



**Practice Patterns of Postgraduate Dental Residency  
Completers From Select Long-Term HRSA-Funded  
Primary Dental Care Training Programs**

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Center for Health Workforce Studies  
School of Public Health  
University at Albany, State University of New York



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**July 2019**



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## PREFACE

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The Oral Health Workforce Research Center (OHWRC) at the Center for Health Workforce Studies (CHWS) at the University at Albany, New York, School of Public Health completed this study to examine practice decisions of graduates of primary care dental postgraduate training programs with a long-term history of funding by the Health Resources and Services Administration (HRSA), assess impacts of their training experience on current practice and access to care, and measure the long-term impact of these programs in improving the capacity of dentists to meet the needs of the underserved.

This report was prepared for OHWRC by Ginachukwu Amah, Matthew Jura, and Elizabeth Mertz at the University of California, San Francisco (UCSF), with layout design by Leanne Keough.

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The mission of OHWRC is to provide accurate and policy-relevant research on the impact of the oral health workforce on oral health outcomes. The research conducted by OHWRC informs strategies designed to increase access to oral health services for vulnerable populations. OHWRC is based at CHWS at the School of Public Health, University at Albany, State University of New York (SUNY), and is the only research center uniquely focused on the oral health workforce.

The views expressed in this report are those of OHWRC and do not necessarily represent positions or policies of the American Dental Association, School of Public Health, University at Albany, SUNY, or UCSF.

*July 2019*

## ACKNOWLEDGEMENTS

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## BACKGROUND

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Professional postgraduate dental (PGD) training programs have the primary goal of ensuring high-quality general and specialist dentists.<sup>1</sup> Importantly, because the demand for these programs exceeds the supply of training slots, many PGD programs that lack graduate medical education (GME) or Health Resources and Services Administration (HRSA) funding must charge tuition for the training, adding further debt load to the dentists of the future and possibly driving them away from working with the underserved.<sup>2</sup> Programs that focus on underserved communities and populations are especially important, as they serve local community needs in addition to encouraging the development of providers committed to working with high-need and disadvantaged populations. In contrast to the field of medicine, in which all physicians complete a residency training in their chosen field, only 41% of dentists went on to postgraduate training in 2016.<sup>3</sup> While recent research has examined training goals and practice patterns of these health providers,<sup>4,5</sup> the long-term impacts have not been assessed comprehensively (in different specialties, regions, and settings) or at scale in more than 2 decades.<sup>6-9</sup>

HRSA, an agency of the US Department of Health and Human Services, is the primary federal agency focused on improving health care for underserved populations, and is also the primary federal funding agency for PGD education. HRSA's Oral Health Training and Workforce Programs include grants for state oral health workforce programs, faculty development, loan repayment, and both pre- and postdoctoral training programs.<sup>10,11</sup> The funding for PGD education programs supports primary care dentistry, which includes Advanced Education in General Dentistry (AEGD), General Practice Residencies (GPR), Dental Public Health (DPH), and Pediatric Dentistry (Pedo). Historically, these have been funded in different ways, but the commitment over time to these primary care fields has been consistent within HRSA's mission: To improve health outcomes and address health disparities through access to quality services, a skilled health workforce, and innovative, high-value programs.

This is in line with the Public Health Service Act and the Health Professions Educational Assistance Act, which authorizes HRSA (as well as other programs) to improve the supply and distribution of health professionals, increase the recruitment and retention of minorities into the health professions, and change the quality and emphasis of curricula to meet emerging health needs (eg, among underserved populations, homeless substance abusers, people with HIV/AIDS, and domestic violence victims) and provide culturally competent care.<sup>12</sup>

Further, HRSA runs both a Teaching Health Center GME (THCGME) program and a Children's Hospitals GME (CHGME) program. The THCGME program trains residents in primary care, while the CHGME program trains both general pediatricians and pediatric subspecialists.<sup>13,14</sup> Finally, residents may also be trained in community-based settings supported by the Area Health Education Center Program or receive

specialized training in geriatrics through the Geriatric Workforce Enhancement Program (formerly funded as the Geriatric Training Program for Physicians, Dentists, and Behavioral/Mental Health Professionals). The costs of training health providers have been modeled,<sup>15</sup> but the long-term care delivery impacts are not often measured or tracked over time. Federally funded PGD training programs result in quantifiable numbers of graduates and services to rural, underserved, and vulnerable patients during training and measurable programmatic capacity to address community needs, but little is known about the long-term impact of the investment in these programs.

### **Purpose of the Study**

The purpose of this study was to examine practice patterns of graduates of primary care dental postgraduate training programs with a long-standing history of HRSA funding. To receive HRSA funding for multiple cycles, the PGD education program would have to be strongly aligned with HRSA's goals and mission, and the grants would support ongoing alignment and development. The study aims were to assess the impacts of graduates' training experience on current practice patterns and subsequent patient access to care, and to measure the long-term impact of these programs on improving the capacity of dentists to meet the needs of the underserved.

## METHODS

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Researchers examined historical HRSA funding data on award disbursements to PGD programs, and selected 25 programs from 13 institutions to participate. A total of 18 programs across 9 institutions agreed, and 12 programs at 7 institutions made it to completion.

Institutional interviews with program directors informed survey development and provided context. The institutional characteristics extracted from these interviews for the analysis included the institution type (dental school, hospital, or health center), geographic diversity of the applicant pool (local, regional, or national), and extent of Medicaid adult dental coverage in the training state (emergency only, extensive, or limited).<sup>16</sup>

A survey of all program completers was developed, pilot tested and deployed, receiving an overall response rate of 44%. Survey questions were developed based on program goals and also sourced from prior similar work identified in a literature review.<sup>4,17</sup> These questions were categorized into a variety of topical areas and sequenced in a manner that gave consideration to the chronology of dental education, training, and practice. The topics included:

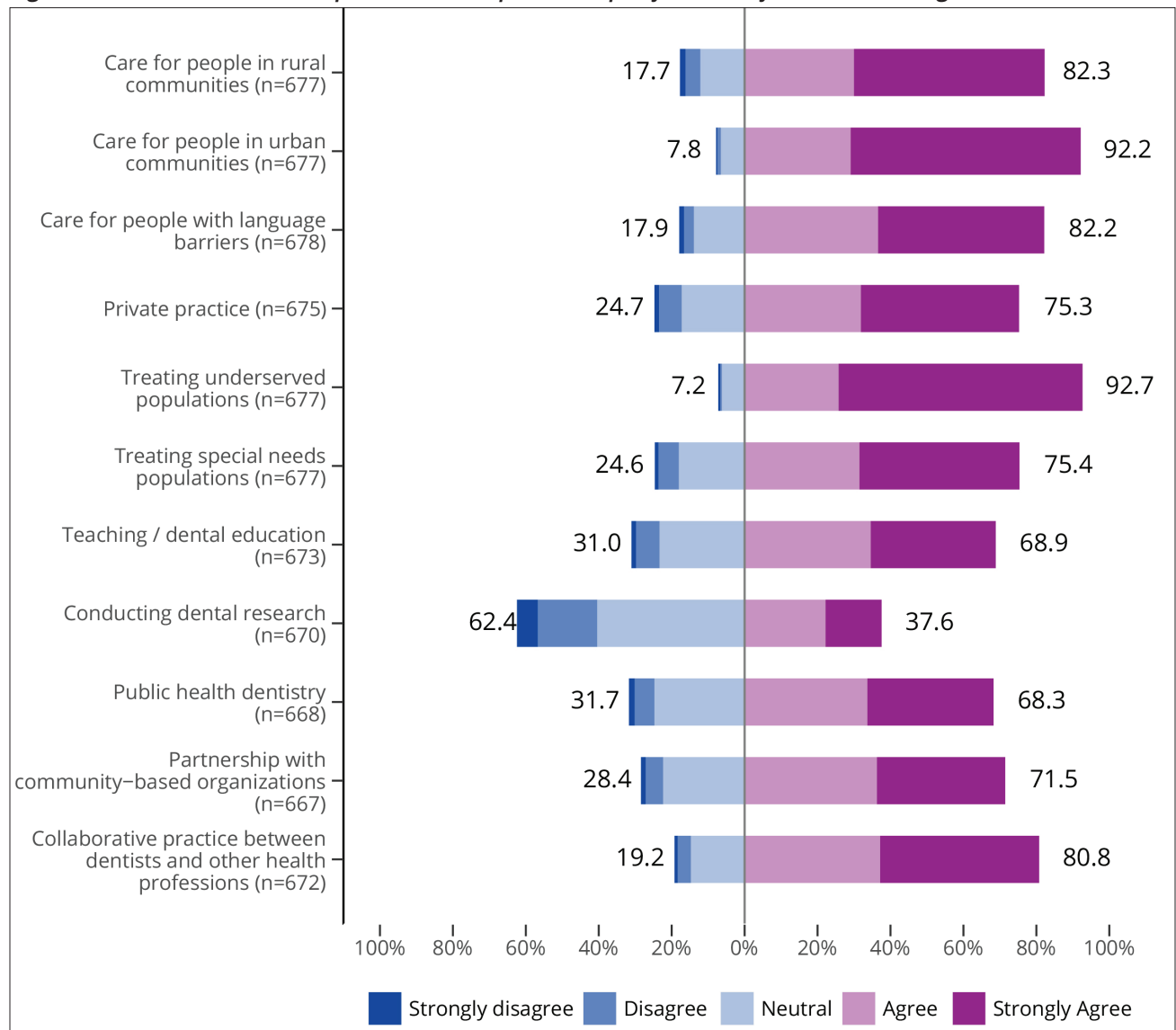
1. Program Identification
2. Education
3. Debt Burden
4. Activity Since Completion of Training
5. Opinions of Program
6. Initial Practice After PGD Training
7. Current Practice and Appointments
8. Clinical Care
9. Patient Information
10. Respondent Demographics

Responses were analyzed descriptively by program type.

## KEY FINDINGS

Compared to the universe of post-graduate trained primary care dentists trained in the same timeframe,<sup>18</sup> the surveyed sample of HRSA-funded PGD completers are younger, more female, and more racially/ethnically diverse. Among the survey completers, a wide variation in educational pathways was observed, including 29% who reported multiple post-graduate dental training experiences and 17% who reported having additional academic degrees. The vast majority of completers across all program types were satisfied with their training, with less than 3% overall indicating any dissatisfaction.

**Figure 1. Extent to Which Completers Felt Prepared in Specific Skills after PGD Training**



Younger dentists reported higher educational debt, with over 10% reporting \$350K+ total debt. Respondents reported a high level of preparation in all HRSA focus areas except dental research (Figure 1). A majority (63%) of respondents had experience in Interprofessional Education during their training, which has been strong focus of HRSA funding in recent years.

In their current practice, completers reported a strong commitment to activities in HRSA's priority areas including treating publicly insured patients (63%), patients with special health needs (53%), working in a medically underserved area (43%) or dental health professional shortage area (30%), and working in dental education (28%). Among clinically active dentists, the average proportion of their patients with public insurance (46%) exceeded the average proportion of patients with private insurance (44%), although this varied by the type of program respondents completed. A current HRSA focus is on addressing the opioid epidemic, while nutrition and tobacco counselling have long been a priority as part of a focus on prevention. Over half of respondents said they usually or always conducted tobacco and nutritional counselling, while 1 in 3 reported usually or always screening for alcohol and substance use.

## DISCUSSION AND CONCLUSION

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When the experiences and long-term practice patterns of graduates of the surveyed set of HRSA-funded programs are judged against HRSA-specific stated goals, we find that the programs surveyed did indeed perform quite well in most priority areas.

Cumulatively, they produced a set of completers that is more diverse than the pool attending similar PGD programs nationally, particularly among African American and female completers, adding to the overall diversity of dental providers with advanced training. The completers surveyed were geographically dispersed, and although we did not independently assess rates of practice in dental health professional shortage areas (DHPSAs), nearly 30% of completers reported practicing in a DHPSA. We were, however, able to ascertain that these dentists both participate in Medicaid at a greater rate than all dentists (63% vs 38% nationally<sup>19</sup>) and see a substantial number of Medicaid patients relative to privately insured patients. More than half of completers also reported treating patients with special health care needs. These are very significant outcomes and speak to the long-term impact of HRSA-funded programs to prepare a dental workforce focused on serving the underserved.

The quality of training was highly rated, with near-universal satisfaction among completers (97%) and a high likelihood of recommending their PDG training program to others (95.9%). In open-ended comment sections, the vast majority of comments were positive, with the few outlying negative comments focused on programmatic components rather than on the value of their education. There is evidence to suggest that these PGD programs are working toward meeting educational goals in several of HRSA's focus areas. Importantly, nearly all completers (93%) rated meeting the needs of underserved populations as something they felt prepared to do thanks to their training. More than three-quarters of completers felt prepared to care for special needs populations, and nearly 70% felt prepared to teach.

Finally, coinciding with HRSA's recent focus on faculty development, we found that nearly 1 in 5 respondents had earned additional postgraduate academic degrees following their PGD training, with 25 of those respondents reporting either a primary or secondary role in a faculty position.

### Policy Implications

#### **Alignment of Federal Funding Priorities and Workforce Policy**

While the findings among this small set of institutions were generally positive, the number of institutions that receive HRSA funding is dwarfed by the overall number of programs, and the institutions that receive any postgraduate or GME funding is difficult to ascertain. The need and demand for postgraduate training

by dental graduates is strong, and the lack of universal access to this training has significant downstream effects on other policy areas such as licensing and high educational debt burden. Our initial findings in this study indicate that the underlying institutional characteristics may be related to outcomes, either through recruitment or training experience (or both), and that investment around a set of strategic priorities can therefore lead to positive benefits. However, a more holistic assessment of the approach to funding graduate dental education is needed, with a vision of supportive policy mechanisms for comprehensive advanced training priorities that meet the needs of both the dental profession and the public.



