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Determinants of Oral Health Assessment and Screening in Physician Assistant Clinical Practice

OHWRC
Oral Health Workforce Research Center

Center for Health Workforce Studies
School of Public Health
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PREFACE

The Oral Health Workforce Research Center (OHWRC) at the Center for Health Workforce Studies (CHWS) at the University at Albany, completed a research project to understand the inclusion of oral health screening and assessment services in physician assistant clinical practice across the US.

This project included a literature review and a survey of a sample of physician assistants to collect primary data about their clinical practices related to oral health services. The goal of the study was to understand uptake among physician assistants of oral health service provision and to describe the predictors of integration including specialty, setting, and education in oral health competencies in professional education programs.

The report was prepared for OHWRC by Margaret Langelier, Simona Surdu, and and Jingya Gao from CHWS, with layout design by Leanne Keough. Anita Glicken from the National Interprofessional Initiative in Oral Health (NIIOH) also contributed to this report. OHWRC is supported by the Health Resources and Services Administration (HRSA) of the US Department of Health and Human Services (HHS) under grant number U81HP27843, a Cooperative Agreement for a Regional Center for Health Workforce Studies. The content and conclusions of this report are those of OHWRC and should not be construed as the official position or policy of, nor should any endorsements be inferred by, HRSA, HHS, or the US government.

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 HRSA-sponsored research center with a unique focus 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 School of Public Health, University at Albany, SUNY, or other subcontractors.

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TABLE OF CONTENTS

Executive Summary

BACKGROUND

Integration of oral health with primary medicine was a theoretical goal verbalized in the Surgeon General's Report, *Oral Health in America*, in 2000. However, progress towards that goal has been slow, and oral health disparities in the population continue to exist almost 2 decades later.

The science linking oral with systemic health has increased since the Surgeon General called attention to the poor oral health of some Americans, including low-income children, elders, and rural populations. Scientists have identified genetic biomarkers that allow for early identification of those at increased risk for developing oral and systemic diseases. As a result, there is greater general recognition of the linkages between physical disease and oral pathology. This has prompted calls for medical professionals to incorporate oral health assessment into their routine clinical activities and to provide early intervention by counseling patients on the importance of achieving and maintaining good oral health.

Primary care providers are uniquely positioned to provide oral health prevention services, including screening, education, fluoride varnish, and referral to dental providers during clinical encounters with patients. Young children, for instance, are more likely to visit a pediatrician than a dentist. Pediatricians and their staff have important opportunities to screen for oral disease, to encourage parents to effect appropriate oral health behaviors in their children, and to refer for diagnosis and treatment when problems are noted. A retrospective cohort study, using Medicaid claims data from North Carolina describing preventive oral health services provided by medical practitioners to kindergarten students, found that Medicaid-eligible children with at least four visits to their primary care medical providers that incorporated preventive oral health services experienced lower rates of caries than their peers with no visits with an oral health component.

The Institute of Medicine (IOM)* also recommends engaging medical providers with oral health assessment and screening of patients. In 2011, IOM published companion reports funded by the Health Resources and Services Administration (HRSA) which discussed both the opportunity for and responsibility of medical professionals to address patients' oral health in their clinical practices. One of the recommendations from the IOM's Committee on Oral Health Access was that HRSA invite key stakeholders from the public and private sectors to meet and develop a core set of oral health competencies for health care professionals. A subsequent 2014 HRSA-sponsored report described core oral health clinical competencies for frontline primary care clinicians, including physician assistants, and outlined strategies for implementing oral health training in primary care practice and safety net settings.

*The Institute of Medicine is now the Health and Medicine Division (HMD) of The National Academies of Sciences, Engineering, and Medicine (The National Academies).

In the more recently published HRSA report, *Oral Health Strategic Framework 2014-2017*, authors describe the challenges of integrating oral health with primary health care and offer a "framework" to strategically align action in the oral health arena with desired outcomes. Educating physician assistant (PA) students about the relationship between systemic health and oral health, and providing them with clinical competencies in oral health screening, assessment, and referral services is consistent with the goals of the framework, and is encouraged in the action items in the report to inform integration of oral and primary health care services.

However, actualization of the integration of oral health services in medical practice is difficult due to the siloed structure of oral health and health delivery systems. One strategy to bridge that gap is interprofessional education that prepares medical professionals to screen for oral disease and to effect referrals to dental professionals while also encouraging dental professionals to evaluate and educate patients regarding the implications of their oral health status on their systemic health.

In 2010, the National Interprofessional Initiative on Oral Health (NIIOH) provided support for the creation of the PA Leadership Initiative in Oral Health. The initiative capitalized on the rapid growth and adaptive nature of the PA workforce and encouraged PAs to incorporate oral health assessment and screening services into their clinical practices. The initiative also advocated for PAs to assume leadership roles in reshaping the medical and oral health delivery system by championing structural changes in workforce preparation and education and in provider engagement and practice uptake.

In the past 5 years, the initiative has used the social change strategy of collective impact by engaging 4 national PA organizations that influence regulatory and professional policies and standards to expand the capacity of the PA workforce to meet the nation's oral health needs. Leadership of the Accreditation Review Commission on Education for the Physician Assistant (ARC-PA), the Physician Assistant Education Association (PAEA), the National Commission on Certification of Physician Assistants (NCCPA), and the American Academy of Physician Assistants (AAPA) are involved with this mutual initiative that leverages each organization's unique capacity to impact change in PA oral health education or practice. The shared goal of the collective is to develop the PA workforce for an expanded role in national efforts to reduce oral health disparities.

Recent studies have reported positive outcomes from the cooperative efforts of these and other strategic PA oral health initiatives. In 2014, a retrospective study of PA faculty who attended innovative oral health faculty development workshops at PAEA education forums in 2011 or 2012 found that 80% of responding participants indicated they had "completely" or "somewhat" integrated workshop content into their PA curricula.

In 2013, a survey of directors of PA education programs, conducted by the Center for Health Workforce Studies (CHWS), found that more than 70% of respondent programs had integrated oral health topics into core content of their PA curriculum. This figure was a notable increase from similar data collected in 2008. Many of the survey respondents indicated use of an online curriculum for teaching about oral health assessment services, including *Smiles for Life*.

In 2013, the American Academy of PAs (AAPA) and Healthcare Performance Consulting conducted a needs assessment to describe gaps in PA education and clinical practice related to oral health care. The study was premised on the assumption that the interaction between knowledge, attitudes, and skills related to oral health, practice systems, and patients impacted or was predictive of a PAs' clinical practice in oral health. The study included a literature review, in-depth interviews and focus groups of PAs, and finally, a web-based survey of a random sample of PAs in the US. The survey was designed to describe PAs' appraisals of their training and education in oral health and subsequent impact on their clinical competencies to provide oral health services.

The survey and interview findings found a gap between PAs' recognition of the need for oral health care services in the patient population and actual adoption of oral health service delivery in their clinical practice. PAs identified a lack of education in oral health competencies as a barrier to providing services. Difficulty with making referrals to oral health providers was also described as an obstacle to more effective practice related to oral health. PA specialty was found to be significantly associated with PAs' ratings about their personal competency to provide oral health services and attitudes toward change in oral health practice. Survey respondents who were also practicing in family medicine, general internal medicine, or pediatrics were more interested in the topic of oral health than PA survey respondents practicing in other specialties.

Although oral health education is now more available to PAs than in the past, no study has yet explored whether training in oral health during foundational professional education translates to actual provision of screening, assessment, and preventive oral health services. The effect on PA clinical practice remains unclear. This report describes the results of a survey of recent PA education program graduates to understand their education in oral health competencies and subsequent integration of oral health services into clinical practice after graduation.

METHODS

The Oral Health Workforce Research Center (OHWRC) at CHWS, in cooperation with researchers from AAPA, conducted a survey of a sample of 2014 graduates from accredited PA professional education programs to describe their current clinical practices related to oral health service delivery. The hypothesis for this study was that PAs who were educated about oral health assessment were more apt than others to provide assessments in their clinical practice. The authors also hypothesized that PAs practicing in primary care specialties (including family practice, internal medicine, pediatrics, etc.) and those employed in safety net settings, where oral health and primary care services are offered in integrated settings, would be more likely to provide oral health screening and assessment services than other PAs.

This survey was intended to build upon the survey research completed by AAPA in 2013, which found that PA specialty was in fact a determinant of oral health screening activities and that education in oral health competencies impacted the decision to include oral health services in clinical practice. In addition to research staff from AAPA, project partners included Anita Glicken, Program Consultant for NIIOH.

Project staff conducted pre-survey interviews with a variety of stakeholders, including PA educators and researchers, as well as several recent graduates of PA education programs who were actively engaged in providing oral health services in their clinical practices. The interviews were non-directive and semi-structured, using a protocol of a small number of key questions to elicit opinions about the facilitators and barriers to integration of oral health services into a PA's clinical practice. Each of the twelve interviews lasted approximately one hour. The insights and suggestions of those who participated in the interviews, along with those of collaborators, informed survey content and design.

The survey was fielded to a stratified sample of 2,500 PAs who had graduated from a PA professional education program in 2014. The sample included graduates from each of the 166 ARC-PA accredited professional education programs in the US in 2014. The number of PAs selected for the sample from each education program was weighted by the total number of graduates from that program compared to the total number nationally.

The survey instrument consisted of fourteen questions about education and training in oral health competencies, implementation of oral health screening activities in clinical practice, and more general inquiries into specialty, practice setting, and geography. The survey questions included pre-defined response options. Most questions also included an "other" response, which permitted the respondent to select and describe "other".

On May 20, 2016, the AAPA sent an email invitation to each of the physician assistants in the stratified sample selected by CHWS. Each invitation contained an individualized hyperlink to the survey instrument. The email explained the purpose of the survey and indicated that participation was voluntary and confidential. Reminder emails were sent to non-respondents at 2 to 3 week intervals from either the OHWRC, Ms. Glicken, or the AAPA.

The survey was also available at the AAPA Membership booth at the 2016 AAPA National Conference in San Antonio, Texas, between May 13 and May 18 to a convenience sample of 2014 graduates. PAs attending the conference often stop at the AAPA booth to update membership information. The electronic member update document solicited voluntary completion of the oral health survey by any AAPA member who had graduated from an education program in 2014. During the annual meeting, 64 physician assistants completed the survey, 34 of whom were also identified as among the PAs in the originally selected sample. The responses of these and the additional 30 PAs who were not in the original sample are reported here and the sample size was adjusted accordingly.

Despite efforts to encourage survey participation, including frequent reminder prompts, an incentive for participation, and leaving the survey open for three months, the survey response rate was quite low. Ninety-eight of the email addresses of the 2,500 PAs solicited to participate were undeliverable, reducing the sample size to 2,402. An additional 30 PAs were added to the sample size (2,432) to adjust for the PAs who completed the survey at the annual meeting (64 total respondents at annual meeting; 34 of these were in the original sample; 30 other respondents were acquired through the convenience sample). In total, 304 PAs responded to the survey, for a 12.6% response rate.

KEY FINDINGS

Characteristics of Current Clinical Practice

- Survey respondents reported a variety of practice specialties, including family medicine/general practice (25.4%), emergency medicine/urgent care (15.1%), and surgical sub-specialties (14.4%).

- Among survey respondents, 41.2% worked in a hospital/medical center and 37.5% worked in an office-based private practice. More than 10% of PAs worked in a health clinic.

- PAs who worked in hospitals mainly worked in outpatient units (30.0%), inpatient units (28.3%), and emergency departments (18.3%).

- Among PAs who worked in a hospital medical center, 43.0% worked in an academic medical center and 40.5% worked in a nonprofit community hospital.

- Among PAs who worked in a private practice, 45.0% worked in a single specialty group practice, 30.6% worked in a multi-specialty physician group practice, and 24.3% worked in a solo physician practice.

- PAs who worked in ambulatory care facilities mainly worked in urgent care centers (83.3%).

- Among PAs who worked in health clinics, 54.8% were employed in a federally qualified health center and 16.1% were employed in a rural health clinic.

