revenue for Predoctoral Dental Education

The ADA Survey of Predoctoral Dental Education (ADA, 2004b) reports that total revenue per DDSE (excluding research) averaged $70,501 in FYE 2002. Public dental schools averaged $78,010 per DDSE, while private and private State-related schools averaged $58,222 and $45,899 per DDSE, respectively. Major sources of revenue for dental education programs include tuition and fees, revenues from clinical operations and State appropriations (largely for public schools). Details for these major sources of revenue are provided below.

Tuition and Fees: Revenue from tuition and fees per DDSE averaged $18,389 in 2002 or roughly 26 percent of dental schools' total revenue per DDSE (excluding research), and ranged from $5,313 to $50,646 (ADA, 2004b). Tuition and fees averaged $12,614 per DDSE for public schools in 2002, $26,133 for private State-related schools, and $31,026 private schools. Dental school tuition and fees have risen by 5 percent per year on average from 1993-2002.

Revenue from Student Clinics: Revenues from "student-generated clinical services" average $10,531 per DDSE, or 13.1 percent of total dental school revenues, with a range of 12 percent for public schools to 16.8 percent for private schools. Thus, student-generated clinic revenues cover only 31.5 percent of the total costs of clinic instruction and operations on average, producing a deficit of nearly 70 percent of the costs of clinical education and 25.5 percent of the total cost of educating a dentist. Proposals for remedying this situation have called for expansion of clinical care programs and innovative financing schemes; to date, however, no general systematic strategy has been identified.

Student-generated clinic income falls far short of covering the costs of clinical education and clinic operations, in part because predoctoral dental students (not faculty or allied health workers) provide most services directly as part of the educational process. Services provided by students usually are offered at substantially reduced fees (typically 50 percent of local market rates) to compensate patients for the additional time required for students to provide services. The situation is compounded by the fact that the "payer mix" of patients who seek care in dental school clinics generally is comprised of a substantial portion of patients on Medicaid (which typically provides low reimbursement for covered services and provides very limited coverage for adult services in most States) and patients who have no dental insurance. In light of these circumstances, the revenue generated in student clinics is notable, but remains considerably below the cost of operating clinical teaching programs for dental students–and is likely to remain so because of the time required to teach students how to perform intricate technical procedures on patients in a manner that is safe and meets quality standards.

State Appropriations: On average, public dental schools received $35,466 per DDSE from State appropriations for dental education programs in 2002, with a range from $11,858 to $70,901 (ADA, 2004b). Private State-related dental schools received an average of $5,541 from State appropriations; the range was between $2,196 and $14,272. The majority of private dental schools received no State appropriations in 2002; however, one private school received $8,968

per DDSE and four other private schools received State appropriations ranging from $821 to $1,568 per DDSE.

Federal Involvement in Dental Education

Involvement of the Federal government in dental education stems largely from Title VII, Section 747, of the Public Health Service Act, which initially was designed to address the supply and distribution of health professionals and the recruitment and retention of underrepresented minorities in the health professions.

A recent review of Title VII, Section 747, activity (ACTPCMD, 2001) cites 10 legislative acts passed between 1963 and 1998 that have shaped the focus of Title VII, Section 747, primary care training programs (including programs in dentistry) over time. Highlights include the following.

- 1963 – The Health Professions Education Assistance Act (Public Law 88-129) was enacted to increase the general supply of physicians and ensure the financial viability of health professions schools. In exchange for Federal assistance, largely in the form of medical school construction grants, schools were required to increase their first-year enrollments by 5 percent and maintain the increases for at least 10 years.
- 1965 – The Health Professions Educational Assistance Amendments (Public Law 89-290) provided matching grants to assist in construction of teaching facilities for schools of medicine, dentistry, osteopathic medicine, optometry and podiatry. Grants also were provided for student education loans.
- 1968 – The Health Manpower Act (Public Law 90-490) funded additional initiatives to strengthen, improve or expand programs to train health professionals.
- 1971 / 1976: The 1971 Comprehensive Health Manpower Training Act (Public Law 92-157) and the 1976 Health Professions Education Assistance Act (Public Law 94-484) focused on increasing the supply of primary care and dental providers, improving geographic distribution of providers, and increasing the number of minorities in the health professions. Grants also were provided for postgraduate training of physicians and dentists and for health professions teacher training.
- 1981 / 1985 / 1988 – The 1981 Omnibus Budget Reconciliation Act (Public Law 97-35), the1985 Health Professions Training Assistance Act (Public Law 99-129) and the 1988 Health Professions Reauthorization Act (Public Law 100-607) largely continued previous legislation.
- 1992 – The Health Professions Education Extension Amendments (Public Law 102-408) shifted the focus of Title VII, Section 747, by linking training of primary care providers to efforts to address workforce shortages in medically underserved communities (MUCs).
- 1998 – The Health Professions Education Partnerships Act, (Public Law 105-392) re-authorized and consolidated 44 different Federal health professions training programs previously authorized under titles VII and VIII of the Public Health Service Act into the Primary Care Medicine and Dentistry cluster. This legislation continued to focus on the production of primary care physicians, dentists, pediatric dentists and physician assistants and on getting primary care health care providers into MUCs. This act also established the Advisory Committee on Training in Primary Care Medicine and Dentistry.

Thus, the initial impetus of Federal workforce legislation was focused on expanding the supply of physicians and dentists to address concerns about access to services and maldistribution of providers. This infusion of Federal funds not only stimulated the creation of 13 new dental schools between 1960 and 1980, it also prompted the expansion of class sizes in existing schools so that the overall production of dentists increased from 3,775 in 1970-71, to roughly 5,300 per year during the latter half of the 1970s, to a high of 5,756 in 1982-83. Federal funds also allowed for much-needed upgrades to dental school physical plants. A major motivation for the expanded Federal role in health professions education beginning in the 1960s was the anticipated increase in utilization of services as a result of new Federal programs (Medicare and Medicaid). Although dentistry's involvement in these Federal health benefits programs eventually was limited, important Federal support for basic dental education programs was provided between 1960 and 1980.

However, severe curtailment of Federal funding and dental schools' inability to identify replacement funds, along with economic and political changes that began in the early 1980s, combined to create a set of forces that led to a substantial reduction of the output of dentists beginning in the 1980s. These reductions virtually erased the expansion of dental school enrollment initiated by the Federal government during the 1960s and 1970s. Seven of the Nation's 60 dental schools–all private schools–closed between 1985 and 2000, an eerie reminder of a caution raised in the 1926 Gies report about the need for adequate public support for dental education and the pitfalls of expecting to conduct dental education on a "commercial basis."

> *Without a relatively large income in excess of fees, salaries for instruction cannot be made sufficient to attract able men to the career of teaching in dentistry, constructive experimentation in dental education will be sporadic and superficial, and in most schools the instruction will remain perfunctory and uninspiring. Deprived of financial support analogous to that given to medical education, research will continue to languish, libraries cannot be materially strengthened, equipment will not be improved, methods will lack scientific scrutiny, desirable development of instruction for both medical and dental students in the correlations between clinical medicine and clinical dentistry will be impossible, and cooperation between medicine and dentistry will not acquire the cordiality and sufficiency that should characterize it.*
>
> -- W. J. Gies, 1926

Medical school enrollment did not experience a similar decline. One plausible reason may be the basic difference in financing the clinical portions of the respective medical and dental education curricula.

Federal Appropriations for Predoctoral Dental Education: The American Dental Association (ADA, 2004b) reports that Federal support for dental education averaged $4,627 per DDSE in 2002; however, that figure applies only to the six schools that received Federal appropriations for predoctoral dental education. Moreover, that figure is highly skewed by Federal appropriations for one private school that received $25,102 per DDSE. Federal support for the other five schools that received Federal appropriations for basic dental education ranged

from $9 to $1,989 per DDSE. The remaining 50 dental schools received no Federal appropriations for basic dental education.

Summary and Outlook: Federal efforts in the 1960s and 1970s created a temporary increase in the production of dentists and had only a limited effect on redistributing dentists into underserved areas. More recent Federal support has focused on training practitioners to address primary care needs of the population, which in dentistry has taken the form of start-up funding for general dentistry and pediatric dentistry residency programs. These residency programs provide considerable amounts of dental services to the underserved and enhance the ability of future dentists to treat underserved populations. However, additional incentives (discussed below) are necessary to influence dentists' decisions to practice in underserved areas or to provide services for underserved segments of the population.

