Adoption of Oral Health Curriculum by Physician Assistant Education Programs in 2014

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Purpose The purpose of the study was to describe inclusion of didactic and clinical instruction in oral health in physician assistant (PA) education programs in 2014. A previous study in 2008 found that PA education program directors generally understood the importance of teaching about the linkage of oral health with systemic health; yet, few programs had actually integrated oral health instruction into the PA curriculum. This study was undertaken to ascertain the number of PA programs teaching oral health topics and to evaluate the content of instruction and implementation strategies.

Methods The study used a Web-based survey using a skip logic design that branched respondents based on inclusion or the absence of an oral health curriculum in the PA education program. The questions included predefined response options with the opportunity for narrative responses and comments. Analysis of survey data was completed using SPSS (IBM) and SAS (SAS Institute, Inc) and consisted mainly of frequencies and cross tabulations.

Results There was greater inclusion of oral health curriculum in 2014 than in 2008 with most PA programs now providing didactic and clinical training in oral health. Stakeholders' efforts to engage PA program faculty with integration of oral health subject matter into core curriculum have resulted in wider availability of training for PA students in oral health promotion and prevention services.

Conclusions Efforts to equip PA faculty to teach oral health topics and clinical skills should continue as past efforts have resulted in wider integration of oral health subject matter into core PA curriculum.

INTRODUCTION

Published in 2000, "Oral Health in America: A Report of the Surgeon General" focused attention on the "silent epidemic" of oral disease in the United States and the disproportionate burden of poor oral health in older and younger populations, those in lower socioeconomic groups, and people from diverse racial and ethnic backgrounds.[1] Efforts to improve the oral health status of the population have increased since that time, but significant disparities in oral health persist. Dental caries is a preventable disease; yet, it occurs 5 times more frequently than asthma[1] and is the most common chronic disease of childhood.[2] More than 51 million school hours and 164 million work hours are lost each year due to dental disease, contributing to educational disparities among children and decreased productivity in the US economy.[3]

Although numerous factors contribute to poor oral health, including uneven access to dental services, socioeconomic limiters, and low oral health literacy, the relative lack of attention to oral health among health care professionals is also a significant contributing factor.[4] Medicine and dentistry typically have been viewed as complementary disciplines treating patients in distinct silos of care.[5] As a result, oral health screening, prevention, and promotion services have been absent from health care with physicians, physician assistants (PAs), nurses, and others not trained in these competencies.[4] The isolation of dentistry from other health professions is a structural issue that exacerbates oral health disparity affecting oral health delivery, payment policy, and patients' oral health outcomes.[6] The emerging science that connects oral health with general health is the "nexus" that links all clinicians to oral health and the opportunity to increase access to oral health services.[7]

Recommended next steps for improving the oral health status of vulnerable and underserved populations include expanding the type of providers authorized to deliver oral health care and the use of collaborative and multidisciplinary teams across our health care system.[8] The Patient Protection and Affordable Care Act encourages interprofessional collaborations and team-based service delivery in the provision of comprehensive, accountable high-quality health care.[9] Creating an integrated collaborative health workforce requires new strategies to train clinicians in interdisciplinary programs that integrate different academic fields of study.[5] The current growth in interprofessional education is an attempt to address historically fragmented health care practices[5] that have contributed to existing health and oral health disparities in the population.

Physician assistants and other health professionals are acknowledged as playing an important role in improving the oral health status of their patients.[10] The Health Resources and Services Administration in its recent report, *The Integration of Oral Health and Primary Care Practice*, described core oral health clinical competencies for frontline primary care clinicians, including PAs, and also outlined strategies for implementation of oral health competencies in primary care practice and safety net settings.[11]

In 2010, the National Interprofessional Initiative on Oral Health[12] supported the creation of the PA Leadership Initiative

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in Oral Health, which uses the social change strategy of collective impact.[13] This strategy engages the leadership of the 4 major PA professional organizations, including the American Academy of Physician Assistants, the Accreditation Review Commission on Education for the Physician Assistant, the National Commission on Certification of Physician Assistants (NCCPA), and the Physician Assistant Education Association (PAEA), working collectively toward the shared goal of preparing the PA workforce for an expanded role in reducing oral health disparities.[14] For example, PA education programs are increasingly integrating didactic and clinical training in oral health topics into their core curricula in the belief that PAs who are trained to understand the importance of oral health to overall health will foster positive oral health behaviors and improved oral health outcomes in their patients.[15]

This article describes a recent study of PA education programs to identify those that are providing oral health education for PA students, determine the depth of integration of oral health topics into core curricula, describe the areas of the existing curriculum in which education about oral health and oral disease is incorporated, understand the use of interprofessional education to learn about oral health, and define the methods used to deliver instruction in oral health.

