

Assessment of the Dental Public Health Infrastructure in the United States

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EXECUTIVE SUMMARY

In its narrowest definition, dental public health is one of the nine specialties of dentistry recognized by the American Dental Association Council on Dental Accreditation. More broadly, dental public health has been defined as the "...science and art of preventing and controlling dental diseases and promoting dental health through organized community efforts. It is that form of dental practice which serves the community as a patient rather than the individual. It is concerned with the dental health education of the public, with applied dental research, and with the administration of group dental care programs as well as the prevention and control of dental diseases on a community basis."

A number of recent initiatives have highlighted the challenges facing oral health in the United States. The Office of the US Surgeon General released its first report on oral health in America several years ago. The major findings of that landmark report were: 1) oral diseases and disorders in and of themselves affect oral health and well-being throughout life; 2) safe and effective measures exist to prevent the most common dental diseases; 3) lifestyle behaviors that affect general health, such as tobacco use, also affect oral health as well; 4) there are profound oral health disparities among the US population; 5) more information is needed to improve America's oral health and eliminate health disparities; 6) the mouth reflects general health and well-being; 7) oral diseases and conditions are associated with other health problems; and 8) scientific research is key to further reduction in the burden of oral diseases and disorders. The "framework for action" spelled out in the Surgeon General's Report on Oral Health highlighted the principal components of a plan to address those issues, which were:

- Change public perceptions regarding oral health and disease so that oral health becomes an accepted component of general health.
- Accelerate the building of the science and evidence base and apply science effectively to improve oral health.
- Build an effective health infrastructure that meets the oral health needs of all Americans and integrates oral health effectively into overall health.
- Remove known barriers between people and oral health services.
- Use public-private partnerships to improve the oral health of those who still suffer disproportionately from oral diseases.

Another major recent initiative was the release of the Healthy People 2010 Objectives for Improving Health. Among the focus areas included in Health People 2010 was oral health, with the overall goal being to prevent and control oral and craniofacial diseases, conditions, and injuries and to improve access to related services. That goal was supported by 17 specific objectives that largely will require concerted dental public health action to achieve and monitor.

In addition, the American Dental Association's Future of Dentistry report adopted a vision of "Improved health and quality of life for all through optimal oral health," and laid out broad recommendations to help achieve that vision. The seven broad recommendations were:

1. Establish and support partnerships and alliances among dental, other health care professional, and public health organizations, as well as business and social service groups, in order to address common goals to improve oral health.
2. Aggressively address the oral health needs of the public.
3. Strengthen and expand dentistry's research and education capabilities.
4. Ensure the development of a responsive, competent, diverse, and "elastic" workforce.
5. Develop strategies to address the fiscal needs of the practice, education and research sectors of dentistry to ensure their viability and vitality.
6. Establish a formal organization with membership consisting of the American Dental Association representing dental practice, the American Dental Education Association representing dental education, and the National Institute of Dental and Craniofacial Research and the American Association of Dental Research representing research.
7. Utilizing the combined resources of the dental profession and dental industry, emphasis should be placed on the development of highly targeted, collaborative marketing and public relations initiatives.

Clearly, implementing the framework outlined in The Surgeon General's Report on Oral Health in America, achieving the Healthy People 2010 Objectives for improving oral health, and realizing the vision of the Future of Dentistry report will require a viable dental public health infrastructure. That infrastructure includes an adequate workforce, a sufficient administrative presence within health departments, adequate financial resources to implement programs, and legal authority to use personnel in an effective and cost-effective manner. To be most effective, that dental public health workforce should be appropriately trained, should represent the diversity of America, and should be sustainable for the foreseeable future.

As a first step toward ensuring the adequacy of the dental public health infrastructure in the United States, this study sought to assess a number of its present elements. Although it is nearly impossible to identify or measure all possible components of that infrastructure, this study did examine a number of the major areas. Where possible, emphasis was placed on infrastructure at the state level. It is hoped the information amassed for this project might provide useful baseline data for new initiative that address elements of the dental public health infrastructure in the United States.

FINDINGS

The findings from this study were based on original data collection and compilation of existing data. Some of the key findings were:

GOVERNMENT

State Health Departments

- In 2001, 38 states (74.5%) had a full time full-time dental director; that figure dropped slightly to 37 states (72.5%) in 2002. The median number of full-time equivalents employees (FTEs) in state dental programs was 2.0, the mean was 6.9, and the range was 0–80.

- In 2001, about 40% of responding states had annual state dental public health program budgets of \$500,000 or less; 9% had total annual budgets of less than \$100,000.

Community and Migrant Health Centers

- 64.7% of Community Health Centers (CHCs) provided dental care services of some type. The number and proportion of CHCs that provided dental care services varied widely among the states, ranging from 1 to 45, and from 22.2% to 100% of CHCs within each state.
- The Healthy People 2010 target of at 75% of CHCs having a dental component was met by 21 states.
- Of the 121 identified Migrant Health Centers, 103 (85.1%) provided some type of dental care.
- About 1.6 million persons received dental care through Bureau of Primary Health Care grantees in 2002; nationally, there were 2,356 patient encounters per dentist or dental hygienist FTE.

US Public Health Services Commissioned Corps

- As of April 14, 2004, there were 489 Dental Officers in the PHS Commissioned Corps, which constituted 8.2% of all Commissioned Corps officers.
- The large majority of Commissioned Corps dental officers were assigned to the Indian Health Service (51%), the Bureau of Prisons (23%), or the Department of Homeland Security (11%).
- As of April 14, 2004 there were 61 dental hygienists in the PHS Commissioned Corps; about 90% were assigned either to the Indian Health Service (64%) or the Federal Bureau of Prisons (26%).

EDUCATION

Schools of Dentistry

- Of the 44 dental schools that responded to a 2001 survey, 31 schools (68%) had a department or division whose primary focus was public health dentistry, community dental health, or dental ecology.
- Of the 31 departments or divisions of dental public health identified by survey respondents, the median number of faculty members in those academic units was 5.0.
- Five responding schools had no faculty members with an MPH or other public health degree.
- The median number of clock hours for most of the dental public health topics addressed in the survey ranged from 4.0–8.0 hours.

Programs in Dental Hygiene

- Among dental hygiene programs responding to a 2001 survey, 64.3% had no faculty member with a public health degree.

- The median number of hours devoted to dental public health topics in dental hygiene curricula ranged from 3.0 (provision and financing of dental care; dental care need, demand & utilization) to 20.0 hours (extramural field experience in public health settings).
- The large majority of dental hygiene programs (85%) offered an associate degree, so most graduates would require additional undergraduate course work before they would meet the admissions requirements for advanced programs in public health.

Schools of Public Health

- In a 2001 survey of accredited schools of public, only one responding school indicated the existence of a department of dental public health or community dentistry.
- 15% of responding schools indicated they offered a Master of Public Health degree in a dental public health concentration area, and 19% reported offering advanced training in dental public health.
- 60% reported having no faculty members with a dental or dental hygiene degree in addition to a public health degree.

Advanced Training Programs in Dental Public Health (Residencies)

- As of June 2002, there were 18 accredited dental public health residency programs; 9 programs were located in schools of dentistry and 9 were sponsored by other institutions.
- Mean first year stipends for dental public health residents (\$18,418) were about \$6000 less for dental public health residencies than for pediatric dentistry residencies, and were about one-half the mean levels of stipend support for preventive medicine residencies.
- Of the nine dental school-based residency programs, five offered no stipend support for residents and five charged fees and/or tuition, which ranged from \$400 to \$34,200 annually.

Prevention Research Centers

- The Prevention Research Centers (PRCs) are a network of academic centers, public health agencies, and community partners conducting applied research and practice in chronic disease prevention and control; there are currently 28 PRCs situated in academic research centers in 25 states.
- 10 of the 28 PRCs have conducted at least one oral health-related project.

WORKFORCE

Board-Certified Public Health Dentists

- As of February 2001 there were 141 active diplomates of the American Board of Dental Public Health; 125 responded to a survey.
- The two most common employment settings for active diplomates were federal government (28.7%) and schools of dentistry (28.7%). Five diplomates (4.1%) were employed by county or local governments and 14 (11.5%) worked for state governments.
- Nearly 90% of active diplomates had graduated from dental school more than 15 years prior to the survey, and 60% received their MPH degree more than 15 years earlier.

Race/Ethnicity of Dental Workforce and Students

- In 1997, 1.9% of active dentists in the United States identified themselves as black or African American, compared to 12.1% of the US population. Blacks were underrepresented in the dental workforce relative to their proportion in the population in virtually every state.
- Hispanic/Latino dentists comprised 2.7% of dentists in the United States in 1997, compared to 10.9% of the US population, and were underrepresented in nearly all states.
- Overall, black/African American students comprised 5.5% of first-year dental students in 2001, compared to 12.1% of the US population. Fourteen of the 54 dental schools had not a single black/African American first-year student.
- Hispanics/Latinos were similarly underrepresented among dental students, comprising 10.9% of the population but 5.2% of dental students.
- Of the 4203 first-year dental students in 2001, there were just 19 American Indians or Alaskan Natives.

National Oral Health Organizations

- The largest major national dental public health organization in the United States is the American Association of Public Health Dentistry (AAPHD). As of May 2003, AAPHD had 640 US members and 78 members living in other countries.
- As of April, 2003 there were 290 members of the American Public Health Association who listed Oral Health Section as their primary section.
- In 2002, ADA had 544 members who reported their specialty as Dental Public Health; of those, 79 were members of the Federal Service. Overall, there was 0.17 ADA-member public health dentist per 100,000 population; no state exceeded 1 public health dentist per 100,000 population.

REGULATORY ISSUES

State Boards of Dental Examiners

- All states and the District of Columbia have a board of dentistry, a board of dental examiners, or a state dental commission. In general, those boards have the power to adopt rules and regulations regarding the practice of dentistry and dental hygiene and to issue, suspend, or revoke state licenses for the practice of those professions.
- All but two states (Connecticut and Washington) included at least one dental hygienist on the state board of dental examiners, although Washington State has a separate Dental Hygiene Examining Committee composed of three practicing dental hygienists and one public member that oversees clinical examination and certifies competency in dental hygiene practice.
- All but seven states included at least one public member with no financial connection to dentistry.
- A public health dentist was identified for just two state boards of dental examiners.

State Practice Acts Regarding Dental Hygiene Practice

- Only one state, Colorado, allows unrestricted, unsupervised practice by a dental hygienist when performing basic prophylaxis.
- Eight states require direct or indirect supervision of dental hygienists working in institutional settings. The distinguishing feature of these levels of supervision is that the supervising dentist must be physically present in the facility when patient care is provided.
- Forty-three states and the District of Columbia permit general supervision in institutional settings. The distinguishing feature of general supervision is that the dentist need not be present when patient care is provided. Most of these jurisdictions require that the supervising dentist examine the patient first to develop a treatment plan, issue a written work order, and / or evaluate the dental hygienist's work within a fixed period of time.

RECOMMENDATIONS

After weighing the findings from this assessment, the following recommendations are offered to enhance the effectiveness of the dental public health infrastructure in the United States.

Government

1. Develop state health department standards that require an adequately trained and credentialed state dental director in all states and the District of Columbia.
2. Provide adequate funding to permit all state health departments to conduct the core public health activities in oral health.
3. Ensure that all county health departments have an appropriately trained county dental director.
4. Include dental services in the scope of services of all county health departments that provide direct clinical care and all federally-funded Community and Migrant Health Centers.
5. Examine the activities and responsibilities of all US Public Health Service Commissioned Corps dental officers to better characterize their scope of activities.

Education

1. Develop model dental public health curricula for schools of dentistry and dental hygiene programs and work with the American Dental Education Association to disseminate and promote the curricula.
2. Recruit dental public health faculty to schools of public health.
3. Develop core courses in dental public health within schools of public health.
4. Increase service learning opportunities for students in dental and dental hygiene programs in diverse, community-based settings.
5. Develop competencies for dental and dental hygiene education that include cultural competence, patient- and community-based prevention, and distributive justice.
6. Develop new models of specialty training in dental public health that ensure adequate coverage of dental public health topics, relevant experience, and financial support for graduate education.

7. Develop dental public health specialty training and credentialing for graduates of accredited dental hygiene programs.
8. Increase the number of dental public health researchers and oral health-related projects in Prevention Research Centers.

Workforce

1. Develop a set of incentives for pursuing dental public health board certification for state, county, and local dental personnel.
2. Ensure that the American Dental Association requires documentation of credentials for dentists who report their specialty as Public Health Dentistry.
3. Enhance outreach by schools of dentistry to increase number of dental and dental hygiene students from underrepresented minority groups.

Regulatory Issues

1. Require dental public health representation on state boards of dental examiners.
2. Increase dental hygiene representation on state boards of dental examiners.
3. Develop evidence-based recommendations for level of dental supervision and scope of permitted dental hygiene services in underserved settings and communities.

CONCLUSIONS

In summary, this report suggests that the dental public health infrastructure in state government and dental educational programs is small in size and has little funding. It is unclear whether the full range of dental public health core functions are provided at county and local levels, but there are indications that generally they are not. Trends in the number of board-certified public health dentists, dental public health residency programs, and dental public health presence in schools of public health suggest that the situation will not likely change appreciably in the near future. Dental public health essentially has no presence or representation on state licensing boards, despite the public health impact of those regulatory bodies. Efforts to improve access to dental preventive services for underserved populations may be hampered by restrictive state practice acts and lack of autonomy of the dental hygiene profession. Substantial proactive efforts may be needed to create a more racially and ethnically diverse dental workforce, which may be critical in helping to achieve the Surgeon General's vision of improved oral health for all and elimination of disparities in our society. There is no single organization or agency that has the ability to bring about the numerous changes that would need to occur to substantially enhance the dental public health infrastructure in the United States, so successful efforts will require substantial collaboration among many diverse partners.

BACKGROUND

In its narrowest definition, dental public health is one of the nine specialties of dentistry recognized by the American Dental Association Council on Dental Accreditation [American Dental Association 2003]. As a recognized dental specialty, dental public health has specific educational, experiential, and testing requirements for attaining certification by the American Board of Dental Public Health. More broadly, dental public health has been defined as the “...science and art of preventing and controlling dental diseases and promoting dental health through organized community efforts. It is that form of dental practice which serves the community as a patient rather than the individual. It is concerned with the dental health education of the public, with applied dental research, and with the administration of group dental care programs as well as the prevention and control of dental diseases on a community basis” [American Dental Association 2003]. Although descriptive of what some dental public health practitioners may do, that definition doesn’t fully capture the scope of dental public health practice. In addition to health education and program administration, dental public health is concerned with policy development; advocacy; conduct of research in epidemiology, health services, and disease prevention; and monitoring trends in disease and risk factors in populations. In reality, personnel who are not board certified specialists in the field and often are not dentists perform much of what might be considered public health dentistry.

A number of recent initiatives have highlighted the challenges facing oral health in the United States. The Office of the US Surgeon General released its first report on oral health in America several years ago [US Department of Health and Human Services 2000a]. The major findings of that landmark report were: 1) oral diseases and disorders in and of themselves affect oral health and well-being throughout life; 2) safe and effective measures exist to prevent the most common dental diseases; 3) lifestyle behaviors that affect general health, such as tobacco use, also affect oral health as well; 4) there are profound oral health disparities among the US population; 5) more information is needed to improve America’s oral health and eliminate health disparities; 6) the mouth reflects general health and well-being; 7) oral diseases and conditions are associated with other health problems; and 8) scientific research is key to further reduction in the burden of oral diseases and disorders. The “framework for action” spelled out in the Surgeon General’s Report on Oral Health highlighted the principal components of a plan to address those issues, which were:

- Change public perceptions regarding oral health and disease so that oral health becomes an accepted component of general health.
- Accelerate the building of the science and evidence base and apply science effectively to improve oral health.
- Build an effective health infrastructure that meets the oral health needs of all Americans and integrates oral health effectively into overall health.
- Remove known barriers between people and oral health services.
- Use public-private partnerships to improve the oral health of those who still suffer disproportionately from oral diseases.

In short, that framework calls for a dental public health approach to solving the problems.

Another major recent initiative was the release of the Healthy People 2010 Objectives for Improving Health [US Department of Health and Human Services 2000b], the third time the US Department of Health and Human Services developed 10-year health objectives for the Nation. Among the focus areas included in Health People 2010 was oral health, with the overall goal being to prevent and control oral and craniofacial diseases, conditions, and injuries and to improve access to related services. That goal was supported by 17 specific objectives that largely will require concerted dental public health action to achieve and monitor.

In addition, the American Dental Association's Future of Dentistry report [American Dental Association 2001] adopted a vision of "Improved health and quality of life for all through optimal oral health," and laid out broad recommendations to help achieve that vision. The seven broad recommendations were:

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4. Ensure the development of a responsive, competent, diverse, and "elastic" workforce.
5. Develop strategies to address the fiscal needs of the practice, education and research sectors of dentistry to ensure their viability and vitality.
6. Establish a formal organization with membership consisting of the American Dental Association representing dental practice, the American Dental Education Association representing dental education, and the National Institute of Dental and Craniofacial Research and the American Association of Dental Research representing research.
7. Utilizing the combined resources of the dental profession and dental industry, emphasis should be placed on the development of highly targeted, collaborative marketing and public relations initiatives.

Clearly, implementing the framework outlined in The Surgeon General's Report on Oral Health in America, achieving the Healthy People 2010 Objectives for improving oral health, and realizing the vision of the Future of Dentistry report will require a viable dental public health infrastructure. That infrastructure includes an adequate workforce, a sufficient administrative presence within health departments, adequate financial resources to implement programs, and legal authority to use personnel in an effective and cost-effective manner. To be most effective, that dental public health workforce should be appropriately trained, should represent the diversity of America, and should be sustainable for the foreseeable future.

As a first step toward ensuring the adequacy of the dental public health infrastructure in the United States, this study sought to assess a number of its present elements. Although it is nearly impossible to identify or measure all possible components of that infrastructure, this study did examine a number of the major areas. Where possible, emphasis was placed on infrastructure at the state level. It is hoped the information amassed for this project might provide useful baseline data for new initiative that address elements of the dental public health infrastructure in the United States.

GOVERNMENT

State Health Departments

State dental health programs are the primary entities responsible for conducting the core public health functions [Institute of Medicine 1988] within states related to oral health conditions: assessment, policy development, and assurance. In assessing the findings from its 2000–2001 Survey of Best Practices, The Association of State and Territorial Dental Directors (www.astdd.org) indexed the core functions as:

Assessment

- Acquiring Data
- Use of Data

Policy Development

- Collaboration and Partnership for Planning and Integration
- Oral Health Program Policies
- Use of State Oral Health Plan
- Oral Health Program Organizational Structure and Resources

Assurance

- Population-Based Interventions
- Oral Health Communications
- Building Linkages and Partnerships for Interventions
- Building Community Capacity for Interventions
- Access to Care and Health System Interventions
- Program Evaluation for Outcomes and Quality Management

An adequate dental public health infrastructure with state dental public health programs is clearly necessary if those programs are to provide those core public health functions. This section summarizes the resources and activities of the state health departments' dental programs.

