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Educating Pediatricians on Children's Oral Health: Past, Present, and Future

David M. Krol, MD

ABSTRACT. *Objective.* The American Academy of Pediatrics (AAP) policy Oral Health Risk Assessment Timing and Establishment of the Dental Home encourages pediatricians to play an important role in the oral health of children. The purpose of this study was to determine how well pediatricians are prepared to play the AAP suggested role in children's oral health by examining the oral health content of their educational process.

Methods. This article reviews current medical education guidelines, programs, surveys, and pediatrician experiences in oral health training at the undergraduate, graduate, and continuing medical education levels.

Results. Although some medical schools, residency programs, and continuing medical education efforts do include oral health in their curricula, the practice is not widespread. Professional and oversight organizations such as the Association of American Medical Colleges, the Council on Medical Student Education in Pediatrics, Association of Pediatric Program Directors, AAP, and the pediatric Residency Review Committee do not include oral health in key guidelines and surveys of the medical education continuum. When surveyed, pediatricians state that the time spent on oral health education at each level of training is inadequate.

Conclusions. Overall, the level of oral health training for pediatricians at the undergraduate, graduate, and continuing medical education levels is inadequate to provide pediatricians with the competencies required for the provision of quality oral health care to children. Despite this inadequacy, educational efforts are under way and various tools and guidelines are available in a few locations. In addition, numerous opportunities exist for the organizations responsible for pediatrician education to ensure that curricula are designed and adopted to achieve these competencies, faculty are trained to teach these competencies, and program accreditation and certification are closely linked to acquisition of these competencies. Ensuring the success of such efforts will require cooperation between many organizations and disciplines and a genuine commitment to improve pediatric education and medical care for children. *Pediatrics* 2004; 113:e487–e492. URL: <http://www.pediatrics.org/cgi/content/full/113/5/e487>; oral health, oral health education, medical education, pediatric education.

ABBREVIATIONS. AAP, American Academy of Pediatrics; AAMC, Association of American Medical Colleges; SD, standard deviation; RRC, Residency Review Committee; GME, graduate medical education; FOPE II, Future of Pediatric Education II; CME, continuing medical education; APPD, Association of Pediatric Program Directors.

The American Academy of Pediatrics (AAP) published a policy statement in May 2003 addressing the role that pediatricians can play in the oral health risk assessment of children.¹ The policy statement suggests that "pediatricians and pediatric health care professionals should develop the knowledge base to perform oral health risk assessments on all patients beginning at 6 months of age." In addition to the AAP, the importance of oral health has been emphasized by the Surgeon General in his report *Oral Health in America*² and the Centers for Disease Control and Prevention in *Healthy People 2010*.³ Unfortunately, various studies have shown that the oral health competency and practice of some pediatricians is less than adequate.^{4–13} For pediatricians to address competently child oral health issues, they must have adequate knowledge of the disease process, risk factors, signs, symptoms, prevention, and intervention strategies. The knowledge base required of pediatricians to perform successfully oral health risk assessments can and should be built and reinforced throughout the medical education process.

Pediatricians need more knowledge and skill in addressing children's oral health because of the prevalence of dental disease, the racial and socioeconomic disparities in disease burden, and the limited access to dental care for many children. Despite that the prevalence and severity of dental caries have decreased,¹⁴ 5 times as many children aged 5 to 17 years have dental caries than asthma.² By the time US children are preschool age, 18.7% have at least 1 tooth with untreated caries.¹⁵ This increases to 77.9% by age 17.¹⁵ A "silent epidemic of dental disease"² exists in the United States that disproportionately affects poor and minority children. These children are more likely to have dental caries^{2,15} and greater unmet dental needs^{16,17} and are less likely to gain access to dental care.¹⁸ Unfortunately, the number of pediatric dentists in the United States is inadequate to meet the needs of children, and many general dentists are not equipped with the skills and training to deal with small children.¹⁹ Optimally, pediatricians see children 8 times in the first year of life and 13 times by age 3.²⁰ Dental caries is a preventable

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disease, and prevention can begin in the pediatrician's office.