## EXECUTIVE SUMMARY REFERENCES

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1. Assael L. Current status of postdoctoral and graduate programs in dentistry. *J Dent Educ.* 2017;81(8):eS41-eS49.
2. Nicholson S, Vujicic M, Wanchek T, Ziebert A, Menezes A. The effect of education debt on dentists' career decisions. *J Am Dent Assoc.* 2015;146(11):800-807.
3. American Dental Association. 2017-18 Survey of Dental Education. <https://www.ada.org/en/science-research/health-policy-institute/data-center/dental-education>. Accessed April 30, 2019.
4. Lau A, Dodson TB, Sonis ST, Kaban LB. An outcomes study of 40 years of graduates of a general practice dental residency. *J Dent Educ.* 2015;79(8):888-896.
5. Takahashi T, Furusawa M, Katakura A, et al. Career paths and aspirations among postgraduate dental trainees on completion of clinical residency program at Tokyo Dental College. *Bull Tokyo Dent Coll.* 2014;55(2):103-109.
6. Atchison KA, Mito RS, Lefever KH, McCauley K. Introduction to section: Dentistry and primary care—an evaluation of postgraduate general dentistry training. *J Dent Educ.* 2002;66(6):728-729.
7. Atchison KA, Bibb CA, Lefever KH, Mito RS, Lin S, Engelhardt R. Gender differences in career and practice patterns of PGD-trained dentists. *J Dent Educ.* 2002;66(12):1358-1367.
8. Gatlin LJ, Handelman SL, Meyerowitz C, Solomon E, Iranpour B, Weaver R. Practice characteristics of graduates of postdoctoral general dentistry programs. *J Dent Educ.* 1993;57(11):798-803.
9. Mito RS, Atchison KA, Lefever KH, Lin S, Engelhardt R. Characteristics of civilian postdoctoral general dentistry programs. *J Dent Educ.* 2002;66(6):757-765.
10. National Center for Health Workforce Analysis. *Oral Health Training and Workforce Programs: Academic Year 2016-2017*. Rockville, MD: Bureau of Health Workforce, Health Resources and Services Administration; 2018.
11. Atchison KA, Mito RS, Lefever KH, et al. Analysis of federal support for postgraduate general dentistry. *J Dent Educ.* 2003;67(3):328-336.
12. Bureau of Health Professions. *Training in Primary Care Medicine and Dentistry: New Competition*. Rockville, MD: Health Resources and Services Administration; 2007.
13. Heisler EJ, Mendez BHP, Mitchell A, Panangala SV, Villagrana MA. *Federal Support for Graduate Medical Education: An Overview*. Washington, DC: Congressional Research Service; 2018.
14. National Center for Health Workforce Analysis. *Children's Hospital Graduate Medical Education Program: Academic Year 2016-2017*. Rockville, MD: Bureau of Health Workforce, Health Resources and Services Administration; 2018.

15. Segal L, Marsh C, Heyes R. The real cost of training health professionals in Australia: it costs as much to build a dietician workforce as a dental workforce. *J Health Serv Res Policy*. 2017;22(2):91-98.
16. Center for Health Care Strategies, Inc. *Medicaid Adult Dental Benefits: An Overview. Updated November 2018*. [https://www.chcs.org/media/Adult-Oral-Health-Fact-Sheet\\_112118.pdf](https://www.chcs.org/media/Adult-Oral-Health-Fact-Sheet_112118.pdf). Accessed April 30, 2019.
17. Atchison KA, Mito RS, Rosenberg DJ, Lefever KH, Lin S, Engelhardt R. PGD training and its impact on general dentist practice patterns. *J Dent Educ*. 2002;66(12):1348-1357.
18. American Dental Association Health Policy Institute, unpublished data, December 2018.
19. American Dental Association. *Dentist Participation in Medicaid or CHIP*. Chicago, IL: Health Policy Institute, American Dental Association; 2018.

# Technical Report

## BACKGROUND

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Professional postgraduate dental (PGD) training programs have the primary goal of ensuring high-quality general and specialist dentists.<sup>1</sup> Importantly, because the demand for these programs exceeds the supply of training slots, many PGD programs that lack graduate medical education (GME) or Health Resources and Services Administration (HRSA) funding must charge tuition for the training, adding further debt load to the dentists of the future and possibly driving them away from working with the underserved.<sup>2</sup> Programs that focus on underserved communities and populations are especially important, as they serve local community needs in addition to encouraging the development of providers committed to working with high-need and disadvantaged populations. In contrast to the field of medicine, in which all physicians complete a residency training in their chosen field, only 41% of dentists went on to postgraduate training in 2016.<sup>3</sup> While recent research has examined training goals and practice patterns of these health providers,<sup>4,5</sup> the long-term impacts have not been assessed comprehensively (in different specialties, regions, and settings) or at scale in more than 2 decades.<sup>6-9</sup>

HRSA, an agency of the US Department of Health and Human Services, is the primary federal agency focused on improving health care for underserved populations, and is also the primary federal funding agency for PGD education. HRSA's Oral Health Training and Workforce Programs include grants for state oral health workforce programs, faculty development, loan repayment, and both pre- and postdoctoral training programs.<sup>10,11</sup> The funding for PGD education programs supports primary care dentistry, which includes Advanced Education in General Dentistry (AEGD), General Practice Residencies (GPR), Dental Public Health (DPH), and Pediatric Dentistry (Pedo). Historically, these have been funded in different ways, but the commitment over time to these primary care fields has been consistent within HRSA's mission: *To improve health outcomes and address health disparities through access to quality services, a skilled health workforce, and innovative, high-value programs.*

This is in line with the Public Health Service Act and the Health Professions Educational Assistance Act, which authorizes HRSA (as well as other programs) to improve the supply and distribution of health professionals, increase the recruitment and retention of minorities into the health professions, and change the quality and emphasis of curricula to meet emerging health needs (eg, among underserved populations, homeless substance abusers, people with HIV/AIDS, and domestic violence victims) and provide culturally competent care.<sup>12</sup>

In addition, the Bureau of Health Workforce (BHW) improves the health of underserved and vulnerable populations by strengthening the health workforce and connecting skilled professionals to communities in need. BHW prepares a quality, skilled workforce, improves workforce distribution, and advances modern health care by focusing on telehealth, rural and underserved populations, and community-based training.<sup>13</sup>

Another key source of funding for PGD education comes from GME, funded through Medicare, which some federal programs use to support hospital-based training of dentists.<sup>14</sup> If a hospital-based program funded by GME has a dental training component, it can draw these funds. However, the dental programs are not tracked as a standalone funded program, and it is therefore very difficult to assess which dental programs and graduates received support through this mechanism. Further, HRSA runs both a Teaching Health Center GME (THCGME) program and a Children's Hospitals GME (CHGME) program. The THCGME program trains residents in primary care, while the CHGME program trains both general pediatricians and pediatric subspecialists.<sup>14,15</sup> Finally, residents may also be trained in community-based settings supported by the Area Health Education Center Program or receive specialized training in geriatrics through the Geriatric Workforce Enhancement Program (formerly funded as the Geriatric Training Program for Physicians, Dentists, and Behavioral/Mental Health Professionals). The costs of training health providers have been modeled,<sup>16</sup> but the long-term care delivery impacts are not often measured or tracked over time. Federally funded PGD training programs result in quantifiable numbers of graduates and services to rural, underserved, and vulnerable patients during training and measurable programmatic capacity to address community needs, but little is known about the long-term impact of the investment in these programs.

### **Purpose of the Study**

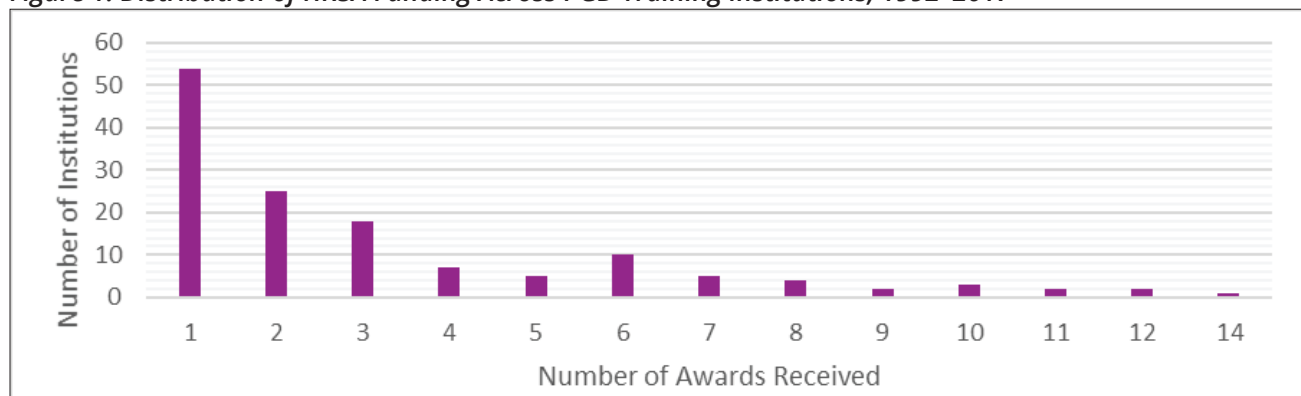
The purpose of this study is to examine practice patterns of graduates of primary care dental postgraduate training programs with a long-standing history of HRSA funding. To receive HRSA funding for multiple cycles, the PGD education program would have to be strongly aligned with HRSA's goals and mission, and the grants would support ongoing alignment and development. The study aims are to assess the impacts of graduates' training experience on current practice patterns and subsequent patient access to care, and to measure the long-term impact of these programs on improving the capacity of dentists to meet the needs of the underserved.

# METHODS

## Sample Selection

This study's aim was to determine the long-term return on investment of HRSA funding with respect to the mission of dental residency programs and the professional trajectory of their residency completers. To answer this question, we collaborated with program directors at a sample of PGD training programs with long-standing HRSA funding to survey their graduates. To select our sample, we examined historical HRSA funding data on award disbursements to PGD programs. Data were supplied from HRSA internal records for 1992 to 2003 and pulled from the HRSA Data Warehouse from 1999 to 2017.<sup>10</sup> This universe of funded programs was assessed to identify the duration and distribution of HRSA funding for residency program trainees and faculty at Commission on Dental Accreditation (CODA)-accredited PGD residency programs (Figure 1).

**Figure 1. Distribution of HRSA Funding Across PGD Training Institutions, 1992–2017**



Among the programs with a strong funding history of postgraduate program support (9 or more years of funding), we then examined geographic distribution and program types to select a broadly representative pool of eligible programs. We invited 25 programs from 13 institutions by email to participate in our study. The 13 invited institutions had received awards for a cumulative average of 17.2 years, compared with the 7.5 years of cumulative funding for all award-receiving institutions. The research participation agreement specified that institutions would not be identified by name, and that each participating institution/program would receive its own data at the end of the study for program development and reporting purposes.

A total of 18 programs at 9 institutions agreed to participate, and 12 programs at 7 institutions proceeded to full study completion. These 7 participating institutions had received an average of 19.14 years of HRSA funding. A universe of limited descriptive data on PGD programs is published from the American Dental Association's (ADA) annual Survey of Advanced Dental Education, and the 2017 data were downloaded

from the ADA Data Center.<sup>17</sup> A comparison of the final study sample with all HRSA-funded programs and with all CODA-accredited programs in primary care is provided in Table 1. The final sample of participating programs is more dental school based compared with all programs, but similar in certificate and degree granting status.

**Table 1. Comparison of PGD Study Programs With All HRSA-Funded and CODA-Accredited Primary Care PGD Programs in 2017**

|                             | Participating Study Programs | All HRSA-Funded Programs | All CODA-Accredited Primary Care Programs |
|-----------------------------|------------------------------|--------------------------|---|
| Number of programs          | N=12                         | N=182                    | N=368                                     |
| Dental school-based         | 8 (66.7%)                    | 99 (54.4%)               | 103 (28.0%)                               |
| Hospital or community-based | 4 (33.3%)                    | 83 (45.6%)               | 265 (72.0%)                               |
| Number of program graduates | N=104                        | N=1490                   | N=2407                                    |
| Certificate only            | 99 (95.2%)                   | 1,410 (94.6%)            | 2,290 (95.1%)                             |
| Certificate and degree      | 5 (4.8%)                     | 80 (5.4%)                | 117 (4.9%)                                |

## Institutional Recruitment

Program directors at participating institutions participated in an interview following a structured question set to identify key program and institutional characteristics. This important step allowed us to capture program context, as the analyses are blinded to specific institutions. The institutional characteristics extracted from these interviews for the analysis included the institution type (dental school, hospital, or health center), geographic diversity of the applicant pool (local, regional, or national), and extent of Medicaid adult dental coverage in the training state (emergency only, extensive, or limited).<sup>18</sup> The years of inclusion (ie, the period of graduates surveyed) were decided based on these interviews and varied based on program funding, history, and available alumni data, but generally spanned from 1990 to 2018.

Each program provided the research team with data on the total number of completers for each year of inclusion and the total number of completers per year with valid email contact information on record. We were unable to assess any details about the gap between completers and contacts, but assume this would be due to normal reasons for attrition (eg, moved, left practice, or died). These contact totals provided the basis for response rate calculations. Programs also provided confirmatory data on the history of HRSA funding and grant type received each year.

## Survey Development

Potential survey questions were developed based on program goals and also sourced from prior similar work identified in a literature review.<sup>4,19</sup> These questions were categorized into a variety of topical areas and sequenced in a manner that gave consideration to the chronology of dental education, training, and practice. The topics included:

1. Program Identification
2. Education
3. Debt Burden
4. Activity Since Completion of Training
5. Opinions of Program
6. Initial Practice After PGD Training
7. Current Practice and Appointments
8. Clinical Care
9. Patient Information
10. Respondent Demographics

The draft survey instrument was reviewed by program directors, who made suggestions for changes and additions. Next, an online pilot survey was constructed. Study data were collected and managed using REDCap (Research Electronic Data Capture) tools hosted at the University of California, San Francisco.<sup>20</sup> REDCap is a secure, web-based application designed to support data capture for research studies, providing (1) an intuitive interface for validated data entry, (2) audit trails for tracking data manipulation and export procedures, (3) automated export procedures for seamless data downloads to common statistical packages, and (4) procedures for importing data from external sources. Program directors and involved faculty and staff tested the online pilot survey, and their input was used to finalize the survey. Finally, variations of the survey were created for each institution, tailored with institution-specific programs and dates and a unique university-specific Uniform Resource Locator (URL).

## Survey Distribution

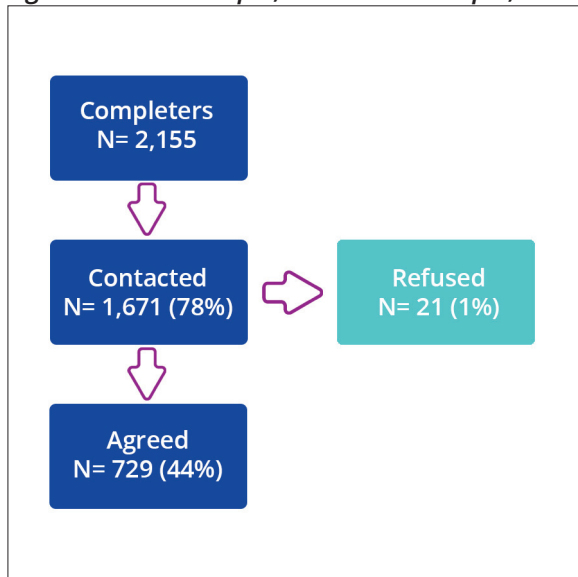
Survey distribution packets containing a distribution schedule, instructions, and a template for survey invitations and reminders were created for each institution. Survey invitations and reminders were then sent to residency program completers by program directors at all participating programs except one, which chose instead to provide an email list to researchers and let them do the direct contact. For that program, survey invitations and reminders were sent directly through REDCap. To increase engagement, personal emails endorsing the survey were sent by program directors. Surveys were in the field for up to 14 weeks (Table 2).



## Response Rates

We tracked both the number of completers by program and institution and the number of completers with contact information. Figure 2 shows how many completers were dropped due to a lack of contact information, with responses based on the number of completers with contact information.

**Figure 2. Total Sample, Contacted Sample, and Overall Response Rate**



Contact information was available for 78% of all completers, and a total of 729 individuals responded to the survey. The overall response rate to the survey among all completers was 34%, while the overall response rate among those we contacted was 44%. This varied by institution and program, as detailed in Table 2 and Table 3 below. DPH programs often have only 1 or 2 residents per year—hence the low total number of DPH respondents.