Data on dental public health programs within state health departments were drawn primarily from the 2001 and 2002 State Synopsis Surveys of Dental Public Health Programs (<http://www.astdd.org>), conducted by the Association of State and Territorial Dental Directors (ASTDD) in collaboration with the Centers for Disease Control and Prevention, Division of Oral Health (CDC-DOH). Contact persons within each state health department were asked, among other items, (1) whether there was a dental presence within the health department; (2) the number of full-time equivalent employees (FTEs) and budget for state DPH programs; (3) the types of services provided by the dental public health program; and (4) activities related to the core public health functions, which includes assessment, policy development, and assurance.

Of the 50 states plus the District of Columbia, 48 states responded to the 2001 State Synopsis Survey. For states that did not respond to the survey, additional data were collected from the ASTDD list of members (<http://www.astdd.org>), The Oral Health America National Grading

Projects for 2001–2002 and 2003 [Oral Health America 2002; 2003], and individual state health department websites.

In 2001, 38 states (74.5%) had a full time full-time dental director; that figure dropped slightly to 37 states (72.5%) in 2002 (Table 1).

Among the 46 states that responded to the 2001 State Synopsis Survey of Dental Public Health Programs, the median number of full-time equivalent employees (FTEs) in state dental programs was 2.0, the mean was 6.9, and the range was 0–80. The median number of FTEs was slightly higher in 2002 (3), although data were available for just 36 states; the range was 0–81. Seventeen of the responding states reported using contracted FTEs in their state programs in 2001; 14 of the responding states in 2002 reported using contracted FTEs. For both years, the median number of contracted FTEs was 0 among responding states.

Table 1. State dental directors and full-time equivalent employees state dental programs in the United States, by state. 2001–2002.

State	Full-Time State Dental Director*		FTEs		Contracted FTEs	
	2001	2002	2001	2002	2001	2002
Alabama	Y	Y	2	3	0	0
Alaska	N	N	0	0	0	0
Arizona	Y	Y	12	11	4	5
Arkansas	Y	Y	1	2	0	0
California	N	N [†]	--	--	--	7
Colorado	Y	Y	2	4	0	0
Connecticut	Y	Y [†]	1	--	1	--
Delaware	Y	Y [†]	18	--	2	--
District of Columbia	N [†]	N [†]	--	--	--	--
Florida	Y	Y [†]	4	--	0	--
Georgia	Y	Y	2	4	25	54
Hawaii	Y	Y	26	28	0	0
Idaho	Y	Y [†]	2	--	3	--
Illinois	Y	Y	6	9	0	0
Indiana	Y	Y	9	11	1	0
Iowa	Y	N [†]	4	--	--	--
Kansas	N	N [†]	--	--	--	--
Kentucky	N	Y	3	11	5	4
Louisiana	N	N	2	2	0	2
Maine	Y	Y	4	4	3	4
Maryland	Y	N [†]	2	--	--	--
Massachusetts	Y	Y	1	3	--	0

Table 1. State dental directors and full-time equivalent employees state dental programs in the United States, by state. 2001–2002.

State	Full-Time State Dental Director*		FTEs		Contracted FTEs	
	2001	2002	2001	2002	2001	2002
Michigan	N	Y	0	1	0	0
Minnesota	Y	Y	1	1	--	0
Mississippi	N	N	2	1	--	0
Missouri	Y	Y	7	2	7	9
Montana	Y	Y	1	1	0	0
Nebraska	Y	Y [†]	2	--	0	--
Nevada	N	N	2	1	0	0
New Hampshire	Y	Y	0	2	13	20
New Jersey	N	N	3	1	0	3
New Mexico	Y	Y	16	14	20	3
New York	Y	Y	13	11	0	0
North Carolina	Y	Y	81	80	0	0
North Dakota	Y	N	4	4	4	1
Ohio	Y	Y	17	16	0	0
Oklahoma	Y	Y	14	3	1	12
Oregon	Y	Y	2	1	1	0
Pennsylvania	Y	Y	1	2	0	0
Rhode Island	N	N	1	1	1	0
South Carolina	Y	Y [†]	1	--	0	--
South Dakota	N	N	0	--	0	--
Tennessee	Y [†]	Y [†]	--	--	--	--
Texas	Y [†]	Y [†]	--	--	--	--
Utah	Y	Y	4	5	0	0
Vermont	Y	Y	6	7	0	0
Virginia	Y	Y	5	5	1	5
Washington	Y	Y [†]	2	--	0	--
West Virginia	N	N	3	4	20	18
Wisconsin	Y	Y	1	2	0	0
Wyoming	Y	Y	2	2	0	0
Proportion of states with full-time dental director	74.5%	72.5%				
Median			2	3	0	0
Range			0–81	0–80	0–25	0–54

*Y= Yes, full-time dental director; N=No full-time state dental director

† State did not respond to the ASTDD/CDC State Synopsis Survey for that year; data were derived from the Oral Health America Survey of State Dental Directors, as reported in its annual National Grading Project [Oral Health America 2002; 2003].

-- = Data not reported

Information on the total budget for the state's dental public health program was reported for 45 states in 2001 and 34 states in 2002 (Table 2). In 2001, about 40% of responding states had annual budgets of \$500,000 or less; 4 (8.9%) state dental public health programs had total annual budgets of less than \$100,000. No information was available for the 5 states and the District of Columbia that did not respond to the survey or the two states that did not provide budgetary information in 2001. The situation remained largely unchanged in 2002; 41% of responding states had an annual budget of \$500,000 or less and 65% had total budgets of \$1 million or less.

Table 2. Budgets for State Dental Public Health Programs, 2001 and 2002

	2001		2002	
	Number of states	Percent of responding states	Number of states	Percent of responding states
Total Budget for State Dental Program				
< \$100,000	4	8.9	2	5.9
\$100,000-\$250,000	7	15.6	7	20.6
\$250,001-\$500,000	7	15.6	5	14.7
\$500,001-1,000,000	13	28.9	8	23.5
≥\$1,000,000	14	31.1	12	35.3
Total	45	100	34	100

State Program Activities

Table 3 summarizes the reported activities conducted by state dental programs. Based on the 37 states that provided information on programmatic activity on the 2001 State Synopsis Survey of Dental Public Health Programs, the most commonly provided program was oral health education and health promotion (86.5%), followed by oral health needs assessments/oral health surveys (78.4%) and school fluoride mouthrinse programs (78.4%). (Note: this excludes community water fluoridation, which is provided to varying degrees in nearly all states). Fluoride varnish programs were conducted by 5 (13.5%) of the responding states.

Table 3. State Dental Health Programs' Reported Activities, 2001.

	Responded	Abuse Neglect/PANDA	Access to Care	Dental Screening	Dental Sealants	Early Childhood Caries/BBTD	School Fluoride Mouthrinse	Fluoride Supplements	Fluoride Varnish	Mouthguard/Injury Prevention	Needs Assessment/Oral Health Surveys	Oral Health Education/Promotion	Smoke and Spit Tobacco Cessation	Other Programs and Type of Other
Alabama	Y	N	N	Y	Y	Y	Y	N	N	N	Y	Y	Y	
Alaska	Y	Y												
Arizona	Y	Y	Y	N	Y	Y	Y	N	N	N	Y	Y	N	
Arkansas	Y	Y	Y	Y	N	N	N	N	N	N	Y	Y	N	
California	N													
Colorado	Y	Y	Y	Y	Y	N	Y	N	Y	N	Y	Y	N	
Connecticut	N													
Delaware	N													
District of Columbia	N													
Florida	N													
Georgia	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N	Y	Y	
Hawaii	N													
Idaho	Y	N	N	N	Y	Y	Y	N	N	N	Y	Y	N	
Illinois	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	Y	N	Private Well Fluoride testing
Indiana	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Infection Control
Iowa	N													
Kansas	Y													
Kentucky	Y	N	Y	Y	Y	N	N	Y	N	N	Y	Y	Y	
Louisiana	N													
Maine	Y	Y	Y	Y	Y	N	Y	Y	N	N	N	Y	N	
Maryland	N													
Massachusetts	Y	N				Y	Y	Y				Y	Y	
Michigan	Y	N	Y	N	N	N	Y	N	N	N	N	Y	N	
Minnesota	N													
Mississippi	Y	Y	Y	N	N		Y				Y			
Missouri	Y	Y	Y	Y	Y	N	Y	N	N	N	Y	Y	Y	Mobile MR-DD/SHCN
Montana	Y	Y	Y	Y	N	Y	Y	N	N	N	Y	Y	Y	
Nebraska	Y	N	N	Y	Y	Y	Y	N	Y	N	Y	Y	N	
Nevada	Y	Y	N	Y	Y	Y	N	N	Y	N	Y	Y	N	
New Hampshire	Y	N	Y	Y	Y	N	Y	N	N	N	Y	Y		
New Jersey	Y	N			Y		Y	Y		Y	Y	Y	Y	
New Mexico	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	Y		

Table 3. State Dental Health Programs' Reported Activities, 2001.

	Responded	Abuse Neglect/PANDA	Access to Care	Dental Screening	Dental Sealants	Early Childhood Caries/BBTD	School Fluoride Mouthrinse	Fluoride Supplements	Fluoride Varnish	Mouthguard/Injury Prevention	Needs Assessment/Oral Health Surveys	Oral Health Education/Promotion	Smoke and Spit Tobacco Cessation	Other Programs and Type of Other
New York	Y	N	N	Y	Y	Y	Y	Y	N	N	Y	Y	Y	High risk/underserved
North Carolina	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y	N	
North Dakota	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Workforce Studies
Ohio	Y	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	N	Dental Safety Net
Oklahoma	Y	Y	Y	Y	Y	Y	N	Y	N	Y	Y	Y	Y	New Water System Fluoridation
Oregon	Y	Y	Y	Y	Y	Y	Y	Y	N	N	Y	Y	N	
Pennsylvania	Y	N	Y	N	N	N	N	N	N	Y	Y	Y	N	Water fluoridation promotion
Rhode Island	Y	N	Y	Y	Y	N	Y	N	N	N	Y	Y	Y	Workforce / Water fluoridation
South Carolina	Y	Y	Y	Y	N	N	Y	N	N	N	Y	Y		
South Dakota	Y													
Tennessee	N													
Texas	N													
Utah	Y	N	Y	Y	Y	N	Y	Y	N	N	Y	Y	Y	
Vermont	Y	N	Y	Y	Y	Y	Y	N	N	N	N	N	N	
Virginia	Y	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	Y	
Washington	N													
West Virginia	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	
Wisconsin	Y	Y	Y	N	Y	Y	Y	Y	N	N	Y	Y	Y	
Wyoming	N													
Total Number (% of responding states)	37 (100)	20 (54.1)	26 (70.3)	26 (70.3)	27 (73.0)	21 (56.8)	29 (78.4)	12 (32.4)	5 (13.5)	9 (24.3)	29 (78.4)	32 (86.5)	15 (40.5)	

County and Local Health Departments

County and local health departments are responsible for providing core public health functions for their communities, and may include oral health as one component of community health being protected or enhanced. It was not feasible in this project to survey all county and local health departments in the United States to assess their dental public health infrastructure. However, a separate project being conducted by Dr. Raymond Kuthy (University of Iowa) and Dr. Larry Hill (Cincinnati Health Department), "Inventory of Community-based Oral Health Programs," is examining oral health services provided by those health departments identified through various sources as likely to be providing such services. That project — supported by the Association of State and Territorial Dental Directors, American Association of Community Dental Programs, and the Health Resources and Services Administration — is collecting information from local and county health departments, school-based health centers, federally-funded Community, Migrant, and Homeless Health Centers, and other community-based oral health programs. Preliminary findings from that project will be available in mid-2004. However, the section below summarizes dental personnel and services provided in federally-funded Community and Migrant Health Centers; some of those centers are, in fact, supported by county or local health departments.

Community and Migrant Health Centers

Community Health Centers (CHCs) were first funded by the Federal Government as part of the War on Poverty in the mid-1960s [Bureau of Primary Health Care 2003]. By the early 1970s, about 100 neighborhood health centers had been established under the Economic Opportunity Act (OEO). Those centers were designed to provide accessible, affordable personal health care services to low income families. The Public Health Service began funding neighborhood health centers in 1969. With the phaseout of OEO in the early 1970s, the centers supported under that authority were transferred to the Public Health Service. Currently, the CHC Federal grant program is authorized under section 330 of the Health Centers Consolidation Act of 1996.

CHCs provide family-oriented primary and preventive health care services for people living in rural and urban medically underserved communities. CHCs exist in areas where economic, geographic, or cultural barriers limit access to primary health care for a substantial portion of the population, and they tailor services to the needs of the community. In FY 2002, approximately \$1.3 billion was allocated by the federal government for CHCs. The program is administered by the Bureau of Primary Health Care, Health Resources and Services Administration (HRSA), US Department of Health and Human Services.

HRSA provides grants to community nonprofit organizations for a broad array of culturally and linguistically competent medical and support services to migrant and seasonal farmworkers and their families. The Migrant Health Act was enacted in September 1962 by Public Law 87-692, which added section 310 to the Public Health Service Act. Migrant Health Centers are currently authorized under the Health Centers Consolidated Care Act of 1996, section 330(g) of the Public Health Service Act. FY 2002 funding for the Migrant Health Program (MHP) was approximately \$107.00 million.

The MHP supports the delivery of migrant health services including primary and preventive health care, transportation, outreach, dental, pharmaceutical, occupational health and safety, and environmental health. These programs use bilingual, bicultural lay outreach workers, health personnel, and culturally sensitive appropriate protocols. They also provide prevention-oriented and pediatric services such as immunizations, well baby care, and developmental screenings. The MHP currently provides grants to 125 public and nonprofit organizations that support the development and operation of 400 migrant clinic sites throughout the United States and Puerto Rico. In 2001, Migrant Health Centers (MHCs) served over 650,000 migrant and seasonal farmworkers. Over 85 percent of users are people of color.

Among other services provided, many CHCs and MHCs provide dental care services through their affiliated clinics. Healthy People 2010 objective 21-14 is to “Increase the proportion of local health departments and community-based health centers, including community, migrant, and homeless health centers, that have an oral health component” (USDHHS 2000b); the 2010 target is 75%, with a 1997 baseline of 34% of local jurisdictions and health centers. To assess the extent of dental service provision through CHCs and MHCs, the database of health centers maintained by the Bureau of Primary Health Care (<http://ask.hrsa.gov/pc/>) was searched. Because detailed information on clinical services was unavailable for each of the approximately 3,000 clinics, dental service provision is summarized only for the CHC Main Sites (Table 4).

This project did not collect detailed information on the types of dental services provided, populations served, or the details of each facility because such information is being collected in a separate project, “Inventory of Community-based Oral Health Programs,” being conducted by Dr. Raymond Kuthy (University of Iowa) and Dr. Larry Hill (Cincinnati Health Department). That project is supported by the Association of State and Territorial Dental Directors, American Association of Community Dental Programs, and HRSA. Preliminary findings from that project will be available in mid-2004.

As shown in Table 4, a total of 788 CHCs were identified in the Bureau of Primary Health Care’s program database for 2003. Of those, 64.7% provided dental care services of some type. The number and proportion of CHCs that provided dental care services varied widely among the states, ranging from 1 to 45, and from 22.2% to 100% of CHCs within each state. The Healthy People 2010 target of at 75% of CHCs having a dental component was met by 21 states.

A total of 121 MHCs were identified in the Bureau of Primary Health Care’s program database (Table 4). Of those, 103 (85.1%) provided some type of dental care. In most states, the number of MHCs was small and 10 states did not have a MHC. Of the seven states with at least 5 MHCs (CA, CO, FL, ID, NC, TX, WA), the large majority of MHCs in all but Idaho provided dental care services.

Table 4. Community Health Centers and Migrant Health Centers Providing Dental Care Services, by State. 2003.

State	Community Health Centers			Migrant Health Centers		
	No.	Number Providing Dental Care	Percent Providing Dental Care	No.	Number Providing Dental Care	Percent Providing Dental Care
Alabama	18	17	94.4	2	1	50.0
Alaska	22	7	31.8	0	0	
Arizona	12	10	83.3	2	2	100.0
Arkansas	10	7	70.0	1	0	0.0
California	73	45	61.6	16	15	93.8
Colorado	13	7	53.8	5	5	100.0
Connecticut	13	11	84.6	0	0	
Delaware	2	2	100.0	1	0	0.0
District of Columbia	1	1	100.0	0	0	
Florida	30	21	70.0	12	11	91.7
Georgia	19	7	36.8	3	3	100.0
Hawaii	9	3	33.3	1	1	100.0
Idaho	7	3	42.9	5	2	40.0
Illinois	31	14	45.2	2	2	100.0
Indiana	3	3	100.0	1	0	0.0
Iowa	7	5	71.4	1	1	100.0
Kansas	7	3	42.9	1	1	100.0
Kentucky	13	11	84.6	1	0	0.0
Louisiana	15	8	53.3	0	0	
Maine	10	6	60.0	1	0	0.0
Maryland	13	11	84.6	3	3	100.0
Massachusetts	27	19	70.4	1	1	100.0
Michigan	21	15	71.4	4	4	100.0
Minnesota	11	7	63.6	1	1	100.0
Mississippi	23	19	82.6	0	0	
Missouri	19	15	78.9	1	1	100.0
Montana	9	7	77.8	1	1	100.0
Nebraska	4	3	75.0	1	1	100.0
Nevada	2	1	50.0	0	0	
New Hampshire	6	3	50.0	0	0	
New Jersey	13	10	76.9	2	1	50.0
New Mexico	15	11	73.3	2	2	100.0
New York	43	37	86.0	3	3	100.0
North Carolina	24	20	83.3	6	5	83.3
North Dakota	2	1	50.0	1	1	100.0

Table 4. Community Health Centers and Migrant Health Centers Providing Dental Care Services, by State. 2003.

	Community Health Centers			Migrant Health Centers		
Ohio	20	10	50.0	1	1	100.0
Oklahoma	7	5	71.4	1	1	100.0
Oregon	12	11	91.7	4	4	100.0
Pennsylvania	28	21	75.0	1	1	100.0
Rhode Island	5	3	60.0	0	0	
South Carolina	21	10	47.6	3	2	66.7
South Dakota	7	2	28.6	0	0	
Tennessee	19	8	42.1	3	1	33.3
Texas	33	25	75.8	13	12	92.3
Utah	9	5	55.6	2	2	100.0
Vermont	3	1	33.3	0	0	
Virginia	17	6	35.3	2	2	100.0
Washington	20	18	90.0	7	7	100.0
West Virginia	27	6	22.2	1	0	0.0
Wisconsin	12	8	66.7	1	1	100.0
Wyoming	1	1	100.0	1	1	100.0
Total	788	510	64.7	121	103	85.1

Source: Bureau of Primary Health Care program database, 2004. (<http://ask.hrsa.gov/pc/>).