Loss of Federal support, declining State appropriations and limitations on student-generated clinical revenue has resulted in greater reliance on tuition and fees during the past 2 decades. Many are concerned about the effects of this change on the affordability of dental education–particularly for economically disadvantaged students–and subsequent career and practice decisions. Dentists who have substantial student debt (as a result of rising tuition levels) are unlikely to participate in public programs such as Medicaid that generally provide relatively low levels of reimbursement. At least in the short-term, it seems likely that dental schools will continue to attract students because of the relatively good rate of return on investment in dental education. However, rising dental education costs that translate into rising levels of student indebtedness are likely to influence who attends dental school as well as the segments of the population dentists are likely to treat upon graduation.

Emerging Challenges

Escalating Dental Education Program Costs: Dental education is an expensive undertaking. Total reported expenditures (excluding research) per DDSE for the 54 schools reporting data for FY 2002 averaged $70,501 per year, with a range of $36,934 to $116,835 per year. Reported costs vary by type of school, with reported average total expenditures per DDSE per year of $78,010 for public schools, $58,222 for private schools, and $45,899 for private-State related schools. Clinical instruction is the major driver of dental education costs.

Escalating Levels of Student Indebtedness: Student indebtedness has become a significant issue for dental education. ADEA (Haden NK et al., 2003) reported that indebtedness for dental school graduates averaged $118,720 in 2003, with public school graduates averaging $105,350 and private/State-related school graduates averaging $152,525. The primary driver of student indebtedness has been escalating tuition costs that now exceed $50,000 per DDSE per year in some private institutions and average $12,614 per year for public schools, $31,026 per year for private schools and $26,113 per year for State-related schools. The effect of rising tuition costs and levels of student indebtedness and their potential effect on the affordability of dental education–especially for economically disadvantaged students–and career decisions (e.g., practice location, decisions regarding specialization and participation in public programs such as Medicaid) are of growing concern to students, families, educators and policymakers alike.

Growing Faculty Shortages: In 1999, the American Association of Dental Schools (AADS, now the American Dental Education Association or ADEA) published the results of a major study of faculty in the Nation's dental schools (Haden NK et al., 2000). The study concluded that, "Dental education now faces a new crisis. This crisis is a shortage of faculty … insufficient numbers of faculty to meet the educational needs of students" (Haden NK et al., 2000). The AADS report tied the impending shortage of faculty to declining trends in the total number of dental school faculty, recent graduates who do not pursue academic careers, increases in faculty vacancies and faculty aging (that will likely lead to greater numbers retiring from the number entering faculty positions).

Vacant budgeted full-time faculty positions have increased since 1992 for both clinical and basic science positions. Vacant clinical science positions increased from 139 in 1992 to 245 in 2000—a 76.3 percent increase. The number of vacant basic science positions increased from 16 in 1992 to 27 in 2000, an increase of 68.8 percent (ADA, 2004a). Fewer sources of revenue–including public support for dental education–and resultant declining faculty salaries compared to the incomes of dentists in private practice are viewed as major contributors to widespread vacant dental school faculty positions. The growing gap between faculty salaries and practicing dentists' incomes (which are increasing at rates roughly double those of faculty salaries) is a critical issue that must be addressed soon in order to avoid a widespread crisis in dental education

3. Dentist Workforce Issues and Emerging Challenges

Overview of the U.S. Dental Care Delivery System

Number and Characteristics of Dentists: The ADA reported that 152,151 U.S. dentists were engaged in either full- or part-time private practice in 1999. This number translates to a ratio of 1,873 people per active practicing dentist, up from 1,808 people per dentist in 1994. Because only about 85 percent of dentists are primary care dentists (i.e., general dentists or pediatric dentists), the ratio becomes roughly 2,200 people per primary care dentist. The population-to-dentist ratio, which has been increasing since 1994, is expected to begin increasing even more rapidly starting in 2010-2015, when dentists who graduated during peak dental school enrollment years begin to retire from the workforce. Without the increase in enrollments that occurred as a result of Federal initiatives to expand dental class sizes and renovate dental school physical plants from the late 1960s to late 1970s (which added roughly 25,000 additional dentists–beyond historic trends in dental school enrollment), prevailing population-to-dentist ratios would be approximately 15 percent higher.

Overall, 35 percent of the Nation's dentists are over age 55, with 9 percent over age 65. Furthermore, the proportion of practicing dentists who are women has risen from fewer than 3 percent in 1982 to 12 percent in 1990 and to 13 percent in 1997, and is projected to increase to 22 percent by 2010 and 28 percent by 2020. Older dentists and women dentists tend to practice fewer hours than their younger, male counterparts (Walton SM et al., 2004). These workforce changes, combined with projected increases in the U.S. population, are likely to substantially exacerbate the challenge of providing broad access to dental services within the coming decade.

Distribution of Dentists and Dental Health Professions Shortage Areas: The distribution of dentists varies considerably across States and regions. Larger and more affluent States have more dentists. This reflects the fact that dentists locate in areas where there is greater demand for their services. The distribution of dentists across regions is projected to change somewhat during the next 20 years. The New England and Mid-Atlantic regions are expected to average 10 to 15 more dentists per 100,000 people than the national average through the year 2020 (AADS, 1989). The ratio for the South Atlantic region is expected to increase to the national average by 2010, and the Pacific region is expected to go from higher than average to below the national average.

The number of officially designated Dental Health Professions Shortage Areas (DHPSAs) has been increasing, as detailed below.

- The number of Dental Health Professions Shortage Areas designated by the U.S. Health Resources and Services Administration (HRSA), Bureau of Health Professions grew from 792 in 1993 to 2,041 in 2002.
- In 1993, HRSA estimated that 1,400 dentists were needed to provide services to residents in designated underserved areas; by 2002, the number of dentists required to meet corresponding population service needs had grown to more than 8,000.
- Recent data indicate that more than 40 million people live in DHPSAs (Haden NK et al., 2003).

Delivery System Components: Approximately 90 percent of the Nation's dentists provide services in the private practice sector of the dental care delivery system. The vast majority of private dentists operate independently owned solo or two-person practices. More than 80 percent of dentists are general dentists, and roughly 3 percent are pediatric dentists.

Safety net facilities such as dental schools, community-based clinics, migrant and rural health centers, school-based or school-linked programs, and mobile vans that target underserved populations primarily in inner-city and rural areas are relatively few in number, but represent important access points for those who have difficulty obtaining care through the private sector. Efforts to expand care through safety net facilities–including a significant new initiative by the Federal government to include dental clinics in all new Federally qualified health centers (FQHCs) or FQHC expansions–face growing challenges in recruiting and retaining dentists because of salary structures that generally cannot compete favorably with incomes derived from private practice. Building clinics is relatively straightforward; staffing them is a decidedly more difficult challenge, in light of the current workforce situation and levels of student indebtedness.

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 also allow expanded-duty personnel with additional training to provide basic restorative procedures.

In light of changing disease patterns, workforce and population trends, and concerns about access for growing numbers of low-income children and adults, disabled individuals, the elderly and other vulnerable populations, public officials have begun to focus on the optimal use of various types of health care personnel to deliver oral health services in more diverse settings in

the future. For example, some States have started to train physicians and other primary care personnel to provide oral health assessments and preventive services for infants and young children. Engaging additional health care personnel (other than dentists) in the delivery of preventive oral health services may help reduce the incidence or severity of dental disease in certain segments of the population over time. However, the need for dentists' services is unlikely to decline in the foreseeable future and is likely to increase as the population continues to grow, diversify, age, and retain teeth for longer periods of time.

National and State Dental Workforce Requirements–Policy Considerations, Models, Projections and Designation of Underserved Areas: If one accepts the premise that some level of basic dental services is required by all members of society (albeit in varying amounts and at different intervals over the course of individuals' lifetimes), then consideration of national and State workforce requirements and, by extension, the financing of dental education constitute matters of broad public policy. However, little evidence exists to suggest that Federal and State policymakers have consistently embraced this role. Part of the problem stems from failure to define those dental services that are considered essential health services (as opposed to services that are not related to disease or medical necessity–e.g., cosmetic services).

The limitations of models developed heretofore for producing projections of dental workforce requirements also have undoubtedly contributed to lack of progress in this area. In the meantime, reports continue to document:

- Growing disparities in access to dental services for growing segments of the population;
- Increases in the number of designated dentally underserved areas–that collectively represent an acknowledged need for more than 8,000 dentists to serve more than 40 million individuals across the United States;
- Impending acceleration of increases in population-to-dentist ratios; and
- Faculty shortages that are likely to increase and further undermine the infrastructure of dental education.

