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Intraprofessional Dental Education: Where Do We Stand?

Introduction

Trends in health care practice indicate that teams produce more effective patient outcomes than individuals providing clinical care. For patients with diseases such as cancer, diabetes and heart disease, the health care team has evolved into a cohesive group of physicians, nurses, pharmacists, social workers, and medical/surgical specialists, including members of the oral health team, to holistically address each problem associated with the illnesses being managed. Our task in dental education is to use this team approach to provide a framework for successful dental teams to treat oral diseases.

The idea for this guiding paper originated during a joint meeting of the administrative boards of the ADEA Council of Deans and the ADEA Council of Allied Dental Program Directors. The two administrative boards recognized the need for dental professionals to be integrated in the academic setting in an effort to provide a framework for successful dental teams. Members of both councils wrote the sections of this paper: Leon Assael, D.M.D., CMM; Michele Carr, RDH, M.A.; Katherine Woods, M.P.H., Ph.D., CRDH; and Stephen Young, D.D.S., M.S.

The goals of this paper are (1) to inform the reader of findings from a survey completed in 2016 that determined the status of intraprofessional dental education in the United States and (2) provide examples of intraprofessional dental education models so institutions can prepare students with the knowledge, skills and attitudes necessary for intraprofessional dental education and future practice. The paper is comprised of five sections, as follows:

- **Survey of Intraprofessional Dental Education:** This section presents the findings from a 2016 ADEA survey on intraprofessional education sent to ADEA Member Institutions. The survey instrument and data tables are included in the appendices.
- **Intraprofessionalism—Historic Models:** This section offers a brief history of intraprofessionalism, including various approaches taken to increase intraprofessionalism in dentistry and dental education.
- **Intraprofessionalism—Accreditation Standards and Professional Principles:** This section provides an overview of where intraprofessional education lines up with the accreditation standards and the professional principles of the dental and allied dental professions.
- **Opportunities for Joint Curriculum and Joint Clinical Education:** This section discusses the opportunities for and challenges of joint curriculum and clinical practice in dental education.
- **Resource Implications:** This section contains an overview of selected resources that provide information on various topics related to intraprofessional education, such as curriculum development and clinical education. These resources serve to inform the reader of the types of information that need to be explored and presented for intraprofessional education.

Survey of Intraprofessional Dental Education

In reviewing the literature, a significant amount of information can be found on *inter*professional education and practice in dental education, but there is minimal information on *intra*professional dental education and practice in academic dental institutions. Therefore, in spring 2016, a survey was sent to dental schools and dental hygiene programs to determine the status of intraprofessional dental education within the curriculum.

For this survey, intraprofessional education was defined as "when students in two or more oral health professions learn, and provide patient care together, in a fashion that promotes lifelong collaboration."

The survey was sent to the 66 U.S. dental schools and 329 dental hygiene programs in dental school and non-dental school settings (the survey instrument is provided in Appendix A, p. 13). The response rate for dental school programs was 68% and for non-dental school programs 62%. Table 1 (see Appendix B, p. 16) details the number of institutions responding by category and percentage of total respondents. The largest percentage of respondents (82.3%) were from non-dental school programs. In the non-dental school category, the largest percentage of respondents (55.8%) were from community and technical colleges (Table 1, p. 16).

Of all responding institutions, 67% indicated they were currently providing intraprofessional experiences for their students. The institutional category with the largest percentage of intraprofessional programs was dental schools at 89%. In the non-dental school category, university programs affiliated with a dental school provided the largest percentage of intraprofessional experiences (95%) (Table 2, p. 16).

In dental and non-dental school settings, participating students were comprised of predoctoral, postgraduate, dental hygiene, dental assisting and other (Table 3, p. 16). Participation for dental students and dental hygiene students at both dental schools and non-dental schools occurred in all years of the curriculum, but with increased participation in the later years of the program (Table 4, p. 17).

Table 5 (p. 17) and Table 6 (p. 18) detail the types of intraprofessional experiences, by student type and institutional setting. No matter the student type, the preponderance of intraprofessional experiences were acquired in clinical settings within the institution or extramural sites (Table 7, p. 18). Except for postgraduate and dental therapy students, all students received some intraprofessional didactic education.

Respondents from institutions that do not provide intraprofessional educational experiences were asked if they planned to provide those experiences in the future. Forty percent of dental schools and 22.5% of non-dental schools indicated plans to incorporate intraprofessional education into the curriculum (Table 8, p. 19).

Dental school and non-dental school programs were asked to identify the barriers they experienced when instituting intraprofessional education. The top five barriers given by dental schools were scheduling; workforce limitations; financial resources; facility limitations; and timing of courses that dental, dental hygiene and dental assisting students could potentially attend together. The top five for non-dental school institutions were scheduling; no dental school in immediate vicinity; timing of courses that dental, dental hygiene and dental assisting students could potentially attend together; workforce limitations; and facility limitations (Table 9, p. 19).

The top five barriers experienced by dental schools and non-dental schools that had already implemented intraprofessional education programs were identical to those experienced by all institutions. Only 12% and 10% of dental schools and non-dental schools, respectively, indicated

they experienced no barriers when instituting an intraprofessional education program (Table 10, p. 20).

The five dental schools without an intraprofessional experiences also ranked resistance of faculty and lack of administrative support as significant barriers (Table 11, p. 21).