METHODS

This study used a survey of all PA education programs to describe the integration of oral health content into the existing PA curriculum in 2014. The survey was preceded by a small number of interviews with PA program directors to understand their experience with integrating oral health topics into PA education. The interviews were nondirective and semi-structured using a protocol of key questions to elicit responses. The information provided during these interviews guided study staff in framing pertinent questions for inclusion in the survey instrument. The study was supervised by the New York State Department of Health Institutional Review Board.

The survey, which required between 5 and 10 minutes to be completed, was hosted on the Web and accessed through individualized links. Survey questions were followed by predefined response options although some questions included an "other" response that permitted the respondent to describe the meaning of "other," if selected, in narrative form. The survey also included 3 open-ended questions, which also solicited narrative comments. Completion of the survey by a program director constituted implied consent to participate in the research.

Although survey respondents answered a common set of core questions, the survey used a skip logic design that directed respondents to different sets of questions depending on individual responses to select items. Respondents were branched based on the current inclusion or the absence of an oral health curriculum in their PA program. This methodology was selected to improve the rate of survey completion and reduce the likelihood of survey abandonment.

In January 2014, PAEA sent an email to the directors of 182 accredited PA education programs describing the survey research. A second email soliciting participation and providing an individualized link to the survey was sent by the nccPA Health Foundation to all program directors a few days later. Thereafter, approximately every 10 days, email reminders were sent to program directors who had not yet completed the survey. The survey was closed to accruals on February 5, 2014, at which point 125 responses (68.7%) from program directors had been received.

Analysis of survey data consisted of frequency distribution and analysis of mean values as well as cross tabulation. The authors conducted χ^2 testing to evaluate differences in the proportion of survey respondents and nonrespondents by geographical region and between PA programs with and without oral health curriculum by selected characteristics. A *t*-test was used to assess the difference in the mean number of graduates per year between PA programs with and without an

Table 1: Percent Distribution of Survey Response of Physician Assistant Programs by Geographic Location (2014)

US Health Resources and Services Administration Region	Survey Respondents (n = 125), %	Survey Nonrespondents (n = 57), %	All PA Programs (N = 182), %
Region 1: ME, NH, VT, MA, RI, CT	7.2	3.5	6.0
Region 2: NY, NJ	11.2	19.3	13.7
Region 3: DE, DC, MD, PA, VA, WV	13.6	24.6	17.0
Region 4: AL, GA, FL, KY, MS, NC, SC, TN	20.8	14.0	18.7
Region 5: IL, IN, MI, MN, OH, WI	19.2	15.8	18.1
Region 6: AR, LA, NM, OK, TX	8.8	8.8	8.8
Region 7: IA, KS, MO, NE	4.8	3.5	4.4
Region 8: CO, MT, ND, SD, UT, WY	4.0	1.8	3.3
Region 9: AZ, CA, HI, NV	6.4	8.8	7.1
Region 10: AK, ID, OR, WA	4.0	0.0	2.8
Total	100.0	100.1	99.9

Total does not equal 100% due to rounding error. There is no significant difference in the proportion of respondents and nonrespondents by region (*P* for χ^2 test > .10).

PA, physician assistant.

oral health curriculum. Data analysis was performed in SPSS version 22 (IBM, Armonk, NY) and SAS 9.3 (SAS Institute, Inc, Cary, NC). To detect subtle differences between groups, the statistical tests were considered significant if the 2-sided *P* was less than .10.

RESULTS

In 2014, PA education programs were geographically dispersed across the United States. More than half of all PA programs (53.8%) were located in region 3 (17.0%), region 4 (18.7%), and region 5 (18.1%) as shown in Table 1. The geographic location of survey respondents in 2014 appeared to be similar to the geographic distribution of survey nonrespondents.

The prevalence distribution of oral health curriculum integration by the types of host institutions of PA program respondents is shown in Table 2. Respondents with and without oral health curriculum were comparable relative with the type of host institution in which the PA education program was located.

There is no significant difference in the proportion of PA program respondents with and without oral health curriculum by institutional type (*P* for χ^2 test > .10).

Survey respondents reporting integrated oral health curriculum graduated, on average, 45.8 students annually as shown in Table 3. Physician assistant program respondents who did not currently use an oral health curriculum had a lower mean number of graduates (39.8). The mean class size difference of 6 students between programs that did and did not include oral health curriculum was statistically significant at $P < .10$.

More than three-quarters (78.4%) of PA program directors (98 of 125 survey respondents) indicated that their program included specific curriculum on oral health and oral disease. The following analyses focus on these programs.