**Table 2. Response Rates by Institution**

| Institution   | Total Weeks in Field | Number of Completers With Contact Information | Response Rate | Response N |
|---------------|----------------------|---|---------------|------------|
| Institution 1 | 11                   | 701   | 60.8%         | 426        |
| Institution 2 | 10                   | 515   | 12.8%         | 66         |
| Institution 3 | 4                    | 76  | 48.7%         | 37         |
| Institution 4 | 4                    | 66  | 10.6%         | 7          |
| Institution 5 | 9                    | 129   | 48.1%         | 62         |
| Institution 6 | 14                   | 97  | 75.3%         | 73         |
| Institution 7 | 6                    | 87  | 66.7%         | 58         |

**Table 3. Response Rates by Program Type**

| Program Type | Number of Institutions | Response Rate | Response N |
|--------------|------------------------|---------------|------------|
| AEGD         | 3                      | 18.8%         | 101        |
| GPR          | 4                      | 52.3%         | 392        |
| DPH          | 2                      | 79.0%         | 15         |
| Pedo         | 4                      | 60.4%         | 221        |

Some completers attended both a general and a specialty residency (more than one program) at the institution; for analytic purposes, those individuals are classified in the terminal program attended (Table 4). The 22 individuals who completed more than one program in our sample were distributed relatively evenly across age cohorts (data not shown).

**Table 4. Pathways of Respondents Completing More Than One PGD Program**

| AEGD   | GPR   | Pedo | N  |
|--------|-------|------|----|
| AEGD → | GPR   |      | 1  |
|        | GPR → | Pedo | 21 |

## Institutional Attributes

Survey respondents across the 4 PGD program types reported diverse program and institutional attributes (Table 5). Most training (61.9%) occurred at hospitals, especially for GPR completers (92.1%), whereas the majority of AEGD (63.4%), DPH (100%), and Pedo (59.3%) completers were trained at dental schools. Most program completers (77.5%) were recruited from a national pool of applicants, but the AEGD and DPH program applicant pool was more evenly distributed among national, regional, and local applicants. In all, most completers (90.5%) were trained in programs held in states with extensive Medicaid adult dental benefits, but nearly half of AEGD completers (48.5%) and a third of DPH completers (33.3%) were trained in states with emergency-only Medicaid dental benefits for adults. In terms of geographic setting, most program completers (91.5%) trained in programs in urban settings, with DPH (33.3%) and AEGD (32.7%) completers training in more suburban settings than GPR (6.1%) and Pedo (0%) completers.

**Table 5. Institutional Characteristics by Respondent Count in Each PGD Program Type**

|  |                | Program    |            |           |            | Total      |
|--|----------------|------------|------------|-----------|------------|------------|
|  |                | AEGD       | GPR        | DPH       | Pedo       |            |
| Program setting                        | Hospital       | -          | 92%        | -         | 41%        | 62%        |
|  | Dental school  | 63%        | 8%         | 100%      | 59%        | 33%        |
|  | Health center  | 37%        | -          | -         | -          | 5%         |
| Geographic diversity of applicant pool | National       | 31%        | 92%        | 67%       | 74%        | 78%        |
|  | Regional       | 37%        | -          | -         | 26%        | 13%        |
|  | Local          | 33%        | 8%         | 33%       |            | 9%         |
| Medicaid adult dental coverage         | Extensive      | 67%        | 92%        | 67%       | 100%       | 91%        |
|  | Limited        | -          | 2%         | -         | -          | 1%         |
|  | Emergency only | 33%        | 6%         | 33%       | -          | 9%         |
| Geographic setting                     | Urban          | 67%        | 94%        | 67%       | 100%       | 91%        |
|  | Suburban       | 33%        | 6%         | 33%       | -          | 9%         |
| <b>Total, N</b>                        |                | <b>101</b> | <b>392</b> | <b>15</b> | <b>221</b> | <b>729</b> |

# FINDINGS

## Demographics

The mean age of respondents was 40 years, both overall and for each program type (Table 6). The gender distribution among the 729 respondents was 61% female, though this varied by program type, with AEGD programs being 65% male. Completers of nonwhite race/ethnicity were overrepresented (75%) in these HSRA-funded programs; prior research has shown that those racial/ethnic groups also have historically included greater proportions of women than the overall dentist population.<sup>21-23</sup> About one-third of respondents were raised in urban areas, 40% in suburban areas, and 24% in small towns or rural communities. Again, these distributions vary by program type, with Pedo completers more likely to be from rural communities and DPH completers more likely to be from large urban areas.

**Table 6. Descriptive Statistics of Respondents**

|                           | Program |      |      |      | Total |
|---------------------------|---------|------|------|------|-------|
|                           | AEGD    | GPR  | DPH  | Pedo |       |
| Mean age, years           | 39.7    | 39.7 | 39.8 | 39.8 | 39.7  |
| Age group, %              | 7.1     | 11.7 | 9.1  | 1.2  | 8.2   |
| <30                       | 7.1     | 11.7 | 9.1  | 1.2  | 8.2   |
| 30-34                     | 16.7    | 18.7 | -    | 21.2 | 18.8  |
| 35-39                     | 33.3    | 22.9 | 63.6 | 33.5 | 27.9  |
| 40-44                     | 19.0    | 21.5 | -    | 21.8 | 20.9  |
| 45-49                     | 11.9    | 12.3 | 18.2 | 15.3 | 13.2  |
| ≥50                       | 11.9    | 12.8 | 9.1  | 7.1  | 11.1  |
| Female, %                 | 35.2    | 62.1 | 83.3 | 69.4 | 60.9  |
| Race/ethnicity, %         |         |      |      |      |       |
| African American/black    | 1.2     | 49.3 | 25.0 | 36.0 | 38.8  |
| Asian                     | 29.1    | 16.7 | 25.0 | 19.7 | 19.3  |
| Hispanic                  | 15.1    | 15.4 | 16.7 | 11.8 | 14.4  |
| White                     | 53.5    | 15.4 | 25.0 | 29.8 | 24.6  |
| Other/mixed               | 1.2     | 3.2  | 8.3  | 2.8  | 2.9   |
| Hometown setting, %       |         |      |      |      |       |
| Large city/urban area     | 46.0    | 38.5 | 50.0 | 24.6 | 35.9  |
| Medium city/suburban area | 26.4    | 38.5 | 33.3 | 50.3 | 40.0  |
| Small city/town           | 23.0    | 18.7 | 16.7 | 17.3 | 18.9  |
| Rural/unincorporated area | 4.6     | 4.3  | -    | 7.3  | 5.1   |
| Military base(s)          | -       | -    | -    | 0.6  | 0.2   |

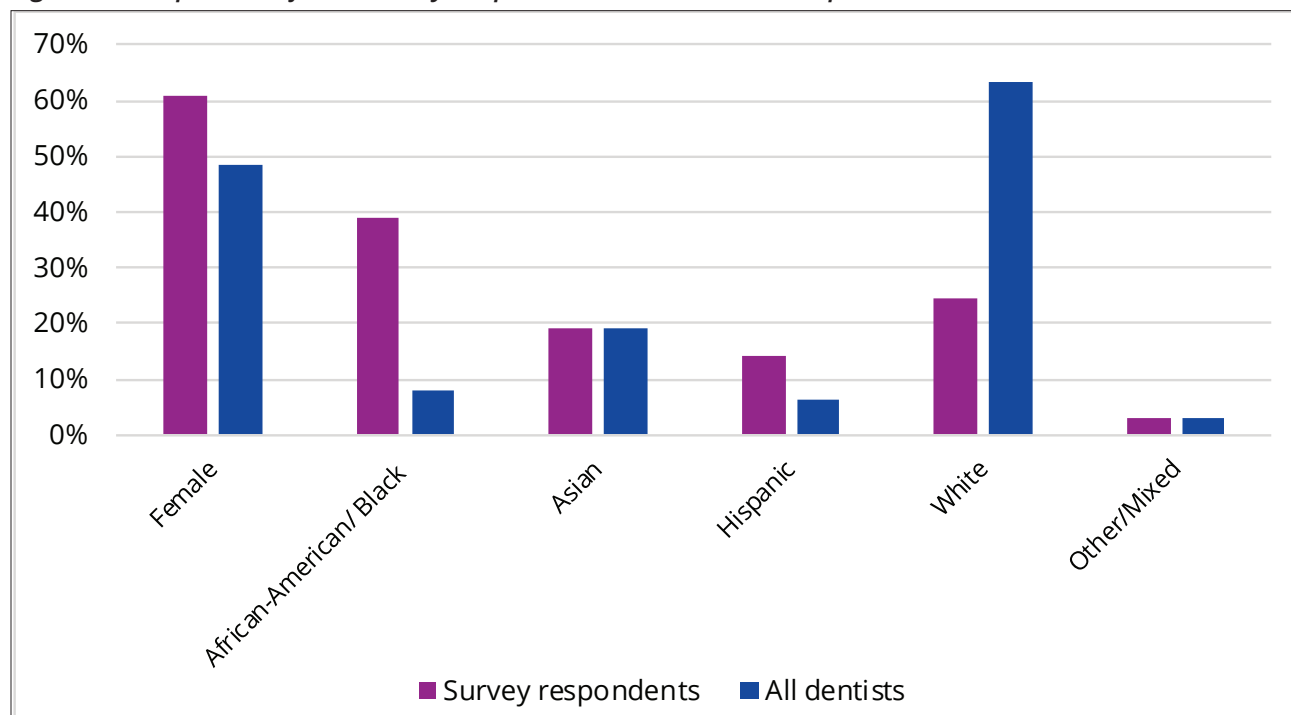
Compared with the universe of postgraduate-trained primary care dentists trained in the same time frame (Table 7), the surveyed sample of HRSA-funded PGD completers is slightly younger (except for DPH, which is much younger), more female, and more racially/ethnically diverse (Figure 3). These demographic differences indicate that a primary goal of HRSA PGD program funding—improving workforce diversity—is being achieved through these programs.

**Table 7. Demographics of All Dentists Completing Primary Care Advanced Education, 1990–Present**

|                        | General Practice Dentists (AEGD and GPR) | Public Health Dentists | Pediatric Dentists | Total |
|------------------------|--|------------------------|--------------------|-------|
| Mean age, years        | 41.4                                     | 46.2                   | 41                 | 41.4  |
| Female, %              | 46.8                                     | 57.1                   | 58.1               | 48.5  |
| Race/ethnicity, %      |  |                        |                    |       |
| African American/black | 8.0                                      | 14.3                   | 7.1                | 7.9   |
| Asian                  | 19.5                                     | 20.9                   | 18.2               | 19.3  |
| Hispanic               | 6.4                                      | 7.8                    | 6.8                | 6.5   |
| White                  | 63.2                                     | 52.5                   | 64.8               | 63.3  |
| Other/mixed            | 2.8                                      | 4.5                    | 3.1                | 2.9   |

Source: American Dental Association Health Policy Institute, unpublished data, December 2018.

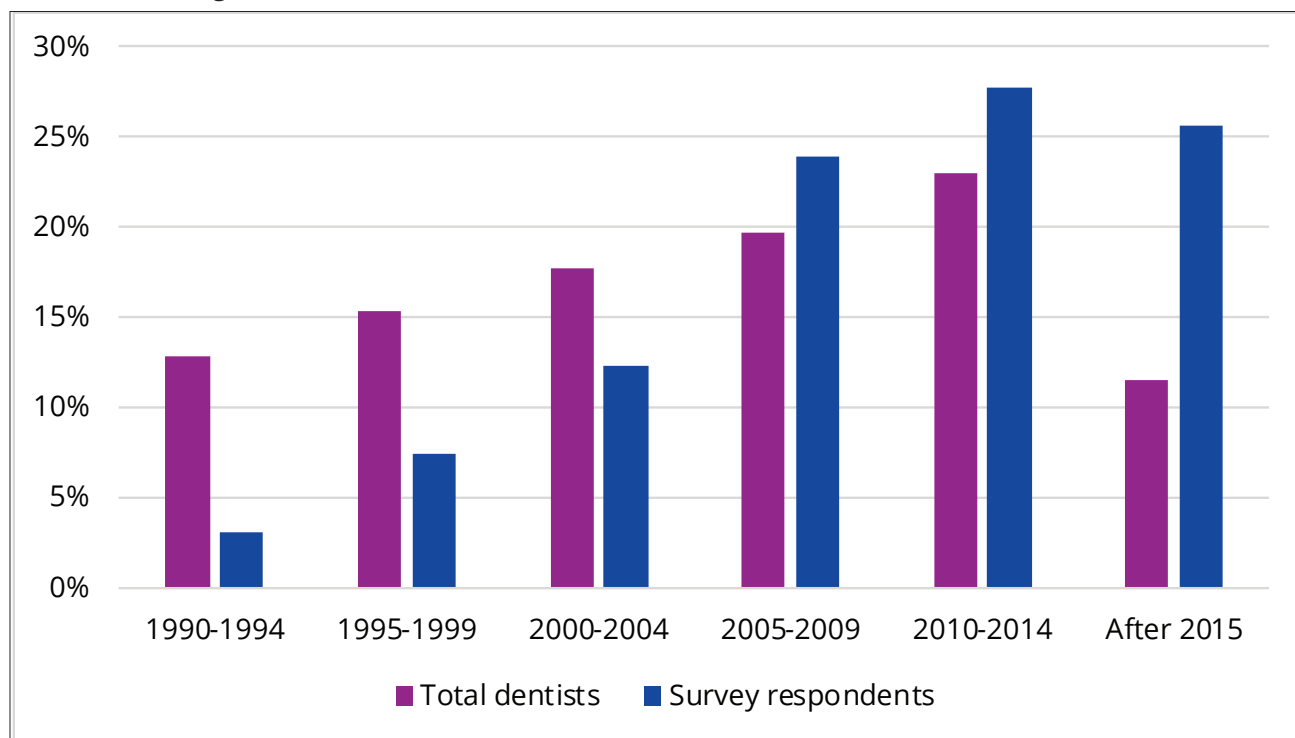
**Figure 3. Comparison of PGD Survey Respondents With All PGD Completers, 1990–Present**



Sources: PGD survey and American Dental Association Health Policy Institute, unpublished data, December 2018.

The respondent's year of graduation over 5-year cohorts is displayed in Figure 4 in comparison with the universe of PGD completers in the 3 disciplines (AEGD/GPR, DPH, and Pedo) for the years 1990 to 2018. The survey sample overrepresents more recent graduates, which is a function of both the survey design (these programs do not all extend back to 1990) and a loss of contact information over time for program completers.

**Figure 4. Comparison of PGD Survey Respondents With All PGD Completers by Year of Graduation From Dental School (Initial Degree), 1990–Present**



Sources: PGD survey and American Dental Association Health Policy Institute, unpublished data, December 2018.