Summary of Results

1. The survey helps provide a snapshot of intraprofessional education in dental education institutions, which is missing in the dental literature.
2. The majority of dental schools provide some intraprofessional experiences for their students.
3. The majority of non-dental school programs provide some intraprofessional experiences for their students.
4. Intraprofessional experiences are provided to predoctoral, postgraduate, dental hygiene, and dental assisting students by the sponsoring institution either within the institution or at extramural sites.
5. The intraprofessional experiences are didactic, laboratory and/or clinical, and distributed in most cases throughout the length of the program.
6. Clinical intraprofessional experiences seem to be the most frequent for both dental school and non-dental school programs.
7. The majority of institutions with no intraprofessional educational program did not plan on initiating such a program.
8. The principle barriers for instituting intraprofessional experiences for all institutions and those with an intraprofessional program were the same:
    a. For dental schools, the principle barriers cited were scheduling; workforce limitations; financial resources; facility limitations; and timing of courses that dental, dental hygiene and dental assisting students could potentially attend together.
    b. For non-dental schools the principle barriers cited were scheduling; no dental school in immediate vicinity; timing of courses that dental, dental hygiene and dental assisting student students could potentially attend together; workforce limitations; and facility limitations.
9. Non-dental schools without intraprofessional experiences cited the same principle barriers as non-dental schools with programs.
10. Dental schools without intraprofessional experiences cited the same principle barriers as those dental schools with programs, but in addition cited resistance of faculty and lack of administrative support as significant barriers.

Conclusions

Much has been explored in the dental literature on interprofessional education, but the information on dental intraprofessional education remains scant. This survey provides a baseline from which to monitor future progress of intraprofessional education in dental schools and non-dental school programs. It also documents, for those considering starting intraprofessional programs, the barriers most often encountered. The next logical steps to aid institutions in establishing new intraprofessional programs or improving current programs would be to gather additional information focusing on best practices and effective strategies used to overcome those barriers.

Intraprofessionalism—Historic Models

In 1840, the first school for dentists opened in the United States—the Baltimore College of Dental Surgery.[1] Since that time, formal training programs for dental assistants and dental hygienists have been developed to enhance the educational experiences of allied dental providers who work with dentists (About the ADA section, History).

As early as 1980, the U.S. General Accounting Office endorsed the increased use of expanded functions "auxiliaries" to help to increase efficiency, cut costs and provide care to those in need.[2] It was recommended that state laws be changed in areas that wished to increase the use of allied dental professionals and employment opportunities. While the term intraprofessionalism may have different meanings to various health care providers, historically in dentistry, the term meant a team approach using the expanded function skills of allied dental providers. Following are examples of earlier models of intraprofessionalism in allied health and dentistry.

The Forsyth Experiment

The Forsyth Dental Center began a program in 1949 to train dental nurses, similar to those who practice in New Zealand.[3] Although the program's overall goals were not met at that time, in 1965 the Forsyth Dental Center approved a project centered on training dental hygienists in advanced skills, such as restorative procedures. The so-called Forsyth Experiment began training hygienists in 1972. After 26 weeks of training in cavity preparation and placement and finishing of restorative materials, the hygienists were found to be competent and, in fact, performed to a level equivalent to recent dentists.[3]

Team Approaches

The team approach to dental care generally meant that dental schools and allied dental education programs worked together to treat patients. The use of allied dental providers' expanded functions, dictated by dentists, was often the standard course of team-based dentistry. The Washington State Dental Auxiliaries Project ran from February 1979 and ended in 1981.[4] The study reported on five two-week periods, centering on the expanded functions performed by dental assistants and dental hygienists at 126 dental practices. Services included oral inspections, placing composite and amalgam restorations, adjusting occlusion of restorations, inserting temporary restorations or crowns, and administering local anesthesia. Interestingly, delegation of tasks to dental hygienists and dental assistants differed. The researchers reported that dentists delegated the tasks more commonly thought to be in the dental hygienists' scope of practice,[4] although the data indicated that tasks often were either not delegated or the delegation was not consistent, with the dentist choosing to perform delegable tasks. As for delegation to dental assistants, the researchers reported that dentists consistently delegated particular tasks to assistants, although the lack of auxiliary training and high staff turnover was found to be an issue. This early study showed a need for better education on the value of the expanded dental team.

A study on intraprofessionalism was completed with trainee dental technicians and undergraduate dental students at a dental school in the United Kingdom, where shared learning is a central theme in national health policies.[5] Each trainee dental technician was paired with two undergraduate dental students to complete assignments over five academic years. The students were surveyed on topics such as teamwork, understanding of roles, respect for each other's professional expertise, and team communication. Participants reported positive effects of the

shared experiences, including better understanding of roles and appreciation of working collaboratively with their partner students.[5]

A study on intraprofessional collaboration between occupational therapists and occupational therapy assistants found that collaborative fieldwork assignments and tutoring had a positive effect.[6] Study participants included students, preceptors who were experienced educators, and tutors. Between the fieldwork and the tutoring, the key themes that emerged were the relationships that were developed, better understanding each professional's role, and better understanding of the environmental influences of clinical and educational settings on learning.[6]

A systematic review of the literature on the safety and quality of services performed by allied dental professionals was published in the *Journal of the California Association*. This study showed that quality reversible procedures can be performed by allied dental providers.[7] However, there were insufficient studies to compare the reversible procedures performed by the dentists versus the allied dental providers.