This article demonstrates that there is currently a limited amount of oral health subject matter in the medical education continuum but that numerous opportunities and models exist that can prepare pediatricians to become the competent providers of oral health care envisioned in the AAP oral health risk assessment policy. The article begins with an examination of current oral health-related educational requirements and guidelines in pediatrician training, provides descriptions of extant programs that focus on integrating oral health training into medical education, and reviews surveys of pediatricians that query the amount of oral health at each level of their medical education. The article then presents opportunities to improve and increase oral health education in the medical education process and proposes a series of useful policies to accomplish the goal of producing pediatricians who can competently provide families with oral health risk assessment, guidance, prevention, and therapeutics.

METHODS

A multistrategy review was performed to obtain information on pediatrician training in oral health. Initially, a Medline search was performed on publications from 1966 to August 2002 combining the MESH terms pediatrics; education, medical; education, medical, undergraduate; education, medical, graduate; education, medical, continuing with oral health, dentistry, and dental caries. A review of publications that focused on medical education from key educational and professional organizations was completed to find references to oral health and physician training in oral health. These publications were accessed through the Internet, from local medical libraries, or directly from the organizations. Recent oral health conference proceedings and abstracts were also reviewed for references to physician oral health education. Finally, individual medical school and residency program web sites were accessed and individuals from schools, residencies, and professional organizations were interviewed for additional information on oral health training.

RESULTS

The medical education process, like other professional education processes, demands a significant amount of time, energy, finances, and lifelong learning for a pediatrician to achieve and maintain competence. A large body of knowledge and skills is required of the medical professional, and a sequential and increasingly focused medical education process serves to prepare the pediatrician with in-depth information and experience. Each phase in the process involves a demonstration of the pediatrician's competency in information appropriate for that given level of education, and this competency must be demonstrated before he or she advances to the next level or continues to practice as a licensed or certified pediatrician. Oral health, an important factor in general health, would reasonably constitute a portion of the numerous competencies and skill sets required of pediatricians at each level of their education.

Undergraduate Medical Education

There are presently 126 allopathic medical schools in the United States and Puerto Rico that educate ~66 000 students each year.²¹ (I limited the discus-

sion to allopathic medical schools. There are, in addition, 20 osteopathic medical colleges that are producing an increasing number of physicians [2534 in 2001–2002].) Although each of these medical schools has the same charge to ensure its students' competencies in the basic and clinical medical sciences and to prepare them fully for the next step in the medical education process, different schools' curricula can vary considerably.²² Basic curriculum requirements are set by a national Liaison Committee on Medical Education²³ (the accrediting authority for medical education programs in the United States), but each medical school's faculty is responsible for the design, implementation, and evaluation of their specific curriculum.

Because few studies or surveys have been conducted on the topic, there is very little evidence to show that oral health, dental health, or some other derivative is included in medical curricula. Examination of the syllabi of classes and clerkships at each medical school would provide the best evidence of oral health content in medical school courses. Information of this sort, however, is not easily available or accessible. In a July 2002 search of the American Association of Medical Colleges' (AAMC's) online Curriculum Directory, no classes, courses, or clerkships related to oral health were found.²² (Search terms used were, dental, oral health, tooth, teeth, mouth, and oral.) This is not surprising considering that the "General Pediatric Clerkship Curriculum" of the Ambulatory Pediatrics Association/Council on Medical Student Education in Pediatrics, a curriculum adopted and adapted by >90% of the clerkships in the United States, does not include any mention of oral health, dentistry, tooth development, or examination of the mouth.²⁴ (One exception is the mention of dental caries in the differential diagnosis of ear pain.)

An additional method of analyzing medical students' access to oral health topics is to survey students directly. Each year, the AAMC distributes a Graduation Questionnaire to graduating medical students querying their educational experiences, student support programs, and potential obstacles faced, including harassment, student debt, and career planning.²⁵ This questionnaire has achieved a high rate of response (91% in 2002) but makes no mention of oral health in any form. The absence of oral health from the survey seems to indicate that oral health is not seen as an important educational topic for medical students. (Other topics mentioned in the AAMC's survey include alternative medicine, genetic counseling, home health care, medical informatics, occupational health, pain management, sleep disorders, and termination of pregnancy.) Given the lack of guidance by the Liaison Committee on Medical Education, the AAMC, and pediatric curriculum models, it is not surprising, then, that some US medical schools are doing an inadequate job of preparing medical students to deal with oral health issues.