## Educational Pathways

Considerable variation in educational pathways was observed among the surveyed completers. As these are postgraduate programs, all completers had an initial dental degree. Among the initial degrees, 7.4% were non-CODA, indicating that these individuals are foreign-trained dentists (FTDs). Among the FTDs, 24% indicated that they had additionally received a DDS/DMD degree from a CODA-accredited school. The percentage of FTDs varied widely by discipline: 67% of DPH program completers were FTDs compared with 24% of AEGD, 4% of Pedo, and 3% of GPR completers.

### Additional PGD Training

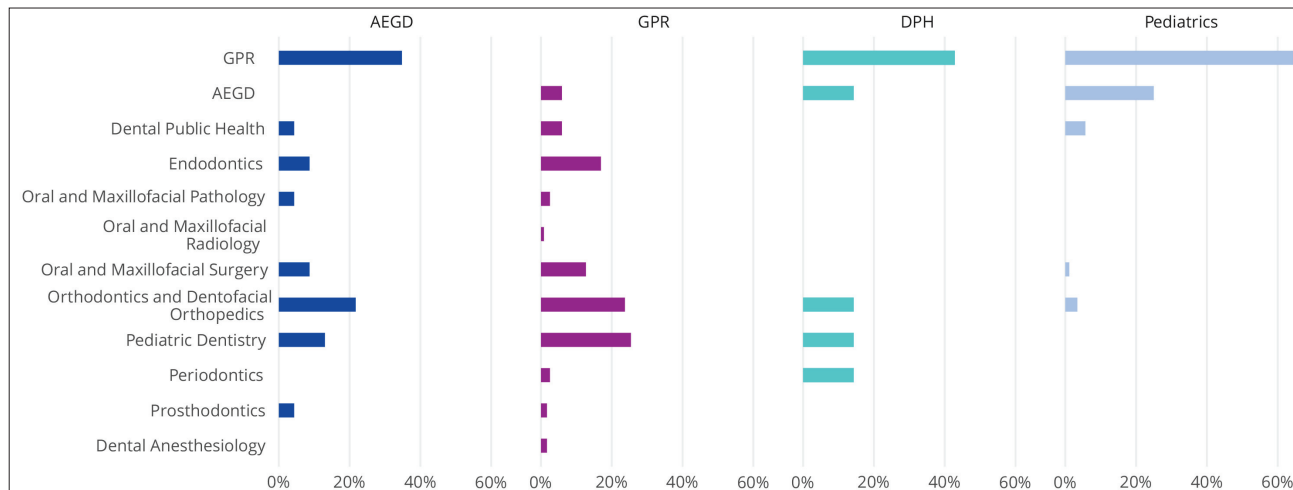
The survey asked all completers if they had attended any additional PGD training programs in addition to the program about which they were being surveyed. A goal of HRSA funding is to enhance the primary care dental workforce and capacity for special needs care, as well as to develop dental faculty. Among all completers, 215 (29.5%) engaged in additional training, either before or after the HRSA-funded program. Among the completers who indicated additional training, GPR (31.6%), Orthodontics (17.2%), Pedo (15.8%), and AEGD (14.0%) were the most common additional training programs attended (Table 8, Figure 5). The institutional representatives with whom we spoke noted that as the specialty programs have become more competitive, the AEGD/GPR programs can serve as a step into an institution toward acceptance, which may be underlying this pattern.

**Table 8. Distribution of Additional PGD Training by Respondents Who Indicated Additional Training Pre or Post Participation in an HRSA-Funded Primary Care PGD Program**

| Additional PGD Training Type             | Program             |                    |                    |                     | Total % <sup>a</sup> |
|--|---------------------|--------------------|--------------------|---------------------|----------------------|
|  | AEGD % <sup>a</sup> | GPR % <sup>a</sup> | DPH % <sup>a</sup> | Pedo % <sup>a</sup> |                      |
| GPR                                      | 40.0                | -                  | 50.0               | 68.7                | 31.6                 |
| AEGD                                     | -                   | 6.6                | 16.7               | 26.5                | 14.0                 |
| Dental public health                     | 5.0                 | 6.6                | -                  | 6.0                 | 6.0                  |
| Endodontics                              | 10.0                | 18.9               | -                  | -                   | 10.2                 |
| Oral and maxillofacial pathology         | 5.0                 | 2.8                | -                  | -                   | 1.9                  |
| Oral and maxillofacial radiology         | -                   | 0.9                | -                  | -                   | 0.5                  |
| Oral and maxillofacial surgery           | 10.0                | 14.2               | -                  | 1.2                 | 8.4                  |
| Orthodontics and dentofacial orthopedics | 25.0                | 26.4               | 16.7               | 3.6                 | 17.2                 |
| Pediatric dentistry                      | 15.0                | 28.3               | 16.7               | -                   | 15.8                 |
| Periodontics                             | -                   | 2.8                | 16.7               | -                   | 1.9                  |
| Prosthodontics                           | 5.0                 | 1.9                | -                  | -                   | 1.4                  |
| Dental anesthesiology                    | -                   | 1.9                | -                  | -                   | 0.9                  |
| <b>Total, N</b>                          | <b>20</b>           | <b>106</b>         | <b>6</b>           | <b>83</b>           | <b>215</b>           |

<sup>a</sup>Percentages add up to more than 100% as respondents could select multiple choices.

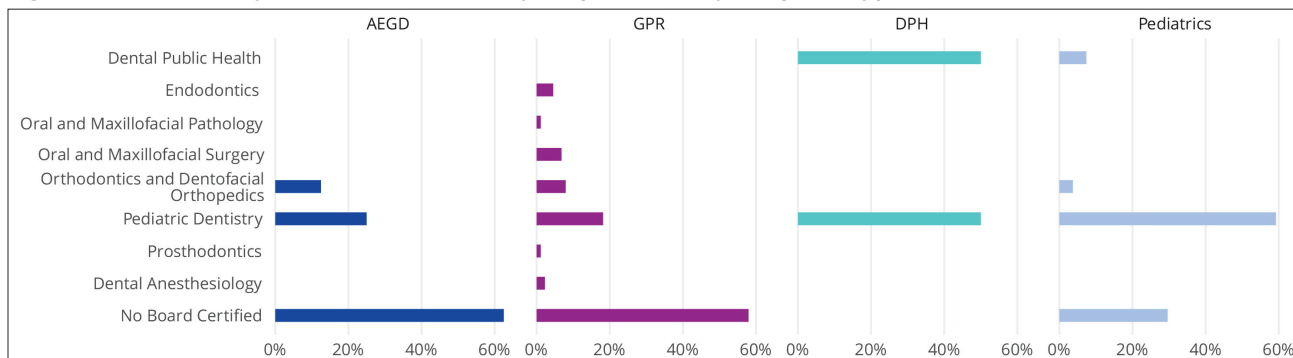
**Figure 5. Distribution of Additional PGD Training by Respondents Who Indicated Additional Training Pre or Post Participation in an HRSA-Funded Primary Care PGD Program**



### Specialty Board Certification

Any respondent who completed a DPH or Pedo program or indicated completion of a specialty program before or after completion of an AEGD or GPR program was asked whether they were board certified in their respective specialty areas. Among the surveyed completers who would be eligible for board certification, approximately 47% had gone on to acquire some sort of board certification (Figure 6).

**Figure 6. Board Certification Distribution of Respondents by Program Type<sup>a</sup>**



<sup>a</sup> Note: Totals may exceed 100% due to individuals with more than one board certification.

We attempted to assess national board certification rates by specialty; however, this information is not publicly available. As a result, we were unable to determine whether the HRSA-funded PGD program completers have higher, lower, or similar board certification rates compared with all PGD program completers.

Among all respondents eligible for board certification, 53% were not yet board certified. The survey asked about future plans among those completers who had not yet become certified (Table 9). Among the 64



respondents to this question, 22 (34%) were actively pursuing board certification or had completed part of their board certification to date. Twenty-three respondents (36%) were planning to take board certification exams in the future.

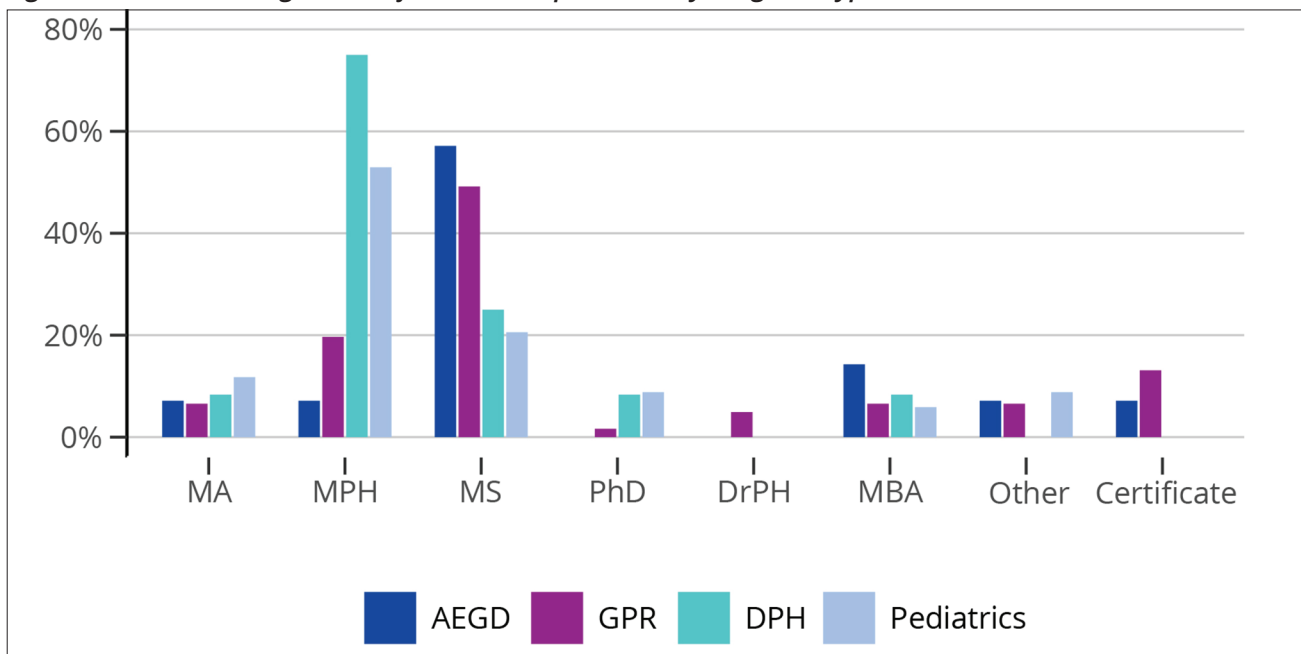
**Table 9. Board Certification Plans Among Non-Board-Certified Respondents**

|  | Non-Board Certified (N=64) |
|--|----------------------------|
| Actively pursuing board certification                          | 22 (34%)                   |
| Completed part of board certification to date                  | 22 (34%)                   |
| Planning to take board certification exams at some future date | 23 (36%)                   |
| Not pursuing board certification                               | 11 (17%)                   |

### Additional Academic Training

Among the respondents, 132 additional degrees were reported by 121 respondents (17%), including 10 (7.6%) Master of Arts (MA), 48 (36.4%) Master of Science (MS), 40 (30.3%) Master of Public Health (MPH), 9 (6.8%) Master of Business Administration (MBA), 5 (3.8%) Doctor of Philosophy (PhD), and 3 (2.3%) Doctor of Public Health (DrPH) degrees. The distribution of degrees is variable by program type (Figure 6).

**Figure 7. Additional Degrees Conferred to Respondents by Program Type**



Of those with an additional academic degree who reported working in dentistry in any capacity, 10 respondents (9%) reported working primarily in a faculty position and 15 (14%) reported a faculty position as a secondary role. HRSA’s investment in these programs has thus resulted in a total of 25 new faculty, evidence in support of HRSA’s focus on the development of faculty.

## Educational Choices and Satisfaction

Survey respondents provided information on both why they chose to pursue postgraduate education (Table 10) and why they chose the specific program they attended (Table 11). Respondents were asked to rank their top 3 reasons.

### Reasons for Pursuing PGD Training

The top 3 reasons ranked first by respondents were also the top 3 reasons ranked at all among all respondents (rank sum): wanting to expand their knowledge and advance their skill set, wanting a more specialized dentistry experience, and wanting hospital-based experience. Four items were more important for individuals than for the overall group, as shown in pink in Table 10. For example, only New York requires completion of a residency program for licensure, and 2 of the 7 institutions surveyed were in New York. Therefore, it is not surprising that individually this was top ranked at No. 4, but overall (sum of ranks) this drops to No. 8, as it is unlikely to be a reason for the respondents in other states. Finally, there are 5 items that seem to be more important across respondents than for individuals, shown in turquoise in the table. A theme here is recognition and encouragement, which may be an important factor for many but not a top reason for their decision to pursue PGD training.

**Table 10. Top and Sum Ranked Reasons to Pursue PGD Training**

|   | Rank 1st – Rank Sum |
|---|---------------------|
| Wanted to expand knowledge and advance skill set          | 1-1                 |
| Wanted more specialized dentistry experience              | 2-2                 |
| Wanted hospital-based experience                          | 3-3                 |
| Licensure requirement for state you wished to practice in | 4-8                 |
| To help you get into a specialty program                  | 5-11                |
| To be recognized as a specialist                          | 6-4                 |
| Wanted more experience with certain populations           | 7-10                |
| Were strongly encouraged by dentists/friends              | 8-6                 |
| Wanted community-based experiences                        | 9-9                 |
| To increase long-term income potential                    | 10-5                |
| Potential employers value additional clinical training    | 11-7                |
| Were strongly encouraged by dental school faculty         | 12-12               |
| To qualify for hospital staff privileges                  | 13-15               |
| Wanted to become an academician                           | 14-14               |
| Program was geographically desirable                      | 15-13               |
| Wanted preparation time for state licensing board exam    | 16-16               |
| To defer educational loan repayment                       | 17-17               |

Rank 1st = Rank order when only first choice is ranked.

Rank Sum = Rank order of sum of individuals ranking item as 1, 2, or 3 among total choices.

## Reasons for Choosing a Specific PGD Program

Next, we examined the reasons for selecting the particular program attended once the respondent decided to pursue postgraduate primary dental care (Table 11). The top 3 reasons for both individuals (rank 1st) and the group (rank sum) were program reputation, geographic location, and quality of training, and although these varied, there was little movement in the order between the 2 ranks.