Dentist Workforce Policy Considerations

Disconnects between National and State Dental Workforce Policy Interests and Support for Dental Education: Evidence of a connection between national policies and support for basic dental education is meager. Except for the period between 1960 and 1980, Federal support for programs that provide basic dental education has generally been lacking. As a result, responsibility for providing major financial support for dental education has largely been taken up by States, although considerable inconsistencies exist across States and over time.

As noted previously, 16 States have no dental schools. Although these generally are States with relatively small populations, many have experienced considerable population increases during the previous decade. Eleven of these States have arrangements with seven dental schools to reserve first-year positions for a limited number of their residents. Several States, most with in-State dental schools, also have relatively large numbers of students who obtain dental education in States other than their State of residence–most notably California (with more than 250 such students), Utah (with approximately 150 students) and, to a lesser extent, Florida, New York and Washington (with between 50 and 100 students each) (ADA, 2004a). Utah does not have a

dental school, but leads the Nation in the number of dental students per population. The other States have dental schools, and all but Washington have more than one school.

A comprehensive analysis of dental school enrollment and dentists' practice location patterns and trends relative to dental school attended is beyond the scope of this project. However, data collected as part of this project (tables 2 through 7) demonstrate:

- Considerable variation in the percentage of dental school first-year positions reserved for in-State residents across all dental schools as well as across public dental schools;
- Considerable variation in the percentage of applications from in-State residents across all schools;
- Considerable variation in the percentage of in-State enrollees across schools and over time;
- Relatively low levels of applications and enrollees from under-represented minority groups; and
- Considerable variation in the percentage of dentists in States that have no dental school who graduated from dental schools in adjacent States.

Table 2. Characteristics of Dental Schools, Dentist Workforce, and In-State Dental School Graduates in States with Dental Schools, by State

State / Jurisdiction	Number of Dental Schools 2001	Number of Dental School Graduates 2003	Percent of Active Dentists Graduated from In-State Dental School		Percent of In-State Dental School Graduates in Active Practice in the State	
			2001	1991	2001	1991
ALABAMA	1 *(public)*	54	72	82	74	80
CALIFORNIA	5 *(2 public)*	613	68	65	85	83
COLORADO	1 (*public)*	35	29	18	72	84
CONNECTICUT	1 *(public)*	32	26	33	46	70
DISTRICT OF COLUMBIA	1 *(0 public)*	68	56	57	8	6
FLORIDA	2 *(1 public)*	182	27	18	92	87
GEORGIA	1 *(public)*	54	54	72	75	56
ILLINOIS	2 *(public)*	101	75	86	63	63
INDIANA	1 *(public)*	94	83	92	74	73
IOWA	1 *(public)*	72	71	76	36	52
KENTUCKY	2 *(public)*	132	91	95	61	67
LOUISIANA	1 *(public)*	55	76	90	71	79
MARYLAND	1 *(public)*	85	41	54	48	57
MASSACHUSETTS	3 *(0 public)*	355	69	54	40	38

Table 2. Characteristics of Dental Schools, Dentist Workforce, and In-State Dental School Graduates in States with Dental Schools, by State

State / Jurisdiction	Number of Dental Schools 2001	Number of Dental School Graduates 2003	Percent of Active Dentists Graduated from In-State Dental School		Percent of In-State Dental School Graduates in Active Practice in the State	
			2001	1991	2001	1991
MICHIGAN	2 *(1 public)*	166	76	84	73	82
MINNESOTA	1 *(public)*	76	77	84	60	68
MISSISSIPPI	1 *(public)*	28	69	54	76	82
MISSOURI	1 *(public)*	80	55	67	37	47
NEBRASKA	2 *(1 public)*	125	87	92	16	25
NEW JERSEY	1 *(public)*	73	39	44	66	65
NEW YORK	4 *(2 public)*	535	63	55	67	70
NORTH CAROLINA	1 *(public)*	79	62	60	76	83
OHIO	2 *(1 public)*	163	80	84	62	66
OKLAHOMA	1 *(public)*	53	81	69	59	75
OREGON	1 *(public)*	67	63	73	55	67
PENNSYLVANIA	3 *(0 public)*	341	74	79	53	57
SOUTH CAROLINA	1 *(public)*	51	70	73	64	85
TENNESSEE	2 *(1 public)*	133	75	86	42	56
TEXAS	3 *(public)*	244	84	89	81	88
VIRGINIA	1 *(public)*	78	54	57	65	71
WASHINGTON	1 *(public)*	54	44	70	47	45
WEST VIRGINIA	1 *(public)*	36	81	86	44	52
WISCONSIN	1 *(0 public)*	74	56	74	44	69
STATES WITH SCHOOLS TOTAL/AVERAGE	32 + DC *(35 public)*	4,388	64	69	58	65

Notes:
2001 professionally active dentists graduated from dental school between 1986 and 1995.
1991 professionally active dentists graduated from dental school between 1976 and 1985.
States with at least one dental school as of 2001.
Source: American Dental Association.

Table 3. Characteristics of Professionally Active Dentists in States with Dental Schools, by State, 2001

State / Jurisdiction	Percent Practicing in Non-Metro Areas 2001 Active Dentists Graduated from:		Percent in General Practice 2001 Active Dentists Graduated from:	
	In-State School	Out-of-State School	In-State School	Out-of-State School
ALABAMA	23	11	76	67
CALIFORNIA	1	1	83	80
COLORADO	12	10	84	77
CONNECTICUT	5	5	72	77
DISTRICT OF COLUMBIA	--	--	96	70
FLORIDA	7	2	81	77
GEORGIA	19	8	84	74
ILLINOIS	6	5	87	77
INDIANA	14	13	83	69
IOWA	30	27	81	74
KENTUCKY	36	20	84	62
LOUISIANA	14	6	85	71
MARYLAND	3	2	81	78
MASSACHUSETTS	1	1	77	70
MICHIGAN	13	13	88	78
MINNESOTA	19	22	89	67
MISSISSIPPI	44	49	86	85
MISSOURI	14	13	84	79
NEBRASKA	35	15	87	67
NEW JERSEY	--	--	86	81
NEW YORK	2	4	83	77
NORTH CAROLINA	19	17	79	76
OHIO	11	8	85	68
OKLAHOMA	23	22	88	74
OREGON	12	15	88	72
PENNSYLVANIA	09	11	79	79
SOUTH CAROLINA	17	21	78	70
TENNESSEE	13	14	82	68

Table 3. Characteristics of Professionally Active Dentists in States with Dental Schools, by State, 2001

State / Jurisdiction	Percent Practicing in Non-Metro Areas 2001		Percent in General Practice 2001	
	Active Dentists Graduated from:		Active Dentists Graduated from:	
	In-State School	Out-of-State School	In-State School	Out-of-State School
TEXAS	8	3	85	66
VIRGINIA	8	6	86	75
WASHINGTON	5	7	88	73
WEST VIRGINIA	45	19	88	72
WISCONSIN	17	21	82	80
STATES WITH SCHOOLS AVERAGE	16	13	84	74

Notes:
2001 professionally active dentists graduated from dental school between 1986 and 1995.
1991 professionally active dentists graduated from dental school between 1976 and 1985.
States with at least one dental school as of 2001.
Source: American Dental Association.

Table 4. Characteristics of Professionally Active Dentists in States with no Dental School, by State, 2001 and 1991

State / Jurisdiction	Percent Graduating from Dental School in Adjacent State(s)		Percent Practicing in Non- Metro Areas	Percent in General Practice
	2001	1991	2001	2001
ALASKA *	8	9	26	80
ARIZONA	23	25	6	82
ARKANSAS	94	91	31	83
DELAWARE	65	54	7	85
HAWAII *	21	33	20	85
IDAHO	21	30	28	78
KANSAS	88	88	25	85
MAINE	46	39	34	75
MONTANA *	11	8	63	82
NEVADA	48	54	6	83

Table 4. Characteristics of Professionally Active Dentists in States with no Dental School, by State, 2001 and 1991

State / Jurisdiction	Percent Graduating from Dental School in Adjacent State(s)		Percent Practicing in Non- Metro Areas	Percent in General Practice
	2001	1991	2001	2001
NEW HAMPSHIRE	40	31	30	80
NEW MEXICO	33	18	22	83
NORTH DAKOTA	59	57	44	76
RHODE ISLAND	66	44	--	75
SOUTH DAKOTA	71	72	39	85
UTAH	1	--	10	78
VERMONT	43	19	45	71
WYOMING	72	61	77	95
STATES WITHOUT SCHOOLS AVERAGE	---	---	30	81

Notes: An "adjacent" State is defined as a State that shares a common physical border with the referenced State. Regional and interstate agreements that allow a State to purchase dental school seats in another State are not included in determining adjacency.
* The one "adjacent" State for Alaska is considered Washington. California is considered to be the one "adjacent" State for Hawaii. No State adjacent to Montana has a dental school; Washington is the closest State to Montana in terms of distance.
2001 professionally active dentists graduated from dental school between 1986 and 1995.
1991 professionally active dentists graduated from dental school between 1976 and 1985.
States with no dental school as of 2001.
Source: American Dental Association.