Table 2: Percent Distribution of Oral Health Curriculum Integration in Physician Assistant Program Respondents by Institutional Type (2014)

Institutional Type	PA Program Respondents With Oral Health Curriculum (n = 96), %*	PA Program Respondents Without Oral Health Curriculum (n = 27), %
Community college	1.0	7.4
College	11.5	11.1
University	56.3	59.3
Academic medical center	30.2	18.5
Other	1.0	3.7
Total	100.0	100.0

Tabulations include only those programs that indicated providing any clinical training. Programs that did not provide clinical training were excluded from the analysis.

*Two of 98 respondents did not report the institutional type.

PA, physician assistant.

Physician assistant program directors with integrated oral health curricula used a variety of teaching strategies to instruct students about oral health as shown in Figure 1. Physician assistant programs commonly integrated instruction about oral health and oral disease into existing subject areas (72.4%). More than half (53.1%) of PA programs provided instruction in oral health to students in stand-alone lectures. About one-third (31.6%) of programs had students access an online oral health curriculum.

Program directors were asked to describe the parts of the existing PA education curriculum into which oral health topics had been integrated with the option to select multiple subject areas. Figure 2 describes topical areas into which oral health was integrated in PA education programs. Three-quarters of program directors (74.5%) indicated that instruction about oral health was included in the "medicine" component of the existing curriculum. Almost two-thirds (63.3%) taught about oral health and oral disease during "physical diagnosis" instruction, and 51.0% included oral health instruction when teaching "pediatrics."

Two-thirds (64.6%) of the PA programs offering training in oral health topics provided 4 or more hours of didactic instruction related to oral health as shown in Table 4. Sixty of the programs that had integrated oral health curriculum indicated that they provided clinical instruction on oral health for students, and most of those (71.7%) provided 3 or fewer hours of clinical skills training in oral health examination and fluoride application. Three percent of PA education programs provided more than 15 hours of either didactic instruction and/or clinical skills training in oral health.

Although 75.5% of PA programs that provided clinical skills training taught students to perform a complete oral examination, only 24.5% of those programs instructed students in applying fluoride varnish, and just 19.4% taught students to perform a knee-to-knee or head-to-knee oral examination on a young child, as shown in Figure 3. Importantly, in many PA programs, students had an opportunity to use their oral health knowledge and demonstrate clinical skills in clinical training experiences with patients (72.2%) and in volunteer/community activities organized by their PA education programs (61.8%).

Table 3: Average Number of Annual PA Graduates by Oral Health Curriculum Integration in Physician Assistant Program Respondents (2014)

Annual PA Graduates	PA Program Respondents With Oral Health Curriculum (n = 96)*	PA Program Respondents Without Oral Health Curriculum (n = 26)*
Mean	45.8	39.8
Standard deviation	19.9	15.0
Minimum–maximum	15–130	14–82

There is a significant difference in the mean of annual graduates between PA program respondents with and without oral health curriculum (*t*-test significant at $P < .10$).

*Two of 98 respondents did not report the number of PA graduates, and 1 of 27 respondents are new PA program respondents.

PA, physician assistant.

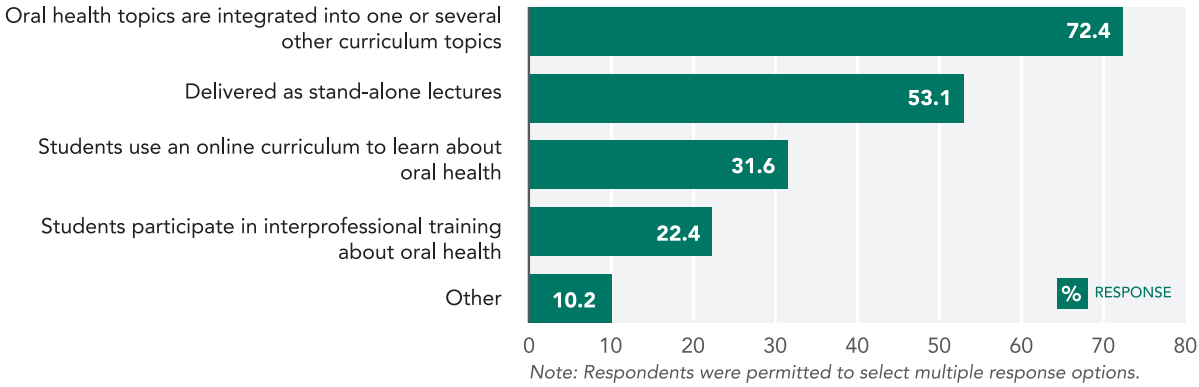


Figure 1. Percent distribution of physician assistant program respondents incorporating oral health by method of delivery of oral health instruction, 2014

The most common oral health topics covered in PA education programs were "infectious disease and common oral pathology" (88.8%) and "chronic systemic disease and oral health" (85.7%). Table 5 shows the oral health topics covered by PA education programs with incorporated oral health curriculum. Respondents were permitted to select multiple response options.