University of Florida/St. Petersburg College Collaboration

The heart of theUniversity of Florida (UF) Health's mission includes a teamwork approach to health care.[8] UF has been involved with the Dental Hygiene Program at St. Petersburg College (SPC) since 1991, and in 2005 a UF satellite clinic was opened on an SPC campus where the two institutions have formed a team approach to educating advanced clinical residency students and dental hygiene students.[9] Each semester at the SPC Dental Hygiene Clinic, UF residents work side-by-side with dental hygiene students to assist the clinic dentist with evaluating dental charting and radiographic examination and diagnoses. The residents learn about the clinical education provided to dental hygiene students.

Since the UF Dental Clinic at SPC opened, in the first semester of clinical practice SPC dental hygiene students rotate to the UF Dental Clinic to observe the dental residents, dental assistants, and licensed dental hygienists providing dental care to patients. For many students, this is the first introduction to the dental team at work. Students are given an opportunity to provide feedback on their experiences observing the dental team at work, and for most the experience is very positive. The SPC students provide dental hygiene services to UF clinic patients for the remaining semesters. Many report they like the team atmosphere where they can see total patient treatment.

While earlier models of intraprofessional teamwork were focused on the use of expanded functions by the dental assistant and dental hygienist, new educational paradigms will be needed to include the dental therapist in a truly team-based approach to the assessment, diagnosis, planning, implementation and evaluation of care in dentistry.

Intraprofessionalism—Accreditation Standards and Professional Principles

Intraprofessional education lines up with the accreditation standards and professional principles of dental and allied dental professions in several areas. The Commission on Dental Accreditation (CODA) of the American Dental Association determines if an institution of higher education meets the minimum standards for accreditation. Those standards are unique to each dental profession. In addition to the accreditation standards, each individual professional should meet specific professional principles. Those principles are guided by the professional associations to which individuals belong. Following is a discussion of the accreditation principles that align with the collaborative nature of intraprofessionalism.

Commission on Dental Accreditation Standards

The *Accreditation Standards for Dental Education Programs*, as put forth by CODA, contain information on the importance of collaboration with other health professionals. The inclusion of intraprofessionalism will allow students and faculty to manage quality patient care grounded in evidence-based practice.

The CODA accreditation standards for dental assisting programs promote ethical responsibility through effective communication.[10] Accreditation standards for dental hygiene programs ask that graduates have "communication skills to effectively interact with diverse population groups and other members of the health care team."[11] Communication between the dental hygienist and all members of the dental team will allow the professional to provide safe and effective care to patients. The CODA standards for accreditation of dental laboratory programs state that the "curriculum must include content at the in-depth level in communication skills"[12] so the dental laboratory technician can communicate effectively with other dental professionals.

ADEA Organizational Standards and Principles

One of the six values identified in the American Dental Education Association's *Statement on Professionalism in Dental Education* is that the dental educator has a *responsibility* to be held accountable and to have a relationship built on trust between oral health professionals. Another value is honoring others through *respect* for others, especially intraprofessional respect for allied dental providers.[13]

The Future

The addition of the dental therapist to the dental team will necessitate a change in the manner in which interaction and communication take place. By incorporating intraprofessionalism into the curriculum, dental and allied dental institutions will fulfill the obligations set forth in the CODA professional standards. New practice models include the dental therapist, and CODA has approved the accreditation guidelines for these emerging oral health professionals. Improved interaction and communication will serve to enhance student and faculty interaction, improve patient care, enrich professional development, and foster a climate of cooperation among all members of the health care team.

Opportunities for Joint Curriculum and Joint Clinical Education

Trends in current health care practices indicate that teams realize more effective patient outcomes than individuals providing clinical care. For patients with diseases such as cancer, diabetes and heart disease, the health care team has evolved into a cohesive group of physicians, nurses, pharmacists, social workers, and medical/surgical specialists, including members of the oral health team, to holistically address each of the problems associated with the illnesses being managed. Our task in dental education is to provide the framework for successful teams to treat the oral diseases that afflict us.

Dental caries and periodontal diseases remain the most undertreated diseases in vulnerable populations, especially in children, the elderly, people who are medically compromised, and low-income individuals. The existing oral health care system, including workforce, payment system and legislative environment, has demonstrated it is not capable of effectively addressing the

hidden epidemic of oral disease. The development of an effective oral health team is an important opportunity to match the gains in the systemic diseases such as those noted above.

The 2009 Institute of Medicine report[14] on the oral health workforce indicated that dental education programs, along with improvements in financing oral health care and government policies, are the keys to improving oral health in the coming years.[15] Thus, team care for oral health must be initiated in dental education programs where effective models can be demonstrated, promulgated and evaluated. These teams are being made possible by joint curriculum and joint clinical education opportunities being realized in dental education programs for dentists, dental therapists, dental hygienists and dental assistants. They are being further developed via pioneering collaborations with the other health care professions, such as medicine, pharmacy and nursing.