Table 5. Dental Education Characteristics of States with Dental Schools

State/ Jurisdiction	Number of Dental Schools 2001	Number of Accredited Advanced Dental Education Programs 2002/2003		1st Year Student Slots: Percent Reserved for Instate Residents 2002/2003		School(s) Set Aside 1st Year Student Slots for Out of State Residents 2001	Percent of Applications from Instate Residents		Percent of Enrollees from Instate		Percent of Applications from Under-Represented Minorities		Percent of Enrollees who are Under-Represented Minorities	
		School Based	Non-School	All Schools	Public Schools		2001	1996	2001	1996	2001	1996	2001	1996
AL	1 *(public)*	9	1	89	89	No	25	19	85	93	18	9	9	6
CA	5 *(2 public)*	34	27	78	86	No	54	65	77	85	8	6	8	6
CO	1 (*public)*	2	6	65	65	No	11	9	68	66	7	6	5	9
CT	1 *(public)*	8	8	40	40	Yes	4	4	12	28	10	8	11	9
DC	1 *(0 public)*	5	7	03	--	No	.5	.4	3	3	26	20	69	61
FL	2 *(1 public)*	22	10	72	92	No	22	36	66	92	15	15	18	19
GA	1 *(public)*	7	8	98	98	No	99	95	100	95	14	0	7	16

Table 5. Dental Education Characteristics of States with Dental Schools

State/ Jurisdiction	Number of Dental Schools 2001	Number of Accredited Advanced Dental Education Programs 2002/2003		1st Year Student Slots: Percent Reserved for Instate Residents 2002/2003		School(s) Set Aside 1st Year Student Slots for Out of State Residents 2001	Percent of Applications from Instate Residents		Percent of Enrollees from Instate		Percent of Applications from Under-Represented Minorities		Percent of Enrollees who are Under-Represented Minorities	
		School Based	Non-School	All Schools	Public Schools		2001	1996	2001	1996	2001	1996	2001	1996
IL	2 *(public)*	9	13	87	87	No	37	17	96	61	13	10	5	16
IN	1 *(public)*	8	3	61	61	No	10	14	68	56	7	8	2	3
IA	1 *(public)*	11	0	66	66	No	11	8	77	70	8	8	11	10
KY	2 *(public)*	12	1	58	58	Yes	11	9	66	65	6	6	.8	7
LA	1 *(public)*	8	4	62	62	No	27	96	85	96	1	0	3	4
MD	1 *(public)*	10	12	51	51	No	8	10	59	59	11	9	8	12
MA	3 *(0 public)*	23	5	15	--	No	4	5	11	16	11	6	11	4

Table 5. Dental Education Characteristics of States with Dental Schools

State/ Jurisdiction	Number of Dental Schools 2001	Number of Accredited Advanced Dental Education Programs 2002/2003		1st Year Student Slots: Percent Reserved for Instate Residents 2002/2003		School(s) Set Aside 1st Year Student Slots for Out of State Residents 2001	Percent of Applications from Instate Residents		Percent of Enrollees from Instate		Percent of Applications from Under-Represented Minorities		Percent of Enrollees who are Under-Represented Minorities	
		School Based	Non-School	All Schools	Public Schools		2001	1996	2001	1996	2001	1996	2001	1996
MI	2 *(1 public)*	10	10	62	57	No	18	17	62	66	10	12	13	13
MN	1 *(public)*	8	6	64	64	Yes	14	11	62	67	6	7	0	1
MS	1 *(public)*	2	3	100	100	No	93	81	100	90	14	16	0	7
MO	1 *(public)*	8	6	51	51	Yes	12	12	48	49	12	7	9	13
NE	2 *(1 public)*	6	2	20	49	Yes	5	5	33	33	3	6	2	6
NJ	1 *(public)*	8	14	88	88	No	14	20	70	84	15	10	15	20
NY	4 *(2 public)*	27	102	48	49	No	22	30	46	61	10	7	6	2

Table 5. Dental Education Characteristics of States with Dental Schools

State/ Jurisdiction	Number of Dental Schools 2001	Number of Accredited Advanced Dental Education Programs 2002/2003		1st Year Student Slots: Percent Reserved for Instate Residents 2002/2003		School(s) Set Aside 1st Year Student Slots for Out of State Residents 2001	Percent of Applications from Instate Residents		Percent of Enrollees from Instate		Percent of Applications from Under-Represented Minorities		Percent of Enrollees who are Under-Represented Minorities	
		School Based	Non-School	All Schools	Public Schools		2001	1996	2001	1996	2001	1996	2001	1996
NC	1 *(public)*	9	9	87	87	No	21	24	86	84	10	10	22	9
OH	2 *(1 public)*	14	16	50	76	No	13	12	52	62	9	8	3	2
OK	1 *(public)*	4	5	91	91	No	29	17	89	83	17	8	19	13
OR	1 *(public)*	4	4	69	69	No	17	12	83	70	5	5	4	1
PA	3 *(0 public)*	20	21	27	--	No	10	12	31	41	10	7	12	10
SC	1 *(public)*	4	4	87	87	No	11	12	82	91	12	9	9	6
TN	2 *(1 public)*	8	5	48	68	Yes	11	16	42	44	27	29	48	39

Table 5. Dental Education Characteristics of States with Dental Schools

State/ Jurisdiction	Number of Dental Schools 2001	Number of Accredited Advanced Dental Education Programs 2002/2003		1st Year Student Slots: Percent Reserved for Instate Residents 2002/2003		School(s) Set Aside 1st Year Student Slots for Out of State Residents 2001	Percent of Applications from Instate Residents		Percent of Enrollees from Instate		Percent of Applications from Under-Represented Minorities		Percent of Enrollees who are Under-Represented Minorities	
		School Based	Non-School	All Schools	Public Schools		2001	1996	2001	1996	2001	1996	2001	1996
TX	3 *(public)*	27	19	89	89	No	58	45	97	95	17	12	18	15
VA	1 (*public)*	7	7	79	79	No	21	15	69	87	9	8	11	7
WA	1 *(public)*	6	4	78	78	No	18	13	70	83	7	6	4	12
WV	1 *(public)*	6	2	88	88	No	10	5	77	48	7	6	0	3
WI	1 *(0 public)*	4	6	33	--	No	4	3	11	32	9	12	11	19
TOTAL/ AVERAGE **	54 *(35 public)*	340	350	58	79	--	22	23	69	65	11	9	11	12

Notes:

* The designation process used by the Federal government to determine Federal dental HPSAs is undergoing review and possible change.

** Nationwide totals/averages do not include Puerto Rico.

Table 6. Dental Residencies and Interstate Agreements for Dental School Slots in States with No Dental School

State/Jurisdiction	Number of Accredited Advanced Dental Education Programs 2002/2003	State Has Interstate Dental School Agreement to Set-Aside 1st Year Student Slots for State Residents 2001
ALASKA	1	YES, via WICHE
ARIZONA #	1	YES, via WICHE
ARKANSAS	0	YES, with Kentucky, Missouri, Louisiana, Tennessee, Texas (via SREB)
DELAWARE	2	NO
HAWAII	3	YES, via WICHE and Missouri
IDAHO	1	YES, via WICHE and Nebraska
KANSAS	0	NO
MAINE	0	NO
MONTANA	0	YES, via WICHE and Minnesota
NEVADA #	3	YES, via WICHE and Nebraska
NEW HAMPSHIRE	1	NO
NEW MEXICO	1	NO
NORTH DAKOTA	0	YES, via WICHE and Minnesota
RHODE ISLAND	1	NO
SOUTH DAKOTA	0	YES, via WICHE and Minnesota
UTAH	3	YES, via WICHE and Nebraska
VERMONT	1	NO
WYOMING	0	YES, via WICHE
STATES WITHOUT SCHOOLS: TOTAL	18	11 have seat set-aside arrangements

Notes:
* The designation process used by the Federal government to determine Federal dental HPSAs is undergoing review and possible change.
# = Since 2002, Arizona and Nevada have opened their own dental schools.
WICHE = Western Interstate Commission on Higher Education promotes resource sharing, collaboration, and cooperative planning among 15 western States and their higher education institutions. Member States include Alaska, Arizona, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, North Dakota, Oregon, Utah, Washington and Wyoming. California and South Dakota are affiliate States.
SREB = Southern Regional Education Board, based in Atlanta, Georgia.