Although there are no curriculum reviews or student survey data, 2 studies have focused on asking practicing physicians to recall their medical school experiences with regard to the amount of oral health

training that they received.^{4,5} Sanchez et al⁵ surveyed licensed pediatricians and family practitioners in Alabama on their overall dental training experiences. Fifty-nine percent of the respondents reported not receiving any preventive oral health information during medical school. Of those who did report receiving oral health training during medical school, 63% reported receiving 2 hours or less, and overall, 85% reported receiving 2 hours or less. A separate study by Lewis et al⁴ focusing only on pediatricians found that the mean hours of oral health instruction was 4.2 (standard deviation [SD]: 11.1), but 37.5% of respondents received no dental health instruction in medical school.

In the context of this seemingly small amount or lack of oral health subject matter, some medical schools have incorporated oral health into their curricula. The University of Kentucky has incorporated oral health into its third-year curriculum for medical students and also into its pediatric residency program.²⁶ Several other medical schools, including the Universities of Washington,²⁷ Chicago,²⁸ and Duke (M.A. Keels, personal communication, July 10, 2003) have also incorporated oral health into the core curricula of their pediatric clerkships. In addition, a dental curriculum for pediatric clerkships has been developed and is accessible on the Internet.²⁹

Graduate Medical Education

Pediatric residency program requirements are determined by the Residency Review Committee (RRC), and each residency program must adhere to a required core curriculum as set by the RRC to be accredited. The pediatric RRC requirements make no explicit mention of oral health, dental health, or dentistry in the educational program requirements.³⁰ Thus, there would seem to be less incentive for residency programs to include oral health training in their programs than there would be for topics that are required by the RRC.

Short of surveying each residency program's lectures and each resident's clinical experiences in oral health, it is difficult to discern whether oral health topics are presented in pediatric graduate medical education (GME). The Future of Pediatric Education II (FOPE II) project of the AAP, as an informational effort, surveyed pediatricians on their experiences in GME and continuing medical education (CME) but did not ask about oral health training (H.J. Mulvey, personal communication, February 26, 2002). Questions related to oral health training were also absent from FOPE II surveys of AAP multidisciplinary sections, residency program directors, and third-year pediatric residents (H.J. Mulvey, personal communication, February 26, 2002).

Studies of practicing pediatricians show that their level of oral health training during residency was less than adequate.^{4,5,31} Seventy-six percent of surveyed pediatricians who had finished their residencies in or after the 1978-1979 academic year believed that their residency experience was "insufficient" in dentistry.³¹ A higher percentage of pediatricians who were trained in 1984 or later felt insufficiently trained in dentistry than those who were trained between

1978 and 1983 (78.9% vs 73.4%; $P = .008$).³¹ Sanchez et al⁵ found that 51% of surveyed pediatricians and family practitioners did not receive information on oral health during their specialty training. Of all survey responders, 80% received 2 hours or less of oral health training during their residencies. Finally, Lewis et al⁴ found that 42.3% of the responding pediatricians reported "no instruction in dental health" during their residency with a mean of 3.0 hours (SD: 6.9).

Despite the mentioned deficiencies in oral health training in pediatric GME, some residency programs are incorporating or planning to incorporate oral health, including the University of Connecticut; Duke University; University of California, San Francisco; New York University/Bellevue; and the University of Kentucky. In addition, the Ambulatory Pediatrics Association's *Educational Guidelines for Residency Training in General Pediatrics*, completed in 1996, includes dental health in its health supervision guidelines and special focus areas.³² Eighty percent of residencies report that they have used these guidelines in their programs, although not specifically the dental guidelines.³² These guidelines have recently been revised to incorporate new information, improved accessibility of information, new curricular emphases, and new Accreditation Council for Graduate Medical Education requirements and include an expanded dental component.³³

In addition to some individual programs and national organizations demonstrating interest in resident education in oral health, 7 sites throughout the United States recently received federal government funding for the integration of oral health education in pediatric or family practice residencies.³⁴ So, although current studies of pediatricians either do not ask about oral health training or show that they did not receive much training during their GME experience, there does seem to be some level of residency program, organizational, and federal support for pediatric resident oral health training. This level of interest affords opportunities to evaluate, improve, and disseminate successful programs and consider additional opportunities to expand and improve the oral health training of residents.