**Table 11. Top and Sum Ranked Reasons to Attend Specific PGD Program**

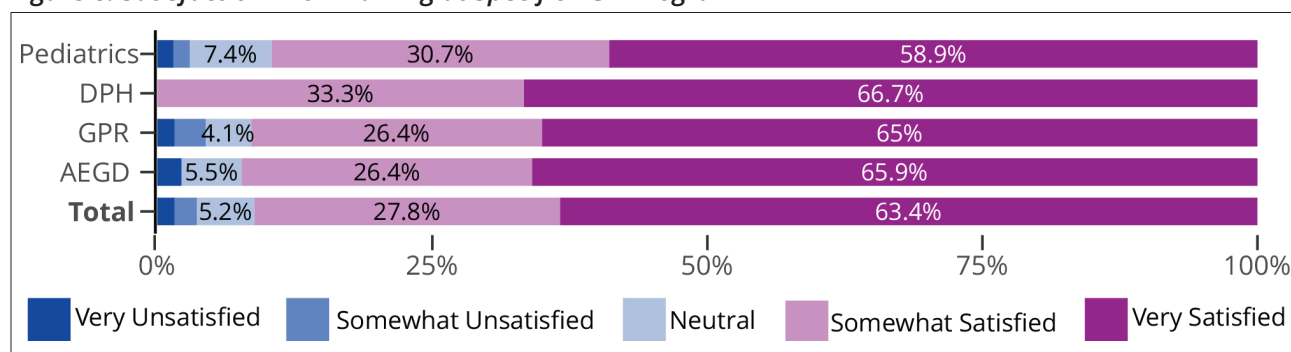
|                                       | Rank 1st – Rank Sum |
|---------------------------------------|---------------------|
| Program reputation                    | 1–3                 |
| Geographic location                   | 2–1                 |
| Quality of dental training            | 3–2                 |
| Quantity of dental experience         | 4–4                 |
| Financial aid package                 | 5–6                 |
| Faculty reputation                    | 6–5                 |
| Other (unspecified)                   | 7–7                 |
| Only choice where matched or accepted | 8–8                 |

Rank 1st = Rank order when only first choice is ranked.

Rank Sum = Rank order of sum of individuals ranking item as 1, 2, or 3 among total choices.

Finally, we asked the completers to tell us how satisfied they were with the programs they attended and whether they would recommend the programs to others. As shown in Figure 8, the vast majority of completers across all program types were either very or somewhat satisfied with their training, with fewer than 2.6% overall indicating any dissatisfaction.

**Figure 8. Satisfaction With Training at Specific PGD Program**



Moreover, when we asked if the completers would recommend their program to others (Table 12), the likelihood of a recommendation was almost identical to the level of satisfaction, providing us with strong evidence that the HRSA-funded programs were delivering a good experience to this group of trainees. PGD program satisfaction data nationally is not available for comparison.

**Table 12. Respondents' Likelihood of Recommending Their Own PGD Training Program**

|   | Program   |            |           |            | Total<br>% |
|---|-----------|------------|-----------|------------|------------|
|   | AEGD<br>% | GPR<br>%   | DPH<br>%  | Pedo<br>%  |            |
| <b>How likely would you be to recommend your residency program to others?</b> |           |            |           |            |            |
| Very unlikely   | 2.2       | 1.3        | -         | 1.5        | 1.5        |
| Unlikely  | -         | 3.4        | -         | 2.5        | 2.6        |
| Neutral   | 6.6       | 8.3        | 8.3       | 11.9       | 9.1        |
| Likely  | 24.2      | 25.5       | 16.7      | 30.3       | 26.6       |
| Very likely   | 67.0      | 61.6       | 75.0      | 53.7       | 60.2       |
| <b>Total, N</b>   | <b>91</b> | <b>385</b> | <b>12</b> | <b>201</b> | <b>689</b> |

## Educational Debt Burden

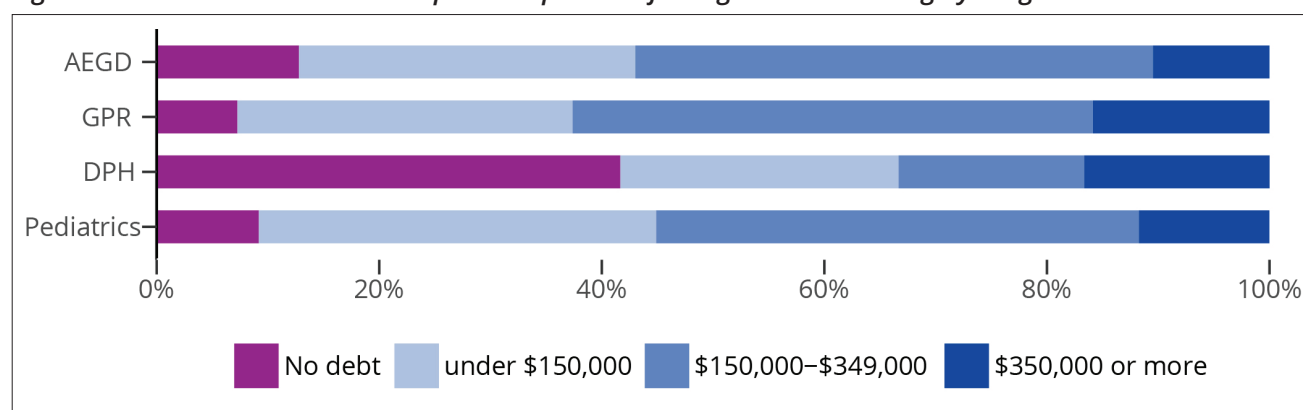
The cost of dental education has been increasing exponentially and now stands as a serious concern for recent dental graduates. PGD education is funded by 3 primary sources: GME, HRSA training grants, and tuition. For students who attend programs that do not receive GME or HRSA funding, the tuition adds to the debt burden as they go into practice. To estimate the impact of debt on students, we asked for both the quantity of debt upon completion of all dental education (pre- and postgraduate) and the perceived impact of that debt on their choices after graduation. Table 13 shows the debt distribution by \$50,000 increments. Interestingly, as a percentage of overall residents by program type, DPH had both the most respondents with no debt (41.7%) and the most respondents with debt of \$350,000 or more (16.7%). Although we were unable to ascertain the reasons behind this, one possibility is the fact that three-quarters of these respondents were foreign trained and subject to different financing systems. On average overall, only 9.2% of respondents ended up debt free, while 31.9% reported more than \$250,000 in total educational debt (Figure 9).

**Table 13. Educational Debt<sup>a</sup> Among PGD Completers**

|                     | Program   |            |           |            | Total %    |
|---------------------|-----------|------------|-----------|------------|------------|
|                     | AEGD %    | GPR %      | DPH %     | Pedo %     |            |
| <\$50,000           | 5.8       | 7.5        | 16.7      | 9.7        | 8.1        |
| \$50,000-\$99,999   | 9.3       | 11.6       | -         | 12.8       | 11.4       |
| \$100,000-\$149,999 | 15.1      | 11         | 8.3       | 13.3       | 12.2       |
| \$150,000-\$199,999 | 20.9      | 13.7       | 8.3       | 11.7       | 14.0       |
| \$200,000-\$249,999 | 11.6      | 14.8       | -         | 12.2       | 13.4       |
| \$250,000-\$299,999 | 7.0       | 8.6        | -         | 11.7       | 9.2        |
| \$300,000-\$349,999 | 7.0       | 9.7        | 8.3       | 7.7        | 8.7        |
| ≥\$350,000          | 10.5      | 15.9       | 16.7      | 11.7       | 14         |
| No debt             | 12.8      | 7.3        | 41.7      | 9.2        | 9.2        |
| <b>Total, N</b>     | <b>86</b> | <b>372</b> | <b>12</b> | <b>196</b> | <b>666</b> |

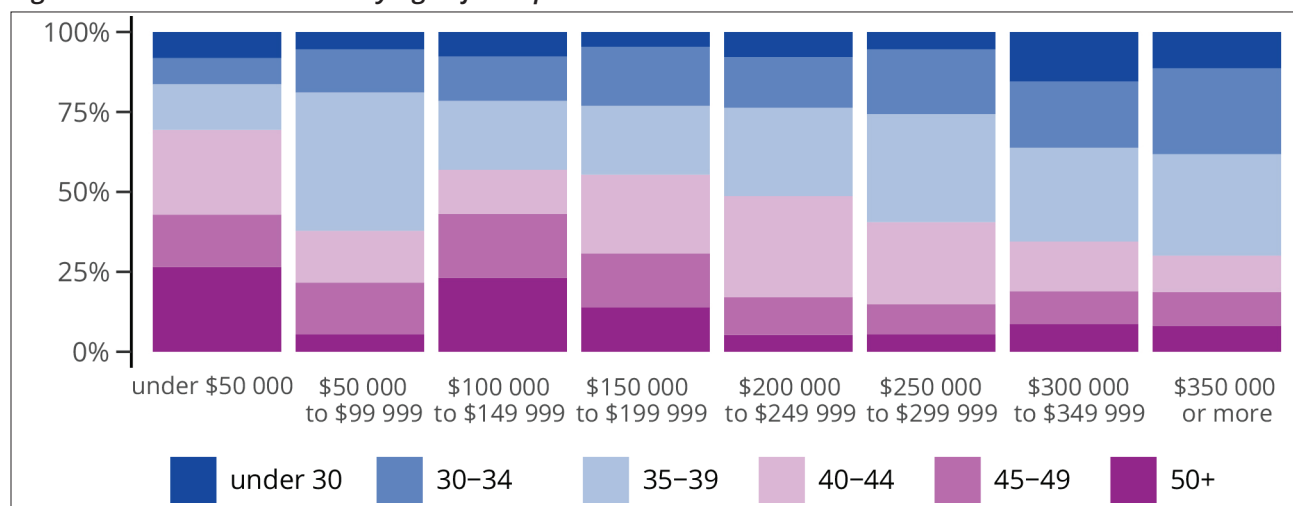
<sup>a</sup> Educational debt = undergraduate + graduate + postgraduate.

**Figure 9. Total Educational Debt<sup>a</sup> Upon Completion of Postgraduate Training by Program**



<sup>a</sup> Educational debt = undergraduate + graduate + postgraduate.

**Figure 10. Educational Debt<sup>a</sup> by Age of Completers**



<sup>a</sup> Educational debt = undergraduate + graduate + postgraduate.

Among those who reported an impact, the reported choices most impacted by debt were to practice full time and to enter private practice, followed closely by accepting an associate position (particularly among younger dentists) and deciding to not purchase a practice. Nine percent reported utilizing a loan repayment program, and 7% reported joining the National Health Service Corps (NHSC) or Indian Health Service (IHS) because of debt. Among completers graduating from dental school after 2010, there was a large uptick in those reporting that debt led them to pursue a specialty (18.5%) or to not practice in their desired location (12.3%).

**Table 14. Career Decisions Influenced by Educational Debt<sup>a</sup> Burden by Graduation Year**

|   | 1990–2000<br>% <sup>b</sup> | 2001–2009<br>% <sup>b</sup> | 2010 or After<br>% <sup>b</sup> | All Completers<br>% <sup>b</sup> | N   |
|---|-----------------------------|-----------------------------|---------------------------------|----------------------------------|-----|
| My educational debt did not influence my practice decisions or career direction | 55.4                        | 47.6                        | 30.8                            | 39.5                             | 260 |
| To practice full time instead of part time                                      | 9.5                         | 18.0                        | 31.3                            | 24.2                             | 159 |
| To enter private practice   | 17.6                        | 19.3                        | 26.5                            | 22.9                             | 151 |
| To accept an associate position   | 8.1                         | 15.9                        | 27.6                            | 21.3                             | 141 |
| To not purchase a practice  | 14.9                        | 12.9                        | 21.9                            | 17.9                             | 119 |
| To pursue a specialty   | 8.1                         | 8.6                         | 18.5                            | 13.8                             | 92  |
| To not pursue a specialty   | 16.2                        | 7.3                         | 13.1                            | 11.4                             | 75  |
| To accept a position as an employee with a dental organization/company          | 10.8                        | 10.3                        | 12.0                            | 11.2                             | 75  |
| To participate in a loan repayment program or scholarship (not NHSC or IHS)     | 9.5                         | 7.7                         | 9.4                             | 8.8                              | 59  |
| To not practice in a location I wanted to practice                              | 1.4                         | 4.7                         | 12.3                            | 8.4                              | 55  |
| To join the National Health Service Corps (NHSC) or Indian Health Service (IHS) | 6.8                         | 6.0                         | 8.0                             | 7.1                              | 47  |
| To not defer starting to practice even though I wanted to                       | 4.1                         | 3.9                         | 6.3                             | 5.2                              | 35  |
| Other   | –                           | 0.9                         | 1.7                             | 1.2                              | 8   |
| <b>Total, N</b>   | <b>74</b>                   | <b>233</b>                  | <b>351</b>                      | <b>658</b>                       |     |

<sup>a</sup> Educational debt = undergraduate + graduate + postgraduate.

<sup>b</sup> Percentages add up to more than 100% as respondents could select multiple choices.

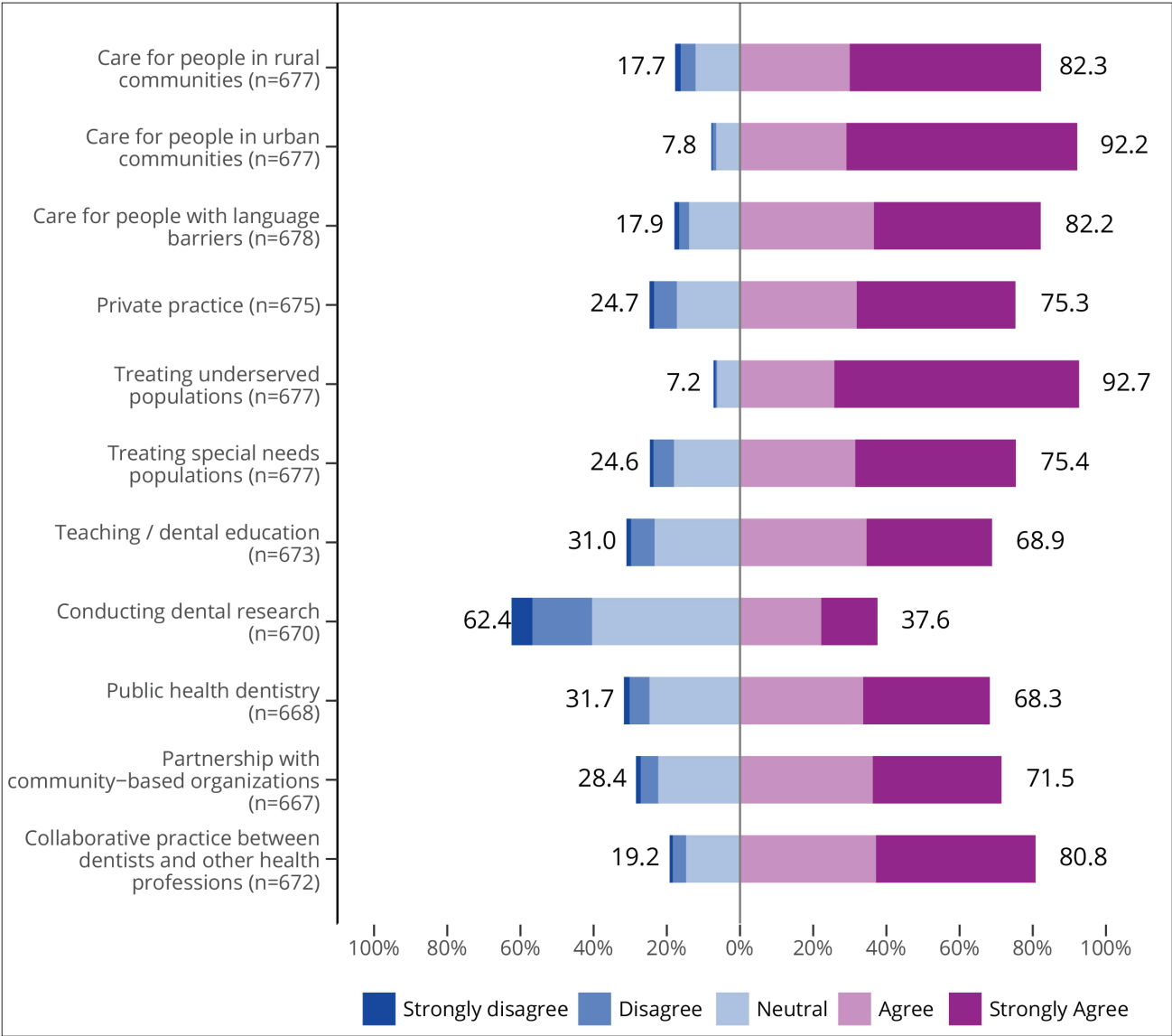
## Educational Experiences in Primary Dental Postgraduate Training

HRSA-funded programs focus on producing a diverse group of leadership-oriented dentists who can work collaboratively with other health professionals to meet the needs of rural and underserved communities. HRSA has also supported programs that produce or develop faculty who are better able to create that workforce. In order to do this, programs have needed to provide residents with opportunities to develop leadership skills, to learn to work collaboratively, and to familiarize themselves with providing care in underserved or rural communities. Programs have also needed to encourage and prepare completers for a career in dental education.