Table 7. Characteristics of Dentist Supply, by State

State/Jurisdiction	Percent Active Dentists in Private Practice 2001	Percent Active Dentists in Govt. Service 2001	Percent Active Dentists in Other Settings 2001	Percent of Population in Dental HPSAs 2003 *	Number of Dentists Needed to Remove HPSAs 2003 *	Percent Age Distribution of Active Dentists 2001	
						55-64 yrs	65+ yrs
ALABAMA	91	2	7	37	649	15.2	11.2
ALASKA	78	18	4	19	20	18.3	5.2
ARIZONA	92	4	4	17	133	19.3	8.5
ARKANSAS	96	2	2	9	25	17.3	10.4
CALIFORNIA	92	2	6	6	191	18.2	9.2
COLORADO	93	3	4	7	45	20.4	8.0
CONNECTICUT	92	1	7	8	39	21.2	12.6
DELAWARE	94	3	3	27	25	22.6	15.4
DISTRICT OF COLUMBIA	89	4	7	12	9	18.0	14.3
FLORIDA	92	3	5	16	542	18.7	12.0
GEORGIA	90	4	6	15	162	19.8	7.1
HAWAII	90	7	3	13	24	14.1	12.5
IDAHO	96	2	2	30	49	21.8	9.6
ILLINOIS	93	2	5	10	284	14.3	9.3
INDIANA	93	1	6	5	65	17.2	11.4
IOWA	90	1	9	19	119	16.4	10.5
KANSAS	93	3	4	22	120	18.6	11.6
KENTUCKY	89	2	9	12	45	15.3	7.1
LOUISIANA	92	2	6	11	53	19.5	10.4
MAINE	96	2	2	29	60	22.5	10.6
MARYLAND	88	5	7	8	66	19.4	8.6
MASSACHUSETTS	90	2	8	8	56	19.3	11.0
MICHIGAN	94	1	5	13	285	17.5	9.9
MINNESOTA	92	1	7	7	46	18.1	7.4
MISSISSIPPI	89	5	6	19	65	15.0	10.3
MISSOURI	93	2	5	26	306	20.0	9.1
MONTANA	93	3	4	36	43	26.2	11.4

Table 7. Characteristics of Dentist Supply, by State

State/Jurisdiction	Percent Active Dentists in Private Practice 2001	Percent Active Dentists in Govt. Service 2001	Percent Active Dentists in Other Settings 2001	Percent of Population in Dental HPSAs 2003 *	Number of Dentists Needed to Remove HPSAs 2003 *	Percent Age Distribution of Active Dentists 2001	
						55-64 yrs	65+ yrs
NEBRASKA	88	3	9	2	3	17.8	10.8
NEVADA	94	3	3	15	63	19.1	7.4
NEW HAMPSHIRE	97	1	2	7	17	21.2	9.8
NEW JERSEY	94	1	5	3	30	15.9	10.5
NEW MEXICO	86	10	4	39	94	20.7	10.3
NEW YORK	89	1	10	9	214	16.8	11.8
NORTH CAROLINA	88	5	7	17	247	17.0	9.2
NORTH DAKOTA	92	6	2	11	7	18.0	7.2
OHIO	93	1	6	10	192	17.4	12.0
OKLAHOMA	89	5	6	11	27	18.4	10.0
OREGON	91	2	7	22	111	20.3	10.4
PENNSYLVANIA	93	1	6	13	304	16.1	10.9
RHODE ISLAND	94	2	4	13	22	19.6	10.8
SOUTH CAROLINA	90	4	6	33	214	21.4	7.3
SOUTH DAKOTA	91	7	2	14	16	15.9	10.1
TENNESSEE	90	2	8	28	254	16.2	9.9
TEXAS	89	4	7	20	510	17.2	8.9
UTAH	95	2	3	26	87	19.2	10.6
VERMONT	98	0	2	5	3	23.8	7.6
VIRGINIA	88	6	6	12	98	18.7	8.8
WASHINGTON	91	4	5	17	122	20.7	8.6
WEST VIRGINIA	88	2	10	14	27	16.5	11.1
WISCONSIN	95	1	4	10	145	17.8	9.0
WYOMING	93	4	3	14	14	21.1	11.9
UNITED STATES TOTAL/AVERAGE	91	3	6	14.5	6,370	17.9	10.0

Notes:
*The designation process used by the Federal government to determine Federal dental HPSAs is undergoing review and possible change.
Sources: ADA, HRSA.

Traditional Mechanisms for Addressing States' Dentist Workforce Needs

Producing Dentists or Subsidizing Dental Education for State Residents: Perhaps the most common mechanism States use to address dental workforce needs is to support educational opportunities for State residents to obtain a dental education by way of one of the following:

- Direct production of dentists in public in-State dental schools (currently 30 States plus Puerto Rico);
- Regional arrangements to provide first-year positions and/or favorable tuition for students from States that have no dental schools (e.g., the Western Interstate Commission for Higher Education (WICHE) program, the Southern Regional Education Board (SREB) and the New England Consortium); or
- State subsidies for students from States that have no dental schools to attend dental schools in other States.

Sixteen of the 20 States that have no State dental schools provide scholarships to State residents enrolled in dental school or per-student payments to specific dental schools where they have a special arrangement to accept students from their States (Bailit and Beazoglou, 2003). The average level of scholarship or direct school subsidy varies, but generally allows students to pay a reduced out-of-State tuition rate that is close to the in-State tuition rate.

Several State dental schools also accept significant numbers of out-of-State students. Although these students usually have to pay higher out-of-State tuition, they still are heavily subsidized by the States in which the dental schools are located. Seven schools fall into this category and collectively, they educate approximately 1,150 out-of-State students per year (Bailit and Beazoglou, 2003).

Reliance on Market Forces or State Residents Returning to Their Native States: Some States that have no public dental schools provide little or no subsidy to students from their States to attend out-of-State dental schools, but have large numbers of students enrolled in such schools. One such State has more than 500 State residents enrolled in out-of-State dental schools. Another State with public dental schools has more than 2,000 State residents enrolled in private or out-of-State dental schools (Bailit and Beazoglou, 2003). These are extreme examples of States that provide minimal subsidies for educating large numbers of dentists (in private or out-of-State public schools), many of whom return to their native State to practice.

Licensure Eligibility Regulations: It has become a common practice for States to use licensure regulations that broaden the range of dental board examinations that make a dentist eligible for licensure, make Foreign dental school graduates who complete U.S. dental residencies eligible for licensure, convey reciprocity or licensure by credentials to dentists who hold licenses in other States, and grant special licenses or provide incentives (e.g., limiting liability) for dentists who work in public health/safety net clinics to attract additional dentists. However, absent changes in the production of dentists, these measures merely serve to influence the distribution of dentists; the gains in dentists achieved by some States are offset by losses in other States.

Dentist Recruitment Programs for Addressing the Needs of Underserved Areas: A limited number of States (e.g., North Carolina) also have active dentist recruitment programs for addressing the needs of underserved areas. These programs typically seek to attract dentists to underserved communities by setting up clinical facilities that lower the dentists' start-up or overhead costs or by offering loan forgiveness programs.

Loan Repayment or Loan Forgiveness Programs for Dentists: A growing number of States have initiated loan repayment or loan forgiveness programs for dentists who agree to practice for stipulated periods of time in underserved areas or serve specified levels of individuals covered by public programs (e.g., Medicaid). This option has been especially popular among rural States that do not have dental schools.

Emerging Challenges and Limitations of Traditional Approaches

Growth and Diversity of the Population: The demographic characteristics of the U.S. population are changing rapidly, with greater numbers of older, sicker and more ethno-culturally diverse people in need of dental services. At the same time, there is growing recognition that the practice of dentistry is becoming increasingly complex, with new clinical and technologic information competing for time in overcrowded dental curricula with the time required to teach traditional clinical skills (ADA, 2001). Furthermore, there is growing agreement that an additional year of education and clinical training would enhance the ability of future dentists to treat patients with complex needs.