- Most PAs worked in an urban (41.2%) or suburban (40.9%) area.

Education in Oral Health Competencies

- Three quarters (74.5%) of PAs who responded to the survey received some instruction in oral health during their education.

- More than half of the PAs indicated that the oral health curriculum was integrated into one or several curricula topics and/or was delivered in stand-alone lectures. In addition, 16.5% were involved in interprofessional learning about oral health during their PA education.

- Almost one fifth of PAs indicated they had received education in oral health from sources other than their PA education program, including continuing education programs or self-study.

- The majority of PAs rated their educational preparation to provide oral health assessments, to identify and counsel patients about oral health, and to make appropriate referrals, as "acceptable" or "good".

- Seventeen percent of respondents indicated that they had received "excellent" preparation during their education program for making appropriate referrals to oral health providers.

- About half of the survey respondents felt that the education they received in their formative education program made them more likely to integrate oral health into clinical practice.

- However, 47.6% of respondents felt that their education made no difference in their attitude about integration of oral health screening and assessment services into clinical practice.

Integration of Oral Health Services into Clinical Practice

- Just over a third (35.7%) of survey respondents provided any oral health services in their current clinical practice.

- PAs working in family medicine/general practice represented more than a third (34.3%) of the PAs who provided any oral health services in their clinical practices, followed by PAs in emergency medicine/urgent care (29.5%).

- PAs in family/general practice who offered oral health services mainly worked in private practice (39.5%), in a health clinic (31.6%), or in a hospital medical setting (13.2%).

- PAs in emergency/urgent care who provided oral health services mainly practiced in hospitals (59.1%) or in private practice (15.9%).

- Uptake of oral examinations varied among survey respondents who provided any oral health services, with 47.1% of respondents reporting "often", and 21.2% reporting "always", for examining and assessing the oral cavity of their patients.

- More than a third of PAs who provided oral health services, either "often" or "always", referred patients to a dental provider when needed.

- More than half of PAs who provided oral health services, either "sometimes", "often", or "always", educated their patients about oral health.

- More than three quarters of PAs "never" applied fluoride varnish for patients in their clinical practices.

- About 65% of PAs conducted oral examinations as needed during acute care visits, 26.2% conducted oral examinations as needed during emergency department visits, and 40.8% did so during patients' annual well visits.

- More PAs (83.9%) indicated examining adult mouths ("sometimes", "often", or "always") than the mouths of children (63.4%). However, more PAs (22.8%) "always" examined children's mouths than "always" examined adult mouths (11.9%).

- When patients present with an oral condition, most of the PAs who provide oral health screenings educate the patient about the implications of poor oral health (76.9%) and many provide the patient with a list of local dentists (67.3%).

- Only 38.8% of PAs who were educated in oral health during their PA education program were providing any oral health services to patients; however, 81% of those PAs who provided oral health services in their clinical practices received their education in oral health during their professional education program.

- After controlling for PA specialty and primary employer, PAs who received education in oral health and disease were approximately 2.79 times (P=0.0043) more likely to provide oral health services in their clinical practice, compared to those who did not receive any education in oral health competencies.

Opinions and Attitudes

- The factor most cited as important or very important for integration of oral health services into clinical practice was that "medical professionals must feel competent to provide oral health assessment services" (93.2%) followed closely by the response that "education for medical clinicians in oral health competencies must be widely available" (92.3%).

- The most cited significant or very significant barriers to integrating oral health services included “time demands” (59.0%), “lack of patients’ adherence to recommendations about oral health and hygiene” (51.0%), and “lack of access to a dental provider referral system” (47.0%).

- The barrier rated as least significant (not significant or only slightly significant) was the “lack of a HEDIS outcome measure” (46.4%).

LIMITATIONS

Since the response rate for the survey was low, the results reported here are likely not generalizable. The authors hypothesize that providing oral health services in clinical practice is an innovative function for PAs, with only limited uptake to date; thus, the survey may have been dismissed by PAs who saw the topic as irrelevant to their practice, especially by those who do not provide oral health services for their patients. However, this hypothesis also suggests that there may be some response bias from those who do provide oral health services.

DISCUSSION

While the generalizability of these results is limited due to the low participation rate, PAs' responses nonetheless provide interesting insights about the integration of oral health assessment into clinical medical practices. As hypothesized before the survey was fielded, the collected data indicated that PAs in primary care, including family medicine, general practice, internal medicine, pediatrics, and obstetrics and gynecology, and those in emergency care were more likely than PAs in other specialties to incorporate oral health screening and assessment services into their clinical practices. Oral health assessment services were provided by PAs in private practices, ambulatory care settings, and in both outpatient and inpatient hospital settings.

While almost three quarters of PAs who responded to the survey reported that they received some education in oral health and disease in their PA curriculum, only 38.8% of those who received didactic and/or clinical instruction in oral health during training had incorporated those competencies into current practice. Still, among those PAs who were providing any oral health services for patients, more than 80% indicated that they had obtained their education in oral health from their PA program, rather than from another source. This suggests that training in oral health competencies during foundational education is important and may increase the likelihood of PAs providing oral health screening services.

The survey data also suggested that misperceptions within the medical community about the importance of screening for oral disease persist, especially in medical specialty practices. Very few PAs in medical or surgical specialties provided any oral health screening services. While most medical specialists do not provide primary medical services, most do collect a medical history and medication use. Incorporating a few questions about dental history, oral hygiene, and the existence of a dental home might provide important information about a patient's oral health status. The linkages between diabetes, cardiovascular disease, and respiratory health and other health conditions with oral disease are well documented. It is important that medical specialists not disregard these connections or minimize the importance of oral health assessment.

The survey data also implied that patients' oral health literacy was problematic. The second most commonly cited barrier to integration of oral health services into clinical practice was a lack of patients' adherence to recommendations about oral health and oral hygiene. While this is an important barrier, it is also a primary reason why provision of these services in medical practice is important. Patients visit primary care providers more often than dentists. Thus, primary care clinicians have a unique opportunity to improve literacy through oral health assessment services accompanied by patient education. Primary care clinicians are well positioned to inform their patients about why oral health matters.

Additionally, the survey results suggested that despite general interest among policymakers, advocates, and stakeholders in integrating oral health with medical services, numerous structural barriers within delivery systems impede that integration. More than half of PAs who responded to the survey indicated that time demands in their practices inhibited incorporation of oral health screening services. Once again, this finding suggests that oral health was perceived to be less important than screening for other health conditions, and further supports the need for clinician education about the documented linkages between oral and systemic disease.

Many PAs cited the lack of reimbursement for oral health services, the lack of encouragement or interest in providing oral health services from other members of the care delivery team, and the lack of access to a dental provider referral system as important or very important barriers to incorporation of oral health assessment services into clinical practice. PAs also emphasized the importance of having established clinical protocols for oral health services. These barriers are likely residual from the historic separation of medicine and dentistry and must be addressed to enable integration.

More than 90% of PAs who responded to the survey indicated that it was important or very important that a medical clinician feel competent to provide oral health services and important or very important that education on oral health topics be available to the medical community. All licensed medical professionals are required to complete continuing education, which would be an appropriate vehicle for instruction in oral health competencies. While valuable online resources providing both didactic and clinical instruction in oral health screening (eg, *Smiles for Life*) already exist, it may be that physicians are unaware of their availability.

CONCLUSIONS

While caution is suggested in generalizing the results of this survey, responses were encouraging regarding oral health service integration in primary care medical practice. There is general acknowledgement that points of entry to oral health services must be increased in order to improve access to the dental service delivery system. Primary medicine is especially important because primary care practitioners are gateways to other health services, and are, therefore, uniquely positioned to counsel, educate, and refer patients to dental providers. The opportunities for patient triage and referral are numerous, and the impacts on access to and utilization of oral health services are potentially substantial.

While uptake of oral health screening and assessment services in primary practice is still not at optimal levels, it was apparent from this survey that there is noticeable progress with integrating these services. The fact that some PAs are frequently or always screening for oral disease during clinical encounters with patients is an indicator that there is a growing consensus on the importance of these services, especially in primary medicine. Ongoing education within the medical community and changes in reimbursement policies, medical record design, and referral networks will all be needed to foster further adoption of oral health screening by medical providers.

Technical Report

BACKGROUND

Integration of oral health and primary medicine was a theoretical goal verbalized in the Surgeon General's Report, *Oral Health in America*, in 2000.[1] However, progress towards that goal has been slow, and oral health disparities in the population continue to exist almost 2 decades later.[2]

The science linking oral with systemic health has increased since the Surgeon General called attention to the poor oral health of some Americans, including low- income children, elders, and rural populations. Scientists have identified genetic biomarkers that allow for early identification of those at increased risk for developing oral and systemic diseases. As a result, there is greater general recognition of the linkages between physical disease and oral pathology. This has prompted calls for medical professionals to incorporate oral health assessment into their routine clinical activities and to provide early intervention by counseling patients about the importance of achieving and maintaining good oral health.

Numerous research studies suggest that addressing oral disease in patients with chronic health conditions results in better overall health outcomes. A recent retrospective cohort study using insurance data about medical treatments and hospitalizations for patients with certain chronic conditions (Type 2 diabetes, coronary artery disease, cerebral vascular disease, and pregnancy) found statistically significant reductions in rates of hospitalization ($P<.05$) and costs of care when periodontal disease in affected patients was treated and managed.[3] Researchers have also found a relationship between oral bacteria and esophageal cancer[4] and an association between periodontitis and mortality in Stage 3 kidney disease.[5] These and other studies reinforce the need for early intervention or prevention of oral disease to forestall development of implicated systemic diseases and to better control long term health outcomes.

Dental caries are preventable, yet they remain the most common disease in childhood—occurring 5 times more frequently than asthma.[1] An estimated 16 million children in America suffer from untreated tooth decay. Each year, dental disease results in more than 51 million lost school hours and 164 million lost work hours, leading to educational disparities and decreased productivity in the workplace.[1] While many factors contribute to poor oral health, including low oral health literacy and uneven access to dental services due to social, economic, and geographic barriers, the relative lack of attention to oral health by primary care professionals remains a significant factor.[2]

Primary care providers are uniquely positioned to provide oral health prevention services, including screening, education, fluoride varnish, and referral to dental providers during clinical encounters with patients. Young children, for instance, are more likely to visit a pediatrician than a dentist. Pediatricians and their staff have important opportunities to screen for oral disease, to encourage parents to effect

appropriate oral health behaviors in their children, and to refer for diagnosis and treatment when problems are noted. A retrospective cohort study, using Medicaid claims data from North Carolina describing preventive oral health services provided by medical practitioners to kindergarten students, found that Medicaid-eligible children with at least 4 visits to their primary care medical provider that incorporated preventive oral health services experienced lower rates of caries than their peers with no visits with an oral health component.[6] The study concluded that efforts to promote oral health in medical settings should continue.[6]

A 2016 time-series cross sectional study used data from the Centers for Medicare and Medicaid's (CMS) Form CMS-416 which describes, among other things, oral health services provided to Medicaid-eligible children on an annual basis under the early and periodic screening, diagnostic, and treatment (EPSDT) benefit in Medicaid. Study authors used this state-submitted data for each year from 2010 to 2013, in multiple regression analyses, to describe the impact of state policy for reimbursement to medical providers on the number of preventive oral health services supplied to those children. The study found an increase in total preventive dental services associated with the implementation of states' policies allowing reimbursement for oral health services performed by medical providers.[7] These studies and others point to the need for additional research to explore outcomes of medical and oral health care integration efforts.

The Institute of Medicine (IOM)* recommends engaging medical providers with oral health assessment and screening of patients. In 2011, the Institute published companion reports funded by the Health Resources and Services Administration (HRSA) which discussed both the opportunity for and responsibility of medical professionals to address patients' oral health in their clinical practices.[2,8] One of the recommendations of the IOM's Committee on Oral Health Access was that HRSA invite key stakeholders from the public and private sectors to meet and develop a core set of oral health competencies for health care professionals.[2]

A subsequent 2014 HRSA-sponsored report[9] described core oral health clinical competencies for frontline primary care clinicians, including physician assistants, and outlined strategies for implementing oral health training in primary care practice and safety net settings.

