# Dental Education's Role in Improving Children's Oral Health and Access to Care

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In 2000, *Oral Health in America: A Report of the Surgeon General* identified disparities in oral health and access to care for vulnerable populations, including children. The report identified a declining dental school applicant pool, shortages of dental school faculties, and an overcrowded curriculum as dental education factors affecting disparities.

Dental school applications are up, but the dentist/population ratio is projected to decline, and the shortage of dental faculty has worsened—limiting dental students' experiences with children. Current Commission on Dental Accreditation (CODA) standards do not include essential curriculum required to care for children. We recommend that CODA revisions to predoctoral and postdoctoral programs include care of infants, characteristics of children that distinguish them from adults, mandatory service learning experiences, emphasis upon social responsibility for all dentists, and use of objective standardized clinical examinations (OSCEs). Additionally, we recommend prioritization of limited pediatric dental resources to young children with disease and older children with complex dental requirements or special health care needs. Critical dental education goals for children should be developed through a special American Dental Education Association task force. Only the dental education community can assure that the dental workforce is better trained to care for children.

**KEY WORDS:** access to care; children; dental care; dental education; oral health

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*Oral Health in America: A Report of the Surgeon General* (SGROH) identified profound and consequential disparities in the oral health of some population groups in America as classified by gender, income, age, and race/ethnicity.[1] Children, as a group, are more likely to be disadvantaged by poverty or minority status and at risk for health disparities.[2] One in 6 of all children in America lives in poverty[3] and half of children under age 5 are from minority groups.[4] Poor children suffer more dental caries than their more affluent peers, and their disease is more likely to be untreated; moreover, disease rates appear to be increasing among the youngest children.[5] A cadre of trained dental professionals who have the skills and knowledge to care for these children will be necessary if we are to improve their oral health.

The SGROH identified 3 factors affecting the education of dental professionals who will care for all populations, including children and children with special health care needs (CSHCN): a diminishing dental workforce, a shortage of dental school faculty, and an overcrowded dental curriculum.[1] Subsequently, the American Dental Education Association (ADEA) Presidential Commission of national experts responded to these areas of concern, affirming that academic dental institutions have a distinct responsibility to educate dental professionals who are competent to care for a changing society.[6] The purpose of this paper is to briefly review progress in the 3 areas identified by the SGROH and suggest ways to advance children's oral health within academic dental institutions.

## WORKFORCE

Workforce factors of importance in addressing disparities include workforce numbers, capacity and flexibility, and diversity.[7] (For more discussion on dental workforce issues, see also articles by Mertz and Mouradian[8] and Nash[9] in this volume). Since the SGROH, there has been an increase in the numbers of dental schools and applicants: 5 new dental schools have opened since 2000, and applicants increased 38% between 2000 and 2005.[10,11] Despite these increases, the overall ratio of dentists to population is projected to decline,[12] and the maldistribution of the dental workforce persists.[13] Some gains have been made in diversity, but the dental workforce is still not reflective of the population as a whole.[14]

The ADEA report suggested that the current oral health workforce has reserve capacity through better utilization of allied dental professionals.[6] It is not clear to what extent this reserve capacity has been realized, given that a large portion of children continue to lack access to needed oral health care.[15] Many strategies to enhance capacity and flexibility of the allied dental workforce have been proposed and/or implemented since the SGROH, as discussed at a recent Institute of Medicine workshop on the US oral health workforce.[16] In addition, some primary care medical providers are conducting preventive

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interventions; only preliminary data are available on this strategy (see Douglass and colleagues[17] in this volume on the role of physicians in children's oral health).

The number of pediatric dentists is particularly critical for meeting the needs of more complex children, including CSHCN. Pediatric dentistry residencies are expanding and applications soaring: between 2000 and 2006 the number of programs increased from 59 to 73, whereas first-year positions increased from 216 to 316. From 1996 to 2006, the numbers of applications to pediatric dental programs grew from 2595 to 6133, respectively.[18,19] However, an increase in numbers of providers does not ensure access to care for underserved populations. Only about one half of practicing pediatric dentists surveyed treat Medicaid patients.[20–22] The selection of trainees with a desire to care for underserved children and specific training strategies to impart the required knowledge, attitudes, and skills (ie, competencies) are needed. Effective training strategies are dependent upon adequate numbers of dental faculty and an appropriate dental curriculum.

### Dental School Faculty Shortages

The shortage of dental school faculty has worsened since the SGROH; at that time, there were 245 vacant full-time faculty and 77 vacant part-time faculty positions in US dental schools.[23] Data from 2005 to 2006 identified 365 full-time and 41 part-time unfilled faculty positions, representing a 49% increase in unfilled faculty lines over 6 years.[10] As many faculty near retirement, there are few young graduates in line to replace them, due in part, undoubtedly, to high student debt, which has been rising steadily since 2000.[24] In 2008, the average dental student debt was $170,000.[25] The shortage of faculty represents a mounting crisis that will have a major impact on the education of all dental professionals, including the pipeline of oral health researchers.