Directors of PA education programs with integrated oral health curriculum also were asked to describe the oral health skill sets taught in these programs. Table 6 describes the multiple oral health skills taught in PA education programs, the most common of which were "identifying oral and pharyngeal cancers" (87.8%) and "identifying oral manifestations of systemic disease" (78.6%).

The use by PA education programs of the "Smiles for Life" oral health online curriculum developed by the Society of Teachers of Family Medicine was of interest because it is a publicly available tool for learning about oral health that is widely endorsed by dental and medical associations.[16] Now in its third edition, the curriculum is organized as 8 distinct modules for classroom presentation and online learning.[16] Eighty-five percent of the directors of PA education programs that currently provide instruction in oral health and 59.3% of directors of programs that do not currently include oral health curricula were familiar with "Smiles for Life." Forty-four percent of programs that included oral health didactic or clinical education used the "Smiles for Life" curriculum, at least in part, in the classroom or on the Web to instruct about oral health. Some of these programs used the "Smiles for Life" curriculum in multiple ways, both in classroom instruction (48.8%) and on the Web (62.8%).

Table 7 was compiled to show the courses from "Smiles for Life" used by PA programs. Among the 43 PA education programs that used the "Smiles for Life" curriculum, more than three-quarters (76.7%) used the entire curriculum. The remainder used only some modules. Among the 23.3% of programs that used only parts of the "Smiles for Life" curriculum, all used "Course 2: Child Oral Health."

All PA program directors were asked to indicate when they first became aware of efforts to teach PA students about oral health and to indicate all sources of that information. As shown in Table 8, program directors who were currently teaching about oral health (34.7%) were significantly more likely than those who were not (14.8%) to indicate that they first became aware of efforts to introduce oral health topics into PA education from training received at PAEA faculty development workshops ($P < .05$). Directors of programs with an oral health curriculum were more likely than those without to have learned

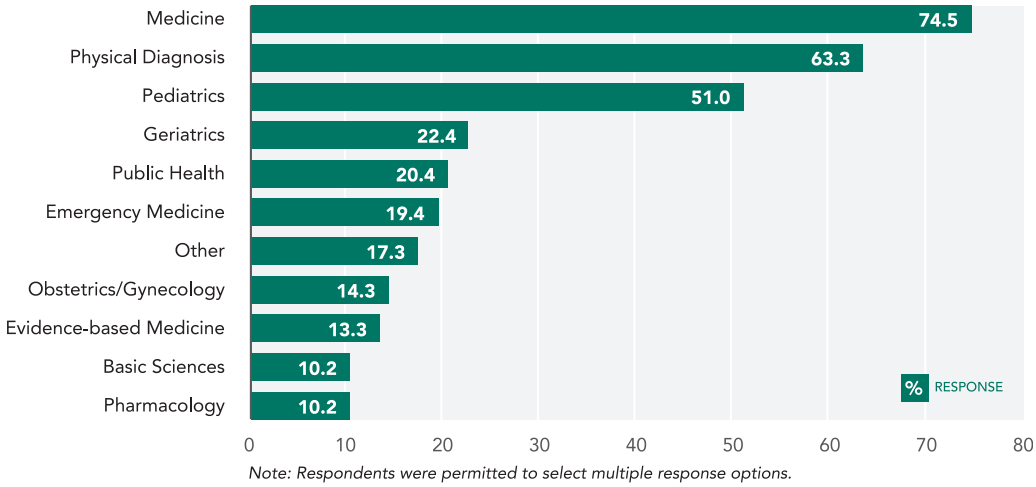


Figure 2. Percent distribution of physician assistant (PA) program respondents incorporating oral health instruction by topical areas in existing PA curriculum, 2014

Table 4: Percent Distribution of Physician Assistant Program Respondents by Number of Hours of Didactic Instruction and Clinical Skills Training in Oral Health Provided to Physician Assistant Students (2014)

Number of Hours	PA Program Respondents With Oral Health Curriculum Providing Didactic Instruction in Oral Health (n = 93), %*	PA Program Respondents With Oral Health Curriculum Providing Clinical Training in Oral Health (n = 60), %*
1–3	35.5	71.7
4–6	31.2	18.3
7–9	19.4	5.0
10–12	8.6	1.7
13–15	2.2	0.0
>15	3.2	3.3
Total	100.1	100.0

Total does not equal 100% due to rounding error.

*Three of 98 respondents did not answer the question, and 2 respondents indicated clinical but not didactic instruction.