In the more recently published HRSA report, *Oral Health Strategic Framework 2014-2017*,[10] authors describe the challenges of integrating oral health with primary health care and offer a "framework" to strategically align action in the oral health arena with desired outcomes. This framework was built through the cooperative effort of the US Public Health Service Oral Health Coordinating Committee and numerous stakeholders from a broad range of government agencies. The framework provides a roadmap

*The Institute of Medicine is now the Health and Medicine Division (HMD) of The National Academies of Sciences, Engineering, and Medicine (The National Academies).

for diverse collaborators to resolve disparities in oral health. It is written for health care professionals from various disciplines, program administrators in governmental and non-governmental agencies and organizations, and other stakeholders with an interest in oral health.[10]

The framework was designed to align activities related to oral health with 5 major goals, including to:

- Integrate oral health and primary health care
- Prevent disease and promote oral health
- Increase access to oral health care and eliminate disparities
- Increase the dissemination of oral health information and improve health literacy
- Advance oral health in public policy and research[10]

Educating physician assistant (PA) students about the relationship between systemic health and oral health and providing them with clinical competencies in oral health screening, assessment, and referral services is consistent with the goals of the framework, and is encouraged in the action items in the report to inform integration of oral and primary health care services.

However, actualization of the integration of oral health services in medical practice is difficult due to the siloed structure of oral health and health delivery systems. One strategy to bridge that gap is interprofessional education that prepares medical professionals to screen for oral disease and to effect referrals to dental professionals, while also encouraging dental professionals to evaluate and educate patients regarding the implications of their oral health status on their systemic health.

The Patient Protection and Affordable Care Act encourages interprofessional collaboration and team-based delivery of services to achieve comprehensive, accountable, high-quality care for the population.[11] Integrating oral health topics into medical education and subsequently into care delivery requires substantial systemic change. Effecting change, as suggested in HRSA's framework, involves a set of complementary actions by a diverse group of committed stakeholders, each with unique capacities to drive the transformation. Education on interprofessional practice requires academic institutions to adopt new strategies to teach about team-based service delivery and the payment models that support these efforts.[12] Several accreditation bodies that oversee the curricula of a variety of health professions have recently mandated new standards for interprofessional education.

PAs are among the health professionals cited as integral to improving oral health care for their patients.[13] As frontline providers, PAs deliver services as part of a health care team, and can prescribe medications and bill for health care services under the supervision of their collaborating physician. In 2010, the

National Interprofessional Initiative on Oral Health (NIIOH)[14] provided support for the creation of the PA Leadership Initiative in Oral Health. The initiative capitalized on the rapid growth and adaptive nature of the PA workforce and encouraged PAs to incorporate oral health assessment and screening services into their clinical practices. The initiative also advocated for PAs to assume leadership roles in reshaping the medical and oral health delivery system by championing structural changes in workforce preparation and education, and in provider engagement and practice uptake.

For the past 5 years, the initiative has used the social change strategy of collective impact by engaging 4 national PA organizations that influence regulatory and professional policies and standards[14,15,16] to expand the capacity of the PA workforce to meet the nation's oral health needs. Leadership of the Accreditation Review Commission on Education for the Physician Assistant (ARC-PA), the Physician Assistant Education Association (PAEA), the National Commission on Certification of Physician Assistants (NCCPA), and the American Academy of Physician Assistants (AAPA) are involved with this mutual initiative that leverages each organization's unique capacity to impact change in PA oral health education or practice. The shared goal of the collective is to develop the PA workforce for an expanded role in national efforts to reduce oral health disparities.[17] For example, the AAPA House of Delegates sponsored a new policy promoting oral health care in PA practice and the NCCPA included questions about oral health on the national PA certification exam. PAEA has developed resources and tools to increase faculty capacity to implement oral health curriculum.

Recent studies have reported positive outcomes from the cooperative efforts of these and other PA strategic oral health initiatives.[18,19] In 2014, a retrospective study of PA faculty who attended innovative oral health faculty development workshops at PAEA education forums in 2011 or 2012 found that 80% of responding participants indicated they had "completely" or "somewhat" integrated workshop content into their PA curricula.

In 2013, a survey of directors of PA education programs, conducted by the Center for Health Workforce Studies (CHWS), found that more than 70% of respondent programs had integrated oral health topics into the core content of their PA curriculum.[19] This figure was a notable increase from similar data collected in 2008. Many of the survey respondents indicated use of an online curriculum for teaching about oral health assessment services, including *Smiles for Life*.[20]

A recent Harder+Company follow-up study of 522 providers from multiple health professions noted that 85% reported that *Smiles for Life* had influenced their practice related to oral health in one or more of the following three ways. It enabled the provider to begin to perform oral health activities; it allowed the provider to perform oral health activities more regularly, and/or it helped improve the ability of the provider to perform oral health activities. In the PA cohort that participated in the study, 84% reported some level of influence from this curriculum on their clinical practice.[21]

In 2013, AAPA and Healthcare Performance Consulting conducted a needs assessment to describe gaps in PA education and clinical practice related to oral health care.[22] The study was premised on the assumption that the interaction between knowledge, attitudes, and skills related to oral health, practice systems, and patients impacted or was predictive of a PAs' clinical practice in oral health. The study included a literature review, in-depth interviews and focus groups of PAs, and finally, a web-based survey of a random sample of PAs in the US. The survey was designed to describe PAs' appraisals of their training and education in oral health, and the subsequent impact on their clinical competencies to provide oral health services.[22]

The survey and interview findings found a gap between PAs' recognition of the need for oral health care services in the patient population and actual adoption of oral health service delivery in their clinical practice. PAs identified a lack of education in oral health competencies as a barrier to providing services. Difficulty with making referrals to oral health providers was also described as an obstacle.[22] PA specialty was found to be significantly associated with PAs' ratings about their personal competency to provide oral health services and attitudes toward change in oral health practice. PAs who were also practicing in family medicine, general internal medicine, or pediatrics were more interested in the topic of oral health than PA survey respondents practicing in other specialties.[22]

Although oral health education is now more available to PAs than in the past, no study has yet explored whether training in oral health during foundational professional education translates to actual provision of screening, assessment, and preventive oral health services. The effect on PA clinical practice remains unclear. This report describes the results of a survey of recent PA education program graduates to understand their education in oral health competencies and subsequent integration of oral health services into clinical practice after graduation.

METHODS

The Oral Health Workforce Research Center (OHWRC) at CHWS, in cooperation with researchers from AAPA, conducted a survey of a sample of 2014 graduates from accredited PA professional education programs to describe their current clinical practices related to oral health service delivery. The hypothesis for this study was that PAs who were educated about oral health assessment were more apt than others to provide assessments in their clinical practice. The authors also hypothesized that PAs practicing in primary care specialties (including family practice, internal medicine, pediatrics, etc.) and those employed in safety net settings, where oral health and primary care services are more likely to be offered in co-located settings, would be more likely to provide oral health screening and assessment services than other PAs. This survey was intended to build upon survey research completed by AAPA in 2013, which found that PA specialty was a determinant of oral health screening activities and that education in oral health competencies impacted the decision to include oral health services in clinical practice. In addition to research staff from AAPA, project partners included Anita Glicken, Program Consultant for the National Interprofessional Initiative in Oral Health.

Project staff conducted pre-survey interviews with a variety of stakeholders, including PA educators and researchers, and several recent graduates of PA education programs who were actively engaged in providing oral health services in their clinical practices. The interviews were non-directive and semi-structured, using a protocol of a small number of key questions to elicit opinions about the facilitators and barriers to integration of oral health services into a PA's clinical practice. Each of the twelve interviews lasted approximately one hour. The insights and suggestions of those who participated in the interviews, along with those of collaborators, informed survey content and design.

The Survey and the Stratified Sample

The survey was fielded to a stratified sample of 2,500 PAs who had graduated from a PA professional education program in 2014. The sample included graduates from each of the 166 ARC-PA accredited professional education programs in the US. The number of PAs selected for inclusion in the sample from each education program was weighted by the total number of graduates from that program compared to the total number nationally. For example, the number of graduates selected for the survey sample from an education program with 60 graduates was proportionately greater than the number selected from a PA program with 20 graduates.

The sample was drawn from a de-identified database supplied by AAPA to the OHWRC, which indicated demographic variables, including age and gender, practice specialty, a geographic identifier (based on the address of the PA on file with AAPA), and the name of the education program from which the PA had

graduated. In all, the database contained information on 6,100 physician assistants who had graduated from an accredited education program in 2014. One assumption informing sample design was that PA employment markets were mostly regional (and perhaps state-based) rather than national, and that selecting a weighted sample by school of graduation might also make the sample geographically representative of new PA practitioners. However, the response rate to the survey was ultimately too low to test this assumption.

The survey instrument consisted of 14 questions about the PA's education and training in oral health competencies, their degree of implementation of oral health screening activities in clinical practice, and their specialty, practice setting, and geography. The survey questions included pre-defined response options. Most questions also included an "other" response, which permitted the respondent to select and describe "other". The survey also asked the respondent to provide a narrative about provision of oral health services in clinical practice. These compiled narratives and "other" responses are available in Appendix A of this report.

The survey was web-based and required between 5 and 10 minutes to complete depending on the PA's uptake of oral health service delivery in clinical practice. The survey employed a skip logic design, which directed respondents to different questions depending on responses to key introductory questions about oral health education and service provision. As a result, respondents were branched only to relevant questions. The survey was built on the Qualtrics platform; survey data resided on a CHWS dedicated server. A copy of the survey instrument is included in Appendix B of this report.

On May 20, 2016, AAPA sent an email invitation to each of the 2,500 physician assistants in the stratified sample selected by CHWS. Each invitation contained an individualized hyperlink to the survey instrument. The email explained the purpose of the survey and indicated that participation was voluntary and confidential. Reminder emails were sent to non-respondents at 2 to 3 week intervals from either the OHWRC, Ms. Glicken, or AAPA. In addition, a postcard was sent to non-respondents by AAPA and the OHWRC soliciting participation in the survey research. The postcard included a generic link to the survey with an individual code for each respondent to enter at survey initiation. The survey remained open for data accrual for 3 months in an attempt to boost response rate.

The survey was also available at the AAPA Membership booth at the 2016 AAPA National Conference in San Antonio, Texas, from May 13 to May 18, to a convenience sample of 2014 graduates. PAs attending the conference often stop at the AAPA booth to update membership information. The electronic member update document solicited voluntary completion of the oral health survey by any AAPA member who had graduated from an education program in 2014. During the annual meeting, 64 PAs completed the survey, 34 of whom were also identified as among those in the original sample. These responses and those of

the additional 30 PAs who were not in the original sample are reported here, and the sample size was adjusted accordingly.

Survey participants were offered an incentive. The first 400 PAs to complete the survey were offered a $5.00 gift card to Amazon. The first 1,000 respondents were offered the opportunity to be included in a drawing for 1 of 3 $100 Amazon gift cards, which were awarded after the survey was closed to accruals.

This project was conducted under the auspices of the New York State Department of Health Institutional Review Board.

Survey Response Rate

Despite efforts to encourage survey participation, including providing frequent reminder prompts, offering an incentive for participation, and leaving the survey open for 3 months, the survey response rate was quite low. Ninety-eight of the email addresses of the 2,500 PAs solicited to participate were undeliverable, reducing the sample size to 2,402. An additional 30 PAs were added to the sample size (2,432), to adjust for those who had completed the survey at the annual meeting (64 total respondents at annual meeting; 34 of these were in the original sample; 30 other respondents were acquired through the convenience sample). In total, 304 PAs responded to the survey for a 12.6% response rate.

Data Analysis

Survey data was cleaned and analyzed using SAS 9.4 (SAS Institute, Inc.) statistical software. Descriptive statistical analyses included frequencies and cross tabulations. Multivariate logistic regression was also used to identify predictors of integration of oral health services into PA clinical practice.

In total, 303 survey responses were included in the analyses, after the exclusion of 1 incomplete survey. Due to the low number of survey responses, certain responses, such as PA specialty, were re-categorized/ regrouped for the multivariate logistic regressions in order to obtain meaningful inferences.