Table 5 presents more detailed characteristics of dental care service provision by the 817 grantees supported by the Bureau of Primary Health Care in 2002 (this excludes 26 grantees in Puerto Rico and US territories). Overall, 71.9% of grantees provided preventive dental services, 63.6% provided restorative dentistry, 66.3% provided emergency dental care, and 34.6% provided rehabilitative dental services (the Bureau of Health Professions Uniform Data System Manual does not provide explicit definitions for these services). The proportion of grantees that provided each type of service varied widely among the states. For example, the proportion providing preventive dental services ranged from 35% to 100%. However, Table 5 includes only services provided directly by the grantee, and does not include services provided through referral to outside providers and paid for by the grantee. For summary purposes, Table 5 describes the number of full-time equivalent (FTE) dental personnel employed by Bureau of Primary Health Care grantees, by state. Because of the large differences in the number of grantees and the number of clinics per grantee among the states, it may not be particularly useful to compare the number of full-time equivalent (FTE) dental personnel across states.

About 1.6 million persons received dental care through Bureau of Primary Health Care grantees in 2002, resulting in 3.7 million patient encounters (Table 5). The number of patient encounters per FTE provides one measure of treatment efficiency; the number of patient encounters per dentist or dental hygienist FTE in 2002 ranged from 844 to 5,850; nationally, there were 2,356 encounters per FTE.

No information was available on the degree to which the core public health functions (assessment, policy development, and assurance) related to oral health were provided by CHCs or MHCs.

Table 5. Dental care service characteristics of Bureau of Primary Health Care grantees, by state. United States, CY 2002.

State	#	Type of Dental Service Provided by Grantee				Full-Time Equivalents (FTE)				Encounters	Users	Encounters per FTE*
		Preventive	Restorative	Emergency	Rehabilitative	Dentist	Dental Hyg.	Assist., other	Total Dental			
Alabama	15	80.0%	73.3%	66.7%	26.7%	17.58	13.97	28.27	59.82	69,844	35,710	2,214
Alaska	19	68.4%	63.2%	73.7%	15.8%	8.96	2.43	12.66	24.05	27,826	13,510	2,443
Arizona	13	76.9%	53.8%	76.9%	30.8%	22.06	5.14	56.93	84.13	54,460	25,103	2,002
Arkansas	10	70.0%	70.0%	70.0%	40.0%	9.01	0.71	11.18	20.90	22,708	12,886	2,336
California	75	68.0%	64.0%	66.7%	25.3%	160.40	10.27	331.63	502.30	525,483	189,872	3,079
Colorado	15	66.7%	60.0%	80.0%	60.0%	32.52	11.44	69.00	112.96	102,715	46,117	2,337
Connecticut	10	90.0%	90.0%	90.0%	70.0%	28.24	13.83	40.06	82.13	102,166	42,258	2,428
Delaware	3	66.7%	66.7%	66.7%	0.0%	1.25	0.00	2.32	3.57	1,786	750	1,429
District of Columbia	2	50.0%	50.0%	50.0%	50.0%	7.80	1.00	6.10	14.90	14,097	8,487	1,602
Florida	30	80.0%	70.0%	73.3%	36.7%	42.89	17.39	84.23	144.51	145,836	62,797	2,419
Georgia	22	54.5%	36.4%	36.4%	31.8%	9.69	3.10	13.68	26.47	29,579	18,514	2,313
Hawaii	10	70.0%	60.0%	60.0%	20.0%	12.13	2.25	20.04	34.42	21,841	9,111	1,519
Idaho	7	57.1%	42.9%	42.9%	14.3%	7.50	1.08	13.37	21.95	18,091	7,605	2,109
Illinois	31	58.1%	51.6%	51.6%	29.0%	26.06	5.78	57.60	89.44	88,198	45,822	2,770
Indiana	10	70.0%	60.0%	60.0%	40.0%	10.00	4.37	17.53	31.90	29,690	13,396	2,066
Iowa	8	50.0%	50.0%	62.5%	37.5%	7.46	3.43	17.96	28.85	25,856	9,890	2,374
Kansas	7	42.9%	28.6%	28.6%	0.0%	1.42	1.42	4.18	7.02	5,511	2,912	1,940
Kentucky	12	83.3%	75.0%	75.0%	8.3%	11.39	5.00	20.20	36.59	32,730	15,769	1,997
Louisiana	16	62.5%	56.3%	56.3%	37.5%	11.53	0.90	20.36	32.79	24,871	13,359	2,001
Maine	12	66.7%	33.3%	41.7%	16.7%	3.39	2.46	6.00	11.85	11,266	7,628	1,926
Maryland	12	83.3%	75.0%	66.7%	25.0%	11.19	1.88	17.30	30.37	35,739	16,263	2,734
Massachusetts	33	66.7%	63.6%	66.7%	51.5%	52.16	15.67	65.83	133.66	152,910	52,809	2,254
Michigan	24	83.3%	75.0%	75.0%	45.8%	46.22	31.27	79.03	156.52	168,962	81,151	2,180
Minnesota	12	58.3%	50.0%	66.7%	33.3%	17.24	9.01	31.81	58.06	54,181	23,376	2,064
Mississippi	21	85.7%	76.2%	85.7%	33.3%	31.52	4.99	47.48	83.99	94,655	47,166	2,593
Missouri	17	94.1%	88.2%	94.1%	47.1%	31.15	4.48	45.16	80.79	74,846	44,246	2,101
Montana	9	100.0%	77.8%	77.8%	33.3%	3.53	1.34	7.45	12.32	13,550	6,240	2,782
Nebraska	3	100.0%	100.0%	100.0%	33.3%	4.50	0.00	8.07	12.57	7,843	4,552	1,743
Nevada	2	50.0%	50.0%	50.0%	50.0%	1.66	2.30	4.00	7.96	9,146	5,076	2,310
New Hampshire	7	42.9%	42.9%	14.3%	14.3%	0.04	2.35	0.69	3.08	2,016	1,009	844
New Jersey	14	85.7%	85.7%	85.7%	71.4%	27.62	3.27	46.34	77.23	82,551	34,839	2,672
New Mexico	13	100.0%	100.0%	92.3%	61.5%	33.84	17.15	73.29	124.28	104,520	40,927	2,050
New York	49	85.7%	79.6%	79.6%	53.1%	112.36	41.25	175.03	328.64	382,585	143,489	2,491
North Carolina	23	73.9%	69.6%	73.9%	21.7%	29.22	11.35	51.55	92.12	72,845	36,548	1,796
North Dakota	2	50.0%	50.0%	50.0%	0.0%	2.20	1.30	3.90	7.40	5,837	2,649	1,668

Table 5. Dental care service characteristics of Bureau of Primary Health Care grantees, by state. United States, CY 2002.

State	#	Type of Dental Service Provided by Grantee				Full-Time Equivalents (FTE)				Encounters	Users	Encounters per FTE*
		Preventive	Restorative	Emergency	Rehabilitative	Dentist	Dental Hyg.	Assist., other	Total Dental			
Ohio	19	73.7%	63.2%	68.4%	36.8%	27.43	10.72	51.80	89.95	85,611	40,751	2,244
Oklahoma	5	80.0%	80.0%	80.0%	40.0%	9.14	1.92	13.44	24.50	21,371	10,852	1,932
Oregon	15	80.0%	73.3%	80.0%	46.7%	28.14	13.61	73.79	115.54	81,854	32,514	1,961
Pennsylvania	28	85.7%	78.6%	75.0%	57.1%	52.40	22.61	89.10	164.11	150,676	63,753	2,009
Rhode Island	5	80.0%	80.0%	80.0%	40.0%	7.09	6.14	19.52	32.75	27,705	9,981	2,094
South Carolina	20	35.0%	30.0%	40.0%	15.0%	7.78	1.17	11.40	20.35	16,716	8,872	1,868
South Dakota	6	100.0%	33.3%	33.3%	16.7%	1.55	1.00	2.87	5.42	3,811	1,742	1,495
Tennessee	21	52.4%	38.1%	42.9%	9.5%	18.14	3.84	26.46	48.44	46,158	29,713	2,100
Texas	35	82.9%	77.1%	80.0%	37.1%	56.02	20.33	113.93	190.28	176,785	80,438	2,315
Utah	10	90.0%	70.0%	70.0%	70.0%	7.42	0.67	13.82	21.91	23,612	10,536	2,919
Vermont	3	66.7%	66.7%	66.7%	33.3%	3.29	4.12	5.64	13.05	10,928	5,191	1,475
Virginia	18	50.0%	33.3%	44.4%	11.1%	10.21	1.50	20.03	31.74	25,372	12,838	2,167
Washington	21	90.5%	90.5%	90.5%	42.9%	119.17	20.54	283.11	422.82	362,116	147,898	2,592
West Virginia	25	48.0%	28.0%	44.0%	20.0%	9.04	2.65	16.15	27.84	22,685	12,194	1,941
Wisconsin	14	57.1%	57.1%	57.1%	50.0%	13.03	8.94	26.50	48.47	47,208	18,896	2,149
Wyoming	4	100.0%	25.0%	0.0%	0.0%	0.04	0.00	0.00	0.04	234	203	5,850
Total	817	71.9%	63.6%	66.3%	34.6%	1205.62	373.34	2257.79	3836.75	3,719,582	1,608,208	2,356

*includes dentists and dental hygienists only.

Source: Bureau of Primary Health Care. Uniform Data System, Calendar Year 2002 Data, National Rollup and Rollups for States. Available at: <http://www.bphc.hrsa.gov/uds/data.htm>.

US Public Health Services Commissioned Corps

Directed by the Surgeon General, the U.S. Public Health Service (PHS) Commissioned Corps is one of the seven Uniformed Services of the United States. It is a specialized career system designed to attract, develop, and retain health professionals who may be assigned to Federal, State or local agencies or international organizations. The mission of the PHS Commissioned Corps is to carry out programs to promote the health of the Nation, understand and prevent disease and injury, assure safe and effective drugs and medical devices, deliver health services to Federal beneficiaries, and furnish health expertise in time of war or other national or international emergencies (USPHS 2004).

As of April 14, 2004, there were 489 Dental Officers in the PHS Commissioned Corps, which constituted 8.2% of all Commissioned Corps officers (N=5,973). Dental officers in the PHS Commissioned Corps work in a variety of agencies or programs throughout the U.S. Department of Health and Human Services and in other Federal agencies. As shown in Table 6, the large majority of Commissioned Corps dental officers were assigned to the Indian Health Service (51%), the Bureau of Prisons (23%), or the Department of Homeland Security (11%). As of

April 14, 2004 there were 61 dental hygienists in the PHS Commissioned Corps; about 90% were assigned either to the Indian Health Service (64%) or the Federal Bureau of Prisons (26%).

Table 6. Dentists and dental hygienists in the US Public Health Service Commissioned Corps, by assigned federal agency*.

Agency	Dental Officers	Dental Hygienists
Agency for Toxic Substances and Disease Registry (ATSDR)	1	0
Bureau of Prisons, Federal (BOP)	111	16
Centers for Disease Control and Prevention (CDC)	8	2
Centers for Medicare and Medicaid Services (CMS)	2	0
Department of Homeland Security (DHS)	55	0
Food and Drug Administration (FDA)	8	2
Health Resources and Services Administration (HRSA)	33	1
Indian Health Service (IHS)	251	39
National Institutes of Health (NIH)	11	0
Office of Public Health and Science (OPHS)	7	0
Program Support Center (PSC)	2	0
United States Department of Agriculture (USDA)	0	1
TOTAL	489	61

* as of April 14, 2004.

EDUCATION

Schools of Dentistry

Schools of dentistry are critical in ensuring the adequacy and quality of the dental workforce; indeed, all dentists are the product of dental education. Dental education can help develop the dental public health infrastructure through the incorporation of a community-based orientation and an understanding of dentistry's role in a broader context of public health as part of the training of future clinicians. Dental schools also are primary training grounds for future dental public health practitioners, researchers, and educators.

A survey questionnaire was developed to assess the presence and size of dental public health departments within schools of dentistry, the organizational placement of dental public health relative to other dental specialties, and the number of faculty members with a master of public health degree or equivalent in addition to a dental degree. The survey also asked about the number of clock hours in the dental curricula devoted to specific dental public health topics and the availability of advanced education in dental public health. The Institutional Review Board of the University of Florida Health Science Center approved the survey.

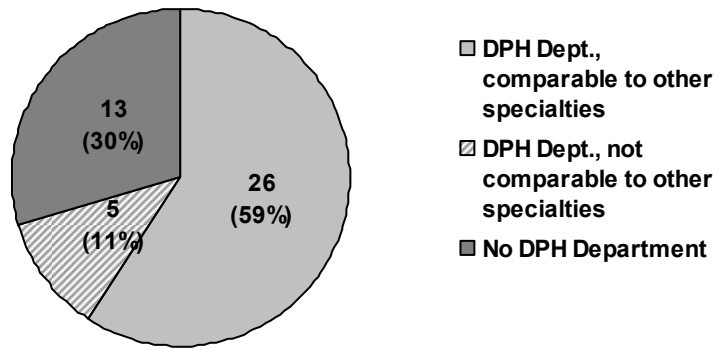
Survey questionnaires were mailed to the deans of all 54 U.S. schools of dentistry in January 2001. The cover letter requested that the dean either complete the survey or forward it to the person who could best answer it. A second mailing was sent to non-responders one month after the initial due date. Responses were received from 45 (83%) dental schools.

Departments of Public Health Dentistry

Of the 45 dental schools that responded to the 2001 survey, 44 provided information on the presence of a dental public health department; 31 schools (68%) had a department or division whose primary focus was public health dentistry, community dental health, or dental ecology.

Of the 31 schools with an academic unit with a focus on public health dentistry, 26 of these academic units had an administrative placement within the school that was comparable to other dental specialties (Figure 1).

Figure 1. Dental Public Health Departments in Schools of Dentistry



Of the 31 departments or divisions of dental public health identified by survey respondents, the median number of faculty in those academic units was 5.0. Eleven (35%) of responding schools had 1–3 faculty members (Table 7).

Table 7. Number of faculty members in department or division of dental public health, schools of dentistry with identified unit (n=31). National Survey of Dental Public Health Activities in Schools of Dentistry, 2001.

Number of Faculty Members in Dental Public Health Department / Division	Number	Percent
1–3	11	35.5
4–8	13	41.9
≥9	7	22.6

Dental Faculty with Public Health Training

Responding dental schools also were asked the total number of dental school faculty members that hold a public health degree in addition to their dental or dental hygiene degree. The median number reported was 3.0; the mean was 3.4. Among the 40 respondents who provided a response to that question, 5 (12.5%) had no faculty members with an MPH or other public health degree (Table 8).

Table 8. Number of dental school faculty members with a public health degree in addition to a degree in dentistry or dental hygiene. National Survey of Dental Public Health Activities in Schools of Dentistry, 2001.

Number of Dental Faculty Members with Public Health Degree	Number	Percent
0	5	12.5
1-3	16	40.0
4-6	17	42.5
≥7	2	5.0

Dental Public Health Topics in Dental School Curricula

Dental schools that responded to the 2001 survey provided information on the number of clock hours devoted to various dental public health topics, including: oral epidemiology; evaluation of the scientific literature and research design; community-based preventive dental programs; dental care delivery systems; modes of financing dental care; jurisprudence; ethical issues; and extramural field experience. Findings are summarized in Table 9. About one-third of responding dental schools devote less than 5 hours in their DMD/DDS curricula on oral epidemiology or evaluation of the scientific literature. The median number of clock hours for most of the dental public health topics addressed in the survey ranged from 4.0–8.0 hours; exceptions to this were ethical issues in dentistry (median=15.0 hours) and extramural field experiences (median=52.0 hours).

Schools of dentistry, in general, have a fairly small dental public health presence, with more than one-half of U.S. dental schools having three or fewer faculty members with graduate degrees in public health. As in other disciplines, a critical mass of dental public specialists is necessary to effectively conduct research, teach predoctoral and postdoctoral students, and serve the public and outside agencies and organizations. With dental public health having no recognized organizational unit in 30% of dental schools and a position further down the organizational chart than other dental specialties, dental public health frequently has little visibility in dental schools.

Table 9. Dental Public Health Topics in Dental School Curricula

Topic	<5 hours		5–10		>10		Median Clock Hours
	N	%	n	%	n	%	
Oral Epidemiology	14	35.0	13	32.5	13	32.5	6.0
Evaluation of the scientific literature and research design	13	31.7	9	22.0	19	46.3	8.0
Community-based preventive dental programs	16	41.0	10	25.6	13	33.3	8.0
Dental care delivery systems	22	53.7	11	26.8	8	19.5	4.0
Modes of financing dental care	24	58.5	11	26.8	9	14.6	4.0
Jurisprudence	11	26.2	18	42.9	13	31.0	7.5
Ethical issues	3	7.1	10	23.8	29	69.1	15.0
Extramural field experience	4	10.3	2	5.1	33	84.6	52.0

Programs in Dental Hygiene

Dental hygienists are licensed oral health professionals who largely focus on preventing oral diseases and protecting patients' total health. They are graduates of accredited dental hygiene education programs in colleges and universities, and must take written and clinical exams before they are allowed to practice. In addition to treating patients directly, dental hygienists also work as educators, researchers, and administrators. Dental hygienists occupy many leadership positions in dental public health at county, state, and national levels. Because of dental hygienists' role in preventing oral disease and directing dental public health efforts, this project assessed the dental public health capacity and curriculum contents of accredited UD dental hygiene programs.

A list of accredited programs in dental hygiene was obtained from the American Dental Hygienists' Association (ADHA) in February 2001. A short e-mail-based questionnaire and cover letter were sent to the contact person listed for each of the 251 identified programs. The programs were asked the number of faculty members with a graduate degree in a public health field, the number of clock hours in each of eight dental public health subjects, and the number of students enrolled in the program.

The cover letter and questionnaire were sent via fax to 22 programs for which there was either no e-mail address or there was a technical problem in sending them electronically. A second e-mail was sent to all non-responders two weeks after the deadline.

Of the 251 accredited US dental hygiene programs identified by the American Dental Hygienists' Association as of February 2001, 130 (51%) responded to the survey. The responding programs reported a mean of 0.6 faculty members with a graduate degree in public health in addition to a dental hygiene degree. Among responding dental hygiene programs, 64.3% had no faculty member with a public health degree, 25.6% had one faculty member with such a degree, and the remaining 11.1% had two or more faculty members with a graduate public health degree. Programs that had a faculty member with a public health degree had a greater mean number of enrolled students than programs that did not (59.0 vs. 46.0; $p < .05$).

As shown in Table 10, the median number of hours devoted to dental public health topics in dental hygiene curricula ranged from 3.0 (provision and financing of dental care; dental care need, demand & utilization) to 20.0 hours (extramural field experience in public health settings).

Table 10. Number of hours devoted to selected dental public health topics in curricula of accredited dental hygiene programs. National Survey of Dental Public Health Activities in Dental Hygiene Programs, 2001.