**Education in HRSA Focus Areas**

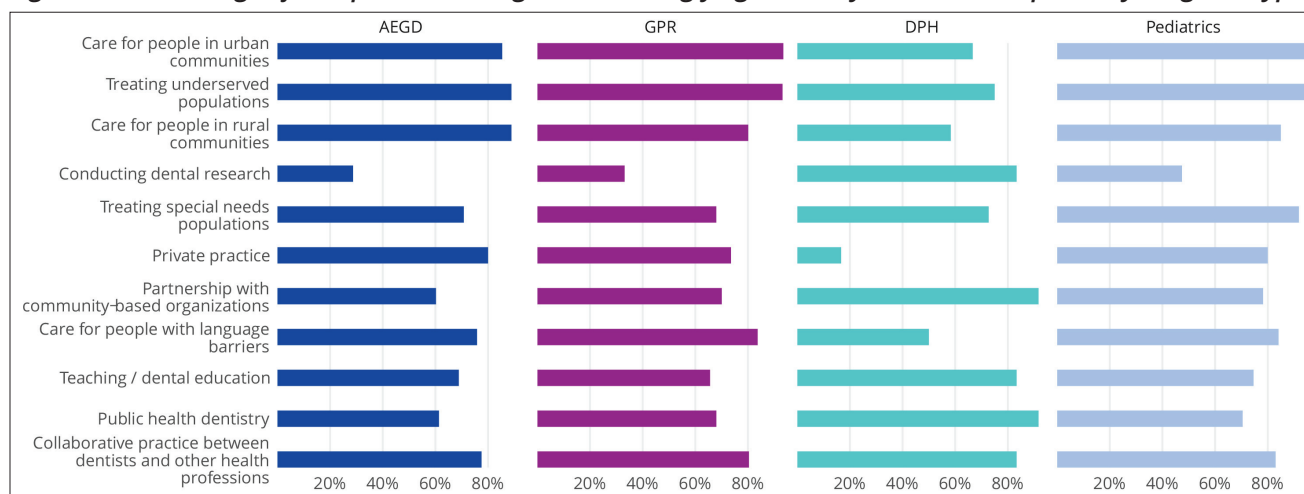
To better understand the extent to which key specific skills were being developed, we asked about each of the focus areas listed in Figure 11. Overall, respondents reported a high level of preparation in all focus areas, with “serving the underserved” reflecting the highest level of preparation (92.7%) and “conducting dental research” reflecting the lowest (37.6%).

**Figure 11. Extent to Which Completers Felt Prepared in Specific Skills From Training**



Preparation by program type varied but remained high across the board (Figure 12). Across nearly every category, Pedo postgraduate completers reported the highest levels of preparation. DPH outperformed the clinical specialties in conducting research, while AEGD did slightly better in rural practice preparation. Completers in all specialties reported a high degree of preparedness in caring for underserved populations (92.7% agreed or strongly agreed), but those who trained in states with extensive Medicaid adult dental benefits were more likely to agree than those who trained in states with less extensive benefits (limited or emergency only; 94% vs 82%). Pedo completers reported the highest agreement for treating special needs patients (92%), followed by DPH (73%), AEGD (71%), and GPR (68%). True to the mission of their specialty, DPH completers were most likely to feel well prepared to form partnerships with community-based organizations (92%) and to practice public health dentistry (92%).

**Figure 12. Percentage of Completers Who Agreed or Strongly Agreed They Were Well Prepared by Program Type**



The survey also included open-ended questions about various components of the respondents' training, including program satisfaction and quality, suggestions for improvement, and their experiences training with other professionals. In the 389 comments about program satisfaction, respondents' sentiments were predominately positive (90.4%). A small but considerable percentage of comments were neutral (4.4%) or negative (5.2%). Negative comments were related to perceived poor faculty performance or bias, administration, patient volume, quality or value of the program, or the scope of the curriculum. Though these topics were mentioned negatively, the majority of comments related to them were positive.

Respondents referred to a number of areas positively. Respondents commented primarily on 2 topics related to the programs themselves: the elements of their programs that they appreciated, such as specific rotations or opportunities for collaborative work, and the diversity of cases, colleagues, and approaches to treatment.



Respondents also put forth positive statements about topics related to their experiences in their programs and the benefits of completing them. Responses covered 3 broad topics: the effect of training on their performance, competence, or confidence; the extent to which the programs prepared them for further training or practice with a high standard of care; and their perceptions of the educational environment.

Most of the 42 suggestions made by respondents were related to increasing exposure to complex cases to allow more training in orthodontics, periodontics, oral surgery, and oral conscious sedation procedures. A few respondents suggested updating equipment, adding additional faculty, improving the research environment, and increasing ancillary support to allow trainees more time to focus on learning.

### Interprofessional Education

Interprofessional education (IPE) is increasingly important for dentists, particularly those in a primary care setting. We found that 63% of respondents had experience in IPE overall but that this varied by program type (Table 15) and age (Table 16).

**Table 15. Exposure to IPE by Program Type**

|          | Program |       |       |        | Total % |
|----------|---------|-------|-------|--------|---------|
|          | AEGD %  | GPR % | DPH % | Pedo % |         |
| No       | 64.8    | 37.7  | 33.3  | 23.4   | 37.1    |
| Yes      | 35.2    | 62.3  | 66.7  | 76.6   | 62.9    |
| Total, N | 91      | 374   | 12    | 197    | 674     |

**Table 16. Exposure to IPE by Age Cohort**

|                 | Age Group |            |            |            |           |           | Total %    |
|-----------------|-----------|------------|------------|------------|-----------|-----------|------------|
|                 | <30 %     | 30–34 %    | 35–39 %    | 40–44 %    | 45–49 %   | ≥50 %     |            |
| No              | 36.0      | 40.5       | 41.6       | 37.5       | 29.6      | 32.8      | 37.6       |
| Yes             | 64.0      | 59.5       | 58.4       | 62.5       | 70.4      | 67.2      | 62.4       |
| <b>Total, N</b> | <b>50</b> | <b>116</b> | <b>173</b> | <b>128</b> | <b>81</b> | <b>67</b> | <b>615</b> |

When asked about their experiences with IPE, respondents identified 2 broad topics: how they gained interprofessional experience or education, and whom they gained it from or worked with collaboratively. In total, 277 respondents commented. Forty-five respondents reported that they had received some IPE either from a course, presentation, seminar, or lecture or at a conference, workshop, or forum. These educational, interprofessional experiences were either provided by or involved resident and attending physicians, nurses, pharmacists, nutritionists, and other dental specialists. Three-quarters of commenting

respondents reported gaining some interprofessional experience on rotation, rounds, or shadows in hospitals, clinics, and skilled nursing facilities. Respondents reported working with practitioners from a variety of health practitioner or care teams. Practice areas included nursing, pharmacy, general surgery, oncology, pediatrics, hematology, oral surgery, internal medicine, craniofacial surgery, emergency medicine, anesthesiology, and ophthalmology.

### **Summary Comments on Program Quality**

Overall, open-ended comments by completers on overall program quality were overwhelmingly positive: 132 of 137 (96.4%) comments by respondents were wholly positive, 2 were neutral, 3 were wholly negative, and 1 mixed. Negative comments included statements about respondent experience, program faculty, and program quality. Respondents referred to the remaining topics positively: the influence of program and faculty on career choices, the extent of preparation for practice, and the effect of training on performance, confidence, or competence. Respondents also made a number of suggestions for improvement in the areas of program structure and funding, administrative efficiency, inclusion of different or additional educational components, and technological advancements.

### **Practice Characteristics**

#### **Retention in the Dental Field**

Approximately 4% of respondents indicated that they were not currently working in the dental field. Half indicated that this was due either to disability or to child or elder care responsibilities or that they had left for another type of work, while the other half were recently graduated and were not yet employed.

#### **Activities Since Training Completion**

To examine how HRSA's training goals extend into practice, we asked completers to respond if they had been involved in activities related to HRSA's priority areas (Table 17). Treating publicly insured patients and treating patients with special health care needs were reported by more than half of respondents.

**Table 17. HRSA Priority Activities Since Program Completion**

|   | N   | %      |
|---|-----|--------|
| Treating patients insured by <b>Medicaid/Children's Health Insurance Program (CHIP)</b>   | 457 | 62.7 % |
| Treating patients with <b>special health care needs</b> (eg, people with developmental disabilities, residents of long-term care facilities/nursing homes, medically compromised patients)                            | 385 | 52.8 % |
| <b>Dental volunteering</b> providing clinical care (eg, school clinics, community screenings, Missions of Mercy (MOM), Remote Area Medical (RAM), international dental mission trips)                                 | 344 | 47.2 % |
| Clinical practice in a setting serving primarily <b>medically underserved areas/populations</b> (ie, groups of persons who face economic, cultural, or linguistic barriers to health care)                            | 310 | 42.5 % |
| <b>Collaborative practice</b> (eg, co-treating patients with another health profession working in an interprofessional team treating patients)  | 241 | 33.1 % |
| Provide clinical care in a <b>dental health professional shortage area</b> (ie, urban or rural area population groups or medical or other public facilities with a shortage of primary medical care dental providers) | 216 | 29.6%  |
| <b>Dental education</b> (eg, continuing education faculty appointment )   | 206 | 28.3 % |
| Dental professional <b>leadership</b> (eg, local dental society, national dental organization, appointment to national examination board)   | 205 | 28.1 % |
| <b>Research</b> (eg, serve in Dental Practice-Based Research Network, participate in university-organized research project, other research)   | 87  | 11.9 % |
| Nonclinical <b>public health</b> (eg, local, state, or federal public health employment or other service policy setting position or committee)  | 55  | 7.5 %  |

### Current Practice

The distribution of primary occupations among all respondents working in the field (both clinical and nonclinical) is shown in Table 18. Among completers working in the dental field, 97% reported practicing clinical dentistry in some capacity.

**Table 18. Respondents' Primary Occupation**

|                                   | N          | %           |
|-----------------------------------|------------|-------------|
| Clinical dentist                  | 545        | 85.4        |
| Dental school faculty             | 25         | 3.9         |
| Hospital dental attending/faculty | 32         | 5.0         |
| Government/public health          | 5          | 0.8         |
| Administrative position           | 6          | 1.0         |
| Other dental occupation           | 18         | 2.8         |
| Other nondental occupation        | 2          | 0.3         |
| Not applicable                    | 5          | 0.8         |
| <b>Total</b>                      | <b>638</b> | <b>100%</b> |

Among clinically active respondents, 12.8% of our sample had completed an AEGD, 57.3% had completed a GPR, and 29.4% had completed a Pedo residency, while fewer than 1% had attended a DPH program. These providers reported working an average of 44.6 weeks per year, 37.5 hours per week in practice, and 32.9 hours per week treating patients. Those in corporate practice reported the highest mean number of patient visits per week (96.8) and days per week seeing patients (4.6), with those in education reporting the lowest (46.9 visits per week and 2.8 days per week seeing patients). Among respondents, the initial choice of practice setting varied by program type (Table 19), with Pedo completers more likely to enter private practice, and with DPH completers just as likely to enter education as private practice but also more likely than any other group to go into federal government service (small sample size caveat, n=11).

**Table 19. Respondents' Initial Practice Setting by Program Type**

|   | Program   |            |           |            | Total %    |
|---|-----------|------------|-----------|------------|------------|
|   | AEGD %    | GPR %      | DPH %     | Pedo %     |            |
| Private practice (owner, associate, or contractor)  | 53.3      | 52.2       | 27.3      | 62.8       | 55.0       |
| Large dental organization/corporate dental chain or franchise                                 | 20.0      | 18.5       | -         | 17.3       | 18.0       |
| Nonprofit health center/federally qualified health center or lookalike or rural health center | 11.1      | 12.1       | 9.1       | 6.1        | 10.2       |
| Local or state government (eg, public health department)                                      | 1.1       | 1.1        | -         | 0.5        | 0.9        |
| Public Health Service Commissioned Corps  | -         | 0.5        | -         | 0.5        | 0.4        |
| Indian Health Service (IHS) civil service   | 2.2       | 0.3        | -         | 0.5        | 0.6        |
| Tribal hire practitioner  | -         | -          | -         | 1.5        | 0.4        |
| Educational institution (eg, faculty or faculty practice)                                     | 6.7       | 2.9        | 27.3      | 5.6        | 4.6        |
| Hospital practice (including teaching in residency program)                                   | 2.2       | 6.3        | 9.1       | 4.1        | 5.2        |
| Armed services (including civil service contractor)   | 1.1       | 1.1        | -         | 1.0        | 1.0        |
| Federal government or other federal service   | -         | -          | 18.2      | -          | 0.3        |
| Prison/correctional institution   | 1.1       | 0.5        | -         | -          | 0.4        |
| Dental industry, association, foundation, or consulting                                       | -         | 0.5        | -         | -          | 0.3        |
| Other   | -         | 0.5        | -         | -          | 0.3        |
| Further residency training  | 1.1       | 3.4        | 9.1       | -          | 2.2        |
| <b>Total, N</b>   | <b>90</b> | <b>379</b> | <b>11</b> | <b>196</b> | <b>676</b> |

Completers provided information on both their initial practice settings after training and their current practice settings. The 15 practice categories were combined into 7 larger categories, and trajectories over time were mapped (Table 20) to examine retention and change over time. Just under half of the respondents (45.6%) both started in and maintained a traditional private practice, which represents retention in that setting of 81.6%. Of the 55.9% of completers who started in a traditional practice and went elsewhere, 5.4% went to corporate practice, 7.1% went to the safety net, and 3.7% went to education. Among the other initial practice areas, corporate practice had a retention of 45.2%, with about the same proportion moving to a traditional practice. Of the 17.9% of completers who started in the safety net, the retention was 49.6%, with only 32.7% switching to a traditional practice. The proportions were similar for the 4.4% of completers who started in education, with 42.9% retention and just over a third moving to a traditional setting. The residency, public sector, and industry trajectories are not broken out due to the small sample sizes.