The re-categorizations for the regression analyses included the following:

- PA specialty was grouped by “primary/emergency care” and all “other”. Specialties included as “primary/emergency care” were emergency medicine/urgent care, family medicine/general practice, general internal medicine, obstetrics/gynecology, geriatrics, and pediatrics. “Other” included surgical and sub-surgical specialties, anesthesiology, radiology, etc.

Settings were grouped into 3 categories:

- Office-based practice
- Inpatient
  - Hospital/medical center
  - Hospice
  - Long-term care facility, including nursing home or assisted living facility
- Outpatient
  - Ambulatory care facility
  - Health clinic
  - Government
  - Home health agency
  - Medical staffing agency
  - Self-employed or independent contractor

Education was grouped into 2 categories:

- The PA received no education in oral health and oral disease.
- The PA received some education in oral health and oral disease from any source (ie, a PA education program, through continuing education, in a professional workshop, etc.)

FINDINGS

While 303 survey responses were analyzed for this report, not all PAs answered every survey question, so the number of responses varies by question.

Characteristics of Current Clinical Practice

Survey respondents reported a variety of practice specialties, including family medicine/general practice (25.4%), emergency medicine/urgent care (15.1%), and surgical sub-specialties (14.4%) (Table 1). The most common surgical specialty among respondents was orthopedic surgery (48.8% of those in a surgical specialty).

Table 1. Medical Specialty in Which PA Respondents Practiced

Medical Specialty	n	%
Not currently in clinical practice	1	0.3%
Addiction medicine	0	0.0%
Anesthesiology	2	0.7%
Dermatology	7	2.3%
Emergency medicine/urgent care	45	15.1%
Family medicine/general practice	76	25.4%
Geriatrics	4	1.3%
Hospice and palliative care	0	0.0%
Hospital medicine	16	5.4%
Internal medicine - general	14	4.7%
Internal Medicine - subspecialty	13	4.3%
Obstetrics/gynecology	1	0.3%
Occupational medicine	4	1.3%
Ophthalmology	0	0.0%
Otolaryngology	3	1.0%
Pain management	8	2.7%
Pathology	1	0.3%
Pediatrics	14	4.7%
Physical medicine/rehabilitation	1	0.3%
Preventive medicine/public health	1	0.3%
Psychiatry	4	1.3%
Radiation oncology	0	0.0%
Radiation - diagnostic	0	0.0%
Radiology - interventional	0	0.0%
Surgery - general	8	2.7%
Surgery - subspecialty	43	14.4%
Other	33	11.0%
Total	**299**	**100.0%**

Among survey respondents, 41.2% worked in a hospital/medical center and 37.5% worked in an office-based private practice (Table 2). More than 10 percent of PAs worked in a health clinic.

Table 2. Primary Employer of PA Respondents

Primary Employer	n	%
Office-based private practice	111	37.5%
Hospital/medical center	122	41.2%
Ambulatory care facility	7	2.4%
Health clinic	31	10.5%
Government	5	1.7%
Home health agency	2	0.7%
Hospice	0	0.0%
Long-term care facility	2	0.7%
Medical staffing agency	7	2.4%
Self-employed or independent contractor	2	0.7%
Other	7	2.4%
Total	**296**	**100.0%**

Among those who worked in a private practice, 45.0% worked in a single specialty group practice, 30.6% worked in a multi-specialty physician group practice, and 24.3% worked in a solo physician practice (Table 3).

Table 3. Description of Office Based Practices Employing PA Respondents

Office Based Practice	n	%
Solo practice	27	24.3%
Single specialty physician group	50	45.0%
Multi-specialty physician group	34	30.6%
Total	**111**	**100.0%**

Among PAs who worked in a hospital medical center, 43.0% worked in an academic medical center and 40.5% worked in a nonprofit community hospital (Table 4).

Table 4. Types of Hospital/Medical Centers Employing PA Respondents

Hospital/Medical Center	n	%
Academic medical center	52	43.0%
Nonprofit community hospital	49	40.5%
For profit community hospital	12	9.9%
State or local government community hospital	3	2.5%
Critical access hospital	1	0.8%
Veterans' Administration hospital	0	0.0%
Non-VA federal hospital	1	0.8%
Psychiatric hospital	1	0.8%
Rehabilitation hospital	0	0.0%
Other	2	1.7%
Total	**121**	**100.0%**

PAs who worked in hospitals mainly worked in outpatient units (30.0%), inpatient units (28.3%), and emergency departments (18.3%) (Table 5).

Table 5. Work Areas in Hospitals in Which PA Respondents Were Employed

Work Area	n	%
Emergency department	22	18.3%
Inpatient unit	34	28.3%
Intensive or critical care unit	5	4.2%
Operating room	11	9.2%
Outpatient unit	36	30.0%
Other	12	10.0%
Total	**120**	**100.0%**

PAs who worked in ambulatory care facilities mainly worked in urgent care centers (83.3%) (Table 6). Among PAs who worked in health clinics, 54.8% were employed in a federally qualified health center and 16.1% were employed in a rural health clinic.

Table 6. Description of Ambulatory Care Facilities, Health Clinics, and Government Entities Employing PA Respondents

Primary Employer	n	%
Ambulatory Care Facility		
Ambulatory surgical center	1	16.7%
Urgent care center	5	83.3%
Total	**6**	**100.0%**
Health Clinic		
Federally qualified health center	17	54.8%
Rural health clinic	5	16.1%
Retail clinic	2	6.5%
Occupational health clinic	2	6.5%
School-based or college-based health center	1	3.2%
Other community clinic	4	12.9%
Total	**31**	**100.0%**

Most PAs worked in an urban (41.2%) or suburban (40.9%) area (Table 7).

Table 7. Geographic Location of PAs' Primary Employers

Geographic Location of Primary Employer	n	%
Urban	122	41.2%
Suburban	121	40.9%
Rural	53	17.9%
Total	**296**	**100.0%**

Nearly 40% of the PAs who responded to the survey worked in 1 of 6 states which are among the 10 most populous in the US, including California (6.2%), Florida (7.9%), New York (6.5%), North Carolina (6.8%), Pennsylvania (6.5%), and Texas (5.5%) (Table 8).

Table 8. State of Primary Employment of PA Respondents

State Location of Primary Employer	n	%
Arizona	6	2.1%
Arkansas	1	0.3%
California	18	6.2%
Colorado	10	3.4%
Connecticut	4	1.4%
Florida	23	7.9%
Georgia	7	2.4%
Idaho	1	0.3%
Illinois	9	3.1%
Indiana	7	2.4%
Iowa	2	0.7%
Kansas	2	0.7%
Kentucky	4	1.4%
Louisiana	5	1.7%
Maine	2	0.7%
Maryland	8	2.7%
Massachusetts	6	2.1%
Michigan	6	2.1%
Minnesota	10	3.4%
Mississippi	1	0.3%
Missouri	5	1.7%
Nebraska	4	1.4%
Nevada	3	1.0%
New Hampshire	2	0.7%
New Jersey	7	2.4%
New Mexico	3	1.0%
New York	19	6.5%
North Carolina	20	6.8%
North Dakota	2	0.7%
Ohio	13	4.5%
Oklahoma	5	1.7%
Oregon	3	1.0%
Pennsylvania	19	6.5%
Rhode Island	1	0.3%
South Carolina	8	2.7%
Tennessee	7	2.4%
Texas	17	5.8%
Utah	2	0.7%
Vermont	2	0.7%
Virginia	6	2.1%
Washington	6	2.1%
Wisconsin	4	1.4%
Wyoming	2	0.7%
Total	**292**	**100.0%**

Education in Oral Health Competencies

Three-quarters (74.5%) of PAs who responded to the survey, all of whom graduated from a PA education program in 2014, received some education in oral health from their institution (Table 9).

Table 9. Oral Health Education from PA Education Programs

Oral Health Education from PA Education Program	n	%
Yes	219	74.5%
No	53	18.0%
Unsure	22	7.5%
Total	**294**	**100.0%**
Note: n=9 missing due to not currently in clinical practice.		

More than half of the PAs indicated that the oral health curriculum was integrated into 1 or more curricula topics (56.4%) and/or was delivered in stand-alone lectures (53.2%) (Table 10). In addition, 16.5% were involved in interprofessional learning about oral health during their PA education.

Table 10. Methods for Delivering the Oral Health Curriculum to PA Students in Education Programs

Methods for Delivering Curriculum	n	%
Stand-alone lectures	116	53.2%
Integrated into one or several other curriculum topics	123	56.4%
Completion of an online curriculum	20	9.2%
Interprofessional oral health training	36	16.5%
Service learning activities	17	7.8%
Other	7	3.2%
Total	**218**	**100.0%**

Almost one-fifth (19.7%) of PAs indicated they had received education in oral health from sources other than their PA education program, including continuing education programs (23.2%) or self-study (23.2%) (Table 11, Table 12).

Table 11. Oral Health Education from Sources Other Than PA Education Programs

Oral Health Education from Sources Other than PA Program	n	%
Yes	58	19.7%
No	223	75.9%
Unsure	13	4.4%
Total	**294**	**100.0%**

Table 12. Sources of Oral Health Education Other Than PA Education Programs

Source of Education	n	%
In-service training	6	10.7%
Professional conferences	6	10.7%
On-line education	8	14.3%
Self-study	13	23.2%
Continuing education courses	13	23.2%
Other	10	17.9%
Total	**56**	**100.0%**

The majority of PAs rated their educational preparation to provide oral health assessments, to identify and counsel patients about oral health, and to make appropriate referrals as "acceptable" or "good" (Table 13). Seventeen percent of respondents indicated "excellent" preparation during their education program for making appropriate referrals to oral health providers.

Table 13. PAs Rating of Their Educational Preparation to Perform Various Oral Health Related Tasks

Rating Preparation From PA Education Program	Poor		Fair		Acceptable		Good		Excellent		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Conduct patient-specific oral health risk assessments	11	5.2%	31	14.6%	93	43.7%	55	25.8%	23	10.8%	**213**	**100.0%**
Identify patient conditions and medical treatments	10	4.7%	30	14.1%	76	35.7%	76	35.7%	21	9.9%	**213**	**100.0%**
Identify patient-specific oral conditions and diseases	10	4.7%	24	11.3%	75	35.4%	84	39.6%	19	9.0%	**212**	**100.0%**
Perform oral health evaluations	16	7.5%	31	14.6%	83	39.0%	64	30.0%	19	8.9%	**213**	**100.0%**
Identify strategies	16	7.5%	27	12.7%	73	34.4%	79	37.3%	17	8.0%	**212**	**100.0%**
Provide patient education	10	4.7%	24	11.3%	67	31.5%	80	37.6%	32	15.0%	**213**	**100.0%**
Offer preventive oral health interventions and strategies	13	6.1%	29	13.6%	71	33.3%	73	34.3%	27	12.7%	**213**	**100.0%**
Offer appropriate referral	13	6.1%	24	11.3%	64	30.0%	75	35.2%	37	17.4%	**213**	**100.0%**

PAs were asked whether having education in oral health impacted their attitudes and behaviors relative to providing oral health services (Table 14). About half of the survey respondents (50.2%) felt that the education they received in their formative education program made them more likely to integrate oral health into clinical practice. However, 47.6% of respondents felt it made no difference in their attitude about integration of oral health screening and assessment services into clinical practice.

Table 14. The Impact of Health Education on PAs' Attitudes about Integrating Oral Health into Clinical Practice

Impact of Education on Attitudes about Providing Oral Health Services	n	%
Made me more likely to integrate oral health into clinical practice	116	50.2%
Made no difference in my attitude about integration of oral health	110	47.6%
Made me less likely to integrate oral health into clinical practice	5	2.2%
Total	**231**	**100.0%**

Integration of Oral Health Services into Clinical Practice

Just over a third (35.7%) of survey respondents provided any oral health services in their current clinical practice (Table 15).