Subject	Median number of hours in curriculum	Percentage distribution by number of hours devoted		
		≤3 hours (%)	4-9 hours (%)	≥10 hours (%)
Epidemiology of oral diseases and conditions	6.0	19.4	48.1	32.5
Evaluation of scientific literature and research design	8.0	19.7	38.6	41.7
Community-based preventive dental programs	6.0	25.2	33.9	40.9
Dental care need, demand, and utilization	3.0	54.8	27.0	18.2
Community program planning and evaluation	8.0	16.4	40.6	43.0
Provision and financing of dental care	3.0	58.7	32.5	8.7
Ethical issues	10.0	19.7	28.3	52.0
Extramural field experience in public health settings	20.0	14.4	14.4	71.2

Table 11 shows the distribution of entry-level dental hygiene programs by state and type of degree offered as of June 2004, when a total of 274 programs were identified. All states and the District of Columbia had at least dental hygiene education program. Overall, the large majority of dental hygiene programs (85%) offered an associate degree (AS, AA, or AAS), 18% of programs offered a bachelor degree (BS-DH), and 4% offered a certificate in dental hygiene (these do not sum to 100% because 16 programs offer 2 or more degree/certificate options). Seven of the 10 certificate programs were offered by institutions that also offered students an associate or bachelor degree. Nationally, 10 educational institutions offered a Master of Science in Dental Hygiene (MS-DH) degree.

Table 11. Dental hygiene programs, by state and type of degree offered, as of June 2004.

State	Certificate	Associate	Baccalaueate	Total entry-level programs	MS-DH	Notes
Alabama	0	1	0	1		
Alaska	0	1	0	1		
Arizona	0	3	1	4		
Arkansas	0	2	1	2		1 program offers AS and BS
California	2	16	4	21		1 program offers certificate and AS
Colorado	0	3	1	4		
Connecticut	0	3	0	3		
Delaware	0	1	0	1		
District of Columbia	1	0	0	1		
Florida	0	18	0	18		
Georgia	1	11	2	13		1 program offers certif. and AAS
Hawaii	0	0	1	1		
Idaho	0	1	1	2	1	
Illinois	0	12	1	13		
Indiana	0	5	0	5		
Iowa	0	4	0	4		
Kansas	0	2	0	2		
Kentucky	0	5	2	5		2 programs offers AS and BS
Louisiana	0	1	2	3		
Maine	0	2	1	2		1 program offers AS and BS
Maryland	0	2	1	3	1	
Massachusetts	1	7	1	7		1 program offers certif., AS, BS
Michigan	1	10	2	12	1	1 program offers certificate and BS
Minnesota	0	8	2	10		
Mississippi	0	4	1	5		
Missouri	0	4	1	5	1	
Montana	0	1	0	1		
Nebraska	0	1	1	2		
Nevada	0	2	0	2		
New Hampshire	0	1	0	1		
New Jersey	0	4	0	4		
New Mexico	0	1	1	2	1	
New York	0	10	1	10		1 program offers AAS and BS
North Carolina	1	11	1	12	1	1 program offers certif. and BS-DH
North Dakota	0	1	0	1		
Ohio	0	11	1	12		
Oklahoma	0	2	1	3		
Oregon	0	3	2	5		
Pennsylvania	1	9	1	10		1 program offers certif. and BS-DH

Table 11. Dental hygiene programs, by state and type of degree offered, as of June 2004.

State	Certificate	Associate	Baccalaueate	Total entry-level programs	MS-DH	Notes
Rhode Island	0	1	0	1		
South Carolina	0	6	0	6		
South Dakota	0	1	1	1		1 program offers AS and BS
Tennessee	0	4	2	5		1 program offers AAS and BS-DH
Texas	2	15	5	20	2	2 programs offer certif. and BS-DH
Utah	0	4	0	4		
Vermont	0	1	0	1		
Virginia	0	3	2	5	1	
Washington	0	6	1	7		
West Virginia	0	2	2	3	1	1 program offers AS and BS-DH
Wisconsin	0	5	1	6		
Wyoming	0	2	0	2		
TOTAL	10	233	48	274	10	

MS-DH = Master of Science in Dental Hygiene

Source: American Dental Hygienists' Association website, www.adha.org, accessed June 30, 2004.

In summary, findings from the survey of dental hygiene programs suggest rather limited public health presence, with relatively few programs having public health trained faculty members and few hours in the curriculum devoted to community-based prevention or program planning. Not only is there limited capacity to teach public health topics in dental hygiene programs, there are few potential public health role models for dental hygienists in training. Because the large majority of dental hygiene programs do not confer a baccalaureate degree, most graduates of dental hygiene programs would require additional undergraduate course work before they would meet the admissions requirements for graduate programs in public health. There are just 10 MS-DH degree programs in the United States, which are intended to prepare leaders in dental hygiene education, research, and leadership.

Schools of Public Health

An effective public health system requires well-educated public health professionals [Gebbie et al. 2003]. Public health professionals receive education and training in a wide range of disciplines, come from a variety of professions, work in many types of settings, and are engaged in numerous kinds of activities; however, all public health professionals share a focus on population-level health. The extent to which we are able to make additional improvements in the oral health of the public depends, in large part, upon the quality and preparedness of the dental public health workforce, which is, in turn, dependent upon the relevance and quality of its education and training. Because dental public health professionals largely receive their public health education and training from accredited schools of public health, this project assessed the dental public health presence and capacity in those institutions.

In February–March 2001, we surveyed all schools of public health that were accredited by the Council on Education in Public Health regarding their dental public health presence. The survey asked whether the school had a department of public health dentistry, its size, the number of faculty members who held a dental or dental hygiene degree in addition to their public health degree(s), the availability of courses on dental public health topics, and the availability of a program with a concentration in dental public health at the master's degree level or beyond. Survey questionnaires and cover letters were sent to the deans of all accredited schools of public health (n=35); usable responses were received from 27 (77%).

A total of 27 of the 35 (77%) schools of public health accredited by the Council on Education in Public Health responded to the 2001 survey. Only one responding school indicated the existence of a department of dental public health or community dentistry within the school of public health. Four of the 27 responding schools (15%) indicated that they offered a Master of Public Health degree in a dental public health concentration area, and five schools (19%) reported offering advanced training in dental public health. Among responding schools, 60% reported having no faculty members with a dental or dental hygiene degree in addition to a public health degree, 28% reported they had one faculty member with a dental or dental hygiene degree, and 12% reported having two or more faculty members with those degrees.

Advanced Training Programs in Dental Public Health (Residencies)

The advanced educational requirement for board eligibility in dental public health generally includes completion of one academic year in a program accredited by the Council on Education for Public Health of the American Public Health Association, leading to a graduate degree in public health, plus a residency in dental public health accredited by the Commission on Dental Accreditation [American Board of Dental Public Health 2003]. (Other acceptable advanced educational preparation includes: two academic years of study in a program accredited by the Commission on Dental Accreditation that leads to a graduate degree in public health; or satisfactory completion of two or more years of advanced education in dental public health from an institution outside the United States followed by the satisfactory completion of a residency program in dental public health accredited by the Commission on Dental Accreditation). Because dental public health residencies are intended to provide practical experience in dental public health and because completion of a residency program is the most common means of meeting the educational criteria for board eligibility, this project examined trends in the number of residencies and residents, and stipends and tuitions for each program.

As of June, 2002, there were 18 accredited dental public health residency programs; 9 programs were located in schools of dentistry and 9 were sponsored by other institutions (Table 12). All dental public health residency directors were certified by the American Board of Dental Public Health, and all but one director were employed full-time by the sponsoring institution.

Table 12. Accredited Dental Public Health Residency Programs, 2001-2002 Academic Year.

Institution	Enrollment		Certificate or Degree Recipients, 2000/01	Stipend, Year 1	Tuition & Fees, Year 1
	1 st Year	2 nd -6 th Year			
Dental Schools					
University of California, San Francisco	2	0	1	\$0	\$6500
University of Florida	0	1	0	\$34,000	\$0
University of Iowa	1	9	2	\$0	\$6028
Boston University	2	0	1	\$41,000	\$36,500
Harvard University	1	2	1	\$25,000	\$28,899
University of Pittsburgh	0	0	1	\$15,000	\$0
Medical University of South Carolina	0	0	0	\$0	\$0
Texas A&M, Baylor	1	2	2	\$0	\$0
University of Texas, Houston	4	1	1	\$25,000	\$300
University of Texas, San Antonio	1	0	1	\$30,000	\$0
Subtotal, Dental Schools	12	15	10	Median: \$20,000 Mean: \$17,000	Median: \$150 Mean: \$7,823
Other Institutions					
Centers for Disease Control and Prevention, Division of Oral Health	1	0	1	\$0	\$0
National Institute of Dental and Craniofacial Research	4	0	1	\$37,000	\$0
V.A. Medical Center, Perry Point, MD	0	0	0	\$33,000	\$0
University of Michigan School of Public Health	2	0	1	\$30,000	\$0
Indian Health Service	0	2	0	\$0	\$0
New York State Department of Health	2	2	4	\$34,000	\$0
North Carolina Division of Dental Health	2	0	0	\$40,000	\$0
Tennessee Department of Health	0	0	0	\$0	\$0
Subtotal, Other Institutions	11	4	7	Median: \$31,500 Mean: \$21,750	Median: \$0 Mean: \$0

Table 12. Accredited Dental Public Health Residency Programs, 2001-2002 Academic Year.

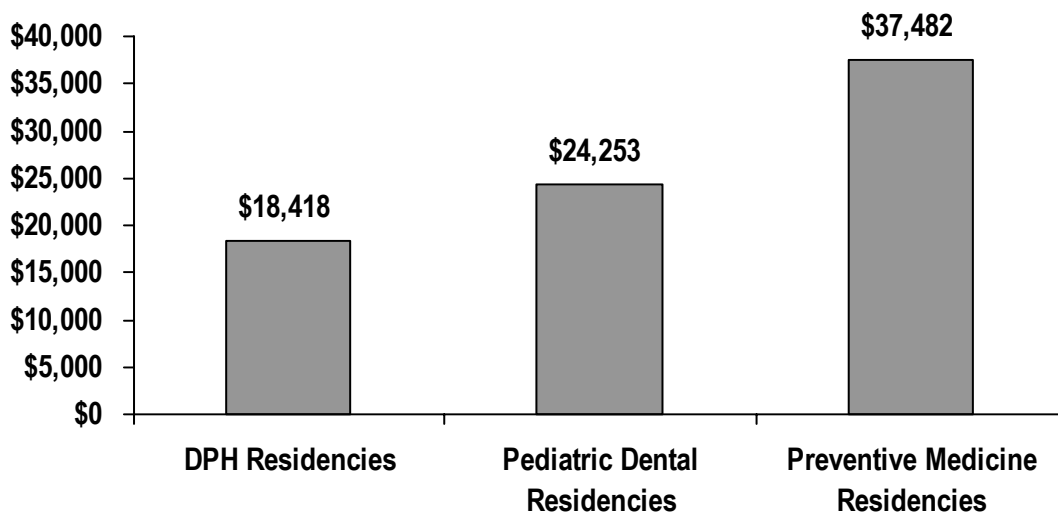
Institution	Enrollment		Certificate or Degree Recipients, 2000/01	Stipend, Year 1	Tuition & Fees, Year 1
	1 st Year	2 nd -6 th Year			
Total	23	19	17	Median: \$25,000 Mean: \$19,111	Median: \$0 Mean: \$4,346

Source: American Dental Association, 2003.

In 2000–01, five of the nine dental school-based residency programs offered no stipend support for residents; the other four dental school-sponsored programs offered stipends ranging from \$20,000 to \$30,000. Five of the nine dental school-based residency programs charged fees and/or tuition, which ranged from \$400 to \$34,200 annually.

To put the stipend support for dental public health residencies in perspective, this project compared the stipends for two comparable types of training programs: pediatric dental residencies and preventive medicine residencies. These were thought to be reasonable comparisons because, similar to dental public health residencies, many pediatric residency programs are supported by HRSA, and because preventive medicine has a similar population-based public health approach to health promotion and disease prevention. Figure 3 shows the considerable difference in stipend support among the residency programs. Mean first year stipends were about \$6000 less for dental public health residencies than for pediatric dentistry residencies, and were about one-half the mean levels of stipend support for preventive medicine residencies.

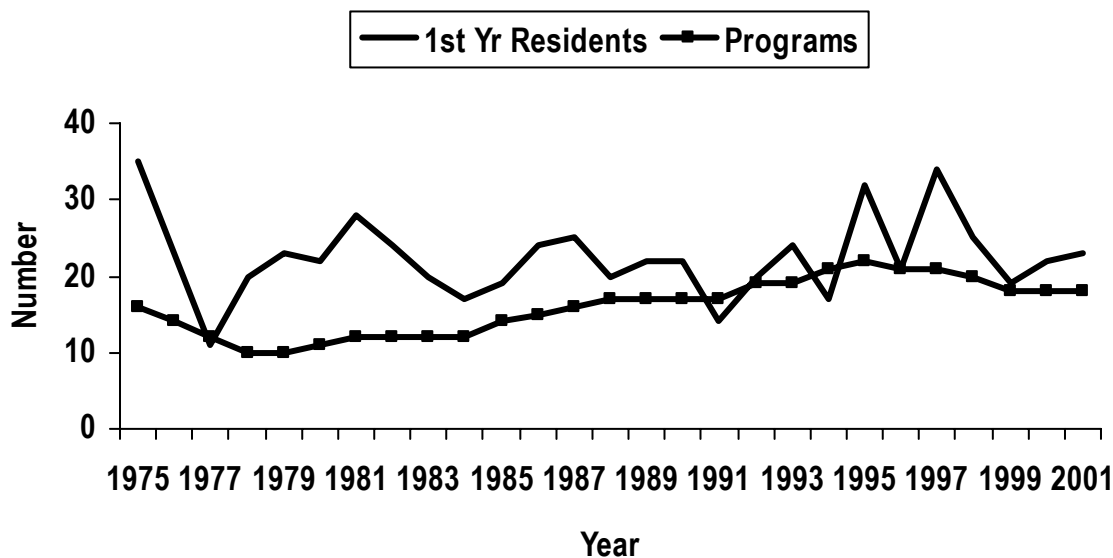
Figure 3. Mean First Year Residency Stipends, 2001–2002



Sources: ADA 2001/2002 Survey of Advanced Dental Education, 2003; AMA Graduate Medical Education Supplement, 2001.

Figure 4 depicts the trends in the number of accredited dental public health residency programs and the number of first-year residents during the past 25 years. The number of programs increased gradually from a low of 10 programs in 1978–1979 to a high of 22 programs in 1995, and has declined to the current level of 18 accredited programs. The number of enrolled first-year residents during this time period ranged from a high of 35 in 1975 to a low of 11 in 1977, with ratios of residents to programs averaging between 0.8 and 2.3. During the most recent five years, the programs averaged 1.0 to 1.6 first-year residents per program.

Figure 4. Accredited DPH Residency Programs, 1975–2001



Prevention Research Centers

The Prevention Research Centers (PRCs) are a network of academic centers, public health agencies, and community partners conducting applied research and practice in chronic disease prevention and control (Table 13). The PRCs are housed within schools of public health, medicine, or osteopathy. There are currently 28 PRCs situated in academic research centers in 25 states. Core funding for the PRCs is provided by the Centers for Disease Control and Prevention through cooperative agreements; FY 2003 core funding was about \$23 million for the centers' infrastructure and community-based research projects.

The PRCs are intended to work with populations having the greatest burden of disease and disability, especially people affected by adverse socioeconomic conditions. The goals of the PRCs are to build long-term relationships for engaging communities as partners in research, conducting research in directions guided by advisory boards of community leaders, and developing the communities' long-term capacity. Families are to be incorporated into many of the interventions. PRCs are to disseminate successful results to comparable communities throughout the nation, to train and offer technical assistance to community and public health practitioners, and develop public health researchers' skills for working with communities.

PRCs conduct research projects on health- or population-specific issues. Each center has a research team composed of multidisciplinary faculty and conducts dozens of companion research projects each year. In addition, the PRCs have created research networks for priority health issues, such as healthy aging and oral health.

The oral health presence among the PRCs was determined by examining several Internet sources: the CDC website for the PRCs (www.cdc.gov/prc), the individual websites for each of the 28 PRCs (if one was available), and the website for the PRC Oral Health Network (<http://www.hsc.usf.edu/prc/ohn-home.html>). Table 11 summarizes the available information on oral health-related projects and researchers at the 28 PRCs. Oral health-related projects were those that specifically investigated surveillance, prevention, or health care access related to dental or oral conditions. Several caveats must be noted: it is possible that some projects may have included an oral health-related component that was not included in the available project descriptions; some projects that did not directly address oral health conditions or treatment clearly had oral health implications (e.g., those that targeted tobacco use or nutrition); and some PRCs had minimal or outdated information available on their websites, so pertinent information may have been missed.

The presence of oral health faculty in the PRCs was determined by several criteria: the inclusion of one or more faculty members on the roster of the PRC that had a faculty appointment in a school of dentistry, a dental or dental hygiene background, or a track record of oral health research; a researcher who currently serves as principal investigator or co-investigator of an oral health-related project in the PRC; or an individual who serves as a representative of a PRC on the PRC Oral Health Network..

Based on available information, at least 10 of the 28 PRCs have conducted at least one oral health-related project. In general, the number of oral health projects was small in each PRC with

most PRCs having no more than one or two such projects. At least 16 PRCs have some degree of oral health faculty presence, as defined above.

Table 13. Prevention Research Centers, January 2004.

State / Institution, Center	Core Focus	Oral Health Projects? ^a	Oral Health Faculty? ^b
Alabama			
University of Alabama at Birmingham, Center for Health Promotion	Reducing Health Risks Among African Americans and Other Underserved People	No	No
Arizona			
University of Arizona, Southwest Center for Community Health Promotion	Promoting the Health of Multi-Ethnic Communities of the Southwest	No	No
California			
University of California at Berkeley, Center for Family and Community Health	Engaging Families, Neighborhoods, and Communities in Chronic Disease Prevention	Yes	Yes
University of California at Los Angeles, UCLA/RAND Center for Adolescent Health Promotion	Promoting the Health and Well-Being of Adolescents	No	Yes
Colorado			
University of Colorado, Rocky Mountain Prevention Research Center	Promoting Healthy Lifestyles in Rural Communities	No	Yes
Connecticut			
Yale University, Yale University-Griffin Hospital Prevention Research Center	Creating Innovative Public Health Initiatives	Yes	Yes
Florida			
University of South Florida, Center for Community-Based Prevention Marketing	Using Community-Based Prevention Marketing for Disease Prevention and Health Promotion	Yes ^c	Yes
Georgia			
Morehouse School of Medicine, Prevention Research Center	Promoting Risk Reduction and Early Detection in African American and Other Minority Communities: Coalitions for Prevention Research	Yes	Yes
Illinois			

Table 13. Prevention Research Centers, January 2004.