CME

CME serves the dual purpose of providing pediatricians a way to stay up-to-date on the latest developments in their field and providing state and professional boards a way to monitor pediatricians' attainment of current medical knowledge. No available study has examined comprehensively the content of CME accessible to pediatricians. Such a study would be difficult to undertake considering the large number of CME providers throughout the United States, although it would not be impossible considering that the AAP and the academic medical centers in the United States provide a large portion of the CME credit to pediatricians.³⁵ The only study of oral health training in pediatric CME discovered that just over 60% of surveyed pediatricians received no instruction in dental health in their CME experience, and the mean hours of instruction was 1.7 (SD: 5.5).⁴

It is not possible to determine, however, whether the pediatricians chose not to include available oral health topics in their CME activities or oral health was absent from their CME subject options.

There is evidence that oral health information is provided to practicing pediatricians via pediatric journals. As the most commonly cited resource for CME,³⁵ journal content can have an important impact on pediatricians' knowledge. Within the past 2 years, reviews of oral health for pediatricians have been published in *Pediatrics in Review*,³⁶ *Current Problems in Pediatric and Adolescent Health Care*,³⁷ and *Current Opinion in Pediatrics*,³⁸ and an entire issue of *Pediatric Clinics of North America*³⁹ was devoted to children's oral health.

Various individual programs currently provide oral health CME to practicing pediatricians. Examples of some of these include a program in Hawaii that has trained primary care providers on "infant bottle tooth decay" prevention⁴⁰ and a preventive oral health training of pediatricians in an infectious disease clinic in New York.⁴¹ Joint annual meetings of pediatricians and dentists take place in San Diego to address pediatric dental disease, as well as a monthly oral health lecture series for physicians-in-training.⁴² Physicians in North Carolina receive training on an oral screening preventive package that includes application of fluoride varnish.⁴³ Other oral health-related programs for practicing physicians include a grand rounds presentation for medical providers in Wisconsin,⁴⁴ an hour-long presentation for medical providers in New York,⁴⁵ and a program developed by the Association of Clinicians for the Underserved that includes training and laminated reminder cards on "Anticipatory Guidance for Oral Health."⁴⁶

DISCUSSION

Barriers to Oral Health Education

At present, the content of the medical education process for most pediatricians does not seem to prepare them adequately to fulfill the role in children's oral health that AAP policy suggests. This does not mean that the educational content cannot be changed to meet more complete requirements or that a pediatrician's role cannot change as the educational content changes. There are, however, multiple barriers to educating pediatricians on children's oral health. Some of the barriers are unique to the topic of oral health, and some are common barriers that affect physician education in general. These barriers include issues of professional boundaries, time, attitude, and the need for consistent topic reinforcement.

First and foremost, the issue of the professional boundary between medicine and dentistry needs to be addressed for progress to occur at the interface of the 2 professions. Both professions must determine the point at which pediatricians should refer to their dental colleagues on issues of oral health. In identifying this point, it will be critical to know the expected role of the pediatrician in providing oral health guidance and care to children and to under-

stand the limitations of that role. Making the pediatrician's role in children's oral health more clear will make it easier for those responsible for the education of current and future pediatricians to determine what knowledge and skills to impart. The recent AAP policy on oral health risk assessment is an important step in that direction.¹

Assuming that the role of the pediatrician and the required educational content are defined, barriers will still exist within the medical education and practice environments. The most salient of these barriers is time. The issue of time limitations often emerges in the medical education process when efforts are made to introduce or expand on subjects within a curriculum that is already burgeoning with information and pressed for inclusion of other important topics. Attempts to squeeze in 1 more class, topic, clerkship, or rotation can be difficult. Therefore, creative ways of incorporating oral health into already extant classes and rotations need to be considered carefully.