Table 15. PAs Providing Any Oral Health Services for Any Patients in Current Practice

PAs Providing Any Oral Health Services in Current Practice	n	%
Yes	105	35.7%
No	181	61.6%
Unsure	8	2.7%
Total	**294**	**100.0%**

PAs working in family medicine/general practice represented more than a third (34.3%) of those who provided any oral health services in their clinical practices (Table 16), followed by PAs in emergency medicine/urgent care (29.5%).

Table 16. PAs Providing Oral Health Services by Practice Specialty

Practice Specialty	n	%
Dermatology	2	1.9%
Emergency medicine/urgent care	31	29.5%
Family medicine/general practice	36	34.3%
Geriatrics	1	1.0%
Hospital medicine	3	2.9%
Internal medicine - general	4	3.8%
Internal medicine - subspecialty	4	3.8%
Occupational medicine	1	1.0%
Otolaryngology	2	1.9%
Pathology	1	1.0%
Pediatrics	9	8.6%
Psychiatry	1	1.0%
Surgery - subspecialty	5	4.8%
Other	5	4.8%
Total	**105**	**100.0%**

PAs in family/general practice who offered oral health services mainly worked in private practice (39.5%), in a health clinic (31.6%), or in a hospital medical setting (13.2%) (Table 17). PAs in emergency/urgent care who provided oral health services mainly practiced in hospitals (59.1%) or in private practice (15.9%).

Table 17. Work Setting by Major Specialties of PAs Providing Oral Health Services

Work Setting	Emergency Medicine/Urgent care		Family Medicine/General Practice		Pediatrics	
	n	%	n	%	n	%
Office-based private practice	7	15.9%	30	39.5%	8	57.1%
Hospital/medical center	26	59.1%	10	13.2%	6	42.9%
Ambulatory care facility	3	6.8%	3	3.9%	0	0.0%
Health clinic	2	4.5%	24	31.6%	0	0.0%
Government	0	0.0%	4	5.3%	0	0.0%
Home health agency	0	0.0%	1	1.3%	0	0.0%
Medical staffing agency	4	9.1%	1	1.3%	0	0.0%
Self-employed or independent contractor	1	2.3%	0	0.0%	0	0.0%
Other	1	2.3%	3	3.9%	0	0.0%
Total	**44**	**100.0%**	**76**	**100.0%**	**14**	**100.0%**

Uptake of oral examinations varied among survey respondents who provided any oral health services; 47.1% "often" examined and assessed the oral cavity of their patients, and 21.2% "always" examined and assessed the oral cavity (Table 18). Many PAs who provided oral health services either "often" (37.1%) or "always" (35.2%) referred patients to a dental provider when needed. More than half of PAs (55.5%) who provided oral health services "sometimes" (22.1%) or "often" (39.4%) educated their patients about oral health.

More than three-quarters (78.6%) of PAs "never" applied fluoride varnish for patients in their clinical practices (Table 18). The reasons likely vary. This service would be generally unnecessary in communities with public water systems that are fluoridated. Also, while fluoride varnish is beneficial for all age groups, children are the population that most often receives this service. PAs who responded to the survey may have more adult patients than children (with the exception of those practicing in pediatrics). Another explanation for the low rate of fluoride application is that other staff within the practice, including nurses or medical assistants, could perform this service for the PAs' patients.

Table 18. Frequency of Providing Oral Health Services

Frequency	Never		Rarely		Sometimes		Often		Always		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Examine and assess the oral cavity	4	3.8%	7	6.7%	22	21.2%	49	47.1%	22	21.2%	**104**	**100.0%**
Assess for oral manifestations of systemic disease	2	1.9%	15	14.4%	34	32.7%	42	40.4%	11	10.6%	**104**	**100.0%**
Assess for the presence of intraoral pathology	0	0.0%	14	13.5%	41	39.4%	36	34.6%	13	12.5%	**104**	**100.0%**
Change medications to protect aaliva, teeth, and/or gums	24	23.3%	42	40.8%	23	22.3%	13	12.6%	1	1.0%	**103**	**100.0%**
Apply fluoride varnish	81	78.6%	8	7.8%	3	2.9%	7	6.8%	4	3.9%	**103**	**100.0%**
Provide dietary counseling	26	25.5%	37	36.3%	17	16.7%	17	16.7%	5	4.9%	**102**	**100.0%**
Educate about personal oral hygiene	7	6.7%	22	21.2%	23	22.1%	41	39.4%	11	10.6%	**104**	**100.0%**
Refer to a dental provider when needed	2	1.9%	3	2.9%	24	22.9%	39	37.1%	37	35.2%	**105**	**100.0%**
Other	4	36.4%	0	0.0%	3	27.3%	3	27.3%	1	9.1%	**11**	**100.0%**

PAs were asked about the frequency/ periodicity of providing oral health services (Table 19). Sixty-five percent conducted oral examinations as needed during acute care visits; 26.2% conducted oral examinations as needed during emergency department visits; and 40.8% did so during patients' annual well visits.

Table 19. When Examinations/Assessments of Oral Cavity Are Conducted

When Examinations/Assessments of Oral Cavity Are Conducted	n	%
Annual Well Visits	42	40.8%
Periodic Follow-up	19	18.4%
As Needed during Acute Care Vistis	67	65.0%
As Needed during ED Visits	27	26.2%
Other	10	9.7%
Total	**103**	**100.0%**

PAs were asked to describe the frequency of performing oral examinations on patients with particular chronic diseases or social behaviors (eg, smoking) (Table 20). PAs indicated that they examined the oral cavity of patients with diabetes "sometimes" (27.7%) or "often" (37.6%), patients with cardiovascular disease "sometimes" (30.7%) or "often" (29.7%), and patients with a history of stroke "sometimes" (26.7%) or "often" (24.8%).

Half (49.5%) of the PAs who responded to the survey indicated they examined the oral cavity of patients with joint replacement "rarely" (37.4%) or "never" (12.1%), and of pregnant patients "rarely" (31.7%) or "never" (16.8%) (Table 20). Oral screenings for these populations are important. Patients with joint replacements are at higher risk for complications from systemic infections. Pregnant women with periodontal disease have a greater likelihood of delivering premature and low birth weight babies.

More PAs (83.9%) indicated examining adult mouths "sometimes" (29.7%), "often" (41.6%) or "always" (11.9%) than examined the mouths of children (63.4% of PAs) ("sometimes" [14.9%], "often" [25.7%], or "always" [22.8%]) (Table 20). However, more PAs (22.8%) "always" examined children's mouths than "always" examined adult mouths (11.9%).

Table 20. Frequency with Which PAs Examined the Oral Cavity of Patients with Particular Chronic Diseases, Social Histories, or Risk Factors

Types of Patients	Never		Rarely		Sometimes		Often		Always		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Children in my practice	26	25.7%	11	10.9%	15	14.9%	26	25.7%	23	22.8%	**101**	**100.0%**
Adults in my practice	8	7.9%	9	8.9%	30	29.7%	42	41.6%	12	11.9%	**101**	**100.0%**
Patients with a complaint about oral cavity	0	0.0%	2	1.9%	16	15.5%	14	13.6%	71	68.9%	**103**	**100.0%**
Patients who indicate no usual dental provider	6	5.9%	17	16.7%	28	27.5%	30	29.4%	21	20.6%	**102**	**100.0%**
Patients with diabetes	9	8.9%	11	10.9%	28	27.7%	38	37.6%	15	14.9%	**101**	**100.0%**
Patients with cardiovascular disease	9	8.9%	18	17.8%	31	30.7%	30	29.7%	13	12.9%	**101**	**100.0%**
Patients with history of stroke	11	10.9%	25	24.8%	27	26.7%	25	24.8%	13	12.9%	**101**	**100.0%**
Patients with joint replacement	12	12.1%	37	37.4%	27	27.3%	15	15.2%	8	8.1%	**99**	**100.0%**
Patients with HIV	12	12.0%	25	25.0%	28	28.0%	19	19.0%	16	16.0%	**100**	**100.0%**
Patients with pregnancy	17	16.8%	32	31.7%	24	23.8%	15	14.9%	13	12.9%	**101**	**100.0%**
Patients with smoking	6	5.9%	15	14.9%	26	25.7%	35	34.7%	19	18.8%	**101**	**100.0%**
Patients with alcohol use	9	9.0%	21	21.0%	27	27.0%	29	29.0%	14	14.0%	**100**	**100.0%**
Patients with substance abuse	12	11.9%	15	14.9%	25	24.8%	31	30.7%	18	17.8%	**101**	**100.0%**
All patients receive an oral health assessment	18	17.6%	27	26.5%	19	18.6%	24	23.5%	14	13.7%	**102**	**100.0%**
Other	3	42.9%	0	0.0%	2	28.6%	1	14.3%	1	14.3%	**7**	**100.0%**

When patients presented with an oral condition, most of the PAs who provided oral health screenings educated the patient about the implications of poor oral health (76.9%), and many provided the patient with a list of local dentists (67.3%) (Table 21). Thirty-nine percent of PAs indicated that office staff within their practices expedited referrals to dentists and made appointments for patients as needed.

Table 21. How PAs Address the Oral Health Concerns of Patients

Addressing Oral Health Concerns of Patients	n	%
Educate the patient about the implications of poor oral health	80	76.9%
Provide the patient with a list of local dentists to call	70	67.3%
Office staff expedite a referral and make an appointment for the patient with a dentist	41	39.4%
Other	6	5.8%
None of the above	1	1.0%
Total	**104**	**100%**

Only 38.8% of PAs who were educated in oral health during their PA education program were providing any oral health services to patients (Table 22). However, 81% of those PAs who provided oral health services in their clinical practices (n=85) received their education in oral health during their professional education program (n=105).

Table 22. Providing Oral Health Services by Oral Health Education

Received Oral Health Education in the PA Professional Program	Provide Oral Health Services							
	Yes		No		Unsure		Total	
	n	%	n	%	n	%	n	%
Yes	85	38.8%	128	58.4%	6	2.7%	219	100.0%
No	11	20.8%	42	79.2%	0	0.0%	53	100.0%
Unsure	9	40.9%	11	50.0%	2	9.1%	22	100.0%
Total	**105**	**35.7%**	**181**	**61.6%**	**8**	**2.7%**	**294**	**100.0%**

Multivariable logistic regression analysis was used to determine if delivery of oral health services in clinical practice was associated with education in oral health competencies, with PA specialty, and/or with primary employer type (Table 23).

After controlling for PA specialty and primary employer type, PAs who received education in oral health and disease were approximately 2.79 times more likely (95% CI=1.39-5.59, *P*=0.0038) to provide oral health services in their clinical practice, compared to those who did not receive any education in oral health competencies (Table 23).

The likelihood of a PA providing oral health services was 6.94 times higher and significant (95% CI=3.82-12.62, *P*<0.0001) if the PA was practicing in primary care or emergency/urgent care versus another medical specialty, controlling for primary employer type and education in oral health (Table 23).

After controlling for PA specialty and education in oral health, PAs who worked in an outpatient or private practice setting were 35% less likely (95% CI=0.36-1.15, *P*=0.1380) to provide oral health services than PAs who worked in inpatient settings; however, the finding was not statistically significant (Table 23). Many of the PAs who worked in emergency/urgent care worked in hospitals, which were classified for this analysis as inpatient.

Table 23. Multivariable Logistic Regression Analysis Describing the Associations Between Delivery of Oral Health Services in Clinical Practice, Oral Health Education, PA Specialty, and Primary Employer Type

Education in Oral Health Competencies and Characteristics of Current Clinical Practice	Did Not Provide Oral Health Services	Provide Oral Health Services				
	n	n	Adjusted OR[a]	95% CI		*P*-Value
PA education program provides oral health						
No	48	14	1.00	Reference		
Yes	139	91	2.78	1.38	5.59	0.0043
Medical specialty						
Other specialty	116	24	1.00	Reference		
Primary/urgent care	71	81	6.94	3.82	12.62	<0.0001
Primary Employer						
Inpatient	105	62	1.00	Reference		
Outpatient/office practice	82	43	0.65	0.36	1.15	0.1380

[a] Odds Ratios (OR) and 95% Confidence Intervals (CI) were adjusted for the 3 variables included in the regression model.