The triple aim in health care summarizes the goals for gaining control of dental caries and periodontal disease. These three goals aim for the highest quality of patient care at the lowest cost and with the best patient experiences. The triple aim is only achievable with the application of team care. Interprofessional education and collaborative practice models are growing that incorporate various oral health professions into a single team for promoting achievement of the triple aim. Oral health professions are actively involved with developing interprofessional teams, such as one to promote oral health awareness developed by dental hygiene, nursing and health management students and faculty.[16]

Today, dentistry is examining the oral health professional team to promulgate an *intra*professional model of care. For dentistry, intraprofessional education can be defined as when students in two or more oral health professions learn and provide patient care together in a fashion that promotes lifelong collaboration to achieve the triple aim. Intraprofessional education is being developed in our academic dental institutions and is making its presence known in the community of oral health practice. Indeed, models of dental practice in which the team function is higher have greater levels of patient satisfaction.[17] Further professionalization and involvement of the dental hygienist and dental assistant result in greater confidence of patients in their clinical care, and promote patient compliance with the dental team's recommendations. Having each team member together offers greater opportunities to expand each team member's scope of practice and perform higher quality clinical care more efficiently. The development of dental therapy in Minnesota demonstrated these qualities in a five-year report of the impact of two dental therapy programs in the state.[18]

The dental therapy and dental hygiene programs at the University of Minnesota have incorporated many collaboration opportunities in both didactic and clinical education. These are based in part on the four domains of core competencies defined by the Interprofessional Education Collaborative in the health professions, adapted here for intraprofessional education.[19] The four domains are the values and ethics of intraprofessional practice, the roles and responsibilities of team members, effective intraprofessional communication, and the promotion of effective team behaviors and functions.

Courses in human anatomy, radiology, pathology, public health, ethics and professional development, among others, are combined and often include dental students. Clinical care is organized into a team care program, where dental, dental hygiene and dental therapy students are organized with faculty into distinct care teams for their clinical practicum. Patients presenting for care are not assigned to a student or faculty member, but to a team consisting of faculty, dental, dental hygiene and dental therapy students. All team members perform evaluation in the same visit, and patient care is usually initiated in the first visit by the appropriate team members.

Communication among the team members, professional identity and the understanding of roles and responsibilities are built around the core competencies. In outreach sites, such as hospitals, domiciliaries, and clinics in rural and urban environments, this collaborative care environment continues as all student groups combine to share many of the domiciled longitudinal clinical education experiences. Dental hygiene, dental therapy and dental faculty are also modeling team activities in these clinical settings.

The opportunities for joint curriculum and clinical practice in the dental professions are being realized. This affords dental education with ways to improve patient care and achieve the triple aim. While opportunities abound, however, challenges remain. The development of a diverse, socially aware and culturally competent care team remains an extant issue from pipeline recruitment of students to the development of cohesive teams. Patient recall remains a vexing problem for most schools and may be enhanced by having dental hygiene, dental therapy and dental assisting programs.[20] The financing of education and the development costs of these programs can be substantial. The development of political support within the dental professions, the public and legislatures is a continuous challenge as new ideas and new ways of practice for the benefit of patients are developed.

Resource Implications

Implementing intraprofessional dental education impacts resources. An ideal venue for implementing intraprofessional dental education is within a dental school setting, where predoctoral, graduate and allied dental education programs coexist. However, of the 66 U.S. dental schools, less than half educate allied dental professionals. An estimated 10% of the 329 dental hygiene programs in the ADEA Survey of Intraprofessional Dental Education are located in dental school settings, and even fewer dental assisting or lab technician programs. Allied dental education programs may be located near dental schools and have affiliations with them, but access to appropriate intraprofessional educational opportunities is a major resource barrier. For allied dental education programs to gain intraprofessional educational opportunities, they must seek venues where intraprofessional dental education can be obtained. While opportunities outside of dental schools exist, they may require additional expenses, such as travel, additional faculty and administrative costs.

Interprofessional education and collaborative practice resources are readily available, as much focus and attention has been given to this topic. The following resources provide information on various topics related to interprofessional education, such as curriculum development and clinical education; yet, this type of information for intraprofessional education is just being explored.

New Opportunities for Education Given Future Practice Models

Future practice models consist of:

- Provider centric to patient/consumer centric.
- Procedure-based reimbursement to value-based reimbursement.
- In-patient focused to ambulatory/home focused.
- Individuals to populations.
- Disease and treatment to health/prevention.

Source: Dufurrena Q. Future practice models for dentistry: The future of dental support organizations. Association of Dental Support Organizations: November 16, 2014. http://6324ac7891d2e48c6619-

47da4c5a06409c18a55f1e56aa713b40.r92.cf2.rackcdn.com/Dufurrena%20Quinn%2010-16-2014%20The%20Future%20of%20Dental%20Practice%204.pdf

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"There has been a silo effect due to the separation of the mouth from the body, which has involved separate training programs, professional identities, payment structures and delivery systems." A new approach involves making health care more accessible. Primary care teams need to be established and a framework organized. A white paper was published in June 2015 titled "Oral Health: An Essential Component of Primary Care." This paper describes an oral health delivery framework that delineates the oral health activities a primary care team can provide, such as screening, fluoride application, early disease detection and referral of those who need treatment.

Source: Qualis Health. Oral health: An essential component of primary care. June 2015. www.safetynetmedicalhome.org/sites/default/files/White-Paper-Oral-Health-Primary-Care.pdf

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The oral health care system is changing. The public's oral health care needs are also becoming more complex. Future dental hygienists need to be prepared to treat this population and the curricula in dental hygiene programs need to change to be better equipped to serve the public's overall health and wellness needs.

Dental hygiene curriculum must change to provide dental hygienists with the necessary education to serve in instrumental roles that address the oral health needs of diverse populations and also contribute to improved access to care. Advanced education and training within interprofessional teams will prepare dental hygienists to better fulfill these needs. Service learning in community-based programs, long-term care facilities, government-run facilities and other locations can enable dental hygiene students to provide care to the underserved. These experiences also can help them develop expertise in addressing diverse populations in a variety of health care settings.