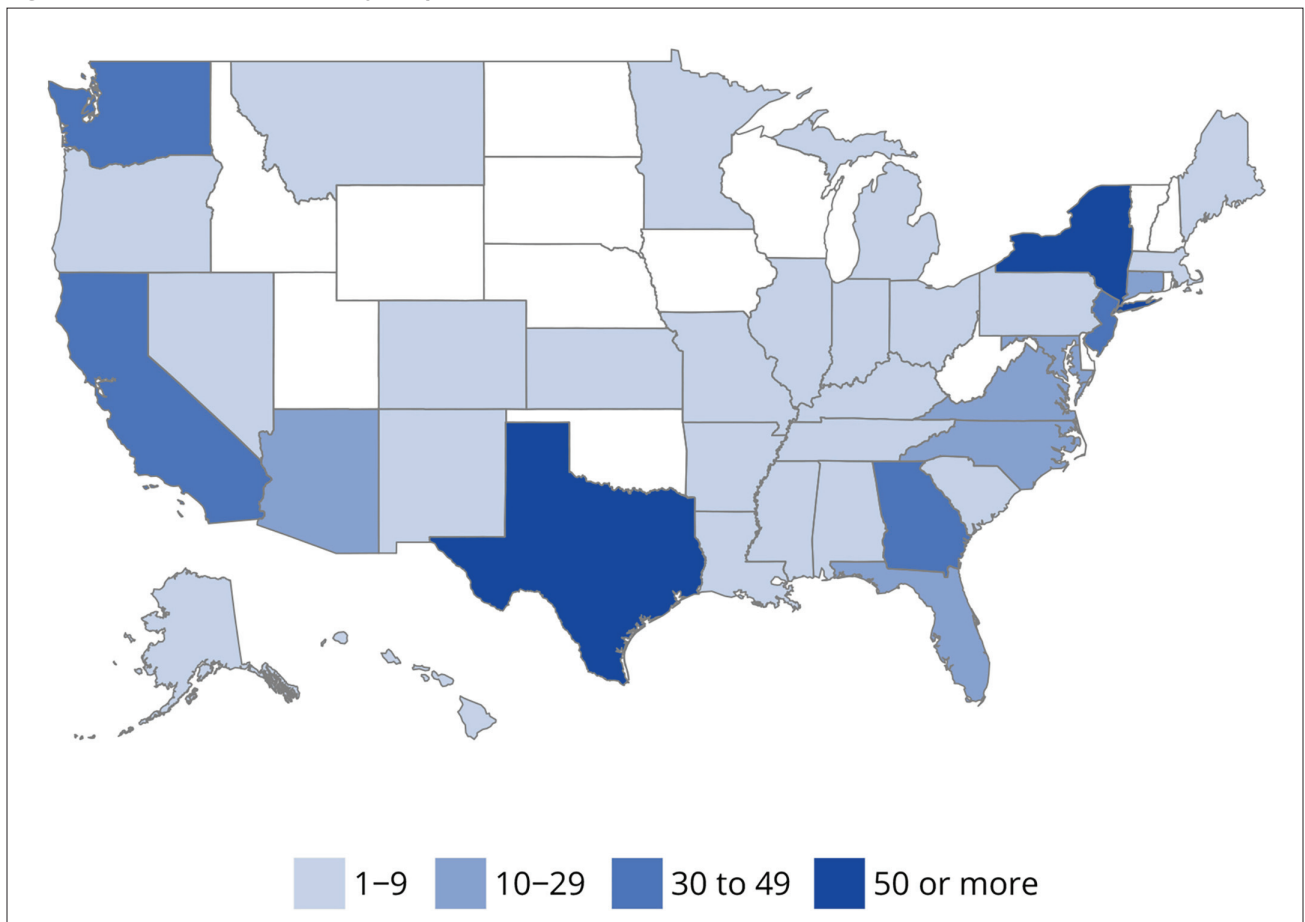
We further examined whether any of the characteristics of the institutions at which the programs were located were associated with particular practice trajectories. Among programs located at a health center (vs a dental school or hospital), a much larger proportion of graduates practiced in the safety net (33% vs 14–19%) in their initial practice, with 25% maintaining this in their current practice. Programs that reported more local recruitment resulted in higher percentages of completers in private practice (79%) than those which recruited regionally (55%) or nationally (61%).

Table 20. Respondents' Initial and Current Practice Trajectories

| Initial to Current Primary Practice Type | N          | Percent of Total | Percent of Subtotal |
|--|------------|------------------|---------------------|
| Traditional to traditional               | 288        | 45.6%            | 81.6%               |
| Traditional to corporate                 | 19         | 3.0%             | 5.4%                |
| Traditional to safety net                | 25         | 4.0%             | 7.1%                |
| Traditional to education                 | 13         | 2.1%             | 3.7%                |
| Traditional to residency                 | 5          | 0.8%             | 1.4%                |
| Traditional to public                    | 3          | 0.5%             | 0.8%                |
| Traditional to industry                  | 0          | 0.0%             | 0.0%                |
| <b>Traditional subtotal</b>              | <b>353</b> | <b>55.9%</b>     | <b>100.0%</b>       |
| Corporate to traditional                 | 50         | 7.9%             | 43.5%               |
| Corporate to corporate                   | 52         | 8.2%             | 45.2%               |
| Corporate to safety net                  | 9          | 1.4%             | 7.8%                |
| Corporate to education                   | 1          | 0.2%             | 0.9%                |
| Corporate to residency                   | 0          | 0.0%             | 0.0%                |
| Corporate to public                      | 3          | 0.5%             | 2.6%                |
| Corporate to industry                    | 0          | 0.0%             | 0.0%                |
| <b>Corporate subtotal</b>                | <b>115</b> | <b>18.2%</b>     | <b>100.0%</b>       |
| Safety net to traditional                | 37         | 5.9%             | 32.7%               |
| Safety net to corporate                  | 7          | 1.1%             | 6.2%                |
| Safety net to safety net                 | 56         | 8.9%             | 49.6%               |
| Safety net to education                  | 7          | 1.1%             | 6.2%                |
| Safety net to residency                  | 1          | 0.2%             | 0.9%                |
| Safety net to public                     | 4          | 0.6%             | 3.5%                |
| Safety net to industry                   | 1          | 0.2%             | 0.9%                |
| <b>Safety net subtotal</b>               | <b>113</b> | <b>17.9%</b>     | <b>100.0%</b>       |
| Education to traditional                 | 11         | 1.7%             | 39.3%               |
| Education to corporate                   | 2          | 0.3%             | 7.1%                |
| Education to safety net                  | 2          | 0.3%             | 7.1%                |
| Education to education                   | 12         | 1.9%             | 42.9%               |
| Education to residency                   | 0          | 0.0%             | 0.0%                |
| Education to public                      | 0          | 0.0%             | 0.0%                |
| Education to industry                    | 1          | 0.2%             | 3.6%                |
| <b>Education subtotal</b>                | <b>28</b>  | <b>4.4%</b>      | <b>100.0%</b>       |
| <b>Residency subtotal</b>                | <b>11</b>  | <b>1.7%</b>      | <b>100.0%</b>       |
| <b>Public subtotal</b>                   | <b>9</b>   | <b>1.4%</b>      | <b>100.0%</b>       |
| <b>Industry subtotal</b>                 | <b>3</b>   | <b>0.5%</b>      | <b>100.0%</b>       |
| <b>Grand total</b>                       | <b>632</b> | <b>100.00%</b>   |                     |

Respondents were not geographically representative of all dentists due to our sample selection and the location of HRSA-funded programs (Figure 13).

**Figure 13. State Distribution of Respondents' Clinical Practices**



## Secondary Occupation

In addition to primary practice settings, a number of individuals reported working in an HRSA priority setting as a secondary practice (Table 21). The most commonly reported secondary practice setting was a hospital (where many special needs patients are seen), followed by a dental school, safety net clinic, and public health program. Among AEGD and DPH completers, the most common secondary practice setting was a dental school, while among GPR and Pedo completers, the hospital position was most common.

**Table 21. Respondents' Secondary Occupations**

|                                    | N  | %     |
|------------------------------------|----|-------|
| Hospital position                  | 71 | 11.1% |
| Dental school faculty              | 44 | 6.9%  |
| Safety net clinic (ie, rural FQHC) | 25 | 3.9%  |
| Public health programs             | 15 | 2.4%  |

FQHC, federally qualified health center.

## Dental School Faculty

The shortage of dental school faculty has been an endemic problem in dental education, and a priority in more recent years for HRSA-funded programs is to support and develop this pipeline. Among the 85 completers who fell into this category, 26% reported being significantly influenced by their PGD experience, while 41% knew before embarking on PGD education that they wanted to be in academics. Twenty percent had started thinking about being involved in academics during their PGD program (Table 22).

**Table 22. Respondents' Motivation to Work in Dental Education**

|  | Program             |                    |                    |                     | Total % <sup>a</sup> |
|--|---------------------|--------------------|--------------------|---------------------|----------------------|
|  | AEGD % <sup>a</sup> | GPR % <sup>a</sup> | DPH % <sup>a</sup> | Pedo % <sup>a</sup> |                      |
| I knew even while in dental school that I wanted to be involved in academics     | 50.0                | 14.3               | 60.0               | 61.0                | 41.2                 |
| The PGD experience was a major factor in my decision to be involved in academics | 25.0                | 25.7               | 40.0               | 24.4                | 25.9                 |
| I started thinking about being involved in academics during my PGD               | 0.0                 | 17.1               | 0.0                | 26.8                | 20.00                |
| I did not start to think about being involved in academics until after my PGD    | 25.0                | 54.3               | 20.0               | 14.6                | 31.8                 |
| <b>Total, N</b>  | <b>4</b>            | <b>35</b>          | <b>5</b>           | <b>41</b>           | <b>85</b>            |

<sup>a</sup> Percentages add up to more than 100% as respondents could select multiple choices.

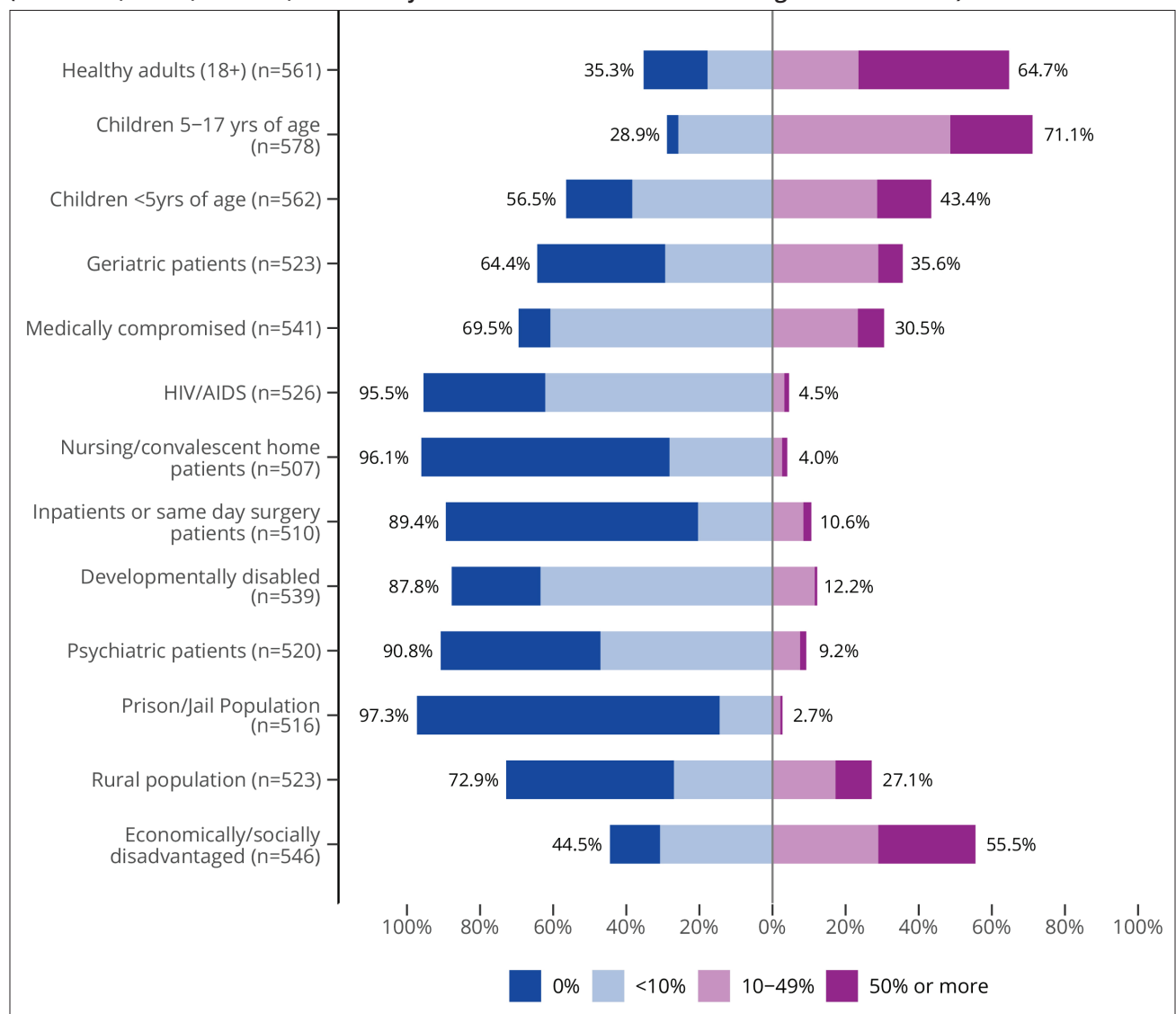


## Patient Characteristics

### Patient Demographics

One of the key HRSA goals is improving access to care for underserved patients. We examined the characteristics of the completers' patients and found a strong commitment to serving vulnerable and underserved patients (Figure 14). About 55% of respondents reported between 10% and 100% of their patient population as being economically or socially disadvantaged, with nearly half of those respondents reporting more than 50% of their patients in this category. Only 13.7% of respondents reported not seeing any patients in this category.