Survey participants were asked about the electronic health records (EHRs) used in their practice setting (Table 24). Only 14.1% of the EHRs used by PA respondents contained any prompt to remind the clinician to ask about the patient's oral health; 29.0% of PAs indicated that the EHR had a specific place in which to record oral health findings. Only 9.0% of PAs indicated that the EHR in their clinical practice interfaced with an electronic dental record (EDR) in the organization. This is an important structural barrier that must be addressed to improve oral health integration.

Table 24. Electronic Health Record (EHR) in the Clinical Practice

EHR in the Clinical Practice	Yes		No		Unsure		Total	
	n	%	n	%	n	%	n	%
Contain a prompt to ask patients about their oral health	41	14.1%	208	71.7%	41	14.1%	**290**	**100.0%**
Contain a prompt to ask about last visit to an oral health provider	34	11.7%	217	74.8%	39	13.4%	**290**	**100.0%**
Have a specific place to document oral health information	84	29.0%	156	53.8%	50	17.2%	**290**	**100.0%**
Interface with an electronic dental record in the organization	26	9.0%	220	75.9%	44	15.2%	**290**	**100.0%**
Allow for sharing information on oral health management among other providers	49	16.9%	182	62.8%	59	20.3%	**290**	**100.0%**

Opinions and Attitudes

PAs were asked about the relative importance of various factors to integration of oral health services into clinical practice (Table 25). The factor most cited (93.2%) as "important" (47.6%) or "very important" (45.6%) was that "medical professionals must feel competent to provide oral health services" followed closely by the availability of oral health education for medical clinicians (92.3%), which was cited as "important" (47.6%) or "very important" (44.7%) by respondents.

Table 25. Relative Importance of Factors to Integration of Oral Health Services into Clinical Practice

Importance of Factors to Integration of Oral Health Services	Not Important		Slightly Important		Fairly Important		Important		Very Important		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Must encourage provision of oral health services	2	1.9%	5	4.8%	16	15.4%	48	46.2%	33	31.7%	**104**	**100.0%**
Medicaid program must reimburse for oral health services	2	1.9%	0	0.0%	13	12.5%	43	41.3%	46	44.2%	**104**	**100.0%**
Commercial insurance plans must reimburse services	1	1.0%	0	0.0%	10	9.6%	49	47.1%	44	42.3%	**104**	**100.0%**
Medical professionals must feel competent to provide services	0	0.0%	0	0.0%	7	6.8%	49	47.6%	47	45.6%	**103**	**100.0%**
Education for medical clinicians must be available	0	0.0%	0	0.0%	8	7.8%	49	47.6%	46	44.7%	**103**	**100.0%**
Established clinical protocol must include oral health screening and	1	1.0%	3	2.9%	18	17.5%	46	44.7%	35	34.0%	**103**	**100.0%**
Training must be available for practice personnel	0	0.0%	3	2.9%	17	16.5%	46	44.7%	37	35.9%	**103**	**100.0%**
Other	3	23.1%	0	0.0%	3	23.1%	4	30.8%	3	23.1%	**13**	**100.0%**

The most cited barriers to integration of oral health services included "time demands" (cited as a "significant" (33.0%) or "very significant" (25.5%) barrier), "lack of patients' adherence to recommendations about oral health and hygiene" (cited as a "significant" (29.0%) or "very significant" (22.1%) barrier) and "lack of access to a dental provider referral system" (cited as a significant (26.0%) or very significant (21.4%) barrier) (Table 26).

The barrier rated as least significant was the "lack of a HEDIS outcome measure" (Table 26). This was rated as "not significant" (25.5%) or only "slightly significant" (20.9%) by 46.4% of PAs who responded to the survey.

Table 26. Relative Significance of Barriers to Integrating Oral Health Services Into PA Clinical Practice

Relative Significance of Barriers to Integrating Oral Health Services Into Clinical Practice	Not Significant		Slightly Significant		Fairly Significant		Significant		Very Significant		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Lack of encouragement or interest from member of clinical team	58	20.4%	42	14.8%	66	23.2%	86	30.3%	32	11.3%	**284**	**100.0%**
Time demands	30	10.5%	32	11.2%	57	19.9%	94	32.9%	73	25.5%	**286**	**100.0%**
Lack of reimbursement for oral health services	59	20.7%	32	11.2%	70	24.6%	81	28.4%	43	15.1%	**285**	**100.0%**
Lack of patients' adherence to recommendations about oral health	39	13.7%	38	13.3%	62	21.8%	83	29.1%	63	22.1%	**285**	**100.0%**
Lack of a HEDIS outcome measure	72	25.5%	59	20.9%	66	23.4%	59	20.9%	26	9.2%	**282**	**100.0%**
Lack of access to a dental provider referral system	70	24.6%	32	11.2%	49	17.2%	73	25.6%	61	21.4%	**285**	**100.0%**
Other	29	43.9%	3	4.5%	12	18.2%	13	19.7%	9	13.6%	**66**	**100.0%**

LIMITATIONS

Since the survey response rate was low, the results reported here are likely not generalizable. The authors hypothesize that providing oral health services in clinical practice is an innovative function for PAs, with only measured uptake to date; thus, the survey may have been dismissed by PAs who saw the topic as irrelevant to their practice. This may be especially true for those who do not provide oral health services to their patients. However, this hypothesis also suggests that there may be some response bias from those who do provide oral health services.

While all email and mail reminders to the sample contained a statement that the survey asked questions relevant to PAs who *did or did not* provide oral health services, the authors suppose that the survey topic may have discouraged participation. Researchers have found that the salience of an issue to the sampled population has a strong positive correlation with survey response rates. A number of studies validate that issue salience has a stronger effect on response rate that any other survey aspect, including advance notice, follow-up, or monetary incentives.[23] In addition, the authors suspect that concerns about the security of accessing a web link from an unfamiliar source may have discouraged some from completing the survey. Researchers attempted to mediate any uncertainty by having the introductory email sent from AAPA, a known professional association. It was thought that this would instill survey legitimacy, and alleviate concerns about privacy and security.

The literature on survey research further suggests that response representativeness is more important than response rate.[23] However, since this area of research is relatively new and provision of oral health services in PA clinical practice is a recent innovation, there is little data available to effect comparisons that could determine representativeness. The AAPA survey which preceded this work also experienced a low response rate, and had similar findings about specialties and settings of PAs to those presented here.

Despite the low response rate, the data was compiled and analyzed. The topic of oral health integration is important, and the data from the survey might contribute to improved understanding of the barriers and facilitators to integration of oral health screening services in medical practices. As described in the following paragraphs, PAs' survey responses seem to support findings in earlier research that specialty and setting may, in fact, impact decisions about the provision of oral health services in medical practices.

DISCUSSION

While the generalizability of these results is limited due to the low participation rate, PAs' responses nonetheless provide interesting insights about the integration of oral health assessment into clinical medical practices. As hypothesized before the survey was fielded, the collected data indicated that PAs in primary care (including family medicine, general practice, internal medicine, pediatrics, and obstetrics and gynecology) and those in emergency care were more likely than PAs in other specialties to incorporate oral health screening and assessment services into their clinical practices. Oral health assessment services were provided by PAs in private practices, ambulatory care settings, and in both outpatient and inpatient hospital settings.

While almost three-quarters of PAs who responded to the survey reported that they received some education in oral health and disease during their PA education programs, only 38.8% of those who received didactic and/or clinical instruction in oral health during training had incorporated those competencies into current practice. Still, among those PAs who were providing any oral health services for patients, more than 80% indicated that they had obtained their education in oral health from their PA program, rather than from another source. This suggests that training in oral health competencies during foundational education is important and may increase the likelihood of PAs providing oral health screening services.

The survey data also suggests that misperceptions within the medical community about the importance of screening for oral disease persist, especially in medical specialty practices. Very few PAs in medical or surgical specialties provided any oral health screening services. While most medical specialists do not provide primary medical services, most do collect a medical history and a list of medications. Incorporating a few questions about dental history, oral hygiene, and the existence of a dental home might provide important information about a patient's oral health status. The linkages between diabetes, cardiovascular disease, respiratory health, and other health conditions with oral disease are well documented. It is important that medical specialists not disregard these connections or minimize the importance of oral health assessment.

The survey data also implied that patients' oral health literacy was problematic. The second most commonly cited barrier to integration of oral health services into clinical practice was a lack of patients' adherence to recommendations about oral health and oral hygiene. While this is an important barrier, it is also a primary reason why provision of these services in medical practice is important. Patients visit primary care providers more often than dentists. Thus, primary care clinicians have a unique opportunity to improve literacy through oral health assessment services accompanied by patient education. Primary care clinicians are well positioned to inform their patients about why oral health matters.

The survey results also suggest that despite general interest among policymakers, advocates, and stakeholders in integrating oral health with medical services, numerous structural barriers within delivery systems impede that integration. PAs who responded to the survey indicated that "time demands" in their practices inhibited incorporation of oral health screening services. Once again, this finding suggests that oral health was perceived to be less important than screening for other health conditions, and further supports the need for education of clinicians about the documented linkages between oral and systemic disease.

Many PAs cited the "lack of reimbursement for oral health services", "the lack of encouragement or interest in providing oral health services from other members of the care delivery team", and "the lack of access to a dental provider referral system" as "important" or "very important" barriers to incorporation of oral health assessment services into clinical practice. PAs also emphasized the importance of having established clinical protocols for oral health services. These barriers are likely residual from the historic separation of medicine and dentistry, which must be addressed to enable integration.

More than 90% of PAs who responded to the survey indicated that it was "important" or "very important" that a medical clinician "feel competent to provide services" in oral health and "important" or" very important" that education about oral health "for medical clinicians must be available". All medical professionals are required to complete continuing education to maintain licensure; continuing education would be an appropriate vehicle for instruction in oral health competencies. While highly recognized online resources providing both didactic and clinical instruction in oral health screening (eg, *Smiles for Life*) already exist, it may be that physicians are unaware of their availability.

CONCLUSIONS

While caution is suggested in generalizing the results of this survey, responses were encouraging about oral health service integration in primary care medical practice. There is general acknowledgement that points of entry to oral health services must be increased in order to improve access to the dental service delivery system. Primary medicine is especially important because primary care practitioners are gateways to other health services and are, therefore, uniquely positioned to counsel, educate, and refer patients to dental providers. The opportunities for patient triage and referral are numerous and the impacts on access to and utilization of oral health services are potentially substantial.

While uptake of oral health screening and assessment services in primary practice is still not at desired levels, it was apparent from this survey that there is noticeable progress with integrating these services. The fact that some PAs are frequently or always screening for oral disease during clinical encounters with patients is an indicator that especially in primary medicine, there is growing acknowledgement of the importance of these services. Ongoing education within the medical community and changes in reimbursement policies, medical record design, and referral networks will all be needed to foster further adoption of oral health screening by medical providers.