Transforming dental hygiene education is imperative to achieving the ADHA's vision for integrating dental hygienists into the health care delivery system as essential primary care providers to expand access to dental care. Since education is the foundation of any profession, the envisioned future of the dental hygiene profession will depend on the transformation of the educational preparation required to better prepare dental hygienists to practice within the integrated health care delivery structure and impact the public's oral and overall health.

Source: American Dental Hygienists' Association. Transforming dental hygiene education and the profession for the 21st century, 2015. www.adha.org/adha-transformational-whitepaper

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"While the traditional dental model of a team headed by a dentist will not disappear, innovative concepts continue to surface all over the country. From the RDHAP in California, to independent practice in Maine, to collaborative practice in New Mexico, to the new community dental health care coordinator in Minnesota, opportunities for dental auxiliaries to provide care are developing all across the country."

Groups such as the Kellogg Foundation, legislators, and social and community leaders play a part in the changes in our health care system. The underserved in nursing homes, remote locations, school-based programs, homebound, and traditional public health clinics have been in the spotlight for years, but access to care issues will lead to more unique opportunities for us to serve. These changes will result in the need to acquire new skills, additional education, special licensure or registrations, and a comprehensive understanding of what it will take to deliver services outside of the confines of a traditional dental office.

Source: Guignon AN. Embracing the future of dental hygiene. *RDH Magazine*, October 2011. www.rdhmag.com/articles/print/volume-31/issue-10/columns/embracing-the-future-of-dental-hygiene.html

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Future and existing alternative workforce models are described for all 50 states as presented by the ADEA Advocacy and Governmental Relations focus area. As the need increases for at-risk populations and access to care remains an issue, more states will be adopting some type of alternative workforce model. Educational programs must be prepared to integrate alternative workforce model training into their curriculums.

Source: American Dental Education Association. Alternative workforce models. January 2014. www.adea.org/uploadedFiles/ADEA/Content_Conversion_Final/policy_advocacy/Documents/emailDist/Jan_2014_Alt_Workforce_Chart.pdf

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There will be a major shift in the number of dental care providers. The number of dental graduates is flat while retirees are on the rise. The number of dental hygiene graduates is about even with dental graduates. Increases in patient demand and shortages in personnel may result in more duties and responsibilities for the auxiliary. Educational programs must be prepared to educate auxiliaries for these expanded roles.

Source: Solomon E. The future of dentistry. *Dental Economics* 94(11), 2004. www.dentaleconomics.com/articles/print/volume-94/issue-11/features/the-future-of-dentistry.html

References

1. American Dental Association. About the ADA—history timeline. ADA, n.d. http://www.ada.org/en/about-the-ada/ada-history-and-presidents-of-the-ada/ada-history-of-dentistry-timeline
2. U.S. General Accounting Office. Increased use of expanded function dental auxiliaries would benefit consumers, dentists, and taxpayers (HRD-80-51). Washington, DC: U.S. General Accounting Office, 1980.
3. Lobene RR, Berman K, Chaisson LB, Karelas HA, Nolan LF. The Forsyth experiment in training of advanced skills hygienists [Special Commemorative Issue]. *Journal of Dental Hygiene* 2013;87(1):63-6.
4. Chapko MK, Milgrom P, Bergner M, Conrad D, Skalabrin N. Delegation of expanded functions to dental assistants and hygienists. *American Journal of Public Health* 1985;75(1): 61-5.
5. Reeson MG, Walker-Gleaves C, Ellis I. Attitudes towards shared learning of trainee dental technicians and undergraduate dental students. *Journal of Dental Education* 2015;9(1): 95-100.
6. Jung B, Salvatori P, Martin A. Intraprofessional fieldwork education: Occupational therapy and occupational therapist assistant students learning together. *Canadian Journal of Occupational Therapy* 2008;75(1):42-50.
7. Dasanayake AP, Brar BS, Matta S, Ranjan VK, Norman RG. Are procedures performed by dental auxiliaries safe and of comparable quality? A systematic review. *Journal of the California Dental Association* 2012;40(1):65-78.
8. University of Florida Health. Mission, vision & values. N.d. www.UFhealth.org
9. University of Florida. UF College of Dentistry and St. Petersburg College kick-off capital fund-raising campaign. *Gator Dentist Today,* Summer 2003. www.dental.ufl.edu/files/2012/01/GDTNewsletter_Summer03.pdf
10. Commission on Dental Accreditation. Accreditation standards for dental assisting education programs. Chicago: American Dental Association, 2013. http://www.ada.org/~/media/CODA/Files/da.ashx
11. Commission on Dental Accreditation. Accreditation standards for dental hygiene education programs. Chicago: American Dental Association, 2013. http://www.ada.org/~/media/CODA/Files/2016_dh.ashx
12. Commission on Dental Accreditation. Accreditation standards for dental laboratory education programs. Chicago: American Dental Association, 2013. http://www.ada.org/~/media/CODA/Files/dlt.ashx
13. American Dental Education Association. ADEA statement on professionalism in dental education. Washington, DC: ADEA, 2009. http://www.adea.org/Pages/Professionalism.aspx
14. Institute of Medicine Board on Health Care Services. The U.S. oral health workforce in the coming decade: Workshop summary. Washington, DC: National Academies Press, 2009. https://www.ncbi.nlm.nih.gov/books/NBK219673/
15. Garcia RI, Inge RE, Niessen L, DePaola DP. Envisioning success: The future of the oral health care delivery system in the United States. *Journal of Public Health Dentistry* 2010;70(Suppl 1):S58-65.