PA, physician assistant.

about oral health education initiatives through continuing medical education (21.4% vs 7.4%, $P < .10$) or from "other" sources including workshops on oral health sponsored by the Association of American Medical Colleges (AAMC) or the NCCPA (18.4% vs 3.7%, $P < .10$).

Although all PA education programs teaching oral health (100%) used PA faculty to instruct on the subject, many programs also used other professional faculty as shown in Table 9. About one-third of the programs providing instruction in oral health used dental faculty (36.0%) and/or medical faculty (31.5%) to teach oral health topics. Physician assistant programs in academic medical centers (15.7%) and universities (12.4%) accessed dental faculty more than those in colleges. Physician assistant programs housed in universities (13.5%) and academic medical centers (12.4%) also relied on medical faculty more than programs located in colleges.

Directors were asked if their PA education program had access to interprofessional education (IPE) opportunities in oral health. Among the 98 programs with oral health curriculum, 41 programs (41.8%) had access to IPE opportunities. However, only 27 of the 41 programs with access (68.3%) engaged in IPE for PA students. Table 10 presents the type of students with whom PA students learned about oral health by the type of the host institution. Among the programs using IPE, many indicated that their students learned about oral health with dental students (44.4%) or nursing students (44.4%).

Respondents were also asked to indicate if there were any statutory or regulatory barriers in the state in which the PA program was located that prevented practicing PAs from providing oral health services. Almost half of the survey respondents indicated that there were no statutory or regulatory barriers for PAs providing oral health services (48.0%) in the state. However, 47.2% were uncertain if there were any barriers to PAs providing these services, and the remainder indicated that there were regulatory barriers (3.7%). An example of a barrier is regulatory restriction on PAs applying fluoride varnish.

Physician assistant programs that did not at the time of the survey include any formal oral health curriculum (N = 27) were asked if the program had ever considered using specific curriculum focused on oral health and disease. Programs were equally likely to have considered (48.1%) or to never have considered (48.1%) integration of oral health topics into their curriculum. Among PA education programs that did not include specific oral health curricula, the reasons most commonly cited for not doing so were lack of available time to include oral health topics in PA education (70.4%) and lack of available faculty with content expertise in oral health (59.3%), as shown in Figure 4.

DISCUSSION

Concerns about the oral health of disadvantaged and vulnerable populations and the scientific evidence of links between oral and systemic health support the objective of encouraging dental–medical collaborations and interprofessional training especially in oral health promotion and disease prevention.[17,18] National policy objectives to increase access to oral health services have resulted in educational initiatives to enhance oral health competencies of health care professionals, particularly primary care clinicians.[8,19] As a result, the integration of oral health curriculum into PA core curricula has been a topic of interest to researchers.

In 2006, Danielsen et al[10] conducted a study to determine the self-perceived skills of PAs and nurse practitioners performing various oral health competencies. In 2010, Jacques et al[20] published the results of a 2008 survey of PA program directors to describe interest in and attitudes about

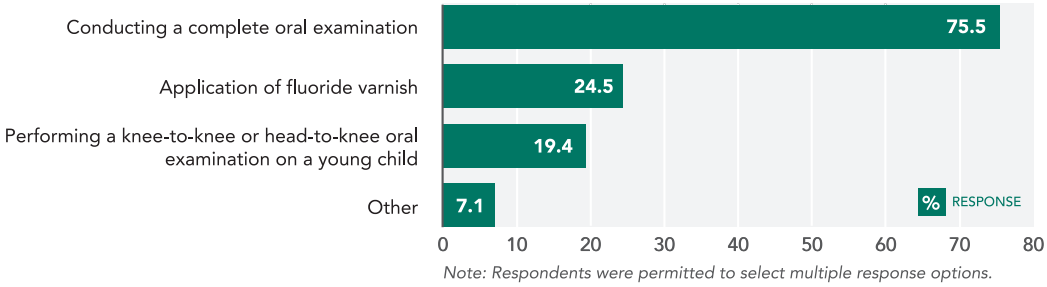


Figure 3. Percent distribution of physician assistant (PA) program respondents incorporating oral health instruction by clinical skills related to oral examination demonstrated to and performed by PA students, 2014

Table 5: Percent Distribution of Physician Assistant Program Respondents by Oral Health Topics Covered (2014)

Topics Covered in the Oral Health Curriculum	PA Program Respondents With Oral Health Curriculum (n = 98), %
Infectious disease and common oral pathology	88.8
Chronic systemic disease and oral health (ie, cardiovascular disease, diabetes, etc)	85.7
Oral pathogens and transmission of caries	78.6
Normal dental development	76.5
Impact of common medications on oral health	68.4
Pain syndromes including temporomandibular joint dysfunction	68.4
Nutrition and oral health	63.3
Social determinants of oral health and health care disparities	50.0
Pregnancy and oral health	45.9
Other	4.1

Respondents were permitted to select multiple response options.
PA, physician assistant.