Appendix A

OTHER/NARRARIVE RESPONSES TO SURVEY QUESTIONS, BY NUMBER

Q3. Please describe the medical specialty in which you currently work. "Other"

Aesthetics (2)
Cardiology (2)
Critical care (2)
GI
Gynecology
Head and neck oncology
Hematology
Hematology/Oncology (3)
Neurology (3)
Neurosurgery/Spine
Oncology
Ortho trauma surgery
Orthopaedics
Orthopedic (2)
Pediatric Hematology/Oncology
Pediatric Ortho
Primary care integrated with behavioral health/addiction
Primary care medicine in a psychiatric facility
Primary Care/Urgent Care
Retail health
Student Health (2)
Trauma/critical care surgery (2)
Urgent Care (11)
Urology (3)
Weight loss and natural hormone replacement

Q5. Surgery Sub-specialty follow-up: Describe your specialty. "Other"

Plastic and OMFS

Q6. Describe your primary employer. "Other"

Convenient Care (Minute Clinic)

Contract to work in Emergency Medicine (2)

FQHC (2)

Hospital (Non-profit)

Privately own

State government hospital

Q8. Hospital/medical center follow-up: Which best describes your hospital/medical center? "Other"

Naval Hospital

Urgent care owned by hospital

Q9. Please select the area in which you work. Describe:

Emergency room (2)

Family Clinic (3)

Floor (1)

ICU (2)

Outpatient and Inpatient (5)

Surgical (6)

Urgent care (2)

Q11. Health clinic follow-up: Which best describes your health clinic? "Other"

FQHC lookalike urban health center (1)

Primary care (1)

Privately owned walk-in urgent care (1)

Q12. Government follow-up: Which best describes your agency? "Other"

Military (2)

Q17. How was the oral health curriculum delivered to students? (Indicate all that apply.). "Other"

Cavity Free at Three

Free Dental Clinic in which we assisted dentist

Half day rotation with a dentist

Hands-on time (ie, fluoride)

Part of our ENT module

Preceptor guided education with existing oral health programs/protocols

Went to dental school and learned to apply fluoride varnish

Q19. Please indicate the source of this education. "Other"

BS in Dental Hygiene

Clinical practice

Dental assistant background, self-study and some at work training

Dentist visit to clinic

EM Fellowship

International rotation

Job experience

My personal dentist/dental hygienists

My wife is a dentist

Respiratory therapy classes

Worked in oral surgery

Q24. Please indicate the oral health services that you provide and their frequency. "Other"

Consult dentist for emergencies

Dental blocks and acute pain management (2)

Emergent antibiotics or temporary pain relief when dentistry unavailable, usually per patient financial situation.

Oral hygiene

Trauma services (2)

Treat dental infections

Q25. When do you conduct examinations/assessments of the oral cavity? (Indicate all that apply.) "Other"

All new patients and head & neck cancer patients

Always when admitting and then as needed during hospital stay

As needed with patient complaints

Daily on the inpatient unit (2)

ICU daily assessments

Nursing home visits

Problem based assessments and referrals

While inpatient

Q26. Please indicate the frequency with which you examine/assess the oral cavity of the following types of patients. (Indicate all that apply.) "Other"

In setting of facial trauma

Sicca syndrome

Trauma

Q27. If an oral health assessment of a patient reveals suspected oral disease, how do you address the concern? (Indicate all that apply.) "Other"

Consult dental

Refer if serious/acute problem

Refer to inpatient dental team

Refer to our in-house dentist.

Tell them to follow up with a dentist

Treatment by our OMFS and dentists

Q31. Please describe the relative significance of the following barriers to integrating oral health services into clinical practice. "Other"

Lack of coverage for oral health services coverage by regular health insurance

Lack of dental insurance

Lack of insurance coverage (6)

Lack of overall knowledge (2)

No EMR

Not applicable to scope of practice (2)

Not practice applicable

People in general lack motivation to visit a dentist until there is problem. Referrals are commonly go to dental schools. Dentistry is broken in a way health care used to be.

We are a subspecialty

We don't provide this type of service at our clinic

Q33. Please indicate any additional personal insights or opinions about the importance of providing any oral health services in PA clinical practice.

Insurance Issues

Better insurance coverage for oral health if it is going to be better integrated with medical practice.

Biggest barrier is not having dentists/oral health professionals who take my patients insurance

I find it difficult for patients to follow oral health recommendations as many do not have dental coverage especially if under Medicaid coverage

Not enough time to discuss oral health in addition to the added documentation required. In addition, insurance coverage for dental care is usually not provided for the people who need it most.

EM providers in general aren't well trained to deal with oral issues. We usually just start the patient on an RX and have them follow-up with Dentists. Unfortunately, most dentists don't take Medicaid so patients have to go to free clinics which are usually over-booked already.

Important for clinical teams despite specialty to perform general oral health services as patients in my area do not have the resources or means to follow up with dental services as often as recommended.

Access to Care

Rural: only one dentist, lack of dental insurance, and cost of dental work.

Oral care is very important in the inpatient setting in my practice due to the frequent manifestation of abscesses and sepsis. It is often due to lack of access to dental care in my area and typical patient demographic.

Time Barriers

As a neurosurgical PA the time constraints and relevance is the largest barrier.

Time constraints do not allow us to counsel on oral health. Unsure of which dentists are in network(s).

Other Comments

For my current practice, oral health screening is limited to recent infections or dental issues that might have required ABX treatments, which might either complicate orthopedic surgical clearance. However, during my family medicine rotations, especially in rural/underserved communities, I was exposed to strategies based on state supported programs that were aimed to improve oral health in children. It would be my intention to continue adding an emphasis in oral health as part of an annual WCC should I practice in a setting more appropriate to this type of education.

I do not think PAs should get involved in oral care.

I feel I am more aware of oral health because a close friend is a dentist, otherwise since there has been no stress on the topic or intervention to learning and improving practice I would be much less active than I already am, which I am aware is not a little already. Thanks. Great survey, hope outcomes are all positive!

I feel that oral health is very important in the overall health of my patients.

I performed fluoride sealants and looked for caries in children in PA school excellent experience.

I screen all patients for dental carries, and advise to see Dentist if I appreciate any issues on examination. Occasionally I will issue formal referral for Dental Care. Also do oral screenings for cancers on all PE's.

I think it is quite important but at my place of employment there are associated dental clinics at each of our medical sites so the need to integrate oral health into a medical visit is minimized as pts with dental needs can see a dental professional (often with walk-in appointments available) in the same building.

I think oral health services is an integral part of overall health.

I was extremely disappointed in my PA program's lack of oral/dental curriculum. I wouldn't even know how important oral health is to systemic health if not for my classmate's husband being in dental school while we were in PA school and telling us key things. I have patients come in to my urgent care clinic for

dental pain, oral infections, etc. and I often feel unequipped to help them. I would like to learn how to do dental blocks for patients in extreme pain (I do lidocaine injections elsewhere daily) I would like to be connected to more dentists and oral surgeons to refer patients. I would like more knowledge about differentiating and treating oral lesions. I attended one talk on oral health at the 2016 AAPA conference, but the speaker talked mostly about the importance of oral health and it didn't find the talk substantive; I didn't learn much applicable information.

I would like more primary care CME focused solely on dental health and disease management.

If we could have a dentist visit our health center or a dentist who we know and trust near our practice, that would increase patient's likelihood to get preventative dental services.

I'm in orthopaedics. The only time we spend with patients about oral hygiene is preparing for and after a joint replacement.

In the ED setting, there is no follow up. If we try to treat an oral condition more than antibiotics and try and arrange follow up for the patent, there is no guarantee they will follow up. I am not prescribing narcotic pain medication for this population, so most leave without being seen when they find this out.

Many adults do not have a regular dentist.

Need more training programs and information.

Needs to be done.

None of my supervising physicians perform oral exams or even include it as part of health assessment.

Not enough education is provided to patients about oral health because they often have a dentist.

Oral health has never been addressed in any clinical setting since my graduation.

Oral health has very little to do with the daily encounters in our general surgery office, particularly as we engage in a significant amount of breast cancer surgery.

Oral health is a large part of gastroenterology. It affects both the disease process and endoscopic interventions that we perform daily. Oral health is always in my assessment. There is not adequate health care availability to refer these patients to the right dentist or oral maxillofacial surgeon.

Oral health is very important for my chemotherapy patients as well as those receiving bisphosphonates. We do our best to address the issues and maintain good hygiene practice and education.

Oral health not emphasized enough in regards to medically related problems like bacteremia, etc.

Since I do provide nutrition education, having more knowledge about oral health and the impact of certain foods on oral health would be super beneficial to augment my current education. I will make a more conscious effort to learn about this and implement it into my practice as best I can, since with my current job we promote overall health and well-being of our patients.

Since I practice in neurology, oral health is not something I particularly deal with on a regular basis.

There should be more integration among medical and dental professionals.

This is a topic not discussed or reinforced in our practice.

Very important, willing to integrate it into my practice. Need the protocols and training in order to integrate it more effectively.

Working in orthopedic unless a patient had a joint replacement oral care is not important. With implants we do remind about prophylactic antibiotic use.

Would love course on emergency dentistry when access to dentist is unavailable. I.e.: alveolar blocks, extractions, treatment of abscess. These issues come up frequently in ED, and can become huge systemic issues. Access to formal dentistry options are limited everywhere, but especially in rural areas. Medicaid covers dentistry for children but not adults. Huge issue for access to care and major source of "bounce backs," even though ED not equipped to address dental emergencies.

Appendix B

SURVEY INSTRUMENT

Recent PA Graduate Survey on Oral Health Practice

You have been selected to receive this questionnaire as part of a stratified sample of recent PA education program graduates across the US. This survey is voluntary and will take approximately 5 to 10 minutes to complete. Your responses will be confidential and reported only in aggregate and averages.

At project completion, the Oral Health Workforce Center at CHWS will update the AAPA file of recent graduates with the practice characteristics collected from this survey including physician assistant specialty, practice setting, and geography and provide that update to the AAPA. AAPA uses this information to better understand emerging practice trends for the PA profession.

Characteristics of Current Clinical Practice

1. Please describe the medical specialty in which you currently work.

- ❍ Not currently in clinical practice (1)
- ❍ Addiction Medicine (2)
- ❍ Anesthesiology (3)
- ❍ Dermatology (4)
- ❍ Emergency Medicine (5)
- ❍ Family Medicine/General Practice (6)
- ❍ Geriatrics (7)
- ❍ Hospice & Palliative Care (8)
- ❍ Hospital Medicine (9)
- ❍ Internal Medicine - General (10)
- ❍ Internal Medicine - Sub-specialty (11)
- ❍ Obstetrics/Gynecology (12)
- ❍ Occupational Medicine (13)
- ❍ Ophthalmology (14)
- ❍ Otolaryngology (15)
- ❍ Pain Management (16)
- ❍ Pathology (17)
- ❍ Pediatrics (18)
- ❍ Physical Medicine/Rehabilitation (19)
- ❍ Preventive Medicine/Public Health (20)
- ❍ Psychiatry (21)
- ❍ Radiation Oncology (22)
- ❍ Radiology - Diagnostic (23)
- ❍ Radiology - Interventional (24)
- ❍ Surgery - General (25)
- ❍ Surgery - Sub-specialty (26)
- ❍ Other (Please describe): (27) _____

Internal Medicine Sub-specialty follow-up: Describe your specialty:

- ❍ Allergy and Immunology (1)
- ❍ Cardiology (2)
- ❍ Critical Care (3)
- ❍ Endocrinology (4)
- ❍ Gastroenterology (5)
- ❍ Hematology (6)
- ❍ Infectious Disease (7)
- ❍ Nephrology (8)
- ❍ Neurology (9)
- ❍ Oncology (10)
- ❍ Pulmonology (11)
- ❍ Rheumatology (12)
- ❍ Other (Please describe): (13) _____

Surgery Sub-specialty follow-up: Describe your specialty:

- ❍ Bariatric Surgery (1)
- ❍ Cardiovascular or Cardiothoracic Surgery (2)
- ❍ Colorectal Surgery (3)
- ❍ Gynecology and Obstetrics (4)
- ❍ Gynecology Oncology (5)
- ❍ Neurologic Surgery (6)
- ❍ Oncologic Surgery (7)
- ❍ Ophthalmic Surgery (8)
- ❍ Oral and Maxillofacial Surgery (9)
- ❍ Orthopaedic Surgery (10)
- ❍ Otorhinolaryngology Surgery (11)
- ❍ Pediatric Surgery (12)
- ❍ Plastic Surgery (13)
- ❍ Transplant Surgery (14)
- ❍ Trauma Surgery (15)
- ❍ Urologic Surgery (16)
- ❍ Vascular Surgery (17)
- ❍ Other (Please describe): (18) _____

2. Describe your primary employer:

- ❍ Office based private practice (1)
- ❍ Hospital/medical center (including government sponsored) (2)
- ❍ Ambulatory care facility (3)
- ❍ Health clinic (4)
- ❍ Government (non-hospital) (5)
- ❍ Home health agency (6)
- ❍ Hospice (7)
- ❍ Long term care facility including nursing home or assisted living facility (8)
- ❍ Medical staffing agency (9)
- ❍ Self-employed or independent contractor (10)
- ❍ Other (Please describe): (11) _____

Office based private practice follow-up: Which best describes your practice?