Sufficient numbers of pediatric dental faculty are particularly important for teaching dental students to treat young children. One study reported that a third of pediatric dental programs had fewer faculty than 5 years previously, and a third had 1 or more unfilled full-time faculty positions.[26] The average faculty-student ratio is greater than 1:6, and sometimes as high as 1:11.[26] Without sufficient faculty, dental schools must select well-behaved children with low disease acuity whom students can treat with less supervision—and not the full range of children requiring dental care.[26] Thus faculty shortages limit delivery of important pediatric curriculum.

Solutions to this problem are complex and a complete discussion beyond the scope of this document. Some potentially useful strategies include the recruitment into dental schools of "master clinicians" from among the ranks of practicing pediatric dentists,[27] fellowships to encourage endodontic residents to enter academic practice,[28] recruitment and retention activities for current faculty,[29] and opportunities for dental students to obtain concurrent advanced degrees in education.[30] The use of preceptors in community-based settings can also help ameliorate faculty shortages. Federal loan repayment incentives for dentists in faculty or research tracks are other promising strategies. Multiple approaches must be explored to address this critical situation.

## DENTAL CURRICULUM

The SGROH noted that the dental curriculum was overcrowded with an ever-expanding knowledge base. Since most children will be treated by general dentists, the dental curriculum must graduate dentists with the knowledge, skills, and attitudes necessary to care for children. The Commission on Dental Accreditation (CODA) is charged with developing and mandating standards for the graduation of competent, entry-level dentists. Current CODA requirements for predoctoral education are general, topic and procedure driven, and applied to the broad age groups: the child, adolescent, adult, and geriatric patient.[31] Infants are not listed as a separate entity despite our current knowledge about the infectious nature of caries and potential for maternal transmission, the importance of the infant oral examination and anticipatory guidance, and the need for early establishment of a dental home.[32] All of these are vital for disease prevention, especially among high-risk children, including children with CSHCN.

In addition to acquiring pediatric-specific dental knowledge, it is also important for dentists to understand the special characteristics of children that distinguish their health needs from those of adults.[33,34] Children are at the beginning of the life span when prevention opportunities are the greatest; they are also constantly changing, which affects both the impact of oral diseases and the kinds of interventions needed. Oral diseases can affect children's overall health and well-being and their ability to grow and develop normally. Children have a unique spectrum of childhood diseases that can interact with their oral health, especially CSHCN. Finally, children are vulnerable: they are dependent on others for their health care, and they are disproportionately represented among disadvantaged populations in our society.[33–35] The current general approach of CODA standards precludes specifying this level of detail, despite its importance for dentists who will care for children.

Another potential barrier to general dentists' willingness to care for infants and young children is inadequate preparation in the necessary technical skills. High faculty/student ratios mean dental students may not gain experience treating children who are fearful, uncooperative, and/or have complex restorative needs.[26] If predoctoral programs teach students to treat well-behaved children 4 years of age and older, and those with low levels of caries, then those are the types of children general dentists will treat in their practices.[36,26] Since decreases in the pediatric dental faculty/student ratio are unlikely in the short term, the focus must be on graduating dentists competent to prevent disease and treat relatively healthy children with mild or moderate amounts of decay. This should include performing an infant oral exam, providing anticipatory guidance and working sensitively with families of diverse backgrounds. If caries are detected in very young children, they can be referred to the pediatric dentist. In fact, pediatric dentists may

need to limit their practices to treatment of very young children with disease, older children with more extensive treatment needs, and CSHCN. The Commission on Dental Accreditation recommendations could require students to have, at a minimum, experience performing infant oral exams and providing oral health guidance to their parents. Contemporary materials are now available to assist dental students and general dentists in preparing to address the needs of children.[37] The successful Access to Baby and Child Dentistry program in Washington state has implemented pediatric training at the community level to prepare general dentists to care for young children.[38]

Dental graduates also need the attitudes that support the inclusion of underserved children in their practices. The CODA standards 2-17, 2-20, and 2-21 are the current requirements that are most relevant to this goal. The Commission on Dental Accreditation standard 2-17 states "Graduates **must** be competent in managing a diverse patient population and have the interpersonal and communications skills to function successfully in a multicultural work environment."[39] The ADEA report recommended that dental education "incorporate cultural competency concepts in all aspects of the clinical instruction curriculum" and include "off-site rotations where students can deliver oral health care to underserved populations."[6] These are still excellent suggestions and need to be accompanied by curriculum covering health disparities, social determinants of health, including oral health literacy, and other points such as families' experiences within the dental care system. Students should learn culturally sensitive, family-centered approaches to dental care, including behavioral change strategies to ameliorate or prevent early childhood caries. Ideally, curriculum should include didactic components and clinical applications or case discussions.