16. Duley SI, Fitzpatrick PG, Zornosa X, Barnes WG. (2012). A center for oral health promotion: Establishing an inter-professional paradigm for dental hygiene, health care management and nursing education. *Journal of Dental Hygiene* 2012;86(2):7.
17. Blue CM, Funkhouser DE, Riggs S, Rindal DB, Worley D, Pihlstrom DJ, Benjamin P, Gilbert GH. Utilization of nondentist providers and attitudes toward new providers model: Findings from the National Dental Practice-Based Research Network. *Journal of Public Health Dentistry* 2013;73(3):237-44.
18. Minnesota Department of Health, Minnesota Board of Dentistry. Early impacts of dental therapists in Minnesota: Report to the Minnesota legislature, 2014. http://www.health.state.mn.us/divs/orhpc/workforce/dt/dtlegisrpt.pdf
19. Interprofessional Education Collaborative Expert Panel. Report of an expert panel. Washington, DC: Interprofessional Education Collaborative, 2011. http://www.aacn.nche.edu/education-resources/ipecreport.pdf
20. Afshari FS, Schelkopf S, Yuan JC-C, Marinis A, Syros G, Campbell SD, Sukotjo C. Current status of patient recall in U.S. predoctoral dental school clinics. *Journal of Dental Education* 2014;78(10):1372-78. http://www.jdentaled.org/content/78/10/1372.full.pdf+html?sid=3ba9037f-f941-47df-bf2b-89c8c0335536

Appendix A: Survey Instrument

Q1 Please select which best describes your institutional setting.
- ❑ Community College/Technical College (1)
- ❑ University affiliated with a Dental School (2)
- ❑ University or College not affiliated with a Dental School (3)
- ❑ Other (4) ____________________

Q2 Is your institution currently providing intraprofessional experiences for your students?
- ❑ Yes (1)
- ❑ No (2)
- ❑ I do not know (3)

Q3 Please select the students at your institution that participate in intraprofessional experiences. (Check all that apply.)
- ❑ Predoctoral (D.D.S./D.M.D.) (1)
- ❑ Post-Graduate (2)
- ❑ Dental Hygiene (3)
- ❑ Dental Assisting (4)
- ❑ Other (includes DLT, Dental Therapy, etc.) (5)

Q4 You indicated that the following students participate in intraprofessional experiences: {Selected choices shown here}. Please explain those experiences.

Q5 In your program, at what level are students when they work on intraprofessional teams? (Check all that apply.)
- ❑ First year dental student (1)
- ❑ Second year dental student (2)
- ❑ Third year dental student (3)
- ❑ Fourth year dental student (4)
- ❑ First year in DH program (5)
- ❑ Second year in DH program (6)
- ❑ Third year in DH program (7)
- ❑ Other (8) ____________________

Q6 What type of intraprofessional experiences do students participate in? (Check all that apply.)

	Didactic (1)	Laboratory (including sim lab) (2)	Clinical (on/off campus) (3)	Other (4)	Describe the "Other" experiences (1)
Predoctoral (D.D.S./D.M.D.) (1)	❑	❑	❑	❑	
Post-Graduate (2)	❑	❑	❑	❑	
Dental Hygiene (3)	❑	❑	❑	❑	
Dental Assisting (4)	❑	❑	❑	❑	
Other (includes DLA, Dental Therapy, etc.) (5)	❑	❑	❑	❑	

Q7 Where do the clinical experiences occur? (Check all that apply.)
- ❑ Dental School Clinic (1)
- ❑ Dental Hygiene Clinic (2)
- ❑ Extramural Sites (3)
- ❑ Other (4) ____________________

Q8 Is your institution currently planning to provide intraprofessional experiences for your students?
- ❑ Yes (1)
- ❑ No (2)
- ❑ I do not know (3)

Display This Question:
Is your institution currently planning to provide INTRAprofessional experiences for your students? Yes Is Selected

Q9 You indicated that your institution is planning to provide intraprofessional experiences for your students. Please describe the planning process.

Q10 What type of intraprofessional experiences would you like to provide to students?

Q11 Which of the following barriers, if any, has your institution faced while trying to implement intraprofessional activities at your institution? (Check all that apply.)

- ❑ No dental school in immediate vicinity (1)
- ❑ Dental school not willing to partner (2)
- ❑ No dental hygiene program in immediate vicinity (3)
- ❑ Dental hygiene program not willing to partner (4)
- ❑ Facility limitations (5)
- ❑ Manpower limitations (6)
- ❑ Scheduling (7)
- ❑ Timing of courses that D.D.S./DH/DA students could potentially attend together (8)
- ❑ Financial resources (9)
- ❑ Different treatment modalities or philosophies (10)
- ❑ Resistance of faculty (11)
- ❑ Lack of administrative support (12)
- ❑ Clinics/classes are not in the same building (13)
- ❑ Clinics/classes could not accommodate the number of students (14)
- ❑ Other barriers not listed above (15)
- ❑ We did not experience any barriers (16)

Display This Question:
If Which of the following barriers, if any, has your institution faced while trying to implement intraprofessional activities at your institution? Other barriers not listed above Is Selected

Q12 You selected the answer choice "Other barriers not listed above" in the previous question. Please provide detail on the particular barriers your institution is facing or has faced that were not listed.