Table 6: Percent Distribution of PA Program Respondents by Oral Health Skills Taught (2014)

Skills Covered in the Oral Health Curriculum	PA Program Respondents With Oral Health Curriculum (n = 98), %
Identifying oral and pharyngeal cancers	87.8
Identifying oral manifestations of systemic disease	78.6
Identifying early signs of dental decay	74.5
Obtaining an oral and dental health history	73.5
Responding to dental trauma and dental emergencies	72.4
Consultation and referral to a dental provider	72.4
Identifying oral manifestations of eating disorders	71.4
Identifying oral manifestations of sexually transmitted disease	71.4
Identifying oral manifestations of immune disorders (eg, HIV)	70.4
Conducting a risk assessment for oral disease	69.4
Providing anticipatory guidance and education on oral health prevention	66.3
Identifying periodontal disease	66.3
Identifying oral manifestations of substance abuse	57.1
Other	3.4

Respondents were permitted to select multiple response options.
PA, physician assistant.

integration of oral health topics into core curriculum. Also in 2010, Anderson et al[5] studied the integration of oral health topics into an interdisciplinary curriculum at a university to understand which parts of the oral health curriculum were most significant in changing PA students' knowledge of oral health. Bowser et al[21] published a study in 2013 to describe gains in knowledge about oral health after implementation of an oral health curriculum in a PA education program. Although each of these studies addressed some aspect of integration of oral health into PA core curricula, there were no recent data on the actual numbers of PA education programs that had adopted any oral health curriculum, the methods used to instruct PAs about oral health, or the amount of didactic or clinical instruction time devoted to oral health education. This study was undertaken to address this lack of current data.

A literature review found evidence that education programs for medical professionals had been integrating oral health curriculum with core curriculum over the past decade. Jacques et al found in a 2008 survey that 93% (n = 77) of respondents (N = 83) believed that PA programs had a responsibility to educate PA students about oral health, and 74.7% also agreed that dental disease prevention should be included in PA education.[20] At that time, 55.6% (n = 46) of survey respondents indicated teaching students about examining children's teeth for cavities for an average of 3.6 instructional hours; yet, only 20.5% of PA education programs were covering oral disease prevention and health promotion in their curriculum.[20] A 2009 survey of 154 US medical and osteopathic schools asking them about the extent of inclusion of oral health curriculum in their medical education found that 69.3% (n = 61) of responding programs (N = 88) reported integration of less than 5 hours of oral health curriculum, and 10.2% of responding programs (n = 9) offered no oral health curriculum.[22] Understanding whether the number of PA programs including oral health curriculum had increased in recent years was a goal of this research.

Although it was difficult to compare results of the survey by Jacques et al in 2008[20] with the 2014 survey of PA education programs because of differences in methodology and survey design, it was apparent that there was increased adoption of oral health curriculum and an expansion in scope of content of oral health topics in PA programs in recent years. The 2014

Table 7: Percent Distribution of Physician Assistant Program Respondents Using "Smiles for Life" by Courses Used to Instruct Physician Assistant Students (2014)

Parts of the "Smiles for Life" Curriculum Used by Programs Accessing the Curriculum	PA Program Respondents With Oral Health Curriculum Using "Smiles for Life" (n = 43), %
All modules	76.7
Course 1: The Relationship of Oral to Systemic Health	18.6
Course 2: Child Oral Health	23.3
Course 3: Adult Oral Health	11.6
Course 4: Acute Dental Problems	9.3
Course 5: Oral Health and the Pregnant Patient	7.0
Course 6: Caries Risk Assessment, Fluoride Varnish, and Counseling	9.3
Course 7: The Oral Examination	16.3
Course 8: Geriatric Oral Health	9.3

Respondents were permitted to select multiple response options.

PA, physician assistant.

survey found that 78.4% (n = 98) of responding programs (N = 125) had integrated oral health content into their curriculum, indicating that efforts to encourage integration of oral health into PA education have resulted in an uptake of PA program curriculum covering oral health and oral disease.

Consistent with the recommendations of the AAMC in *Contemporary Issues in Medicine: Oral Health Education for Medical and Dental Students*,[23] the breadth of oral health topics in PA programs in 2014 was considerable, covering disease prevention, identification of caries and oral cancers, risk assessment, and oral health counseling, among others. Physician assistant programs that responded to the survey had integrated didactic instruction in oral health across a broad spectrum of subject areas in PA curriculum but especially in course material related to medicine (74.5%), physical diagnosis (63.3%), and pediatrics (51.0%).