State / Institution, Center	Core Focus	Oral Health Projects? ^a	Oral Health Faculty? ^b
University of Illinois at Chicago, Illinois Prevention Research Center	Controlling Diabetes in Communities	Yes	Yes
Iowa			
University of Iowa, Prevention Research Center	Improving the Health of Rural Iowans Through Nutrition and Exercise	No	No
Kentucky			
University of Kentucky, Prevention Research Center	Controlling Cancer in Central Appalachia	No	Yes
Louisiana			
Tulane University, Environmental Diseases Prevention Research Center	Preventing Environmental Diseases	No	No
Maryland			
The Johns Hopkins University, Center for Adolescent Health Promotion and Disease Prevention	Promoting the Health of Adolescents Through Families and Communities	No	No
Massachusetts			
Boston University, Partners in Health and Housing Prevention Research Center	Improving the Well-Being of Public Housing Residents	No	No
Harvard University, Prevention Research Center on Nutrition and Physical Activity	Promoting Nutrition and Physical Activity Among Children and Youth	No	No
Michigan			
University of Michigan, Prevention Research Center of Michigan	Improving Health in Partnership with Families and Communities	Yes	Yes
Minnesota			
University of Minnesota, National Teen Pregnancy Prevention Research Center	Preventing Teen Pregnancy and Promoting Healthy Youth Development	No	No
Missouri			
Saint Louis University, Prevention Research Center	Preventing Chronic Disease in High-Risk Communities	No	No
New Mexico			
University of New Mexico, Center for Health Promotion and Disease Prevention	Promoting Healthy Lifestyles in American Indian Communities	Yes	Yes

Table 13. Prevention Research Centers, January 2004.

State / Institution, Center	Core Focus	Oral Health Projects? ^a	Oral Health Faculty? ^b
New York			
Columbia University, Harlem Health Promotion Center	Putting Health Promotion Into Action	Yes	No
State University of New York at Albany, Prevention Research Center	Preventing Chronic Disease Through Community Interventions	No	No
North Carolina			
University of North Carolina at Chapel Hill, Center for Health Promotion and Disease Prevention	Improving Community Health through Workplace Health Promotion	Yes	Yes
Oklahoma			
University of Oklahoma, Native American Prevention Research Center	Promoting Health and Preventing Disease in Native Americans	No	No
Pennsylvania			
University of Pittsburgh, Center for Healthy Aging	Promoting Health and Preventing Disease Among Older Adults	?	Yes
South Carolina			
University of South Carolina, Prevention Research Center	Promoting Health Through Physical Activity	No	Yes
Texas			
University of Texas Health Science Center at Houston, Texas Prevention Research Center	Growing from Healthy Children to Healthy Adults	Yes	Yes
Washington			
University of Washington at Seattle, Health Promotion Research Center	Keeping Older People Healthy and Independent through Community Partnerships	No	Yes
West Virginia			
West Virginia University, Prevention Research Center	Promoting Health and Preventing Disease in Rural Appalachia	No	Yes

^a One or more current or past projects directly related to oral health

^b One or more faculty members listed on Prevention Center directory who have a dental or dental hygiene background, are faculty members at a school of dentistry, are currently principal investigator or co-investigator of an oral health-related project, or serve as a representative of a PRC on the PRC Oral Health Network

^c Oral Health Network Coordinating Center

WORKFORCE

Board-Certified Public Health Dentists

The principal purposes of the American Board of Dental Public Health, as defined in its Articles of Incorporation, are: 1) to protect and improve the public's health by the study and creation of standards for the practice of dental public health in all of its aspects and relationships; 2) to grant and issue dental public health certificates to dentists who have successfully completed the prescribed training and experience requisite for acquiring the special knowledge and ability needed for the practice of dental public health; and 3) to ensure continuing competency of diplomates [American Board of Dental Public Health 2003]. Board-certified public health dentists are, in theory at least, those dentists who are knowledgeable and competent in the practice of the specialty.

We conducted a survey of dentists who were certified by the American Board of Dental Public Health (ABDPH) as specialists in the field in February 2001. The survey asked about current employment status, employment setting, professional activities, membership in professional organizations, recent attendance at major dental conferences, year of dental school graduation, and year of board certification.

The survey questionnaires were sent to all known active diplomates of the board at that time (n=141), based on the list provided by the Executive Secretary of the ABDPH. Persons who did not respond to the initial mailing were sent a second mailing two months after the original due date.

Of the 141 Diplomates of the American Board of Dental Public Health (ABDPH) classified as "active" as of February 2001, completed survey questionnaires were received from 125 (89%). Of the respondents, 80 (64%) were employed full-time in a dental public health related field, 15 (12%) worked part-time in dental public health, 12 (10%) were employed in field other than dental public health, four (3%) were unemployed at the time of the survey, and 14 (11%) respondents reported "other" employment status. Among the 14 respondents reporting "other" status, 7 reported they were retired.

Table 14 summarizes selected characteristics of ABDPH Diplomates. The two most common employment settings for active diplomates were federal government (28.7%) and schools of dentistry (28.7%). Five diplomates (4.1%) were employed by county or local governments and 14 (11.5%) worked for state governments. Nearly 90% of active diplomates had graduated from dental school more than 15 years prior to the survey, and 60% received their MPH degree more than 15 years earlier. Board-certified public health dentists were more likely to belong to the American Association of Public Health Dentistry (89.6%) than the American Public Health Association (44.0%). Most diplomates were members of the American Dental Association (68.8%), but relatively few were members of the National Dental Association (1.6%) or Hispanic Dental Association (7.2%).

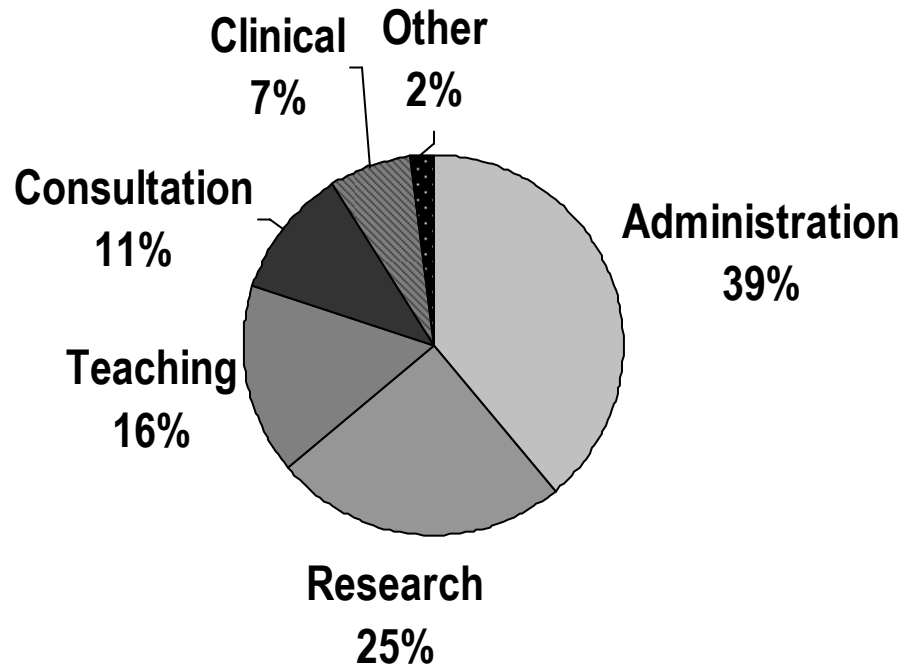
Based on the 93 active board-certified dentists who responded to questions about current professional activities, diplomates reportedly spent a mean of 39% of their time on administrative duties, followed by research (25%) and teaching (16%) (Figure 2).

Table 14. Selected characteristics of active Diplomates of the American Board of Dental Public Health (n=125). 2001 Survey of Diplomates of the American Board of Dental Public Health.

Characteristic	N	%
Place of Employment*		
Federal government	35	28.7
State government	14	11.5
County or local government	5	4.1
School of dentistry	35	28.7
School of public health	6	4.9
Private organization	7	5.7
Other	20	16.4
Year of Dental School Graduation		
Before 1971	44	35.2
1971–1985	68	54.4
1985–2001	13	10.4
Year received MPH degree		
Before 1971	30	24.0
1971–1985	45	36.0
1985–2001	50	40.0
Professional organizations to which Diplomates belong		
American Association of Public Health Dentistry	112	89.6
American Dental Association	86	68.8
American Dental Education Association	30	24.0
American Public Health Association	55	44.0
Association of State and Territorial Dental Directors	13	10.4
Hispanic Dental Association	9	7.2
International Association for Dental Research	52	41.6
National Dental Association	2	1.6
Meetings attended in 2000		
American Association of Public Health Dentistry / Association of State and Territorial Dental Directors	57	45.6
American Public Health Association	21	16.8
American Dental Association	17	13.6
American Dental Education Association	15	12.0
Hispanic Dental Association	2	1.6
International Association for Dental Research	44	35.2
National Dental Association	4	3.2

* Answers were missing for 3 respondents.

Figure 2. Average Distribution of Activities among Active Diplomates



2001 Survey of Diplomates of the American Board of Dental Public Health. n=93

Race/Ethnicity of Dental Workforce and Students

Oral health problems disproportionately affect disadvantaged populations among underrepresented minority groups in the United States [USDHHS 2000a]. As the Surgeon General noted, this disparity will not be ameliorated through technology improvements or increases in clinical productivity. Moreover, recent data show that underrepresented racial and ethnic minority dentists are more likely to provide care to minority populations. In 1996, black dentists reported that 61.8 percent of their patients were black, and Hispanic dentists reported that Hispanic patients made up 45.4 percent of their practice; 76.6 percent of white dentists' patients were white [Brown et al. 2000]. One study of the role of black and Hispanic physicians in the provision of care for underserved populations demonstrated that these physicians practiced in communities with a higher percentage of their racial or ethnic group [Komaromy et al. 1996]. Also, black physicians saw more Medicaid-insured patients and Hispanic physicians more uninsured patients, than other physicians. If this pattern of treatment of Medicaid patients and the uninsured is similar for dentists, the underrepresentation of minority dentists may also contribute to the unmet needs of minority patients. As Grembowski et al. [1989] noted in their public health model of the dental care process, a cultural gap between dental care providers and patients creates an imbalance of power, resulting in a lower standard of care and a lower probability of treatment completion.

Regarding the importance of reaching parity in the dental profession, the American Association of Dental Schools (now the American Dental Education Association) commented, “The production of underrepresented minority (URM) dentists is totally out of synch with projected U.S. demographics. The U.S. population is expected to increase by 60 percent, reaching 394 million by 2050. At that time, nearly half (48 percent) of the population will be constituted from racial and ethnic minority groups. Strategic measures are needed to increase the number of URM dental graduates that will improve access to care for minorities throughout the nation” [AADS 1999].

Data on the race/ethnicity of dental care providers were derived from surveys of professionally active dentists conducted by the American Dental Association [ADA 1999]. The most recent data available for race/ethnicity of practicing dentists were collected in 1997. Information on the race and ethnicity of dental students and recent dental school graduates was obtained from the American Dental Education Association [Weaver et al. 2003; Valachovic 2000].

In 1997, 1.9% of active dentists in the United States identified themselves as black or African American, compared to 12.1% of the US population (Table 15). Blacks were underrepresented in the dental workforce relative to their proportion in the population in virtually every state; the only exceptions were South Dakota and Vermont, where Blacks comprised less than 1% of the population. The estimated proportion of dentists who were black or African American ranged from 0% (HI, ID, MT, UT, WY) to 20.9% (DC), with blacks comprising less than 5% of dentists in all but two jurisdictions (MD, DC).

Hispanic/Latino dentists comprised 2.7% of dentists in the United States in 1997, compared to 10.9% of the US population, and were underrepresented in nearly all states. Underrepresentation was most pronounced in the states with relatively large Hispanic/Latino populations such as Arizona, California, Colorado, Florida, Illinois, Nevada, New Jersey, New York, New Mexico, and Texas. The estimated proportion of dentists who considered themselves to be Hispanic/Latino ranged from 0% (DE) to 13.1% (NM).

Although “Asian or Pacific Islander” is a very heterogeneous group, they comprise a greater proportion of all active dentists (5.7%) than in the general US resident population (3.6%). This pattern is particularly notable in Hawaii, where Asians/Pacific Islanders comprise 73.8% of dentists and 63.1% of the general population, and in California, where they account for 11.8% of the general population but more than 20% of active dentists.

Table 15. Race and Hispanic origin of active dentists and resident population, 1997.

State	White ¹		Black ¹		Hispanic/ Latino		Asian/ Pacific Islander ¹		Amer. Indian / Alaskan Native ¹		Other Dentist (%)
	Dentist (%)	Pop. (%)	Dentist (%)	Pop. (%)	Dentist (%)	Pop. (%)	Dentist (%)	Pop. (%)	Dentist (%)	Pop. (%)	
Alabama	93.9	72.4	4.0	25.8	1.0	0.8	0.7	0.6	0.1	0.4	0.2
Alaska	92.7	72.8	0.5	3.6	1.4	3.3	2.4	4.4	1.9	16.0	1.1
Arizona	91.1	68.8	1.0	3.0	2.9	20.6	3.5	2.0	0.3	5.6	1.1
Arkansas	96.3	81.2	1.6	15.9	0.8	1.6	0.9	0.7	0.2	0.5	0.2
California	70.8	51.5	1.4	6.8	4.4	28.9	20.7	11.8	0.2	0.9	2.6

Table 15. Race and Hispanic origin of active dentists and resident population, 1997.

State	White ¹		Black ¹		Hispanic/ Latino		Asian/ Pacific Islander ¹		Amer. Indian / Alaskan Native ¹		Other
	Dentist (%)	Pop. (%)	Dentist (%)	Pop. (%)	Dentist (%)	Pop. (%)	Dentist (%)	Pop. (%)	Dentist (%)	Pop. (%)	Dentist (%)
Colorado	93.6	79.2	0.6	3.9	2.4	13.7	2.5	2.3	0.3	0.9	0.7
Connecticut	94.6	81.4	1.0	8.4	1.5	7.7	2.3	2.3	0.0	0.2	0.5
Delaware	96.3	76.1	2.4	18.6	0.0	3.1	1.4	1.9	0.0	0.3	0.0
District of Columbia	66.7	27.9	20.9	62.2	5.0	6.6	3.8	2.9	0.0	0.3	3.6
Florida	86.7	69.5	1.2	14.2	9.2	14.3	1.9	1.7	0.1	0.4	0.8
Georgia	91.3	67.4	4.7	28.0	2.0	2.5	1.3	1.8	0.1	0.2	0.6
Hawaii	22.4	29.4	0.0	2.7	1.3	4.3	73.8	63.1	0.7	0.6	1.8
Idaho	97.4	90.7	0.0	0.4	1.6	6.5	0.9	1.1	0.2	1.3	0.0
Illinois	89.5	72.3	2.4	14.9	1.8	9.4	5.3	3.2	0.1	0.2	0.9
Indiana	95.8	88.6	1.3	8.1	1.1	2.2	1.3	0.9	0.1	0.2	0.5
Iowa	96.6	94.9	0.6	1.9	1.2	1.7	1.0	1.2	0.0	0.3	0.6
Kansas	95.0	87.1	1.0	5.6	1.7	4.7	1.5	1.7	0.3	0.9	0.5
Kentucky	96.5	91.4	1.6	7.1	0.8	0.7	0.4	0.6	0.2	0.2	0.6
Louisiana	93.1	64.0	3.4	31.8	2.3	2.5	1.0	1.2	0.0	0.4	0.2
Maine	97.0	97.8	0.2	0.4	1.2	0.7	0.7	0.7	0.3	0.5	0.7
Maryland	83.6	65.8	6.7	26.9	2.4	3.3	5.2	3.8	0.2	0.3	1.9
Massachusetts	91.3	85.5	1.0	5.2	1.6	5.7	4.9	3.4	0.0	0.2	1.1
Michigan	93.6	81.3	2.7	14.1	1.1	2.5	1.7	1.5	0.1	0.6	0.8
Minnesota	97.2	92.1	0.2	2.7	0.6	1.6	1.5	2.5	0.0	1.2	0.5
Mississippi	92.3	62.0	4.9	36.2	1.6	0.7	0.9	0.7	0.1	0.4	0.2
Missouri	94.5	86.1	2.1	11.1	1.2	1.4	1.5	1.1	0.1	0.4	0.6
Montana	93.6	91.4	0.0	0.3	1.3	1.5	4.7	0.6	0.2	6.2	0.2
Nebraska	96.4	90.3	0.4	3.8	1.2	3.8	1.5	1.3	0.0	0.9	0.4
Nevada	91.9	73.2	0.9	6.8	4.1	13.9	2.5	4.4	0.0	1.8	0.5
New Hampshire	98.0	96.7	0.5	0.6	0.5	1.4	0.7	1.1	0.0	0.2	0.3
New Jersey	89.6	69.8	1.7	13.2	2.9	11.5	4.9	5.1	0.0	0.3	1.0
New Mexico	84.9	48.9	0.4	1.9	13.1	38.7	1.0	1.4	0.3	9.2	0.3
New York	88.0	66.1	1.7	14.5	3.7	13.7	5.4	5.2	0.0	0.4	1.1
North Carolina	93.8	73.8	3.8	21.9	0.8	1.8	0.9	1.2	0.3	1.3	0.4
North Dakota	96.5	93.2	0.3	0.5	1.6	0.9	1.0	0.8	0.3	4.6	0.3
Ohio	94.9	86.0	1.9	11.3	0.7	1.5	1.8	1.1	0.0	0.2	0.7
Oklahoma	93.7	80.1	1.3	7.5	0.7	3.2	1.8	1.3	2.0	7.9	0.5
Oregon	92.4	88.6	0.4	1.6	1.1	5.3	5.3	3.1	0.3	1.4	0.6
Pennsylvania	94.4	88.6	1.4	1.6	1.0	5.3	2.6	3.1	0.1	1.4	0.5
Rhode Island	94.4	87.5	0.4	3.8	1.5	5.9	2.4	2.2	0.0	0.5	1.3
South Carolina	94.4	67.9	4.1	29.9	0.6	1.1	0.3	0.8	0.1	0.2	0.5

Table 15. Race and Hispanic origin of active dentists and resident population, 1997.

State	White ¹		Black ¹		Hispanic/ Latino		Asian/ Pacific Islander ¹		Amer. Indian / Alaskan Native ¹		Other
	Dentist (%)	Pop. (%)	Dentist (%)	Pop. (%)	Dentist (%)	Pop. (%)	Dentist (%)	Pop. (%)	Dentist (%)	Pop. (%)	Dentist (%)
South Dakota	97.8	90.1	0.6	0.6	0.6	0.9	0.3	0.6	0.3	7.8	0.3
Tennessee	92.2	81.5	4.9	16.3	1.2	1.0	0.9	0.9	0.1	0.2	0.6
Texas	87.8	56.7	1.8	11.7	6.0	28.5	3.5	2.7	0.2	0.5	0.7
Utah	98.3	89.5	0.0	0.7	0.6	6.0	0.9	2.4	0.0	1.4	0.2
Vermont	97.2	97.6	0.6	0.5	0.9	0.8	0.3	0.8	0.0	0.3	0.9
Virginia	91.2	73.4	3.4	19.6	1.7	3.3	3.1	3.4	0.1	0.3	0.5
Washington	91.2	84.0	0.5	3.2	1.1	5.4	6.4	5.5	0.2	1.8	0.6
West Virginia	95.5	95.7	1.1	3.1	0.8	0.5	1.8	0.5	0.1	0.1	0.6
Wisconsin	96.8	90.0	0.2	5.4	1.0	2.3	1.4	1.5	0.1	0.9	0.5
Wyoming	98.7	90.8	0.0	0.7	0.4	5.6	0.9	0.8	0.0	2.2	0.0
United States	88.5	72.7	1.9	12.1	2.7	10.9	5.7	3.6	0.2	0.7	1.0

¹ Not of Hispanic/Latino origin.