Q13 Please provide any additional information that you feel would be helpful.

Appendix B: Survey Results Tables

Table 1: The Institutional Setting of Survey Respondents

	Number of Institutions	Percent
Dental School	46	17.7%
Non-Dental School	214	82.3%
Community College/Technical College	145	55.8%
University affiliated with a Dental School	20	7.7%
University or College not affiliated with a Dental School	43	16.5%
Other	6	2.3%
Total	260	100.0%

Source: American Dental Education Association, Intraprofessional Education Survey, 2016

Table 2: The Provision of Intraprofessional Experiences, by Institutional Setting

	Number of Institutions	Yes	No	Don't Know
Dental School	46	41	5	0
Non-Dental School	214	134	71	8
Community College/Technical College	145	85	53	7
University affiliated with a Dental School	20	19	1	0
University or College not affiliated with a Dental School	43	26	15	1
Other	6	4	2	0
Total	260	175	76	8

Source: American Dental Education Association, Intraprofessional Education Survey, 2016

Table 3: The Participation of Students in Intraprofessional Education, by Institutional Setting

		Participating Students				
	*Number of Institutions**	Predoctoral (D.D.S./D.M.D.)	Post-Graduate	Dental Hygiene	Dental Assisting	Other (includes DLT, Dental Therapy, etc.)
Dental School	*41*	39	21	19	10	5
Non-Dental School	*134*	26	15	124	53	14
Community College/Technical College	*85*	5	3	79	44	6
University affiliated with a Dental School	*19*	19	10	18	3	3
University or College not affiliated with a Dental School	*26*	2	2	23	5	4
Other	*4*	0	0	4	1	1
Total	*175*	65	36	143	63	19

*Only institutions that provide intraprofessional education were able to respond
Source: American Dental Education Association, Intraprofessional Education Survey, 2016

Table 4: The Level of Students in Intraprofessional Education, by Institutional Setting

	Number of Institutions*	Dental Students				Dental Hygiene			
		1st Yr	2nd Yr	3rd Yr	4th Yr	1st Yr	2nd Yr	3rd Yr	Other
Dental School	*41*	16	18	33	31	7	12	5	7
Non-Dental School	*134*	21	21	16	16	58	99	13	30
Community College/Technical College	*85*	9	12	4	3	36	64	3	22
University affiliated with a Dental School	*19*	9	6	11	12	11	17	3	3
University or College not affiliated with a Dental School	*26*	3	3	1	1	10	15	6	5
Other	*4*	0	0	0	0	1	3	1	0
Total	*175*	37	39	49	47	65	111	18	37

*Only institutions that provide intraprofessional education were able to respond
Source: American Dental Education Association, Intraprofessional Education Survey, 2016

Table 5: Types of Intraprofessional Experiences, by Student Type

	Didactic	Laboratory (including sim lab)	Clinical (on or off campus)	Other
Predoctoral (D.D.S./D.M.D.)	35	15	61	5
Postgraduate	7	5	34	3
Dental Hygiene	65	43	114	23
Dental Assisting	17	18	54	6
Other (incl DLA, Dental Therapy, etc.)	7	6	8	3

Source: American Dental Education Association, Intraprofessional Education Survey, 2016

Table 6: Types of Intraprofessional Experiences, by Student Type and Institutional Setting

		Dental School	Non-Dental School	Non-Dental Schools: Community College/ Technical College	Non-Dental Schools: University affiliated with a Dental School	Non-Dental Schools: University or College not affiliated with a Dental School	Non-Dental Schools: Other	Total
*Number of Institutions**		*41*	*134*	*85*	*19*	*26*	*4*	*175*
Predoctoral (D.D.S./D.M.D.)	Didactic	19	16	1	12	3	0	35
	Laboratory (including sim lab)	10	5	2	2	1	0	15
	Clinical (on or off campus)	35	26	7	17	2	0	61
	Other	1	4	1	3	0	0	5
Postgraduate	Didactic	7	0	0	0	0	0	7
	Laboratory (including sim lab)	3	2	0	1	1	0	5
	Clinical (on or off campus)	20	14	3	8	3	0	34
	Other	0	3	1	0	2	0	3
Dental Hygiene	Didactic	8	57	33	12	12	0	65
	Laboratory (including sim lab)	4	39	28	3	8	0	43
	Clinical (on or off campus)	18	96	61	15	18	2	114
	Other	0	23	14	3	6	0	23
Dental Assisting	Didactic	1	16	13	1	2	0	17
	Laboratory (including sim lab)	2	16	13	1	2	0	18
	Clinical (on or off campus)	10	44	36	3	4	1	54
	Other	0	6	5	0	1	0	6
Other (incl DLA, Dental Therapy, etc.)	Didactic	3	4	1	1	1	1	7
	Laboratory (including sim lab)	3	3	1	0	1	1	6
	Clinical (on or off campus)	3	5	3	1	1	0	8
	Other	0	3	2	0	0	1	3

*Only institutions that provide intraprofessional education were able to respond
Source: American Dental Education Association, Intraprofessional Education Survey, 2016

Table 7: Locations of Clinical Experiences, by Institutional Setting

	*Number of Institutions**	Dental School Clinic	Dental Hygiene Clinic	Extramural Sites	Other
Dental School	*41*	35	4	17	6
Non-Dental School	*134*	28	85	53	29
Community College/Technical College	*85*	7	58	32	18
University affiliated with a Dental School	*19*	17	8	10	3
University or College not affiliated with a Dental School	*26*	3	18	11	7
Other	*4*	1	1	0	1
Total	*175*	63	89	70	35