Dental Service Needs Relative to the Overall Supply of Dentists' Services: The substantial number of dental health professions shortage areas; limited access to dental services for individuals who are covered by public programs, are disabled or are living in institutional or residential settings (e.g., nursing homes); and difficulties recruiting dentists for community health centers, military and faculty positions serve as indicators of a growing need for concerted public action to address current and emerging oral health needs of the U.S. population. Individual States have responded to emerging dental workforce issues by reducing barriers to licensure. Although such changes may produce short-term improvements in the supply of dentists and services in some States, they are likely to exacerbate declines in services in other States and in already underserved areas (e.g., rural areas and inner cities), especially during a period of declining dentist-to-population ratios and professional demographic trends that portend reduced availability of dental services.

Rising Educational Costs and Problems Inherent in Current Financing Schemes: The costs of acquiring dental education now far exceed the resources of the vast majority of U.S. families. At the same time, dental schools are struggling to cover the costs of providing dental education in the face of declining public support and business models that generate gross imbalances between predoctoral program clinic revenues and costs of operation. The result has been significant increases in tuition and fees and corresponding increases in student indebtedness during the past several years. Although the return on investment to acquiring a dental education remains favorable, the debt levels that most students now acquire to finance their education are likely to influence their career decisions in ways that do not bode well for expanding access to dental services for underserved and vulnerable populations. Proposals recently have surfaced to

tie additional training to debt reduction through service to underserved populations; however, the underlying vision has yet to be established in a broad public policy framework.

In light of these trends and the limitations of traditional approaches, a more proactive, systematic strategy seems to be necessary to address the shortcomings of the current system. The following section outlines several strategies for overcoming these limitations.

4. Addressing Emerging Dental Education and Related Public Interests as Matters of Broad Public Policy

The preceding sections have laid out a case for treating as matters of broad public policy dental education and the public's related interests in having reasonable access to dental services provided by dentists capable of meeting the oral health care needs of the United States population. Making this shift to treating dental education as an essential national resource and collective enterprise will require strategic, collaborative efforts on the part of States and the Federal government in a number of key areas, several of which are highlighted below.

Public Interests in Dental Education

Educating Practitioners to Meet the Needs of the Population: Public policy makers–particularly State policymakers–and the public at large have longstanding interests in dental education as it relates to public safety, practitioner competency and the general availability of dental services. However, the ability of the prevailing model (which allows dental school graduates to enter general practice without additional training) to adequately impart the knowledge and skills necessary for dentists to meet the needs of an increasingly diverse and challenging population is currently an issue.

Access to Services: States and the Federal government have joint public interests in ensuring an adequate supply and distribution of qualified dental practitioners to meet the oral health care needs of the public. Of particular concern to public policymakers are those members of the public who face significant barriers to accessing services (i.e., those who traditionally have been underserved–individuals with low incomes, developmental disabilities or medically compromising conditions; young children and the elderly; and those in remote rural or many inner-city areas). The Nation also faces growing challenges in assembling an adequate dental workforce to provide dental services in military and public health facilities. Building new dental facilities may be a necessary antecedent to expanding care for underserved populations; however, if an adequate supply of dentists is not available, new facilities alone will not produce the intended results.

> *To set up a generation of physicians, of dentists, of nurses, whose service is so costly as to be out of the reach of the self-respecting man of modest means who desires to pay his way would be a dismal mistake in civilization.*
>
> -- Henry S. Pritchett, 1926
> President, Carnegie Foundation for the Advancement of Teaching

Public Data Sources to Support Workforce Analyses and Policy Development

Reliable, publicly available data sources on key aspects of dental education (e.g., enrollment levels, student and faculty characteristics, program finances, graduates' career choices, levels of student indebtedness) and the dental workforce (e.g., number and types of practitioners, practice locations, number of hours worked) are essential for monitoring workforce trends, policy analyses and planning activities. Such data need to be collected, updated and made available on an ongoing basis to shed light on emerging trends and facilitate the evaluation of policy options and program changes over time. Likely users of such data include researchers; policy analysts; local, State, regional and Federal officials; and program planners and evaluators. The ADA and ADEA currently collect and compile data on a number of variables that are relevant to workforce analyses and policy development; however, access to data on the production and distribution of dentists may be restricted or cost-prohibitive for some interested parties. Moreover, data issues stemming from a reliance on secondary data–such as the problems cited in this report concerning the DDSE unit of analyses–underscore the importance of publicly maintained data sources that provide ready access for the public, researchers and policy analysts.

Federal Data Sources: The U.S. Department of Health and Human Services, Health Resources and Services Administration, Bureau of Health Professions would seem to be an appropriate entity to carry out this role. In the past, HRSA has occasionally disseminated data on the location and characteristics of dentists and other health professionals.

Suggested data sources to be compiled and made available through one or more agencies of the Federal government include, but are not limited to:

- A central repository of publicly accessible data on dental workforce characteristics and trends in all States;
- A central repository of publicly accessible data on dental health professions shortage areas (D-HPSAs); and
- A central repository of publicly accessible data on dental education programs, including enrollment and graduation trends, student characteristics and variables related to program financing (costs and revenues).

Regular release of timely, publicly compiled data sources of this nature could overcome limitations of current privately compiled data sources (e.g., the problems associated with use of the DDSE unit of analysis noted throughout this report) and go a long way towards facilitating more timely and rational policy and program development at both the State and Federal levels.

State Data Sources: States also can play a valuable role by collecting and making available detailed information about dentists who are licensed and/or practicing within their jurisdictions. Examples of useful data include the number, type, location and demographic characteristics of licensed/practicing dentists; which schools or residency programs the State's dentists attended; length of time in practice; and whether and to what extent dentists participate in Medicaid. Some States already collect information of this sort through a series of questions that are included in dentists' license applications. For optimal effectiveness, however, comparable information should to be collected for all States.

Data on Dental Education Program Costs and Revenues: Analysis of the differences and variations among types of schools and among schools is complicated and confounded by two factors: 1) the use of DDSE as a unit of analysis in reports issued by the ADA and ADEA and 2) the lack of a generally accepted standard for allocating and reporting costs. The DDSE has been used historically to compare the overall institutional cost per (hypothetical) student based on an admixture of programs in ("undergraduate"/predoctoral) dental education, advanced dental specialities (residencies), allied dental education (e.g., dental hygiene and dental assisting) and non-specialty graduate dental education. Although the convenience afforded by combining these units may have value to historical users, the use of DDSE as a unit of analysis obscures valid comparisons across institutions (that may or may not offer all component programs) and programs (that have widely varying educational elements, cost structures and potential offsetting sources of revenue).

Dental Education Financing Issues: Student Indebtedness and Dental Faculty Shortages

Student Indebtedness: Rising student indebtedness has serious implications for public policy. The average cost for tuition and fees for 4 years of dental school is approaching $100,000 overall and is considerably higher in private schools. Average student debt for graduating dentists is roughly $120,000 and is increasing. Escalating costs and levels of indebtedness have not dissuaded students from pursuing careers in dentistry, most likely because dentistry still provides a good rate of return on the investment in dental education (ADA, 2004a). However, rising costs and indebtedness are likely to discourage economically disadvantaged and minority students from pursuing dentistry as a career. Because studies have shown that minority dentists are more likely to provide care to minority patients, rising costs can have a future effect on access to care for vulnerable, underserved populations. A second aspect of this problem relates to career decisions of graduating dentists. Data compiled by ADEA suggest that graduates who face substantial educational debt forego careers in dental education or employment in public clinics that treat the underserved. Moreover, those entering private practice with substantial debt levels will be disinclined to participate in public programs such as Medicaid or the SCHIP because of the relatively low reimbursement rates that these programs typically provide.

Faculty Recruitment and Retention: Faculty recruitment and retention also are matters that public policymakers need to consider seriously. The growing gap between dental school salaries and incomes earned by dentists in private practice (combined with increasing student indebtedness) has led to rising numbers of vacant faculty positions in dental schools across the country–now in excess of 250 budgeted positions. Less than 1 percent of graduating dental students report plans to pursue careers in dental education, a rate that is far less than the 5 percent figure that Kennedy (1995) has estimated is needed to meet the collective faculty replacement needs of the Nation's dental schools. The less than 1 percent figure also is in stark contrast to the roughly 30 percent of graduating medical students who report they plan to become full-time university faculty (JAMA, 2001).

No single approach is likely to resolve either of these growing problems that have significant public policy implications for the future availability of dental services and the Nation's dental education infrastructure. Thus, there would seem to be a clear rationale for increased Federal and State involvement to develop sustainable initiatives to address these issues.

Federal interventions could include:

- Subsidies in the form of grants and scholarships for disadvantaged students who wish to pursue careers in dentistry;
- Loan forgiveness programs for graduates who practice in underserved areas or serve underserved populations;
- Financial incentives (grants, scholarships or loan forgiveness) for graduates who pursue careers as dental faculty; and
- Support for developing and recruiting faculty for community-based teaching programs.