- ❍ Solo practice (1)
- ❍ Single specialty physician group (2)
- ❍ Multi-specialty physician group (3)

Hospital/medical center follow-up: Which best describes your hospital/medical center?

- ❍ Academic medical center (1)
- ❍ Nonprofit community hospital (2)
- ❍ For profit community hospital (3)
- ❍ State or local government community hospital (4)
- ❍ Critical access hospital (5)
- ❍ Veterans' Administration hospital (6)
- ❍ Non-VA federal hospital (7)
- ❍ Psychiatric hospital (8)
- ❍ Rehabilitation hospital (9)
- ❍ Other (Please describe): (10) _____

Hospital/medical center follow-up: Please select the area in which you work:

- ❍ Emergency department (1)
- ❍ Inpatient unit (2)
- ❍ Intensive or critical care unit (3)
- ❍ Operating room (4)
- ❍ Outpatient unit (5)
- ❍ Other (Please describe): (6) _____

Ambulatory care facility follow-up: Which best describes your ambulatory care facility?

- ❍ Ambulatory surgical center (1)
- ❍ Urgent care center (2)
- ❍ Rehabilitation facility (3)
- ❍ Other (Please describe): (4) _____

Health clinic follow-up: Which best describes your health clinic?

- ❍ Federally qualified health center (1)
- ❍ Rural health clinic (2)
- ❍ Retail clinic (3)
- ❍ Free clinic (4)
- ❍ Occupational health clinic (5)
- ❍ School-based or college-based health center (6)
- ❍ Correctional facility clinic (7)
- ❍ Other community clinic (Please describe): (8) _____

Government follow-up: Which best describes your agency?

- ❍ Federal Bureau of Prisons (1)
- ❍ Indian Health Service (2)
- ❍ Federal Public Health Service (3)
- ❍ State or Local Department of Health (4)
- ❍ Other (Please describe): (5) _____

3. Which best describes the geographic location of your primary employer?

- ❍ Urban (1)
- ❍ Suburban (2)
- ❍ Rural (3)

4. In what state is your primary employer located?

- ❍ Alabama (1)
- ❍ Alaska (2)
- ❍ Arizona (3)
- ❍ Arkansas (4)
- ❍ California (5)
- ❍ Colorado (6)
- ❍ Connecticut (7)
- ❍ Delaware (8)
- ❍ District of Columbia (9)
- ❍ Florida (10)
- ❍ Georgia (11)
- ❍ Hawaii (12)
- ❍ Idaho (13)
- ❍ Illinois (14)
- ❍ Indiana (15)
- ❍ Iowa (16)
- ❍ Kansas (17)
- ❍ Kentucky (18)
- ❍ Louisiana (19)
- ❍ Maine (20)
- ❍ Maryland (21)
- ❍ Massachusetts (22)
- ❍ Michigan (23)
- ❍ Minnesota (24)
- ❍ Mississippi (25)
- ❍ Missouri (26)
- ❍ Montana (27)
- ❍ Nebraska (28)
- ❍ Nevada (29)
- ❍ New Hampshire (30)
- ❍ New Jersey (31)
- ❍ New Mexico (32)
- ❍ New York (33)
- ❍ North Carolina (34)
- ❍ North Dakota (35)

- ❍ Ohio (36)
- ❍ Oklahoma (37)
- ❍ Oregon (38)
- ❍ Pennsylvania (39)
- ❍ Puerto Rico (40)
- ❍ Rhode Island (41)
- ❍ South Carolina (42)
- ❍ South Dakota (43)
- ❍ Tennessee (44)
- ❍ Texas (45)
- ❍ Utah (46)
- ❍ Vermont (47)
- ❍ Virginia (48)
- ❍ Washington (49)
- ❍ West Virginia (50)
- ❍ Wisconsin (51)
- ❍ Wyoming (52)

Oral Health Education

5. Did your PA education program provide you with any education in oral health and oral disease?

- ❍ Yes (1)
- ❍ No (2)
- ❍ Unsure (3)

5a. How was the oral health curriculum delivered to students? (Indicate all that apply.)

- ❑ Stand-alone lectures (1)
- ❑ Integrated into one or several other curriculum topics (2)
- ❑ Completion of an online curriculum (3)
- ❑ Interprofessional oral health training (4)
- ❑ Service learning activities (5)
- ❑ Other (Please describe): (6) _____

6. Have you received any education in oral health competencies from sources other than your PA education program?

- ❍ Yes (1)
- ❍ No (2)
- ❍ Unsure (3)

6a. Please indicate the source of this education.

- ❍ In-service training (1)
- ❍ Professional conferences (2)
- ❍ On-line education (3)
- ❍ Self-study (4)
- ❍ Continuing education courses (5)
- ❍ Other (Please describe): (6) _____

7. On a scale of excellent to poor, rate your preparation from your PA education program to perform the following oral health services:

	Excellent (5)	Good (4)	Acceptable (3)	Fair (2)	Poor (1)
a. Conduct patient specific oral health risk assessments	❍	❍	❍	❍	❍
b. Identify patient conditions and medical treatments that impact oral health	❍	❍	❍	❍	❍
c. Identify patient specific oral conditions and diseases that impact overall health	❍	❍	❍	❍	❍
d. Perform oral health evaluations linking patient history, risk assessment, and clinical presentation	❍	❍	❍	❍	❍
e. Identify strategies to prevent or mitigate the risk of oral and systemic disease	❍	❍	❍	❍	❍
f. Provide patient education about the importance of oral health and how to maintain good oral health	❍	❍	❍	❍	❍
g. Offer preventive oral health interventions and strategies	❍	❍	❍	❍	❍
h. Offer appropriate referral for oral health services	❍	❍	❍	❍	❍

8. How did your education in oral health impact your attitude about integrating oral health into clinical practice?

❍ Made me more likely to integrate oral health into clinical practice (1)
❍ Made no difference in my attitude about integration of oral health (2)
❍ Made me less likely to integrate oral health into clinical practice (3)

Integration of Oral Health Services into Clinical Practice

9. Do you provide any oral health services for any patients in your current practice?

- ❍ Yes (1)
- ❍ No (2)
- ❍ Unsure (3)

10. Please indicate the oral health services that you provide and their frequency. (Indicate all that apply.)

	Always (5)	Often (4)	Sometimes (3)	Rarely (2)	Never (1)
Examine and assess the oral cavity	❍	❍	❍	❍	❍
Assess for oral manifestations of systemic disease	❍	❍	❍	❍	❍
Assess for the presence of intraoral pathology	❍	❍	❍	❍	❍
Change medications to protect saliva, teeth, and/or gums	❍	❍	❍	❍	❍
Apply fluoride varnish	❍	❍	❍	❍	❍
Provide dietary counseling to protect teeth	❍	❍	❍	❍	❍
Educate about personal oral hygiene	❍	❍	❍	❍	❍
Refer to a dental provider when needed	❍	❍	❍	❍	❍
Other (Please describe):	❍	❍	❍	❍	❍

10a. When do you conduct examinations/assessments of the oral cavity? (Indicate all that apply.)

- ❑ Annual well visits (1)
- ❑ Periodic follow-up visits (2)
- ❑ As needed during acute care visits (3)
- ❑ As needed during emergency department visits (4)
- ❑ Other (Please describe): (5) _____

10b. Please indicate the frequency with which you examine/assess the oral cavity of the following types of patients. (Indicate all that apply.)

	Always (5)	Often (4)	Sometimes (3)	Rarely (2)	Never (1)
a. Children in my practice	❍	❍	❍	❍	❍
b. Adults in my practice	❍	❍	❍	❍	❍
c. Patients with a complaint about the oral cavity	❍	❍	❍	❍	❍
d. Patients who indicate no usual dental provider	❍	❍	❍	❍	❍
e. Patients with diabetes	❍	❍	❍	❍	❍
f. Patients with cadiovascular disease	❍	❍	❍	❍	❍
g. Patients with history of stroke	❍	❍	❍	❍	❍
h. Patients with joint replacement	❍	❍	❍	❍	❍
i. Patients with HIV	❍	❍	❍	❍	❍
j. Patients who are pregnant	❍	❍	❍	❍	❍
k. Patients who are smokers	❍	❍	❍	❍	❍
l. Patients who use alcohol	❍	❍	❍	❍	❍
m. Patients who are substance abusers	❍	❍	❍	❍	❍
n. All patients receive an oral health assessment	❍	❍	❍	❍	❍
o. Other (Please describe):	❍	❍	❍	❍	❍

10c. If an oral health assessment of a patient reveals suspected oral disease, how do you address the concern? (Indicate all that apply.)

- ❑ Educate the patient about the implications of poor oral health (1)
- ❑ Provide the patient with a list of local dentists to call (2)
- ❑ Office staff expedite a referral and make an appointment for the patient with a dentist (3)
- ❑ Other (Please describe): (4) _____
- ❑ None of the above (5)

11. Does the EHR in your clinical practice…

	Yes (1)	No (2)	Unsure (3)
a. Contain a prompt to ask patients about their oral health	❍	❍	❍
b. Contain a prompt to ask patients about the last visit to an oral health provider	❍	❍	❍
c. Have a specific place to document oral health information	❍	❍	❍
d. Interface with an electronic dental record in the organization	❍	❍	❍
e. Allow for sharing information on oral health management among other providers	❍	❍	❍

Opinions and Attitudes

12. Please describe the relative importance of the following factors to integrating oral health services during clinical encounters.

	Very Important (5)	Important (4)	Fairly Important (3)	Slightly Important (2)	Not Important (1)
a. Colleagues and supervising physicians must encourage provision of oral health services	❍	❍	❍	❍	❍
b. The Medicaid program must reimburse for oral health services provided by a medical clinician or assistive personnel	❍	❍	❍	❍	❍
c. Commercial insurance plans must reimburse for oral health services provided by a medical clinician or assistive personnel	❍	❍	❍	❍	❍
d. Medical professionals must feel competent to provide oral health assessment services	❍	❍	❍	❍	❍
e. Education for medical clinicians in oral health competencies must be widely available	❍	❍	❍	❍	❍
f. Established clinical protocols must include oral health screening and assessment services	❍	❍	❍	❍	❍
g. Training must be available for practice personnel on information flow, expediting referrals, and billing related to oral health services	❍	❍	❍	❍	❍
h. Other (Please describe):	❍	❍	❍	❍	❍

13. Please describe the relative significance of the following barriers to integrating oral health services into clinical practice.

	Very Significant (5)	Significant (4)	Fairly Significant (3)	Slightly Significant (2)	Not Significant (1)
a. Lack of encouragement or interest from members of the clinical team prevents the integration of oral health services into patient care	❍	❍	❍	❍	❍
b. Time demands prohibit best practices in this area	❍	❍	❍	❍	❍
c. Lack of reimbursement for oral health services prevents uptake in medical practice	❍	❍	❍	❍	❍
d. Lack of patients' adherence to recommendations about oral health and oral hygiene limit effectiveness	❍	❍	❍	❍	❍
e. Lack of a HEDIS outcome measure about oral health makes examination of the oral cavity a low priority	❍	❍	❍	❍	❍
f. Lack of access to a dental provider referral system in the area is a barrier	❍	❍	❍	❍	❍
g. Other (Please describe):	❍	❍	❍	❍	❍

Narrative Comments

Please indicate any additional personal insights or opinions about the importance of providing any oral health services in PA clinical practice.

Thank You

Thank you for your time and your contribution to this research. If you qualify for a $5.00 Amazon gift code as one of the first 400 PAs to respond to the survey or if you wish to enter the drawing for the $100 gift card, we will need an email address to reach you.
Email address: (1)

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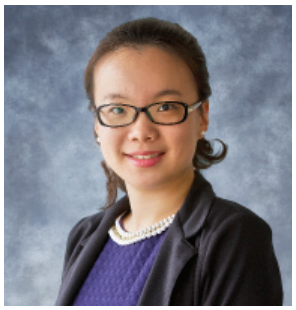

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