*Only institutions that provide intraprofessional education were able to respond
Source: American Dental Education Association, Intraprofessional Education Survey, 2016

Table 8: Plans to Provide Intraprofessional Experiences, by Institutional Setting

	*Number of Institutions**	Yes	No	Don't Know
Dental School	*5*	2	3	0
Non-Dental School	*80*	18	41	21
Community College/Technical College	*60*	13	33	14
University affiliated with a Dental School	*1*	0	1	0
University or College not affiliated with a Dental School	*17*	5	6	6
Other	*2*	0	1	1
Total	*85*	20	44	21

*Only institutions that don't provide intraprofessional education (or don't know if they do) were able to respond.
Source: American Dental Education Association, Intraprofessional Education Survey, 2016

Table 9: Barriers to Intraprofessional Experiences, by Institutional Setting

			Non-Dental Schools				
	Dental School	Non-Dental School	Community College/ Technical College	University affiliated with a Dental School	University or College not affiliated with a Dental School	Other	Total
Number of Institutions	*46*	*214*	*145*	*20*	*43*	*6*	*260*
No dental school in immediate vicinity	0	75	55	0	19	1	75
Dental school not willing to partner	1	13	10	3	0	0	14
No dental hygiene program in immediate vicinity	4	8	6	0	2	0	12
Dental hygiene program not willing to partner	0	0	0	0	0	0	0
Facility limitations	10	49	32	5	12	0	59
Manpower limitations	15	62	37	8	16	1	77
Scheduling	22	117	73	15	28	1	139
Timing of courses that D.D.S./DH/DA students could potentially attend together	10	64	38	12	12	2	74
Financial resources	12	35	24	2	9	0	47
Different treatment modalities or philosophies	5	20	11	4	4	1	25
Resistance of faculty	9	27	14	5	7	1	36
Lack of administrative support	4	16	9	3	2	2	20
Clinics/classes are not in the same building	8	31	20	3	7	1	39
Clinics/classes could not accommodate the number of students	4	28	16	3	9	0	32
Other barriers not listed above	8	24	15	2	7	0	32
We did not experience any barriers	5	18	13	1	2	2	23

Source: American Dental Education Association, Intraprofessional Education Survey, 2016

Table 10: Barriers to Intraprofessional Experiences, for Programs With Intraprofessional Experiences, by Institutional Setting

			Non-Dental Schools				
	Dental School	Non-Dental School	Community College/ Technical College	University affiliated with a Dental School	University or College not affiliated with a Dental School	Other	Total
Number of Institutions	*41*	*134*	*85*	*19*	*26*	*4*	*175*
No dental school in immediate vicinity	0	35	26	0	9	0	35
Dental school not willing to partner	0	6	3	3	0	0	6
No dental hygiene program in immediate vicinity	4	3	2	0	1	0	7
Dental hygiene program not willing to partner	0	0	0	0	0	0	0
Facility limitations	7	30	19	5	6	0	37
Manpower limitations	13	33	20	7	6	0	46
Scheduling	21	78	46	14	17	1	99
Timing of courses that D.D.S./DH/DA students could potentially attend together	9	37	17	11	8	1	46
Financial resources	11	16	11	2	3	0	27
Different treatment modalities or philosophies	4	16	8	4	4	0	20
Resistance of faculty	5	21	11	5	5	0	26
Lack of administrative support	1	5	2	3	0	0	6
Clinics/classes are not in the same building	6	14	9	2	2	1	20
Clinics/classes could not accommodate the number of students	2	14	9	2	3	0	16
Other barriers not listed above	7	16	10	2	4	0	23
We did not experience any barriers	5	13	9	1	1	2	18

Source: American Dental Education Association, Intraprofessional Education Survey, 2016

Table 11: Barriers to Intraprofessional Experiences, for Programs Without* Intraprofessional Experiences, by Institutional Setting

			Non-Dental Schools				
	Dental School	Non-Dental School	Community College/ Technical College	University affiliated with a Dental School	University or College not affiliated with a Dental School	Other	Total
Number of Institutions	*5*	*80*	*60*	*1*	*17*	*2*	*85*
No dental school in immediate vicinity	0	40	29	0	10	1	40
Dental school not willing to partner	1	7	7	0	0	0	8
No dental hygiene program in immediate vicinity	0	5	4	0	1	0	5
Dental hygiene program not willing to partner	0	0	0	0	0	0	0
Facility limitations	3	19	13	0	6	0	22
Manpower limitations	2	28	17	1	9	1	30
Scheduling	1	38	27	1	10	0	39
Timing of courses that D.D.S./DH/DA students could potentially attend together	1	27	21	1	4	1	28
Financial resources	1	19	13	0	6	0	20
Different treatment modalities or philosophies	1	4	3	0	0	1	5
Resistance of faculty	4	6	3	0	2	1	10
Lack of administrative support	3	11	7	0	2	2	14
Clinics/classes are not in the same building	2	16	11	1	4	0	18
Clinics/classes could not accommodate the number of students	2	13	7	1	5	0	15
Other barriers not listed above	1	8	5	0	3	0	9
We did not experience any barriers	0	5	4	0	1	0	5

Source: American Dental Education Association, Intraprofessional Education Survey, 2016