Sources: American Dental Association. Distribution of dentists in the United States by region and state, 1997. Chicago, IL: ADA Survey Center; 1999. U.S. Census Bureau. Resident population estimates of the United States by sex, race, and Hispanic origin: April 1, 1990 to July 1, 1999, with short-term projection to November 1, 2000. Available at: <http://eire.census.gov/popest/archives/national/nation3/intfile3-1.txt>

Data on race and ethnicity of first-year dental students in 2001 suggest that the dental profession is slowly moving toward greater diversity, although it will be quite some time before some groups attain representation in the profession equal to their proportion in the population. Overall, black/African American students comprised 5.5% of first-year dental students in 2001, compared to 12.1% of the US population (Table 16). Fourteen of the 54 dental schools had not a single black/African American first-year student. Even in large, diverse states there were very few black/African American students: for example, the five dental schools in California had a total of just 8 black/African American first-year students, New York's four schools had a total of 9, Texas had a total of 8 black/African American first-year students, and Florida's two dental schools had a total of 4. Hispanics/Latinos were similarly underrepresented among dental students, comprising 10.9% of the population but 5.2% of dental students. There were just 19 American Indian/Alaskan Native first-year dental students in 2001. In contrast, Asians and Pacific Islanders comprised 21.6% of first-year dental students, compared to 5.7% of the US population.

Table 16. First-year dental school enrollees in 2001 entering class, by school and race/ethnicity.

State	School Name	American Indian/ Alaskan Native		Asian / Pacific Islander		Black/ African American		White		Hispanic/ Latino		Other or Not Reported		Total No.
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Alabama	Alabama	0	0	2	3.4	5	8.6	50	86.2	0	0.0	1	1.7	58
California	UCLA	0	0.0	43	48.9	2	2.3	32	36.4	5	5.7	6	6.8	88

Table 16. First-year dental school enrollees in 2001 entering class, by school and race/ethnicity.

State	School Name	American Indian/Alaskan Native		Asian / Pacific Islander		Black/ African American		White		Hispanic/ Latino		Other or Not Reported		Total
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
California	UCSF	0	0.0	43	52.4	0	0.0	24	29.3	8	9.8	7	8.5	82
California	Loma Linda	1	1.1	38	42.2	3	3.3	41	45.6	7	7.8	0	0.0	90
California	Pacific	0	0.0	48	32.4	3	2.0	73	49.3	10	6.8	14	9.5	148
California	USC	0	0.0	68	47.2	0	0.0	63	43.8	4	2.8	9	6.3	144
Colorado	Colorado	0	0.0	4	10.5	0	0.0	27	71.1	2	5.3	5	13.2	38
Connecticut	Connecticut	0	0.0	7	16.7	3	7.1	28	66.7	1	2.4	3	7.1	42
District of Columbia	Howard	0	0.0	8	12.3	47	72.3	3	4.6	3	4.6	4	6.2	65
Florida	Nova SE	0	0.0	23	24.5	0	0.0	48	51.1	13	13.8	10	10.6	94
Florida	Florida	0	0.0	10	12.7	4	5.1	48	60.8	15	19.0	2	2.5	79
Georgia	MC Georgia	0	0.0	3	5.4	4	7.1	49	87.5	0	0.0	0	0.0	56
Illinois	Illinois	0	0.0	18	28.1	2	3.1	35	54.7	2	3.1	7	10.9	64
Illinois	S. Illinois	0	0.0	2	4.0	1	2.0	43	86.0	1	2.0	3	6.0	50
Indiana	Indiana	0	0.0	11	11.0	1	1.0	82	82.0	1	1.0	5	5.0	100
Iowa	Iowa	1	1.4	4	5.4	2	2.7	56	75.7	5	6.8	6	8.1	74
Kentucky	Kentucky	0	0.0	4	7.8	0	0.0	44	86.3	0	0.0	3	5.9	51
Kentucky	Louisville	0	0.0	3	3.8	1	1.3	69	87.3	0	0.0	6	7.6	79
Louisiana	Louisiana	0	0.0	4	6.7	0	0.0	54	90.0	2	3.3	0	0.0	60
Maryland	Maryland	0	0.0	24	24.7	5	5.2	57	58.8	3	3.1	8	8.2	97
Massachusetts	Boston	0	0.0	49	42.6	3	2.6	45	39.1	11	9.6	7	6.1	115
Massachusetts	Harvard	0	0.0	8	22.9	1	2.9	22	62.9	2	5.7	2	5.7	35
Massachusetts	Tufts	1	0.7	64	42.1	5	3.3	65	42.8	8	5.3	9	5.9	152
Michigan	Detroit	0	0.0	9	12.0	1	1.3	53	70.7	6	8.0	6	8.0	75
Michigan	Michigan	0	0.0	25	22.1	10	8.8	68	60.2	5	4.4	5	4.4	113
Minnesota	Minnesota	0	0.0	9	10.6	0	0.0	69	81.2	0	0.0	7	8.2	85
Mississippi	Mississippi	0	0.0	1	3.3	0	0.0	29	96.7	0	0.0	0	0.0	30
Missouri	Missouri-KC	0	0.0	6	9.2	3	4.6	46	70.8	5	7.7	5	7.7	65
Nebraska	Creighton	0	0.0	11	13.1	0	0.0	68	81.0	4	4.8	1	1.2	84
Nebraska	Nebraska	1	2.2	1	2.2	0	0.0	41	91.1	0	0.0	2	4.4	45
New Jersey	New Jersey	0	0.0	12	15.8	6	7.9	48	63.2	6	7.9	4	5.3	76
New York	Columbia	0	0.0	44	55.7	1	1.3	22	27.8	5	6.3	7	8.9	79
New York	New York	0	0.0	85	35.6	3	1.3	115	48.1	8	3.3	28	11.7	239
New York	Buffalo	0	0.0	19	24.1	4	5.1	51	64.6	3	3.8	2	2.5	79
New York	Stony Brook	0	0.0	7	18.4	1	2.6	27	71.1	1	2.6	2	5.3	38
North Carolina	North Carolina	0	0.0	4	5.2	12	15.6	55	71.4	5	6.5	1	1.3	77
Ohio	Ohio State	0	0.0	9	8.7	2	1.9	86	82.7	2	1.9	5	4.8	104

Table 16. First-year dental school enrollees in 2001 entering class, by school and race/ethnicity.

State	School Name	American Indian/Alaskan Native		Asian / Pacific Islander		Black/ African American		White		Hispanic/ Latino		Other or Not Reported		Total No.
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Ohio	Case Western	0	0.0	18	26.1	1	1.4	47	68.1	1	1.4	2	2.9	69
Oklahoma	Oklahoma	9	16.7	5	9.3	0	0.0	36	66.7	1	1.9	3	5.6	54
Oregon	Oregon	0	0.0	6	8.6	0	0.0	61	87.1	3	4.3	0	0.0	70
Pennsylvania	Pennsylvania	1	1.1	33	35.5	6	6.5	44	47.3	3	3.2	6	6.5	93
Pennsylvania	Pittsburgh	0	0.0	12	16.4	2	2.7	49	67.1	5	6.8	5	6.8	73
Pennsylvania	Temple	1	0.8	23	18.7	9	7.3	68	55.3	8	6.5	14	11.4	123
South Carolina	MUSC	0	0.0	3	5.7	4	7.5	42	79.2	1	1.9	3	5.7	53
Tennessee	Meharry	0	0.0	1	1.9	49	92.5	2	3.8	0	0.0	1	1.9	53
Tennessee	Tennessee	1	1.3	6	8.0	10	13.3	57	76.0	1	1.3	0	0.0	75
Texas	Baylor	0	0.0	17	19.1	6	6.7	56	62.9	7	7.9	3	3.4	89
Texas	UT-Houston	1	1.5	16	24.6	2	3.1	34	52.3	12	18.5	0	0.0	65
Texas	UT-San Antonio	0	0.0	11	13.4	0	0.0	57	69.5	14	17.1	0	0.0	82
Virginia	Virginia	0	0.0	9	10.7	7	8.3	63	75.0	2	2.4	3	3.6	84
Washington	Washington	0	0.0	12	22.2	1	1.9	35	64.8	1	1.9	5	9.3	54
West Virginia	West Virginia	0	0.0	1	2.3	0	0.0	41	95.3	0	0.0	1	2.3	43
Wisconsin	Marquette	2	2.7	4	5.5	1	1.4	42	57.5	5	6.8	19	26.0	73
Total		19	0.5	907	21.6	233	5.5	2570	61.1	217	5.2	257	6.1	4203

Source: Weaver RG, Valachovic RW, Haden NK. Applicant analysis: 2001 entering class. J Dent Educ 2003;67(6):690–709.

National Oral Health Organizations

There are a many national organizations in the United States directly or indirectly involved in dental public health issues. Some of these organizations have dental public health activities as a primary mission, while others are focused primarily on other issues such as dental practice, education, or research but have some involvement in public health issues. A list of major national dental organizations and their mission statements are provided in Table 17. Information on the mission of each organization was obtained from the organizations' websites. Although many organizations specifically mention serving the public or improving its oral health, most are specifically focused on clinical aspects of dentistry and dental care. In addition, there are non-dental organizations not listed in Table 17 that are involved in promoting oral health and access to dental care. However, it was not feasible to detail all the activities of all dental and non-dental organizations that may be considered to be dental public health-related. Therefore, this report will provide more detailed information for some of the major national dental organizations that are involved in key aspects of dental public health practice.

Table 17. National dental organizations and their mission statements.

Organization / website	Mission
Academy of General Dentistry http://www.agd.org/	To serve the needs and represent the interests of general dentists; to promote the oral health of the public; and to foster continued proficiency of general dentists through quality continuing dental education in order to better serve the public
Alpha Omega International Dental Fraternity http://www.ao.org/	Alpha Omega is the oldest international dental organization and was founded in Baltimore, Maryland in 1907 by a group of dental students originally to fight discrimination in dental schools. Today, with its headquarters relocated to Warrendale, PA, it is primarily an educational and philanthropic organization.
American Academy of Pediatric Dentistry http://www.aapd.org/	The mission of the American Academy of Pediatric Dentistry is to advocate policies, guidelines, and programs that promote optimal oral health and oral health care for children. The Academy serves and represents its membership in the areas of professional development and governmental and legislative activities. It is a liaison to other health care groups and the public.
American Academy of Periodontology http://www.perio.org/	The Academy's mission is to advocate, educate, and set standards for advancing the periodontal and general health of the public and promoting excellence in the practice of periodontics. Periodontics is one of nine dental specialties recognized by the American Dental Association.
American Association of Endodontists http://www.aae.org/	The American Association of Endodontists is dedicated to excellence in the art and science of endodontics and to the highest standard of patient care. The association inspires its members to pursue professional advancement and personal fulfillment through education, research, advocacy, leadership, communication and service.
American Academy of Implant Dentistry http://www.aaid-implant.org/	The mission of the Academy is to advance the practice of implant dentistry through education, credentialing, and advocacy on behalf of patients and practitioners.
American Association for Dental Research http://www.iadr.com/	To advance research and increase knowledge for the improvement of oral health. <ul style="list-style-type: none"> • Promote support for oral health research. • Enhance the quality and scope of oral health. • Promote the advancement of oral health and science. To support and represent the oral health research community. <ul style="list-style-type: none"> • Facilitate professional development in the oral health research community. • Increase the Association's services, resources, and membership. • Represent the scientific community on issues related to oral health research. To facilitate the communication and application of research findings. <ul style="list-style-type: none"> • Increase opportunities for scientific exchange. • Enhance science transfer to scientific/professional societies, educators, clinicians, and the public.

Table 17. National dental organizations and their mission statements.

Organization / website	Mission
American Association of Oral & Maxillofacial Surgeons http://www.aaoms.org/	The Mission of the American Association of Oral and Maxillofacial Surgeons is to provide a means of self-government relating to professional standards, ethical behavior and responsibilities of its fellows and members; to contribute to the public welfare; to advance the specialty; and to support its fellows and members through education, research and advocacy.
American Association of Orthodontists http://www.aortho.org/	The American Association of Orthodontists is a professional association of educationally qualified orthodontic specialists dedicated to advancing the art and science of orthodontics and dentofacial orthopedics, improving the health of the public by promoting quality orthodontic care, and supporting the successful practice of orthodontics.
American Association of Public Health Dentistry http://www.aaphd.org/	To improve the public's health through oral health research, service, education and policy development.
American Association of Women Dentists http://www.womendentists.org/	Our mission statement is "Women Advancing Dentistry."
American College of Dentists http://www.facd.org/	Our mission is to promote excellence, ethics, and professionalism in dentistry.
American College of Prosthodontists http://www.prosthodontics.org/	The American College of Prosthodontists is a non-profit educational and scientific organization created to represent the needs and interests of Prosthodontists within organized dentistry and to the public by providing a means for stimulating awareness and interest in the field of Prosthodontics. It is the goal of the ACP to be the global resource for all aspects of the specialty.
American Dental Assistant's Association http://www.dentalassistant.org/	To advance the careers of dental assistants and to promote the dental assisting profession in matters of education, legislation, credentialing and professional activities which enhance the delivery of quality dental health care to the public.
American Dental Association http://www.ada.org/	The ADA is the professional association of dentists committed to the public's oral health, ethics, science and professional advancement; leading a unified profession through initiatives in advocacy, education, research and the development of standards.
American Dental Education Association http://www.adea.org/	The mission of the American Dental Education Association is to lead individuals and institutions of the dental education community to address contemporary issues influencing education, research, and the delivery of oral health care for the improvement of the health of the public.
American Dental Hygienists' Association http://www.adha.org/	To improve the public's total health, the mission of the American Dental Hygienists' Association is to advance the art and science of dental hygiene by ensuring access to quality oral health care, increasing awareness of the cost-effective benefits of prevention, promoting the highest standards of dental hygiene education, licensure, practice and research and representing and promoting the interests of dental hygienists.

Table 17. National dental organizations and their mission statements.

Organization / website	Mission
American Orthodontic Society http://www.orthodontics.com/	The Mission of the American Orthodontic Society is to maintain professionalism by providing continuous orthodontic education, mentoring, consultation, credentialing, and recognition for dentists and auxiliaries throughout the world.
American Public Health Association, Oral Health Section http://www.apha.org/sections/	<p>APHA is an Association of individuals and organizations working to improve the public’s health and to achieve equity in health status for all. We promote the scientific and professional foundation of public health practice and policy, advocate the conditions for a healthy global society, emphasize prevention and enhance the ability of members to promote and protect environmental and community health.</p> <p>Oral Health Section: Promotes the importance of oral health and increasing the public’s access to oral health preventive and treatment services; monitors and communicates the oral health needs of the public.</p>
American Society of Forensic Odontology http://www.forensicdentistryonline.org/new_asfo/newwasfo.htm	The largest organization representing those interested in forensic dentistry worldwide.
Army Dental Care System https://www.dencom.army.mil/	To ensure dental readiness and enhance wellness by providing dental care and promoting oral health for the Army.
Association of Clinicians for the Underserved, Oral Health Section http://www.clinicians.org/	ACU is a nonprofit, interdisciplinary organization whose mission is to improve the health of underserved populations by enhancing the development and support of the health care clinicians serving these populations.
Association of Managed Care Dentists http://www.amcd.org/	The Association of Managed Care Dentists (AMCD) is a not-for-profit organization whose purpose is to provide education, representation and a forum for communication among dentists. We strive to develop improved patient care, enhance business practice strategies, monitor and improve quality assurance, plan design, and patient satisfaction.
Association of State and Territorial Dental Directors http://www.astdd.org/	ASTDD formulates and promotes the establishment of sound national dental public health policy and assists state dental programs in the development and implementation of programs and policies for the prevention of oral diseases.
Delta Sigma Delta International Dental Fraternity http://www.deltsig.com/	Delta Sigma Delta: An international dental fraternity that brings together the leaders of the profession to further excellence in the ethical, professional and scientific ideals of dentistry through fellowship, knowledge, strength and justice.
Hispanic Dental Association http://www.hdassoc.org/	The mission of the Hispanic Dental Association is to optimize the oral health of the Hispanic community.
National Association of Dental Plans http://www.nadp.org/	Our mission is to promote and advance the dental benefits industry to improve consumer access to affordable, quality dental care.

Table 17. National dental organizations and their mission statements.

Organization / website	Mission
National Dental Association http://www.ndaonline.org/	The mission of the National Dental Association is to continually enhance the skills of its members, recruit under-represented minorities into the profession, and create opportunities for research among its members and the communities they serve. The National Dental Association is dedicated to elevating the health status of the underserved by serving as advocates in the public arena and private sector in order to increase their access to care.
Oral Health America http://www.oralhealthamerica.org/	To increase public awareness of oral health's importance to total health.
Psi Omega Fraternity http://www.psiomegafaternity.org/	The objectives of this Fraternity are to maintain and advance the high standards of dentistry by instilling in its members the spirit of fraternal cooperation; and to exert its influence for the advancement of the dental profession in its methods of teaching, of practice, of research, of ethics and of jurisprudence.
Special Care Dentistry http://www.scdonline.org/	SCD's goal is to act as a central focus for diverse individuals and groups with a common interest in oral health for people with special needs and direct its resources accordingly.

Overall and state-specific membership information was derived from each organization’s online membership directory. The ADA online membership directory was searched for active members who reported their specialty as Dental Public Health; this search was performed by state. There were many duplicate entries in the database, which were eliminated to calculate the number of active ADA members per state who reported their area of specialty as Dental Public Health.

There are three major national dental public health organizations in the United States. The largest of these is the **American Association of Public Health Dentistry (AAPHD)**, founded in 1937. The stated mission of AAPHD is: “To improve the public’s health through oral health research, service, education and policy development.” The vision of the organization: “The vision of the American Association of Public Health Dentistry is optimal oral health for all.” (AAPHD 2003).

The membership of AAPHD is composed primarily of public health dentists and dental hygienists involved in program administration, education, research, and clinical practice. As of May 2003, there were 640 members of AAPHD residing in the United States and an additional 78 members living in other countries. The distribution of members is shown in Table ORGS. Three states (DE, RI, WY) had no AAPHD members and five states (AR, MT, SD, UT, VT) had just a single member. Eight states (CA, MD, NY, TX, MA, IL, IA, NC) accounted for nearly 50% of the U.S. membership of AAPHD.

The second largest national dental public health organization is **Oral Health Section of the American Public Health Association (APHA)**. APHA’s stated mission is: “APHA is an Association of individuals and organizations working to improve the public's health and to achieve equity in health status for all. We promote the scientific and professional foundation of public health practice and policy, advocate the conditions for a healthy global society, emphasize prevention and enhance the ability of members to promote and protect environmental and

community health.” (APHA 2003). As one of 25 discipline-based sections within APHA, the Oral Health Section states its purpose as: “Promotes the importance of oral health and increasing the public's access to oral health preventive and treatment services; monitors and communicates the oral health needs of the public.”