Similar State initiatives to complement Federal programs are likely to be needed.

Linking Public Support for Dental Education to Public Policy Concerns

In light of the growing need for dental services and workforce trends that portend an accelerated decline in dentist-to-population ratios, State and Federal attention and support for dental education are necessary. The magnitude of the emerging problem and the current political and economic environment require a strategic approach to address the public policy concerns inherent in this issue–i.e., approaches that adopt a broad National strategy for dealing with these issues while, at the same time, recognizing the problems of individual States and educational institutions.

If carried out in a broader, more strategic fashion, the interventions and initiatives highlighted in the previous section would undoubtedly help address fundamental public policy issues that stem from current and impending problems related to dental education. Michigan, Minnesota, and Utah provide illustrations of States that have mounted creative efforts to develop more systematic initiatives to link support for dental education and public policy interests.

Using Medicaid Graduate Medical Education (GME) Funds to Support Dental Education Programs in Underserved Communities[9]

Example #1–Michigan: Medicaid GME policy in Michigan changed significantly in 1997 when the State took steps to structure payments to bring physician education more in line with its public policy goals to train appropriate numbers of primary care providers, enhance training in rural areas, and support education in ways of particular importance in the treatment of the Medicaid-eligible population (Holmes, 2003). Historically, no accountability was required of training programs because funding was based on cost, and the State had no idea how much it was contributing to GME.

Most of the nearly $200 million in GME funds previously included in Medicaid fee-for-service hospital patient care payments and managed care organization (MCO) capitation rates were carved out and directed for redistribution into two different pools. For the first 3 years of the new policy, a historic cost pool reimbursed each hospital the same amount in payments that it received in 1995, based on that year's costs for medical education. A second pool, the primary

[9] Reference material compiled by NCSL for the HRSA-sponsored National Conference of State Legislatures Conference on State Support for Dental Education: Making It Work to Address Critical Oral Health Workforce Needs. Park City, Utah: May 16-17, 2003.

care pool, seeks to encourage the education of young physicians in the primary care fields of general practice, family practice, preventive medicine, obstetrics and geriatrics. Payments from the primary care pool to hospitals are based on the institution's number of residents in primary care and its share of Medicaid patients. To qualify for reimbursement from either pool, a hospital must submit a report to the State detailing resident profiles and how it is using the funds to support specific public policy goals and priorities.

A third pool, the Innovations in Health Professions Education Grant Fund, was established with GME that funds formerly were included in capitation payments to MCOs to foster innovations in health profession education and accelerate the pace of change currently sweeping the State's health care delivery system. Grants are awarded on a competitive basis to programs that support the goals of the new GME initiative, with emphasis on innovative training in managed care arrangements. Only consortia consisting of at least a hospital, a university and a managed care organization are eligible to apply. Early funding under this pool supported activities such as making changes in curriculum to add exposure to managed care, developing evidence-based medicine teaching experiences and establishing interdisciplinary education curricula with other health professions. The funding size of the pool depends on the annual availability of funds.

The State has concluded that funds in this pool have been well spent. Residency educators say that they now can make changes they have been wishing to make. University, hospital and health plan officials have been forced to communicate without each other on GME issues in a productive and positive manner. The new managed care curriculum is largely viewed as useful, but it is too soon to tell whether such changes can be sustained.

The initiative's overall effect on addressing State workforce goals is not yet known. The State believes that such programs would be more effective if a more coherent policy approach could be developed between Medicaid and Medicare and other payers. State efforts such as Michigan's may need to exercise caution on how specifically they direct their initiatives regarding State workforce needs. Physicians have typically responded to other market changes more quickly than to State financing changes. In Michigan, there appears to be no shortage of primary care physicians, but there is evidence of a shortage of some specialists who may not be willing to be part of managed care networks.

In 2001, a new formula was established that takes into consideration utilization by and service to the State's Medicaid population. Previously, funds were distributed based on hospital costs. New formulas use physician intern and resident full-time equivalents (FTEs) with weighting for Medicaid utilization, hospital case mix, physician enrollment in Medicaid, and physician board certification to distribute funds. Teaching hospitals now are required to submit annual updates on their intern and resident FTEs. For a hospital to receive GME funds, the new policy also required participation in a managed care plan.

Furthermore, beginning in 2001, Medicaid agreed to provide funding to educate third- and fourth-year students at the State's one public dental school that is developing specialized curricula and programs intended to further increase the participation of dentists in Medicaid. Funding covers teaching and other administrative costs that can be matched under Medicaid's

intergovernmental transfer mechanism to draw additional Federal matching funds and provide new revenue for the State's dental school.

Recently, Medicaid Intergovernmental Transfer (IGT) funds have been used to support two physician residency programs in psychiatry that provide considerable training in community mental health settings. The programs' affiliated universities use State general funds and a Medicaid GME innovations grant as the State match under IGT to obtain Federal matching funds. These non-hospital-based residencies otherwise are not eligible for the State's Medicaid GME payments.

Example #2–Minnesota: Recognizing that medical education was important to the State's economy and that a more competitive (managed care) health care market threatened the viability of many State teaching hospitals, the Minnesota Legislature in 1993 charged the commissioner of health with estimating the total costs of medical education and research in the State. This resulted in a series of advisory committee reports that identified the need for explicit funding of medical education and research and culminated in a 1996 estimate that approximately $37 million (the deficit between teaching program costs and revenues) could be lost as a consequence of competition in the State's managed care market (Leitz, 2003).

To partially address the deficit, the Legislature that same year authorized creation of a Medical Education and Research Cost (MERC) Trust Fund to capture new and existing State sources of medical education funds. In 1997, lawmakers appropriated $5 million in new funding from the State's general fund and $3.5 million from an existing State health care provider tax pool.[10] Sponsoring institutions are eligible to apply on behalf of their accredited programs and are responsible for distributing the funds to the more than 300 training sites that actually incur the cost of medical education (including non-hospital settings). Eligible applicants are accredited programs that train physicians, advanced practice nurses, physician assistants, doctor of pharmacy practitioners and dentists. Reports from the training institutions are required to document that the distribution was made appropriately. In 1998, the Legislature provided ongoing support for the trust fund by appropriating $10 million from the State general fund for distribution in FY 1999 and by increasing the Department of Health budget by $5 million annually beginning in FY 2000.[11]

Lawmakers also agreed in 1997 to carve out GME funds from Medicaid managed care rates beginning in 1999. The funds are directed to the MERC trust fund for direct distribution to medical and dental teaching programs. Distribution of payments, which did not begin until 2001, is based both on the extent of educational programs and Medicaid revenue volume at respective teaching sites.

[10] These dollars were matched with approximately $9.3 million in Federal Medicaid funds for 1 year only. A new assessment of private payers was considered, but was rejected because the assessment could not include self-funded plans due to restrictions under the Federal Employee Retirement Income Security Act (ERISA), which prevents States from regulating the health plans of large employers that self-insure.

[11] New York is the only other State that supports GME through an all-payer fund.

Presently, funding sources for the MERC trust fund include:

- *Tobacco settlement fund*–Payment of $350 million to a medical education endowment is split between MERC and the State's academic health centers. In 2001, MERC received $7.3 million.
- *Medicaid matching funds*–Through an amendment to the State Medicaid plan, Federal matching funds procured through the intergovernmental transfer mechanism have increased GME payment levels to teaching hospitals. Each year, transfers of about $5 million in State tobacco settlement funds awarded to the University of Minnesota Academic Medical Center and $2.4 million from the University of Minnesota to Medicaid are used to obtain Federal matching funds to support MERC's new dental GME innovations pool. Medicaid matching funds for GME provider distribution are distributed to MERC through the Department of Health.
- *State general fund payments.*
- *Medicaid managed care "carve-out."*

MERC funds support more than 2,000 FTE trainees at 400 training sites. The funding formula is cost-based—based on the cost per trainee in each discipline. In the first 3 years, MERC has distributed more than $53 million. Distribution of payments is not linked to State workforce or policy goals for specific health professions because officials do not feel that they presently have adequate data to support such decisions.

Example #3–Utah: In 1995, two technical advisory groups to the Utah Health Policy Commission concluded that the State's major academic health center and residency training programs were significantly threatened by changes that were occurring in the health care system and projected changes in Federal policy for funding GME. To develop a basis for making policy decisions in response to these changes, the commission requested an independent study to determine GME costs and revenue sources statewide. Anticipating that Utah's academic training centers would have to further compete on price and quality for patients, the commission was interested in possibly using the study results to begin the difficult task of separating the cost of training from the cost of patient care in these institutions.