Results from the survey showed that oral health topics were more widely integrated into didactic instruction than in the past; yet, the survey also revealed that PA programs devoted less time to practical clinical instruction and skills demonstration in oral health than to classroom instruction on the topic. Although most PA programs with oral health instruction provided at least one hour and up to more than 15 hours of didactic instruction, only 60 of the 98 programs (63.2%) instructing in oral health provided any clinical training time for students. Among programs that provided clinical training, most (71.7%) provided 3 or fewer hours of clinical skills demonstrations with only 28.3% of programs providing more than 3 hours of clinical instruction time. Consistent with national policy objectives encouraging the training of primary care clinicians in oral health competencies,[11] 75.5% of PA programs with oral health curriculum were teaching students to conduct a complete oral examination, and many programs also provided opportunities for students to demonstrate oral health skills in clinical training (72.2%) or through volunteer/community activities in oral health (61.8%). These data, however, suggest that there may be further opportunities to integrate clinical skills instruction and demonstration into existing oral health curricula to increase the competency of PAs to perform oral examinations and provide preventive services.

Table 8: Percent Distribution of Physician Assistant Program Respondents by Source of Directors' First Awareness of Efforts to Teach Physician Assistant Students About Oral Health Topics (2014)

First Awareness of Efforts to Teach PA Students About Oral Health	PA Program Respondents With Oral Health Curriculum (n = 98), %	PA Program Respondents Without Oral Health Curriculum (n = 27), %
From a conference presentation	41.8	48.1
Conversation with a PA colleague	34.7	37.0
From an article in a professional newsletter or journal	34.7	44.4
Training at a PAEA faculty development workshop on oral health**	34.7	14.8
Continuing medical education credit activities*	21.4	7.4
Other*	18.4	3.7
Conversation with a dental colleague	15.3	3.7
Participation in an nccPA Health Foundation Leadership Summit on oral health	8.2	11.1
Conversation with a medical colleague	4.1	0.0

Respondents were permitted to select multiple response options.

There is a significant difference in the proportion of PA program respondents with and without oral health curriculum by type of first awareness (χ^2 test significant at: $^{**}P < .05$, $^{*}P < .10$).

NCCPA, National Commission on Certification for Physician Assistants; PA, physician assistant; PAEA, Physician Assistant Education Association.

Table 9: Percent Distribution of Physician Assistant Program Respondents Teaching Oral Health Topics by Type of Faculty Used and Type of Institution in Which the Physician Assistant Program Is Located (2014)

Type of Faculty Instructing Students About Oral Health	Community College (n = 1), %	College (n = 8), %	University (n = 52), %	Academic Medical Center (n = 28), %	All PA Program Respondents With Oral Health Curriculum (n = 89), %*
PA faculty	1.1	9.0	58.4	31.5	100.0
Dental faculty	1.1	6.7	12.4	15.7	36.0
Medical faculty	0.0	5.6	13.5	12.4	31.5
Dental hygiene faculty	0.0	1.1	11.2	6.7	19.0
Community dentist	0.0	2.2	4.5	1.1	7.9
Other	0.0	1.1	2.2	4.5	7.9
Nursing faculty	0.0	3.4	1.1	2.2	6.7

Respondents were permitted to select multiple response options.

*Nine of 98 respondents did not report the type of faculty used and/or the type of institution.

PA, physician assistant.

Although 41 PA education programs providing oral health instruction had access to IPE opportunities for PA students to learn about oral health topics with students from other health disciplines, just 27 programs were actively using interprofessional training opportunities. Physician assistant programs with IPE were mainly located in universities (N = 13) and academic medical centers (N = 10). Many of the innovative programs in interdisciplinary education have begun in academic medical centers.[24]

In the 27 programs using IPE, students were actively involved in learning about oral health with students from other professional education programs. In some, PA students received oral health instruction with students from multiple disciplines at the same institution. Programs with access to IPE should be encouraged to explore these opportunities because interdisciplinary training is recognized as an important tool in enabling collaboration and creating effective health care teams.[25] Collaborations between the medical and dental sectors have the potential to reduce oral health disparities and positively impact oral health outcomes.[8,26]

Although PA programs universally used PA faculty to instruct on oral health topics (100.0%), many also used faculty from other disciplines, including dentistry (36.0%) and medicine (31.5%), to teach about oral health. The opportunity to use other professional faculty was mainly available to PA programs located in universities or academic medical centers where other clinical training programs were located. Accessing faculty from other disciplines to facilitate interdisciplinary learning is an effective strategy for maximizing resources and building collaborations among both students and faculty.[27]