As of April, 2003 there were 290 members of APHA who listed Oral Health Section as their primary section (Table 18). There were 11 states with no member of the Oral Health Section; 44% of the members resided in one of five states (CA, MD, NY, IL, MA).

The other major national dental public health organization in the United States is the **Association of State and Territorial Dental Directors (ASTDD)**. This national non-profit organization represents the directors and staff of state public health agency programs for oral health. Full membership is limited to one per state, and the member is the state or territorial dental director except where there is no director of a state oral health program. ASTDD allows associate membership for persons other than state or territorial dental directors; as of May 2003, there were 46 associate members of ASTDD.

The **American Dental Association (ADA)**, established in 1859, is the world's oldest and largest dental professional association. The ADA is involved in wide array of activities designed to increase awareness of oral health, access to dental care, and disease prevention, including advocacy, research, and health communications. In 2002, ADA had 544 members who reported their specialty as Dental Public Health; of those, 79 were members of the Federal Service. Comparing the number of ADA members who considered themselves to be specialists in dental public health to the number of active diplomates of the American Board of Dental Public Health (141), it is obvious that most ADA-listed specialists in the discipline are not board-certified. The number of ADA-member public health dentists in the states (excluding Federal Service members) ranged from 0 in five states (Maine, New Hampshire, South Dakota, Vermont, and Wyoming) to 41 in California. Because the states vary widely in their total population, the number of specialists per 100,000 population was calculated for each state, based on the 2000 US Census (Table 18). Overall, there was 0.17 ADA-member public health dentist per 100,000 population; no state exceeded 1 public health dentist per 100,000 population. Stated another way, there were 605,208 persons per ADA-member dental public health specialist in the United States. Similarly, there were 0.28 AAPHD members per 100,000 population in the United States (data not shown); the number per 100,000 population exceeded 1.0 in just two states: Iowa (1.20) and Maryland (1.28).

Founded in 1913, the mission of the **National Dental Association (NDA)** includes recruitment of under-represented minorities into the dental profession and elevation of the health status of the underserved by serving as advocates in the public arena and private sector in order to increase their access to care. NDA has approximately 10,000 members, of whom 7,000 are dentists. No specific information was available on the number of public health dentists or dental hygienists in NDA.

The mission of **The Hispanic Dental Association (HDA)**, established in 1990, is to optimize the oral health of the Hispanic community. HDA seeks to provide a voice for the Hispanic oral professional in the United States; promote the oral health of the Hispanic community through

improved prevention, treatment and education; foster research and knowledge concerning Hispanic oral health problems; disseminate information to both Hispanic dental professionals and the community at large; provide a worldwide source of continuing education for oral health professionals serving the Hispanic community; and stimulate interest and encourage entry of Hispanics into oral health. No specific information on public health dental professionals in HDA was available.

Table 18. Membership in American Association of Public Health Dentistry (AAPHD), Oral Health Section, American Public Health Association (APHA), American Dental Association dental public health specialists, and National Dental Association (NDA) members, by state, as of May 20, 2003.

State	AAPHD	APHA Oral Health Section	ADA DPH specialists (active)	ADA DPH specialists per 100,000 population [†]
Alabama	7	7	10	0.22
Alaska	7	1	6	0.96
Arizona	13	5	6	0.12
Arkansas	1	0	1	0.04
California	65	36	41	0.12
Colorado	7	4	18	0.42
Connecticut	13	5	2	0.06
Delaware	0	0	1	0.13
District of Columbia	5	4	1	0.17
Florida	22	7	31	0.19
Georgia	13	9	14	0.17
Hawaii	6	1	3	0.25
Idaho	2	0	1	0.08
Illinois	31	17	6	0.05
Indiana	5	3	8	0.13
Iowa	28	7	13	0.44
Kansas	3	1	4	0.15
Kentucky	9	1	7	0.17
Louisiana	2	0	2	0.04
Maine	3	1	0	0.00
Maryland	62	30	14	0.26
Massachusetts	31	16	23	0.36
Michigan	18	14	15	0.15
Minnesota	8	5	6	0.12
Mississippi	7	2	1	0.04
Missouri	10	5	7	0.13
Montana	1	0	3	0.33
Nebraska	6	1	1	0.06
Nevada	4	3	4	0.20
New Hampshire	8	0	0	0.00

Table 18. Membership in American Association of Public Health Dentistry (AAPHD), Oral Health Section, American Public Health Association (APHA), American Dental Association dental public health specialists, and National Dental Association (NDA) members, by state, as of May 20, 2003.

State	AAPHD	APHA Oral Health Section	ADA DPH specialists (active)	ADA DPH specialists per 100,000 population [†]
New Jersey	14	15	12	0.14
New Mexico	19	1	4	0.22
New York	38	30	38	0.20
North Carolina	23	3	26	0.32
North Dakota	4	0	1	0.16
Ohio	10	6	13	0.11
Oklahoma	6	1	11	0.32
Oregon	12	3	9	0.26
Pennsylvania	19	15	7	0.06
Rhode Island	0	1	3	0.29
South Carolina	9	0	1	0.02
South Dakota	1	0	0	0.00
Tennessee	11	3	15	0.26
Texas	30	11	26	0.12
Utah	1	1	3	0.13
Vermont	1	1	0	0.00
Virginia	16	4	17	0.24
Washington	13	9	18	0.31
West Virginia	4	0	2	0.11
Wisconsin	12	1	10	0.19
Wyoming	0	0	0	0.00
Total	640	290	465*	0.17

* Excludes 79 members of Federal Dental Service

[†]Based on 2000 US Census

REGULATORY ISSUES

State Boards of Dental Examiners

All states and the District of Columbia have a board of dentistry, a board of dental examiners, or a state dental commission. In general, those boards have the power to adopt rules and regulations regarding the practice of dentistry and dental hygiene and to issue, suspend, or revoke state licenses for the practice of those professions. In some states, the board administers the licensing examination for dentists or dental hygienists. State boards of dental examiners always include dentists, and the large majority of boards also include dental hygienists and members of the public. Some states also include other dental personnel, such as dental assistants or denturists. The licensure and regulatory issues under the control of state boards of dentistry can directly impact the health of the public. For example, state dental boards control the ability of dentists and dental hygienists to move between states, which can affect the number of practitioners and access to care. The boards can determine the ability of non-dentists to provide services to dentally underserved populations within a state, and potentially can help ensure the competence of dental care providers within their jurisdictions. Because state boards of dentistry can establish rules that may have public health implications, information was sought on the degree of representation on those boards by public health dentists.

The presence of dental public health dentists on state boards of dental examiners was determined by: (1) examining the composition of board as described in each state's statutes pertaining to the establishment of a board of dentistry; (2) obtaining a list of the current members of each state's board members; and (3) determining the specialty status of each dentist member of each board.

The statutes governing state boards of dental examiners and current board members for nearly all states were found on the Internet. The lists of current board members were obtained either from each board's website or from minutes of a recent meeting of the board. Seven state boards that did not have the list available on the Internet were contacted by telephone or e-mail.

Specialty status was determined primarily from the American Dental Association (ADA) online membership directory. Dental public health specialty status was determined by the member's reported specialty in the ADA database, not by board certification. For the small number of dentists who were members of a state board of examiners but not the ADA, specialty status was determined by searching telephone directories and the Internet.

As of April 25, 2003, information on the composition of the boards of dental examiners was found for all states except New Mexico and the District of Columbia (Table 19). New Mexico did not yet have a current board appointed by the state governor, and the District of Columbia did not have board information available on the Internet and did not respond to telephone requests. In situations in which there was a discrepancy between the size and composition of the board as described in the state statute and the current actual composition, the current composition was recorded.

The median size of the state boards of examiners was 9 (range: 5–20), with a median of 6 members who were dentists (range: 4–13). All but two states (Connecticut and Washington)

included at least one dental hygienist on the state board of dental examiners, although Washington State has a separate Dental Hygiene Examining Committee composed of three practicing dental hygienists and one public member that oversees clinical examination and certifies competency in dental hygiene practice. All but seven states included at least one public member with no financial connection to dentistry.

A public health dentist was identified for two state boards of dental examiners, Connecticut and Rhode Island. By statute, the Rhode Island State Board of Examiners in Dentistry includes the Chief of the Office of Dental Public Health, who must be a licensed dentist possessing a masters degree in public health or a certificate in public health from an accredited program. No other state had a similar requirement for its board of dental examiners.

Table 19. Composition of state boards of dental examiners as of April 25, 2003.

State	Dentists	Dental Hygienists	Dental Assistants and Other Health Personnel	Public	Public Health Dentists
Alabama	5	1	0	0	0
Alaska	6	2	0	1	0
Arizona	6	2	0	3	0
Arkansas	6	1	0	2	0
California	6	1	1 DA	2	0
Colorado	5	2	0	3	0
Connecticut	6	0	0	3	1
Delaware	5	1	0	3	0
District of Columbia	--	--	--	--	--
Florida	7	2	0	2	0
Georgia	9	1	0	1	0
Hawaii	8	2	0	2	0
Idaho	5	2	0	1	0
Illinois	7	2	0	1	0
Indiana	9	1	0	0	0
Iowa	5	2	0	2	0
Kansas	6	2	0	1	0
Kentucky	7	1	0	0	0
Louisiana	13	1	0	0	0
Maine	5	1	1 denturist	1	0
Maryland	9	3	0	2	0
Massachusetts	6	1	1 (DA advisor)	1	0

Table 19. Composition of state boards of dental examiners as of April 25, 2003.

State	Dentists	Dental Hygienists	Dental Assistants and Other Health Personnel	Public	Public Health Dentists
Michigan	10	4	2 DA	3	0
Minnesota	4	1	1 DA	2	0
Mississippi	7	1	0	0	0
Missouri	5	1	0	1	0
Montana	5	2	1 denturist	2	0
Nebraska	6	2	0	2	0
Nevada	7	2	0	1	0
New Hampshire	6	2	0	1	0
New Jersey	8	1	0	2	0
New Mexico*					
New York	13	3	1 DA	3	0
North Carolina	6	1	0	1	0
North Dakota	5	1	0	1	0
Ohio	5	1	0	1	0
Oklahoma	8	1	0	2	0
Oregon	6	2	0	1	0
Pennsylvania	7	1	1 consumer protection; 1 commissioner; 1 secretary of health	2	0
Rhode Island	7	2	0	4	1 (Chief of Oral Health)
South Carolina	7	1	0	1	0
South Dakota	4	1	0	0	0
Tennessee	7	2	1 DA	1	0
Texas	10	2	0	6	0
Utah	6	2	0	1	0
Vermont	6	2	0	1	0
Virginia	7	2	0	1	0
Washington	13	0 [†]	0	2	0
West Virginia	6	1	1 DA	1	0

Table 19. Composition of state boards of dental examiners as of April 25, 2003.

State	Dentists	Dental Hygienists	Dental Assistants and Other Health Personnel	Public	Public Health Dentists
Wisconsin	6	3	0	2	0
Wyoming	5	1	0	0	0
Median	6	1	0	1	0
Minimum	4	0	0	0	0
Maximum	13	4	2 (DA)	6	1

*No board has been appointed as of 4/25/03.

†Washington has a separate Dental Hygiene Examining Committee composed of three practicing dental hygienists and one public member.

Note: The District of Columbia did not respond to several requests for a list of its current board members and was therefore not included in the analysis.

State Practice Acts Regarding Dental Hygiene Practice

Dental hygienists can potentially facilitate access to preventive dental services, conduct oral health promotion activities outside of dental office settings, and provide screening and preventive services in dentally-underserved institutional settings [American Dental Hygienists' Association 2001]. However, in nearly every state the scope of dental hygiene practice is regulated by state boards of dental examiners, which are composed primarily of dentists with a substantially smaller number of dental hygienists. Regulations on the scope of practice of dental hygiene, purportedly enacted to ensure quality of care, also may have implications on the available dental public health infrastructure and access to care [Glover 1989; Reveal 1989].

Information on the levels of supervision by a dentist required for a dental hygienist to provide routine prophylaxis or apply topical fluoride in each state and the District of Columbia was obtained from the American Dental Association (ADA) and the American Dental Hygienists' Association (ADHA). Because levels of required supervision differ for dental offices and institutional settings in a number of states, the regulations regarding those practice settings were examined separately. Most of the information was available through the ADA's website (www.ada.org). In addition, the ADHA has compiled a chart of dental hygiene permitted functions and supervision levels, by state. In cases where there were questions about the required level of supervision in a given state or the ADA and ADHA documents seemed to be contradictory, that state's dental practice act was consulted; the exact text of nearly all state practice acts were accessible on the Internet.

State Practice Acts Regarding Dental Hygiene Practice

The states vary widely in the required degree of supervision of dental hygienists by a dentist, and the states frequently differ in the rules governing dental hygiene practice in dental office or institutional settings (Table 20).

Only one state, Colorado, allows unrestricted, unsupervised practice by a dental hygienist when performing basic prophylaxis.

Thirteen states require direct or indirect supervision of dental hygienists working in dental offices. The distinguishing feature of both direct and indirect supervision is that the supervising dentist must be physically present in the office when patient care is provided.

Thirty-six states plus the District of Columbia permit general supervision of dental hygienists in dental offices. The distinguishing feature of general supervision is that the dentist need not be present when patient care is provided. However, a number of these jurisdictions require, as a condition of general supervision, that the supervising dentist examine the patient first develop a treatment plan, issue a written work order, and/or evaluate the hygienist's work within a fixed period of time. Other restrictions may also apply.

Eight states require direct or indirect supervision of dental hygienists working in institutional settings. The distinguishing feature of these levels of supervision is that the supervising dentist must be physically present in the facility when patient care is provided.

Forty-three states and the District of Columbia permit general supervision in institutional settings. The distinguishing feature of general supervision is that the dentist need not be present when patient care is provided. Most of these jurisdictions require that the supervising dentist examine the patient first to develop a treatment plan, issue a written work order, and / or evaluate the dental hygienist's work within a fixed period of time. Other restrictions are indicated in the footnotes to Table 18.

Table 20. Levels of required supervision of dental hygienists by dentists, by state.

State	Dental office	Nursing home/institutional settings
Alabama	D/I	D/I
Alaska	G	G
Arizona	G	G
Arkansas	D/I	D/I
California	G	G - LU
Colorado	U	U
Connecticut	G	G - LU
Delaware	G	G
District of Columbia	G	G
Florida	G	G
Georgia	D/I	D/I ²
Hawaii	D/I	G - PH
Idaho	G	G

Table 20. Levels of required supervision of dental hygienists by dentists, by state.

State	Dental office	Nursing home/institutional settings
Illinois	D/I	G
Indiana	D/I	D/I
Iowa	G	G
Kansas	G	G
Kentucky	G	G
Louisiana	D/I	G
Maine	G	G - PH - LU
Maryland	D/I	G ³
Massachusetts	G	G
Michigan	G	G
Minnesota	G	G - LU
Mississippi	D/I	G
Missouri	G	G - LU
Montana	G	G - PH
Nebraska	G	G
Nevada	G	G - PH - LU
New Hampshire	G	G - PH
New Jersey	D/I	G
New Mexico	G	G - LU
New York	G	G
North Carolina	D/I	D/I - PH
North Dakota	G	G
Ohio	G ¹	D/I - G ⁴
Oklahoma	G	NP
Oregon	G	G - LU
Pennsylvania	G	G
Rhode Island	G	G
South Carolina	D/I	D/I - G - PH ⁵
South Dakota	G	G
Tennessee	G	G
Texas	G	G
Utah	G	G
Vermont	G	G
Virginia	G	G
Washington	G	G - LU
West Virginia	D/I	D/I
Wisconsin	G	G
Wyoming	G	G

D/I = direct or indirect supervision by dentist

G=general supervision by dentist

U=unrestricted, unsupervised practice (basic prophylaxis)

LU = Limited unsupervised practice. Nine states permit this type of practice in institutions, which generally requires a separate permit or special licensure.

PH = Public health supervision. This is a form of general supervision, but the institution employs the dental hygienist. Institutions may include public or private schools, hospitals, clinics, prisons, or other specified institutions.

¹ Rules in Ohio require patient be notified that dentist will not be in the office during treatment by the dental hygienist.

² Georgia – The law provides that the requirement of direct supervision does not apply to the performance of dental hygiene duties at approved and specified state or county government dental facilities.

³ Maryland - General Supervision is permitted in government institutions and by Board of Dental Examiner's express waiver in other qualifying institutions.

⁴ The Ohio Board will issue a dental hygienist a general supervision special needs permit for limited settings such as a school.

⁵ South Carolina – Dental hygienists may perform prophylaxis in school settings under general supervision with both parents' written permission.

Source: American Dental Association. Updated May 8, 2003.

DISCUSSION

Government

State dental programs, in general, have few employees and small budgets. It is perhaps remarkable that programs are able to conduct as many activities as they do, with a median of just 2–3 full-time employees and typical annual budgets of less than \$1 million. But more than one-quarter of states lack a full-time dental director; such states tend to be less likely than states with a full-time director to conduct core public health activities in oral health [Centers for Disease Control and Prevention 1994].

Although most federally-funded Community and Migrant Health Centers provide some level of dental care services, it is unclear whether these centers or local and county health departments conduct the full range of core public health functions in oral health. For example, local and county-level data on the oral health status of populations are difficult to locate, and it is unclear to what extent community-level oral disease prevention and health promotion activities are being provided. Although timely access to appropriate dental care services is very important, it is unlikely that a treatment-only approach will adequately reduce the disease burden and eliminate disparities in oral health status.

The dental presence within the Public Health Service Commissioned Corps is relatively small, consisting of 550 dentists and dental hygienists assigned throughout the federal government and throughout the nation. It is not clear whether that number of commissioned officers is sufficient to adequately address the mission of the Commissioned Corps, but the dental presence is small (at least in terms of commissioned officers) in most agencies of the Department of Health and Human Services. Interestingly, there are more dental officers in the Department of Homeland Security (55) than in the combined number of officers assigned to the Centers for Disease Control and Prevention (8), the National Institutes of Health (11), the Health Resources and Services Administration (33), and the Center for Medicare & Medicaid Services (2). It is not clear whether that distribution best reflects the distribution of the primary threats to the oral health of the nation and their prevention and control.

Education

Dental public health has a minimal presence in schools of public health, which does not bode well for a field that requires a master of public health degree or equivalent as part of the minimal educational preparation. Just four of the 27 institutions responding to the survey of accredited schools of public health offered a degree in a dental public health concentration area, and 60% of responding schools had not a single faculty member with a dental or dental hygiene degree. Students attending such institutions may receive excellent training in a core area of public health, but are unlikely to receive instruction in topics specific to dental public health such as community-based dental disease prevention or oral health surveillance.

Even in schools of dentistry, dental public health tends to have a small presence: 41% of US dental schools either had no dental public health academic unit or had a unit whose administrative placement was not comparable to other dental specialties. More than one-half of dental schools had three or fewer faculty members with MPH or equivalent degrees; 12.5% had none. Such a small presence creates several possible challenges to the future of dental public health: there are relatively few role models for dental students, many schools are unlikely to have a critical mass of public health dentists to be effective in specialty education or research, and the specialty may be dismissed as marginal by the school's administration, faculty, and students.