Off-site service learning opportunities, now required by the Liaison Committee on Medical Education,[40] can help ensure students gain a better understanding of diverse communities and how to practice effectively in such environments, and increase dental graduates' likelihood of treating underserved populations following graduation.[41,42] Although community-based education has undoubtedly increased since 2000 (due to the Robert Wood Johnson pipeline grant program and other initiatives),[43] inclusion in CODA requirements could leverage forward movement for all dental schools. Trained and calibrated community preceptors can also provide powerful role modeling and help with faculty shortages. Students could reinforce their learning in these subjects during off-site rotations by journaling or self-reflection activities.

To what extent can dental education affect dentists' sense of social responsibility after graduation?[41] The CODA Standard 2-20[39] requires that "Graduates **must** be competent in applying ethical, legal and regulatory concepts to the provision and/or support of oral health care services"; whereas CODA Standard 2-21[39] requires that "Graduates **must** be competent in the application of the principles of ethical reasoning and professional responsibility as they pertain to patient care and practice management." These goals need to be specifically expanded to include the dimensions of social responsibility and dentists' requirement to "share in providing advocacy to and care of the underserved."[44]

Current professional and ethical standards in dentistry include social responsibility of dentists to provide care for the underserved and to advocate for these groups. The latest addition to the American Dental Association Code Principles of Ethics and Code of Professional Conduct,[44] and new documents from the ADEA[45] and the American Student Dental Association[46]are excellent statements of ethics and professionalism for dentistry; the latter 2 include specific points for the dental educational context and include items that address the role of school culture, faculty modeling, and other administrative factors in creating a "hidden curriculum"[47] that can either reinforce or undermine professional standards for trainees. Given the consensus around ethical and professional goals that has emerged in these articulations, CODA standards should be revised to reflect these changes. A more diverse workforce may also help increase care in underserved communities, since these individuals may be more likely to work in communities of need.[48]

Assessment of cultural competency and communication skills is important and possible with objective standardized clinical examinations (OSCEs). OSCEs are currently used to assess communication and other skills in the United States Medical Licensing Examination, by the National Board of Dental Examiners in Canada, and in many medical and dental schools.[49–53] Increasingly, health professional schools are seeking ways to assess professionalism[54] and to selectively admit, train, and monitor students in their professional development. Admissions selection criteria could include valid measures that help assess students' ethical decision-making and communication skills before entry, as pioneered in Canada with the multiple mini-interview.[51]

These points must also apply to the graduate training of dentists who work with children. Importantly, accreditation standards for advanced specialty education programs in pediatric dentistry (residencies)—also prescribed by CODA—have no requirements that underscore graduates' moral responsibility to care for the oral health of disadvantaged children either.[55] Pediatric dentists have the most expertise in children's oral health and must be the principal advocates for the oral health needs of children in the United States, including CSHCN,[56] informing policy makers and advising organized dentistry about access issues for vulnerable children and their families. These activities involve skills sets and knowledge beyond performing dental procedures. The CODA accreditation standards for advanced specialty education programs in pediatric dentistry have just been revised and are in the final stages of acceptance, but there are no competencies intended to ensure pediatric dental residents are prepared for these advocacy roles and will "enter the oral health care profession as a member of a moral community."[6] Such cross-disciplinary competencies have been articulated for maternal and child health leaders, including those in pediatric dentistry.[57,58]

Similarly CODA requirements affect advanced general dentistry programs, which include advanced education in general dentistry and general practice residency programs.

These residents receive some of their training in hospitals with medically compromised patients and could function as "super dentists" to help care for children presenting with more challenging treatment needs, including CSHCN. Currently there are no accreditation standards for pediatric dentistry training in these programs, so graduates' experience can range from considerable to none.[59] In 2006 to 2007, approximately 1500 dentists were being trained in these programs each year who could contribute significantly to the care of these vulnerable populations.[60]

## CHANGING PARADIGMS FOR DENTAL EDUCATIONS

Significantly, in 2008 the House of Delegates of the ADEA approved "Competencies for the New General Dentist,"[61] which do begin to address some of the curricular issues of concern. These competencies specify that graduates should be prepared to "manage the oral health care of the *infant,* child, adolescent and adult as well as the unique needs of women, geriatric and special needs patients." [emphasis added] However, there is much room for specificity within these general recommendations. In addition, there is no assurance they will be reflected in CODA standards without further advocacy. Also in 2008, an important paper provided the history of dentistry's accreditation process and called for a thorough review of the current approach to accreditation. The authors listed key principles for dental education reform, including "adequate time in community-based sites" and the "engagement of all dental schools in teaching, research, and service programs to reduced oral health disparities."[62]