Time limitations are also a critical factor in the practicing pediatrician's willingness to take on oral health guidance and possible treatment responsibilities. Even if the pediatrician is educated and competent in providing oral health services to children, he or she likely faces tight office-visit time limitations. During a well-child care visit, for example, competing topics could include injury prevention, nutrition, domestic violence screening, breastfeeding, school readiness issues, developmental issues, and other anticipatory guidance issues. The pediatrician must also allow time for parents to raise particular issues of concern and complete a physical examination all within a short well-child examination. Such limitations make it difficult for the pediatrician to incorporate new issues and screenings into the visit and make it essential for added topics to be relevant and meaningful to his or her practice. To overcome this barrier, there must be not only a way to make oral health services fit within the time constraints of a busy practice but also an interest on the part of the pediatrician to make it a part of his or her routine.

This leads to the challenges of attitude and reinforcement. These attitude and reinforcement barriers have to do with encouraging a consistent belief among pediatricians that incorporating oral health in their daily practice is worthwhile. Assuming that pediatricians receive adequate education on child oral health issues during their formal training, they will require additional education on how best to incorporate oral health into their practice and will need to be reinforced consistently with the message of the importance of oral health to a child's general health status. Such education may best be provided via various CME activities and a consistently repeated message that children's oral health is important and a part of the pediatrician's responsibility.

Even if these barriers are overcome, systemic issues may have a dramatic effect on the attitudes of pediatricians toward incorporating oral health into their daily practice. Difficulty in making appropriate referrals for children who are at risk as a result of a lack of pediatric dentists, dentists who are comfort-

able with treating children, or dentists who are willing to accept Medicaid could dampen enthusiasm for screening. Although the educational process may not be the appropriate venue to address this concern, it is another barrier to face in efforts to increase the role of pediatricians in children's oral health.

Opportunities for the Future

Increasing and improving the oral health content at all levels of a pediatrician's medical education must begin with quantifying and evaluating the learning opportunities that are currently made available to them. Organizations that are interested in medical education, such as the AAMC, can document the extent of oral health training through their Graduation Questionnaire and their Curriculum Directory. Surveys of pediatric residency programs, third-year residents, or members of the Association of Medical School Pediatric Department Chairs or Association of Pediatric Program Directors (APPD) could provide information from residency training. The AAP could begin including oral health questions in any future third-year resident surveys and other surveys related to pediatric education. The AAP and other organizations that are responsible for CME could identify and evaluate the amount of oral health content in its CME offerings and evaluate those oral health education programs on their success in improving pediatrician competency in children's oral health.

Including oral health education at each level of a pediatrician's medical training will require not only efforts by each educational program but also support from educational and professional organizations. In medical school, the required subjects by the Liaison Committee on Medical Education such as anatomy, microbiology, pathology, and preventive medicine all can touch on oral health topics. In addition, clinical rotations such as family medicine, obstetrics and gynecology, emergency medicine, and pediatrics and topics related to societal, socioeconomic, and cultural competence issues can incorporate oral health and reinforce its importance. In most of the tertiary training settings of medical students and pediatricians, exposure to and reinforcement of oral health issues occur infrequently. It is in the ambulatory or primary care setting where many opportunities exist to reinforce oral health issues in well-child care, children with special health care needs, adolescent care, and interprofessional communication (eg, referrals) and through exposure to oral health professionals in their practice settings. The AAP and Ambulatory Pediatrics Association can support and, perhaps, design curricula that take advantage of these opportunities. Oral health educational efforts can be facilitated by schools and residency programs that have access to dental schools and pediatric dental residency programs or can partner with community dentists who might be interested in participating in the education of physicians.

Organizations with an interest in medical education can also play a leading role in facilitating oral health education. The AAMC can partner with the American Dental Education Association to design

oral health curricula and encourage cross-disciplinary education at the undergraduate level. The Council on Medical Student Education in Pediatrics can make oral health an explicit subject of its general pediatrics curriculum, rather than a differential diagnosis. The pediatric RRC could include oral health as 1 of the core competencies for residency training. This may encourage residency programs to incorporate oral health topics into existing rotations such as developmental, adolescent, infectious disease, neonatal, ambulatory, and the continuity experience or even to develop a dental elective for the residents. A less comprehensive effort could be inclusion of oral health in the various grand rounds, chief of service, and other scheduled lectures to housestaff by individual programs. The APPD could include oral health in its competency evaluation strategy. Currently, neither of 2 evaluation tools—on the APPD web site via the Accreditation Council for Graduate Medical Education and a model evaluation tool from 1 pediatric residency—includes the mouth/teeth in its physical examination.^{47,48}