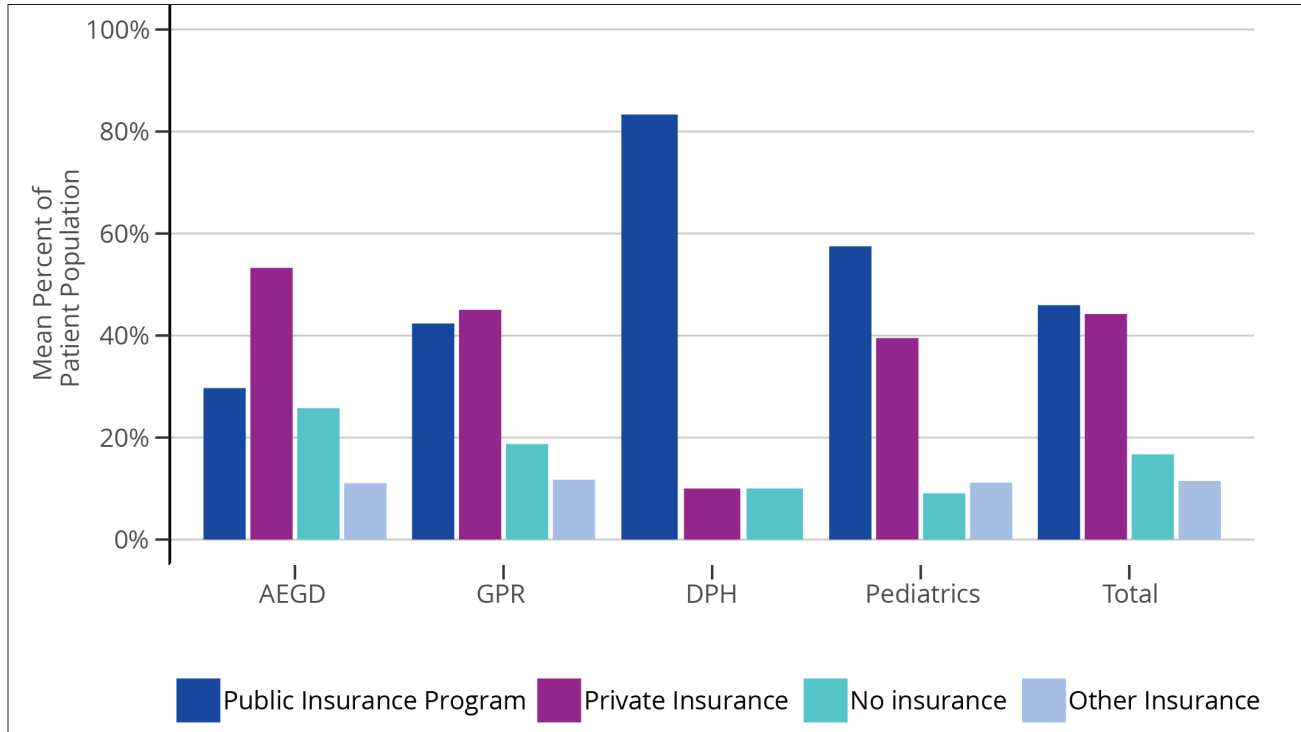
**Figure 14. Percentage of Completers Reporting Various Characteristics Among Their Patient Populations (Either 0%, <10%, 10–49%, or ≥50% of Their Patients Have the Following Characteristics)**



## Patient Insurance Status

When asked for the distribution of insurance status among their patients, the average proportion of respondents' patients with public insurance (45.9%) slightly exceeded the average proportion of patients with private insurance (44.2%), though this varied greatly by program type (Figure 15).

**Figure 15. Respondents' Mean Percentage of Patient Population by Insurance Type**

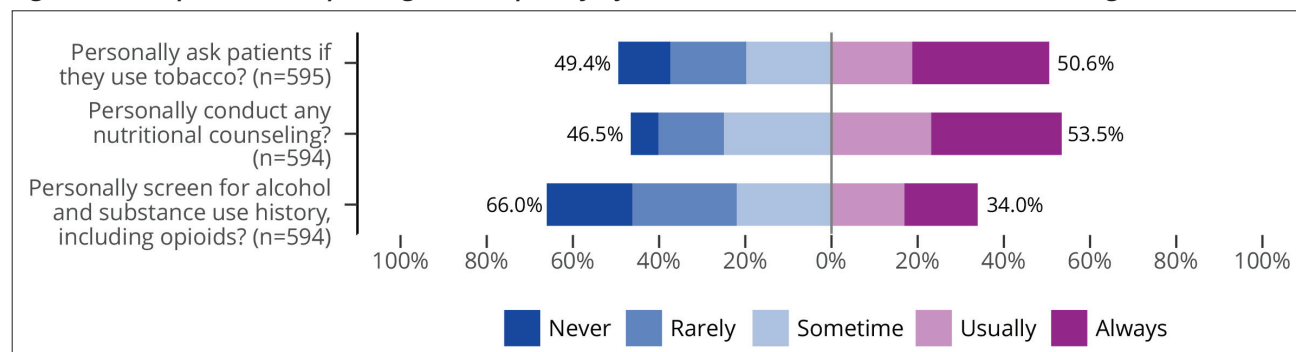


The mean public insurance patient load for DPH and Pedo completers (83.3% and 57.5%, respectively) was greater than that for AEGD and GPR completers (29.7% and 42.4%, respectively). However, AEGD and GPR completers reported more patients with no insurance (25.8% and 18.7%) than did DPH and Pedo completers (10.0% and 9.0%).

## Nutrition and Substance Use Counseling

A more recent focus of HRSA is on addressing the opioid epidemic, while nutrition and tobacco counseling have long been a priority as part of a focus on prevention. Using a 5-point scale from “never” to “always,” completers were asked if they personally counseled patients on these topics (Figure 16). More than half of respondents reported “usually” or “always” conducting tobacco and nutritional counseling, while 1 in 3 reported “usually” or “always” personally screening for alcohol and substance use history.

**Figure 16. Respondents Reporting the Frequency of Nutrition and Substance Use Counseling**



## Program-Reported Impacts

The purpose of this study was to examine practice patterns of graduates of primary care dental postgraduate training programs with a long-standing history of HRSA funding. To receive such funding for multiple cycles, the PGD education program would have to be strongly aligned with HRSA’s goals and mission, and the grants would support ongoing alignment and development.

Programs’ administrators reported 5 key impacts of HRSA funding on the sustainability of their programs. Many programs use these dollars to grow their programs—developing new programs, expanding the class size of existing programs, opening new training sites, or increasing resident lines and locations. The funding may also be used to further develop residency program content through such initiatives as developing a master’s-level program, adding public health content, and improving curriculum and didactic training. A related use of the investment is for faculty recruitment, retention, and loan repayment. Additionally, programs may use the funding to support residents directly through tuition support and stipends, or to purchase equipment for the training. Finally, operational costs were noted, including business development to become self sustaining.

## LIMITATIONS

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This study has several important limitations. First, the response rate of 44% in a convenience sample means that inferences from these data about comparable program outcomes or national trends cannot be made. The study design allows examination only of trends and descriptions, not of causal factors. For example, provider practice choices either may have been impacted by the programmatic training focus or may themselves have impacted the choice of training program to enter. The goal was only to understand the long-term outcomes of HRSA's investment in long-funded institutions and programs. DPH was included as a primary care dental specialty as it existed at the institutions sampled, but as the responses were very low, these findings in particular should be viewed as initial data only.

## DISCUSSION AND CONCLUSION

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When the experiences and long-term practice patterns of graduates of the surveyed set of HRSA-funded programs are judged against HRSA-specific stated goals, we find that the programs surveyed did indeed perform quite well in most priority areas.

Cumulatively, they produced a set of completers that is more diverse than the pool attending similar PGD programs nationally, particularly among African American and female completers, adding to the overall diversity of dental providers with advanced training. The completers surveyed were geographically dispersed, and although we did not independently assess rates of practice in dental health professional shortage areas (DHPSAs), nearly 30% of completers reported practicing in a DHPSA. We were, however, able to ascertain that these dentists both participate in Medicaid at a greater rate than all dentists (63% vs 38% nationally<sup>24</sup>) and see a substantial number of Medicaid patients relative to privately insured patients. More than half of completers also reported treating patients with special health care needs. These are very significant outcomes and speak to the long-term commitment of HRSA-funded programs to prepare a dental workforce focused on serving the underserved.

The quality of training was highly rated, with near-universal satisfaction among completers (97.4%) and a high likelihood of recommending their PDG training program to others (95.9%). In open-ended comment sections, the vast majority of comments were positive, with the few outlying negative comments focused on programmatic components rather than on the value of their education. There is evidence to suggest that these PGD programs are working toward meeting educational goals in several of HRSA's focus areas. Importantly, nearly all completers (92.7%) rated meeting the needs of underserved populations as something they felt prepared to do thanks to their training. More than three-quarters of completers felt prepared to care for special needs populations, and nearly 70% felt prepared to teach.

Finally, coinciding with HRSA's recent focus on faculty development, we found that nearly 1 in 5 respondents had earned additional postgraduate academic degrees following their PGD training, with 25 of those respondents reporting either a primary or secondary role in a faculty position. Those 25 new faculty members represented 36% of all reported faculty members and 40% of all completers who listed "dental school faculty" as their primary position.

## Policy Implications

### Alignment of Federal Funding Priorities and Workforce Policy

While the findings among this small set of institutions were generally positive, the number of institutions that receive HRSA funding is dwarfed by the overall number of programs, and the institutions that receive any postgraduate or GME funding is difficult to ascertain. The need and demand for postgraduate training by dental graduates is strong, and the lack of universal access to this training has significant downstream effects on other policy areas such as licensing and high educational debt burden. Our initial findings in this study indicate that the underlying institutional characteristics may be related to outcomes, either through recruitment or training experience (or both), and that investment around a set of strategic priorities can therefore lead to positive benefits. However, a more holistic assessment of the approach to funding graduate dental education is needed, with a vision of supportive policy mechanisms for comprehensive advanced training priorities that meet the needs of both the dental profession and the public.

### Specialty-Specific Trends

HRSA's definition of primary care includes a diverse set of programs, with AEGD and GPR programs focused on general practice (although with different focal areas even between them), which differs markedly from DPH and Pedo programs. We see distinctive patterns among these groups, with pediatric dentists still more likely to work in private practice than in safety net institutions, though children are now a universally covered population. While DPH is considered a nonclinical specialty, many of our survey respondents reported working clinically, and the use of the DPH residency as a pathway for FTDs is indicative of broader trends in supply and demand for DPH training that require further examination. AEGD and GPR programs provide advanced general training, and our data may also indicate a gateway to specialty training. However, no current data are available to assess specialty-specific trends and outcomes.

### Dental Workforce Data Collection

Long-term issues raised by this study require further research and data collection. We are not able to track or measure the impact with current data sets. Studies that use primary data collection are more expensive and focused on specific programs or issues. Investments in collaborations with institutions such as the ADA, the Health Policy Institute, and the American Dental Education Association—who maintain the most comprehensive workforce data sources and continue to expand and enhance these data for research and policy analysis—would be a critical next step in developing the evidence base for workforce policy.

In summary, the results of this study indicate a positive impact of the training experience on workforce preferences for practice and subsequent access to care in those practices, suggesting that these programs may be a model for professional training programs. Nevertheless, much more comprehensive and comparable information is needed for agencies to design and measure the long-term impact of the dollars invested in improving the capacity of the dental profession to address the oral health needs of the most vulnerable populations in the United States.





# References

## TECHNICAL REPORT REFERENCES

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1. Assael L. Current status of postdoctoral and graduate programs in dentistry. *J Dent Educ.* 2017;81(8):eS41-eS49.
2. Nicholson S, Vujicic M, Wanchek T, Ziebert A, Menezes A. The effect of education debt on dentists' career decisions. *J Am Dent Assoc.* 2015;146(11):800-807.
3. American Dental Association. 2017-18 Survey of Dental Education. <https://www.ada.org/en/science-research/health-policy-institute/data-center/dental-education>. Accessed April 30, 2019.
4. Lau A, Dodson TB, Sonis ST, Kaban LB. An outcomes study of 40 years of graduates of a general practice dental residency. *J Dent Educ.* 2015;79(8):888-896.
5. Takahashi T, Furusawa M, Katakura A, et al. Career paths and aspirations among postgraduate dental trainees on completion of clinical residency program at Tokyo Dental College. *Bull Tokyo Dent Coll.* 2014;55(2):103-109.
6. Atchison KA, Mito RS, Lefever KH, McCauley K. Introduction to section: Dentistry and primary care—an evaluation of postgraduate general dentistry training. *J Dent Educ.* 2002;66(6):728-729.
7. Atchison KA, Bibb CA, Lefever KH, Mito RS, Lin S, Engelhardt R. Gender differences in career and practice patterns of PGD-trained dentists. *J Dent Educ.* 2002;66(12):1358-1367.
8. Gatlin LJ, Handelman SL, Meyerowitz C, Solomon E, Iranpour B, Weaver R. Practice characteristics of graduates of postdoctoral general dentistry programs. *J Dent Educ.* 1993;57(11):798-803.
9. Mito RS, Atchison KA, Lefever KH, Lin S, Engelhardt R. Characteristics of civilian postdoctoral general dentistry programs. *J Dent Educ.* 2002;66(6):757-765.
10. National Center for Health Workforce Analysis. *Oral Health Training and Workforce Programs: Academic Year 2016-2017*. Rockville, MD: Bureau of Health Workforce, Health Resources and Services Administration; 2018.
11. Atchison KA, Mito RS, Lefever KH, et al. Analysis of federal support for postgraduate general dentistry. *J Dent Educ.* 2003;67(3):328-336.
12. Bureau of Health Professions. *Training in Primary Care Medicine and Dentistry: New Competition*. Rockville, MD: Health Resources and Services Administration; 2007.
13. Bureau of Health Workforce. Health Resources and Services Administration website. <https://www.hrsa.gov/about/organization/bureaus/bhw/index.html>. Accessed April 30, 2019.
14. Heisler EJ, Mendez BHP, Mitchell A, Panangala SV, Villagrana MA. *Federal Support for Graduate Medical Education: An Overview*. Washington, DC: Congressional Research Service; 2018.

15. National Center for Health Workforce Analysis. *Children's Hospital Graduate Medical Education Program: Academic Year 2016-2017*. Rockville, MD: Bureau of Health Workforce, Health Resources and Services Administration; 2018.
16. Segal L, Marsh C, Heyes R. The real cost of training health professionals in Australia: it costs as much to build a dietician workforce as a dental workforce. *J Health Serv Res Policy*. 2017;22(2):91-98.
17. American Dental Association. 2016-17 Survey of Advanced Dental Education. <https://www.ada.org/en/science-research/health-policy-institute/data-center/dental-education>. Accessed April 30, 2019.
18. Center for Health Care Strategies, Inc. *Medicaid Adult Dental Benefits: An Overview*. Updated November 2018. [https://www.chcs.org/media/Adult-Oral-Health-Fact-Sheet\\_112118.pdf](https://www.chcs.org/media/Adult-Oral-Health-Fact-Sheet_112118.pdf). Accessed April 30, 2019.
19. Atchison KA, Mito RS, Rosenberg DJ, Lefever KH, Lin S, Engelhardt R. PGD training and its impact on general dentist practice patterns. *J Dent Educ*. 2002;66(12):1348-1357.
20. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)—a metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform*. 2009;42(2):377-381.
21. Mertz E, Wides C, Gates P. The American Indian and Alaska Native dentist workforce in the United States. *J Public Health Dent*. 2017;77(2):125-135.
22. Mertz E, Calvo J, Wides C, Gates P. The Black dentist workforce in the United States. *J Public Health Dent*. 2017;77(2):136-147.
23. Mertz E, Wides C, Calvo J, Gates P. The Hispanic and Latino dentist workforce in the United States. *J Public Health Dent*. 2017;77(2):163-173.
24. American Dental Association. *Dentist Participation in Medicaid or CHIP*. Chicago, IL: Health Policy Institute, American Dental Association; 2018.





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