There are few training programs and residents, and there are very few board-certified public health dentists in state or local dental public health programs. Perhaps it is time to re-evaluate whether the current training and certification model for public health dentists, developed more than 50 years ago [Diefenbach 1997], is still appropriate in the 21st century. Compared to training programs in primary dental care (e.g. pediatric dentistry) or analogous training programs in medicine (i.e. preventive medicine residencies), dental public health residencies are seriously under-funded. With substantial barriers to completing formal training in dental public health and few incentives, it is little wonder that the large majority of educators teaching dental public health topics in school of dentistry have not completed a dental public health residency program, are not board-certified public health dentists, and have little interest in pursuing such training or certification [Kaste et al. 1998; Kaste et al. 2001].

Specialty training in dental public health generally requires trainees to complete a Master of Public Health (MPH) degree at the trainees own expense. The 2004 tuition for accredited schools of public health averaged nearly \$11,000 per year for in-state students and more than \$15,000 per year for out-of-state students [Association of Schools of Public Health, 2004]. In contrast, preventive medicine residencies typically award the MPH degree as part of the residency, during which the resident receives a median stipend that is approximately double the median stipend provided to dental public health residents. The relatively high cost of obtaining a Master of Public Health degree, when added to the high levels of indebtedness of dental school graduates—which averaged more than \$107,000 for the class of 2002 [Weaver et al. 2002]—creates a considerable financial barrier to educational preparation in dental public health. In addition, the salaries of public health dentists are relatively low when compared to current income for private practice dentists. For example, the median salary for a state dental director in a state that required a master's degree in addition to a dental degree was \$100,000 in 2003 [Association of State and Territorial Dental Directors 2004]. In comparison, the median net

income for independent dentists in private practice in 2000 was \$150,000 for general practitioners and \$220,000 for specialists [American Dental Association 2002]. Such salary disparities further reduce the attractiveness of entering the specialty of dental public health.

Dental hygiene programs, arguably the most important training ground for oral health practitioners whose activities are almost entirely devoted to disease prevention, generally lack faculty with public health training. Nearly two-thirds of responding dental hygiene programs had not a single faculty member with a public health degree, and another one-quarter of programs had just one. With fewer than one in five dental hygiene programs offering a baccalaureate degree, most dental hygiene program graduates face another educational barrier in pursuing advanced degrees such as a Master in Public Health. One potentially positive finding is that current entry-level dental hygiene programs typically devote a substantial number of curriculum hours providing clinical services in public health settings. However, restrictions on dental hygiene practice imposed by some state dental licensing boards may limit the ability of dental hygienists to pursue careers in institutional settings in those states.

Workforce

Although there are no specific guidelines for the optimum number of adequately trained dental public health personnel, by almost any definition the workforce is small. If dental specialty board certification is the accepted benchmark for demonstrated competence in the practice of that specialty, the United States has a very small cadre of such personnel. There are virtually no board-certified public health dentists at the county or local level and minimal presence in state programs. Even applying broader definitions of public health dentists, based on membership in the major dental public health organizations or self-reported specialty among American Dental Association members, there are very few public health dental practitioners in any state. The number of dental public health workers in the United States other than dentists is unclear; the Public Health Workforce enumeration conducted for the Bureau of Health Professions in 2000 reported a total of 2,032 public health dental workers, including 1,240 in federal agencies and 792 in state and territorial agencies [Bureau of Health Professions 2000]. However, no information on public health dental workers was reported by many states, and there was no information on the type of personnel employed or their activities.

The existing cohort of board-certified public health dentists has a rather old age distribution: about 90% graduated from dental school more than 15 years ago and more than one-third received their dental degree more than 30 years ago. Given the modest number of dental public health residents currently in training programs, the age distribution will not likely change in the near future.

The face of dentistry still does not reflect the face of America. Blacks/African Americans, Hispanics/Latinos, and Native Americans are substantially under-represented in the dental profession relative to their proportion in the population in virtually every state. The situation looks only slightly better among first-year dental school students than in the practicing dental community, ensuring that the current pattern will continue for some time. Issues of cultural competence are unlikely to be rectified without creative solutions to achieve a dental workforce that more closely mirrors the public it serves. The disparity in health status and access to care

that exists in this country may be partly attributable to racial/ethnic discrimination [Williams et al. 2003] and cultural mistrust [Doescher et al. 2000]; creating a health care system that more closely resembles the diversity of America would probably help ameliorate those factors.

Regulatory Issues

State dental licensing boards hold tremendous power over the practice of dentistry and dental hygiene in their jurisdiction, and the policies and regulations promulgated by those boards may have substantial public health implications. In particular, the boards determine the scope of dental and dental hygiene practice, establish rules and procedures governing licensure to practice, and impose sanctions on practitioners who violate regulations and codes of ethics. Therefore, state licensing boards can potentially control the supply of dentists and dental hygienists within a state, which may affect access to care by limiting the number of available dentists and increasing prices because of reduced competition. The boards determine which procedures dental hygienists may perform and in which settings they may perform them, with or without the supervision of a dentist. Those regulations also have implications for access to care and the delivery of preventive services, particularly for persons residing in institutional settings or in areas with little or no access to dentists. Despite the strong public health impact that may result from the actions of state dental licensing boards, there is virtually no dental public health presence on these boards. Only one state has a statutory requirement to include a public health dentist (RI), and just one other state licensing board included a dentist who defined his specialty as dental public health. There is, as was pointed out more than decade ago [Allukian 1991], a public health vacuum in state licensing boards.

Perhaps a greater dental public health presence on state licensing boards might lead them to abandon initial clinical examination of U.S. dental school graduates. Those clinical licensing exams have no demonstrated effect in predicting the quality of dental care or in protecting the public [Dugoni 2003], bear little association to dental school performance [Ranney et al. 2003], delays dentists' entry in the workforce and restricts their ability to relocate, unnecessarily puts human subjects at risk [Formicola et al. 2002], and frequently use outdated standards of care that result in inappropriate patient care [Anusavice & Benn 2001]. Perhaps, with more of a public health orientation, state boards of dentistry could redirect their energies toward activities that might ensure continued competence of practitioners and establish policies that maximize access to care.

In addition, dental hygiene remains under-represented on state dental licensing boards, with a median of one dental hygienist on boards with a median of six members who are dentists. Dental hygiene generally lacks autonomy over its own licensing and practice. In contrast, the nursing profession is governed by state boards of nursing in all 50 states and the District of Columbia. Dental hygienists require some level of supervision by a dentist in dental office settings in all but one state. In settings that may be less attractive for dentists, such as prisons, nursing homes, and schools, dental hygienists are afforded more independence. The more liberal standards of supervision allowed in institutional and public health settings may increase access to preventive services for some segments of communities, but the required levels of supervision in other settings may serve to restrict access to preventive dental services and reduce potential competition with dentists. In particular, standards of supervision that require a dentist to be

physically present or to examine all patients prior to dental hygiene services may impede delivery of school-based dental screening and prevention services. Although school nurses routinely screen students for health conditions such as scoliosis, hearing loss, visual impairment, and head lice, dental hygienists in many states are explicitly prohibited from screening schoolchildren for oral health problems. Dental licensing boards' continued restriction on dental hygienists' ability to practice in underserved communities could lead to law suits similar to the one brought by the Federal Trade Commission against the South Carolina Board [Federal Trade Commission 2003], and ultimately could lead to dentistry's loss of monopoly on providing dental care [Benn 2003].

Recent developments suggest there is real or perceived demand for training new types of health care professionals in the United States to increase access to care in settings currently underserved by dentists. For example, pediatric oral health therapists are being trained in New Zealand with the intention of having them provide care to children in remote Alaskan Native tribal areas, although the Alaskan Dental Health Aide Program initiative has been met with resistance from the American Dental Association (Nash 2005). The American Dental Hygienists' Association recently called for the development of an Advanced Dental Hygiene Practitioner curriculum that would allow credentialed dental hygienists to provide diagnostic, preventive, restorative and therapeutic services directly to the public (American Dental Hygienists' Association 2004). It is too soon to evaluate the effectiveness or acceptance of these types of initiatives in the United States, although there is a long history of successful programs such as the New Zealand dental nurse/therapist and its variants in at least 41 other countries including Australia, Great Britain, Canada, Singapore, China (Hong Kong), and Thailand (World Health Organization 2004). Trained auxiliaries in the United Kingdom have been found to be comparable to dentists in performing oral assessments (Kwan et al. 1996) and Canadian dental therapists were found to provide dental restorations of clinical quality comparable to those provided by dentists (Ambrose et al. 1976). Organized dentistry at the national and state levels continues to generally oppose increased autonomy of non-dentists, but trends in the number of dental graduates, demographic characteristics, and preferred practice settings of American dentists suggests that problems in access to care in many communities will not soon be alleviated solely by dentists.

RECOMMENDATIONS

After weighing the findings from this assessment, the following recommendations are offered to enhance the effectiveness of the dental public health infrastructure in the United States.

Government

1. Develop state health department standards that require an adequately trained and credentialed state dental director in all states and the District of Columbia.
2. Provide adequate funding to permit all state health departments to conduct the core public health activities in oral health.
3. Ensure that all county health departments have an appropriately trained county dental director.
4. Include dental services in the scope of services of all county health departments that provide direct clinical care and all federally-funded Community and Migrant Health Centers.

5. Examine the activities and responsibilities of all US Public Health Service Commissioned Corps dental officers to better characterize their scope of activities.

Education

1. Develop model dental public health curricula for schools of dentistry and dental hygiene programs and work with the American Dental Education Association to disseminate and promote the curricula.
2. Recruit dental public health faculty to schools of public health.
3. Develop core courses in dental public health within schools of public health.
4. Increase service learning opportunities for students in dental and dental hygiene programs in diverse, community-based settings.
5. Develop competencies for dental and dental hygiene education that include cultural competence, patient- and community-based prevention, and distributive justice.
6. Develop new models of specialty training in dental public health that ensure adequate coverage of dental public health topics, relevant experience, and financial support for graduate education.
7. Develop dental public health specialty training and credentialing for graduates of accredited dental hygiene programs.
8. Increase the number of dental public health researchers and oral health-related projects in Prevention Research Centers.

Workforce

1. Develop a set of incentives for pursuing dental public health board certification for state, county, and local dental personnel.
2. Ensure that the American Dental Association requires documentation of credentials for dentists who report their specialty as Public Health Dentistry.
3. Enhance outreach by schools of dentistry to increase number of dental and dental hygiene students from underrepresented minority groups.

Regulatory Issues

1. Require dental public health representation on state boards of dental examiners.
2. Increase dental hygiene representation on state boards of dental examiners.
3. Develop evidence-based recommendations for level of dental supervision and scope of permitted dental hygiene services in underserved settings and communities.

CONCLUSIONS

In summary, this report suggests that the dental public health infrastructure in state government and dental educational programs is small in size and has little funding. It is unclear whether the full range of dental public health core functions are provided at county and local levels, but there are indications that generally they are not. Trends in the number of board-certified public health dentists, dental public health residency programs, and schools of public health suggest that the

situation will not likely change appreciably in the near future. Dental public health essentially has no presence or representation on state licensing boards, despite the public health impact of those regulatory bodies. Efforts to improve access to dental preventive services may be hampered by restrictive state practice acts and lack of autonomy of the dental hygiene profession. Substantial proactive efforts may be needed to create a more racially and ethnically diverse dental workforce, which may be critical in helping to achieve the Surgeon General's vision of improved oral health for all and elimination of disparities in our society. There is no single organization or agency that has the ability to bring about the numerous changes that would need to occur to substantially enhance the dental public health infrastructure in the United States, so successful efforts will require substantial collaboration among many diverse partners.

References

Allukian M. (1991). The public health vacuum in state licensing boards. *J Public Health Dent*; 51(2):67-8.

Ambrose ER, Hord AB, Simpson WJ. (1976). A quality evaluation of specific dental services provided by the Saskatchewan Dental Plan: final report. Regina, Canada: Province of Saskatchewan Department of Health.

American Board of Dental Public Health. (2003). Informational brochure. Springfield, IL: American Board of Dental Public Health, Inc. Available at: <http://www.aaphd.org/docs/ABDPHbrochure.doc>.

American Dental Association. (1999). Distribution of dentists in the United States by Region and State, 1997. Chicago, IL: American Dental Association Survey Center.

American Dental Association. (2001). Future of Dentistry. Chicago, IL: American Dental Association, Health Policy Resources Center.

American Dental Association. (2002). The 2001 Survey of Dental Practice: Income from Private Practice of Dentistry. Chicago, IL: American Dental Association, Survey Center.

American Dental Association. (2003). 2001/02 Survey of Advanced Dental Education. Chicago, IL: American Dental Association, Survey Center.

American Dental Association, Council on Dental Education and Licensure. (2003). Definitions of Special Areas of Dental Practice. Accessed 6/25/2003 at: <http://www.ada.org/prof/ed/specialty/definition.html#specialty>.

American Dental Hygienists' Association (2001). Access to Care Position Paper, 2001. Accessed 6/25/03 at http://www.adha.org/profissues/access_to_care.htm.

American Dental Hygienists' Association (2004). ADHA membership supports creation of advance practice credential during annual session in Dallas. Accessed 7/15/04 at: <http://www.adha.org/news/071204-adhp.htm>.

Anusavice KJ, Benn DK. (2001). Is it time to change state and regional dental licensure board exams in response to evidence from caries research? *Crit Rev Oral Biol Med* 12(5):368-72.

Association of Schools of Public Health. Member schools [web site]. Accessed 4/21/04 at: <http://www.asph.org/document.cfm?page=200>.

Association of State and Territorial Dental Directors. (2004). ASTDD Dental Director Salary Survey. [unpublished data].

Benn DK. (2003). Professional monopoly, social covenant, and access to oral health care in the United States. *J Dent Educ* 67(10):1080–90.

Brown LJ, Wagner KS, Johns B. (2000). Racial/ethnic variations of practicing dentists. *J Am Dent Assoc*; 131:1750–4.

Bureau of Health Professions. (2000). *The public health work force: enumeration 2000*. Rockville, MD: US Department of Health and Human Services, Health Resources and Services Administration, Bureau of Health Professions, National Center for Health Workforce Information and Analysis.

Bureau of Primary Health Care. (2003). *Community Health Centers: program information*. Available at: <http://www.bphc.hrsa.gov/programs/CHCPrograminfo.asp>. Accessed 01/27/04.

Centers for Disease Control and Prevention. (1994). Core public health functions and state efforts to improve oral health — United States, 1993. *MMWR*; 43(11):201, 207–9.

Diefenbach VL. (1997). Genesis of residency programs in dental public health: reflections of the first dental public health resident? *J Public Health Dent*; 57(2):89–92.

Doescher MP, Saver BG, Franks P, Fiscella K. (2000). Racial and ethnic disparities in perceptions of physician style and trust. *Arch Fam Med*; 9:1156-63.

Dugoni AA. (2003). Protection of the public. *J Calif Dent Assoc* 31(11):801–3.
Formicola AJ, Shub JL, Murphy FJ. (2002). Banning live patients as test subjects on licensing examinations. *J Dent Educ* 66(5):605–9; discussion 610–1.

Federal Trade Commission. (2003). *FTC Charges South Carolina Board of Dentistry* [press release dated 9/15/03]. Available at: <http://www.ftc.gov/opa/2003/09/socodentist.htm>.

Gebbie K, Rosenstock L, Hernandez LM, editors. (2003). *Who Will Keep the Public Healthy? Educating Public Health Professionals for the 21st Century*. Washington, DC: Institute of Medicine, National Academies Press.

Glover WA. (1989). Trends in state practice acts: quality, access and cost—striking a balance. *J Public Health Dent*; 49(4):224–7.

Grembowski D, Andersen RM, Chen M. (1989). A public health model of the dental care process. *Med Care Rev*; 46(4):439-96.

Institute of Medicine. (1988). *The future of public health*. Washington, DC: National Academy Press.

Kaste LM, Sadler ZE, Hayes KL, Narendran S, Niessen LC, Weintraub JA. (1998). Academic dental public health diplomates: their distribution and recommendations concerning the predoctoral dental public health faculty. *J Public Health Dent* 58 (Suppl 1):94–100.

Kaste LM, Sadler ZE, Weintraub JA, Niessen LC, Narendran S, Hayes KL. (2001). Training status and interest in certification of nondiplomate faculty teaching predoctoral dental public health. *J Public Health Dent* 61(2):114–9.

Komaromy M, Grumbach K, Drake M, Vranizan K, Lurie N, Keane D, Bindman AB. (1996). The role of black and Hispanic physicians in providing health care for underserved populations. *N Engl J Med*; 334(20):1305-10.

Kwan SY, Prendergast MJ, Williams SA. (1996). The diagnostic reliability of clinical dental auxiliaries in caries prevalence surveys--a pilot study. *Community Dent Health* 13(3):145-9.

Nash DA. (2005) Developing and deploying a new member of the dental team: a pediatric oral health therapist. *J Public Health Dent* (in press).

Oral Health America. (2002). *Filling the Gap: Oral Health in America. The Oral Health America National Grading Project 2001–2002*. Chicago, IL: Oral Health America.

Oral Health America. (2003). *Keep America Smiling: Oral Health in America. The Oral Health America National Grading Project 2003*. Chicago, IL: Oral Health America.

Ranney RR, Wood M, Gunsolley JC. (2003). Works in progress: a comparison of dental school experiences between passing and failing NERB candidates, 2001. *J Dent Educ*;67(3):311–6.

Reveal M. (1989). Dental hygiene regulation and practice. *J Public Health Dent*; 49(4):228–30.

US Department of Health and Human Services. (2000a). *Oral Health in America: A Report of the Surgeon General*. Rockville, MD: US Department of Health and Human Services, National Institutes of Health, National Institute of Dental and Craniofacial Research. NIH Publication No. 00-4713.

US Department of Health and Human Services. (2000b). Chapt. 21: Oral Health. In: *Health People 2010 (2nd edit)*. With Understanding and Improving Health and Objectives for Improving Health. 2 vols. Washington, DC: US Government Printing Office.

US Public Health Service. The mission of the Commissioned Corps. Available at: <http://www.usphs.gov/html/mission.html>.

Valachovic RW (ed). (2000). *Trends in dental education 2000: the past, present, and future of the profession and the people it serves*. Washington, DC: American Association of Dental Schools.

Weaver RG, Haden NK, Valachovic RW. (2002). Annual ADEA survey of dental school seniors: 2002 graduating class. *J Dent Educ* 2002;66(12):1388–1404.

Weaver RG, Haden NK, Ramanna S, Valachovic RW. (2003). Applicant analysis: 2001 entering class. *J Dent Educ*; 67(6):690–709.

Williams DR, Neighbors HW, Jackson JS. (2003). Racial/ethnic discrimination and health: findings from community studies. *Am J Public Health*; 93(2):200–8.

World Health Organization. (2004). WHO Oral Health Country/Area Profile Programme. Malmö, Sweden: World Health Organization Collaborating Centre. Accessed 7/15/04 at: <http://www.whocollab.od.mah.se>.