The new ADEA competencies[61] and the 2003 ADEA report[6] also recommend interprofessional collaboration, stronger linkages between medicine and dentistry and other health professions, and movement toward more integrated health care delivery. These linkages are critical for children, who visit their primary care medical provider earlier and more frequently than their dentist. Improving communication and coordination between dentists and primary care providers will help expand the numbers of providers that promote oral health, reinforce prevention messages, and ensure high-risk children are referred early for dental care.[63] The recent American Academy of Pediatrics National Oral Health Summit[64] and this special oral health November-December 2009 issue of *Academic Pediatrics* signals child health professionals' interest in improving children's oral health; additional collaborative efforts are needed at local, state, and national levels, including the development of best practices for dentist-physician collaboration and communication.

The new Commission on Curriculum Innovation of ADEA is another potentially powerful avenue for stimulating curriculum change in many arenas touched on in this review.[65] Critical discussions are taking place about the importance of basic and behavioral sciences and systemic health in the dental curriculum, as well as adequate experiences with children and other underserved populations. New models are needed to deliver this content more efficiently in a currently overcrowded curriculum. The closer collaboration of ADEA and American Association of Medical Colleges on curricula[62, 66] and other efforts[67] is also an excellent step forward. Still, accreditation standards must be revised to accelerate curriculum change and ensure inclusion of specifics related to care of children, who cannot wait.

## SUMMARY AND CONCLUSION: A NEED FOR CHANGE

A declining dental workforce, dental faculty shortages, and the inadequacy of the dental curriculum all work against the development of a socially responsible group of dental professionals who are competent to provide care for children, including the very young as well as CSHCN. Among these, the inadequate dental academic pipeline poses perhaps the greatest threat to the future training of dentists and oral health researchers. The lack of progress in many areas since the SGROH and the ADEA Presidential Commission's calls for change is apparent. Current CODA requirements for predoctoral and graduate dental education in pediatric dentistry, pediatric, or general/hospital dentistry do not include infant oral health care skills, knowledge of children's unique needs, or the moral obligation to provide advocacy and care for underserved groups such as poor children and CSHCN. In Canada, the first competency for dental graduates is to "recognize the determinants of oral health in individuals and populations and the role of dentists in health promotion, including the disadvantaged."[68] By contrast, the lack of a systematic approach to these factors within dental education in the United States raises concerns about our commitment to society's pressing needs. The lack of preparation of our dental workforce to render culturally competent care to diverse groups, including those with special needs and the very young, is a contributing factor to health disparities that only the dental academic community can address.[69–71]

## RECOMMENDATIONS

We agree that it is time for a review of the current CODA approach to accreditation of dental schools and graduate programs. The following changes should be considered:

- revision of CODA standards for predoctoral programs, including competencies (knowledge, attitudes, and skills) related to the unique characteristics of children that distinguish them from adults and provision of family-centered care; the social determinants of health, issues of social justice, and provision of culturally competent care; and the management of the oral health care needs of special populations, including when to refer the more complicated patients, including CSHCN
- revision of CODA requirements to include predoctoral dental student experiences in diverse community settings
- revision of CODA standards 2-20 and 2-21 to reflect current professionalism and ethics statements in dentistry that include the social responsibility of dentists to provide advocacy and dental care for the underserved
- revision of CODA standards for advanced general dentistry programs to include curricular content in

provision of dental care to pediatric patients and CSHCN
- revision of CODA standards for pediatric dentistry advanced specialty education programs to reinforce predoctoral pediatric curricular content concerning the unique characteristics of children that distinguish them from adults and provision of family-centered care; the social determinants of health, issues of social justice, and provision of culturally competent care; develop competencies (knowledge, attitudes and skills) that prepare the pediatric dentist for his/her role as the primary advocate for oral health care for all children including CSHCN, as developed for leadership training programs including pediatric dentistry[57,58,63]
- recommendation or required assessment of communication skills and cultural competency based on newer educational methodologies such as OSCEs

We also recommend that the dental education community:
- develop a task force under ADEA leadership to consider strategies to improve children's oral health through dental education strategies
- intensify efforts to decrease faculty shortages; test multiple strategies to increase the recruitment and retention of the next generation of academic leaders
- expand and strengthen interprofessional collaborations between dentistry, medicine, and other health professions
- consider the value of prioritizing limited pediatric dental resources for the most complex children, including the very young with dental disease and CSHCN
- continue curriculum innovation efforts nationally and at the level of individual schools

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