Since the study concluded that GME funding sources were being eroded, the State Legislature in 1997 created the Medical Education Council to address various issues associated with funding for health professions education in Utah (Squire, 2003). The mission of the council is to find ways to stabilize such funding by effectively determining the costs of health professions education and to better understand and address the State's health workforce needs. The council currently is conducting extensive workforce planning and analyses that, combined with the cost study findings, will provide the basis for distributing GME payments more accountably and is developing a rational State health workforce policy.

In its effort to both improve GME funding and address State health workforce needs, the council in the late 1990s developed and submitted a proposal to HCFA (now CMS) that would allow Utah to establish a broad-based, multiple payer mechanism to finance graduate medical education. The proposal called for payments under this mechanism to be made directly to the training programs, not to the affiliated service institutions (teaching hospitals). Payments would reward outcomes that address State workforce objectives.

Although HCFA initially insisted the demonstration incorporate Medicare, Medicaid and other State funds, the Federal waiver that ultimately was approved will apply only to Medicare GME payments. Effective January 2003, all Medicare funds covering direct and indirect GME costs are being paid directly to the statewide council for 5 years. Under the demonstration project, the council will create a new formula for distributing Medicare indirect GME funds based upon actual documented costs and will develop a statewide physician resident rotation information system to assist with payment verification.

In 2001, the council reached an agreement with the State Medicaid program to begin using appropriated State medical school funds as the State share for drawing down Federal matching funds under the IGT mechanism to enhance Medicaid support for graduate medical education in Utah's three teaching hospitals. The total amount in the Medicaid GME payment pool was estimated at approximately $20 million. Funds in the Medicaid pool also will cover dental and podiatry education based at these hospitals. The additional Federal matching funds will be weighted to provide increased support to train certain physician specialties that are considered by the council to be in short supply.

Furthermore, the Utah Legislature in 2001 appropriated $566,000 in general funds to the University of Utah regional dental education program with the intent that it be used as the State share under IGT to obtain Federal matching funds to enhance dental residency education at the university. Utah does not have a dental school.

Universal Dental Residency (PGY-1) Training: A Policy Strategy for Accelerating System Change to Serve Public Interests

Universal Dental Residency (PGY-1) Training: What It Means and What It Would Entail: In 1995, the Institute of Medicine (IOM, 1995) called for the creation of a number of graduate dental education (residency) positions sufficient to accommodate all graduates by 2005. In 1999, the Journal of Dental Education (AADS, 1999) published a series of articles in a special issue that set forth a focused and compelling rationale for a mandatory, post-graduate year of dental residency education (PGY-1). The rationale rests on two primary points:

1. An assessment of the competencies (and their underlying knowledge and skills) that a workforce dominated by general practitioners will require to meet the oral health needs of the public in the coming century; and
2. An objective assessment of what the predoctoral curriculum realistically can be expected to deliver.

A former dean and author of one of the AADS papers (Kennedy, 1999) asserted that, until the dental profession in general and dental regulators come to the same conclusion (about mandatory PGY-1 training), debate will continue and dental education will not have the opportunity to comprehensively reconceptualize and restructure the predoctoral curriculum. The recent action by New York to adopt PGY-1 as a requirement for initial licensure beginning in 2007 and interest by other large States (e.g., California) would seem to indicate growing support for this concept; however, broader support could hasten implementation.

Advantages of Universal PGY-1: From a public policy perspective, the advantages of a universal PGY-1 include:

- Enhanced health and safety of the public as a result of the additional, more complex experiences and competencies afforded by PGY-1 training;
- Greater opportunities for dentists to be exposed to more diverse patients in more diverse settings as part of their clinical education;
- Creation of a "driver" to expand dental residency training sites and programs, thereby expanding access to care "platforms" within underserved communities;
- Opportunities to expand service delivery to underserved populations using more skilled practitioners (i.e., dental residents instead of predoctoral dental students);
- Expansion of training and access to care sites for States that do not have dental schools; and
- Evidence that graduates of general dentists trained in advanced (residency) training programs are more likely to treat medically compromised and underserved populations (AADS, 1999; Atchison et al., 2002).

Community Health Centers (CHCs) as Training Sites for Dental Education: Creating a universal PGY-1 experience would require expansion of dental residency training programs. Some of this expansion could come from increasing the number of residents in existing programs, with the remainder coming from the creation of new programs or new program sites (such as has been done through for general dentistry and pediatric dentistry with Federal Title VII, Section 747, funds administered by HRSA). It is generally anticipated that the majority of new residency training program sites, at least those supported by public funds, would be used for expansion of primary care residency programs (i.e., programs in general dentistry and pediatric dentistry).

It seems reasonable that some of these programs will be established in hospital settings and will be financed through GME funding. However, there also seems to be merit in considering community clinic sites, especially in underserved communities (e.g., federally qualified health centers–FQHCs), for a significant portion of this expansion. Linking dental residencies and FQHCs or other CHCs could provide not only rich patient care experiences (because of the more complex needs of patients who use these facilities), but also could provide the financial foundation necessary to support the costs of PGY-1 education. Additional benefits of co-locating dental residencies in FQHCs or CHCs include the opportunities for interaction of dental residents and primary medical residents with attending staff, thereby enhancing dental residents' active involvement as part of the primary care team.

Once established, these community-based sites also may serve as additional clinical training sites for predoctoral dental students as part of their extramural experiences. However, acquisition of fundamental technical skills and core knowledge will likely continue to occur primarily within dental school settings.

Catalyzing System Change: Formicola et al. (1999) succinctly summarized the situation with respect to creating a National system to support universal PGY-1 as follows: "After 20 years of debate and discussion, it appears that conditions are right for moving toward a mandatory postdoctoral year in dentistry. These conditions are: 1) the fewest number of graduates to

accommodate in a PGY-1 year since 1982; 2) credible reports from the profession and from others outside the profession that urge dentistry to require a PGY-1 year; 3) Federal legislation that allows dentistry to expand the number of residency positions in hospitals and off-site locations;[12] 4) a means of ensuring the quality of a PGY-1 year through the existing accreditation process; and 5) a means of monitoring individual compliance with the requirement through existing State licensing agencies."

5. Summary and Recommendations

Summary

This report began by highlighting several important and related phenomena:

- A growing recognition of the inter-relatedness of oral health and general health, and the critical importance of broad access to basic dental services;
- Rising public concerns about disparities in oral health and access to care that in turn, have raised questions about the supply and training of dentists; and
- Renewed interest among State and Federal officials about the public policy aspects of dental education.

Major sections of the report provide details about changes in the production, number, characteristics and distribution of dentists that are likely to further limit the supply of dental services and exacerbate access to care issues for growing segments of the population unless Federal and State officials begin to deal with dental education as a matter of broad public policy. Dental schools are facing substantial challenges (that some have characterized as crises) as they struggle to incorporate new information from a rapidly expanding knowledge base into already overcrowded curricula, cover the costs of clinical education, and deal with growing faculty shortages. Rising costs of education and declining Federal and State support for dental education is contributing to growing levels of student indebtedness which, in turn, make dentists who enter the profession less likely to provide services for underserved segments of the population. Clearly, the time has come to embark upon Federal and State strategies that address these problems in a concerted manner, based upon the fundamental public policy interests in dental education.

Recommendations

The broad strategies for Federal and State policy development to enhance dental education and advance the public's interests in having access to safe, competent practitioners prepared to address the oral health needs of a broad range of individuals include the following.

1. Develop and maintain publicly available Federal and State data sources that adequately support workforce analyses and policy development.
2. Expand Federal and State programs that address dental student indebtedness and faculty shortages.

[12] Although a recent CMS ruling regarding GME funding for dental residencies has introduced caution and some setbacks in existing programs hospital-based dental residency program funding, and appears to favor the creation of new (start-up) programs for hospital-based residencies.

3. Link public support for dental education to public policy concerns (using approaches similar to those that have been adopted in the three State examples highlighted in section four).
4. Develop and support a National strategy for implementing universal dental residency (PGY-1) training in order to accelerate system changes that will better serve the public interest.

Leaders in the field of dental education, dental practice and related health policy have reached a considerable degree of consensus about what needs to be done to make dental education function in a manner that serves the longstanding fundamental interests of the public. It remains for leaders from the public policy domain–both at the Federal and State levels–to partner with professional leaders and vested stakeholders to purposefully address dental education as an essential National resource, as a National enterprise, and as a matter of broad public policy.

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