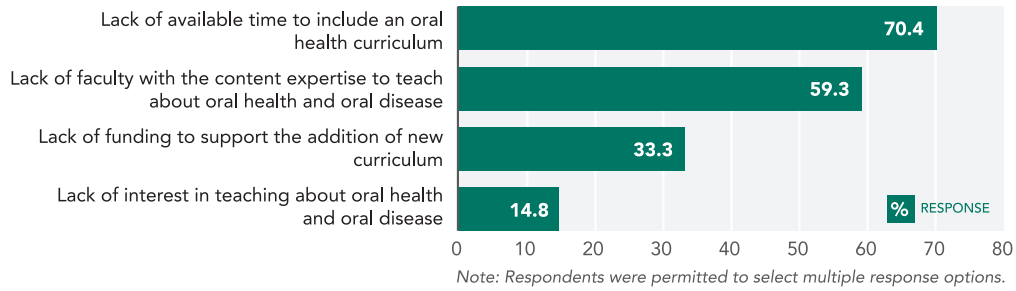
Among the program directors who indicated there was no oral health curriculum in their education programs (21.6% of all respondents), about half (48.1%) revealed that the PA program had "never" considered incorporating an oral health curriculum. This suggested an opportunity to further educate faculty in PA programs about the importance of oral health to systemic health and its impact on health outcomes, especially in

Table 10: Percent Distribution of Physician Assistant Program Respondents Engaged in Interprofessional Education with Other Professional Education Programs by Types of Students With Whom Physician Assistant Students Learn and by Type of Institution in Which the Physician Assistant Education Program Is Located (2014)

Type of Students Sharing IPE Activities with PA Students	College (n = 3), %	University (n = 13), %	Academic Medical Center (n = 10), %	Other (n = 1), %	All PA Program Respondents With Oral Health Curriculum Using IPE (n = 27), %
Dental students	3.7	18.5	22.2	0.0	44.4
Nursing students	7.4	18.5	18.5	0.0	44.4
Dental hygiene students	3.7	29.6	3.7	0.0	37.0
Medical students	0.0	11.1	18.5	0.0	29.6
Pharmacy students	3.7	14.8	11.1	0.0	29.6
Dental residents	3.7	11.1	11.1	0.0	25.9
Other	0.0	7.4	3.7	3.7	14.8

Respondents were permitted to select multiple response options.

IPE, interprofessional education; PA, physician assistant.



Note: Respondents were permitted to select multiple response options.

Figure 4. Percent distribution of physician assistant program respondents that do not currently provide training in oral health by reasons for not integrating oral health curricula, 2014

patients with chronic disease. The most common reason selected by respondents for not including oral health topics in PA training was lack of available time (70.4%) followed by lack of faculty with content expertise to teach about oral health and oral disease (59.3%). To increase the competence of program faculty with oral health topics, program leadership could encourage participation in continuing education offerings and oral health workshops or the use of "Smiles for Life" and other available online curricula.

Although the high response rate and the uniform geographic distribution of survey respondents and nonrespondents in 2014 suggest that the results of the survey are representative of PA education programs overall, caution is suggested in generalizing results to nonrespondent programs.

CONCLUSIONS

Many PA programs now commonly educate PA students about the connection between oral and systemic health and the importance of oral health promotion and prevention. Study results indicated considerable breadth in the number of PA education programs that had formally adopted an oral health curriculum. In addition, there was substantial depth in oral health content in the programs with oral health topics integrated into a broad and comprehensive range of subject areas.

However, the survey also revealed opportunities to increase the number of PA education programs integrating oral health curriculum. A percentage of survey respondents (and likely some nonrespondents) had yet to engage with efforts to teach PA students about oral health. In addition, although many programs had incorporated oral health didactic instruction, some did not also include accompanying clinical instruction on oral health examination and other skills.

Findings suggest a need for ongoing continuing education of PA faculty about the importance of oral health training for students. Present efforts to engage programs with oral health education should be continued, especially in light of the already successful inclusion of oral health instruction in most PA programs. In addition, consideration should be given to helping programs develop a strategy for engaging other health professions in interprofessional learning in oral health to enhance opportunities to advance interprofessional practice and access to oral health care.

Although the survey examined educational practices related to oral health didactic and clinical training, the level of integration of that learning into PA clinical practice remains a question. Several preliminary studies are underway to evaluate whether PA students incorporate oral health screening, prevention, and promotion services into their clinical rotations, but it is largely unknown if PA students incorporate these services into their clinical practices once graduated and professionally active. A study of PAs who have had didactic and clinical instruction in oral health during preparatory education would be instructive to determine how that training translates to practice and to identify facilitators and barriers to providing oral health services in clinical settings.

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