In designing CME programs, it will be important to determine the most important oral health information needed by pediatricians; to make the information available via journals, CME courses, educational projects and programs; and to test pediatricians on that information in their specialty boards. This all will require cooperation among professional societies, professional boards, dental colleagues, journal editors, and education oversight organizations. Because academic medical centers, the AAP, and journals are the most common sources of CME for pediatricians,³⁵ these will be the key areas to focus efforts to increase oral health content. Academic medical centers can make available, with the help of the Association of Medical School Pediatric Department Chairs and dental colleagues, oral health CME courses for practicing pediatricians. The AAP can increase the number of oral health modules in their CME programs and continue including oral health topics in *Pediatrics in Review*. Finally, pediatric journal editors can encourage pediatricians and pediatric dentists to submit papers that address children's oral health.

Finally, testing pediatricians on oral health content may be an incentive to teach and learn about it. The United States Medical Licensing Examination could include oral health topics on all parts of its examinations, perhaps providing an incentive for medical schools and residency programs to teach the topic. The American Board of Pediatrics has included 7 oral health content specifications in its Program for Maintenance of Certification in Pediatrics (D. Butzin, personal communication, February 25, 2002). (The content specifications are know how to counsel parents regarding their child's dental care, recognize the relationship of dietary intake and feeding habits to dental health, know the usual clinical picture of "nursing bottle" caries, know the recommendations for fluoride use, know the definition and causes of delayed dental eruption [hypothyroidism, hypopituitarism, ectodermal dysplasia, and rickets], recognize the varied clinical manifestations of dental infection

[swelling below the jaw with a mandibular dental abscess and periorbital swelling with a maxillary dental abscess], and know the indications for reimplantation of an avulsed tooth.) By including questions that address these content specifications, there may be incentive on the part of residency programs and CME providers to include programs that address these topics. With oral health as a topic on which pediatricians will be tested, an inclination to learn about children's oral health may result.

CONCLUSIONS

The FOPE II project from the AAP stated, "There is no organizational structure charged with the responsibility to define the core competencies required of pediatricians at all educational levels. There is no coordinated process to ensure that curricula are designed and adopted to achieve these competencies, faculty are trained to teach these competencies, and program accreditation and certification is closely linked to acquisition of these competencies."³⁵ These comments accurately reflect the core problems with the level and quality of oral health education for pediatricians.

Various studies have shown that the oral health competency and practice level of some pediatricians is less than adequate.⁴⁻¹³ Some of this inadequacy can be explained by the lack of oral health content in the educational process in which they participated. This lack of oral health knowledge by practicing pediatricians stands in contrast to the knowledge and skills required to fulfill the role suggested by the AAP policy on oral health risk assessment timing and establishment of the dental home. The difference should provide more than enough incentive to improve the knowledge and skill levels of pediatricians and expand existing or design new educational programs at all levels of medical education. Such initiatives would likely be worthwhile given the evidence showing that oral health educational programs that are aimed at improving pediatricians' knowledge and practice can be successful.⁴⁹⁻⁵¹

This article has summarized the current state of oral health education for pediatricians and organizational focus on oral health in medical education. New efforts to educate pediatricians in oral health at each level of medical education are being developed throughout the United States, making it difficult to keep an updated and exhaustive list. Thus, it is likely that some programs have not been recognized and the number has been underestimated. This limitation, however, does not obviate the need for the organizational structure and coordinated process described in FOPE II.³⁵

Many improvements can be made throughout the medical education process to provide pediatricians with the knowledge and skills to provide families competently with oral health guidance, prevention, and possible therapeutic treatments. Such efforts will require changes at each level of pediatric training. They will also require changes in the policies, educational efforts, and evaluation strategies of professional organizations and other entities that have some responsibility for the education of and quality

of care provided by pediatricians. A process of change such as this will require cooperation among many organizations and disciplines and a genuine commitment to improve pediatric education and medical care for children.

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