Critical Issues in Dental Education

U.S. Predoctoral Education in Pediatric Dentistry: Its Impact on Access to Dental Care

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Abstract: This study sought to identify faculty, organization, patient pool, and procedures taught in predoctoral pediatric dentistry programs using a questionnaire sent to all fifty-five U.S. dental schools in 2001. Forty-eight (87 percent) programs reported an average of 3.9 full-time and 2.1 part-time FTE faculty, resulting in a mean faculty to student ratio of 1:6.4. One-third employ general dentists to teach pediatric dentistry, and 36 percent report fewer faculty than five years ago. Two-thirds were stand-alone departments. Over half (55 percent) reported increases in patient pools, but also a lack of patients with restorative needs. Half of the programs supplemented school-based pools with special populations, and two-thirds sent students on external rotations, most often to treat high-caries children. Those not using external rotations cited lack of faculty. Accepted patients averaged about four years, with only 6 percent of the pool under three years. Low-income or Medicaid-covered children accounted for 88 percent of school patient pools. Half of the schools felt the pool inadequate to meet competencies, attributable to lack of patients' restorative needs or inadequate intake numbers. Fewer than half of the programs (48 percent) provided hands-on experience with disabled patients, and one-third afforded every student with this experience. Pediatric dentistry was mentioned in fewer than half of the competency documents. Results suggest that U.S. pediatric dentistry predoctoral programs have faculty and patient pool limitations that affect competency achievement and adversely affect training and practice.

Access to dental care and oral health disparities have been linked to low socioeconomic status and cultural and ethnic barriers. In addition to these, some within the practicing community suggest that lack of adequate preparation in dental school may be an additional issue related to access to care. At its October 2000 Annual Session, the American Dental Association (ADA) House of Delegates adopted Resolution 59H-2000, which stated:

Resolved, that the ADA Commission on Dental Accreditation review the predoctoral education standard 2.25 regarding pediatric dentistry to assure adequate and sufficient clinical skills of graduates.

The genesis of this statement, which became known as the Texas Resolution because it was first brought forth in 1999 by the Texas Dental Association, was a concern that a perceived barrier to access to care for children may be the result of inadequacies in U.S. predoctoral dental education in pediatric dentistry. The background statement supporting the resolution described a belief that many practitioners are not confident or adequately trained to treat the very young and adolescent dental patient.

Parties of interest responding to this resolution included the ADA, the American Dental Education Association (ADEA), and the American Academy of Pediatric Dentistry (AAPD). The AAPD convened a task force to investigate the concerns expressed in the ADA resolution and its background statement and charged the task force to work in concert with the Section on Pediatric Dentistry of ADEA to organize an investigation into current practices in pediatric dental education and produce a symposium that would address the issues from various perspectives. This symposium was held during the 2002 Annual Session of ADEA, in San Diego, where the data in this paper were presented.

It was necessary to collect data concerning both didactic and clinical content of current pediatric dentistry curricula in North American dental schools to test the validity of concerns expressed in the ADA resolution. Anecdotal information suggested that many factors might have influenced pediatric dentistry educational programs over the past twenty years. These factors include:
• a declining workforce of dental educators, resulting in difficulty filling faculty positions and impacting faculty-student ratios for clinical programs;³
• the collapse of departments of pediatric dentistry into larger divisions headed by individuals other than pediatric dentists;
• a change in the epidemiology of dental caries in U.S. children;⁴
• a decrease in severe caries in the patient populations seeking care in predoctoral pediatric dentistry dental school clinics and a resultant decrease in complexity of clinical procedures being performed by dental students during their training;⁵
• funding shortages in dental schools in general; and
• the introduction of new, less specific and less prescriptive accreditation standards for dental education programs.⁶

Whether and how these factors have affected the experiences of graduating dental students is pertinent to the accuracy of the perception by the clinical community, voiced in several forums,¹²⁷-¹⁰ that they are inadequately prepared to provide care to children with severe dental disease.

The purpose of this investigation was to survey pediatric dentistry predoctoral program directors to collect data about their workforce, the organization of their departments, their pediatric patient pools, and the didactic and clinical content of their predoctoral pediatric dentistry programs.

Materials and Methods

A survey developed by the task force and refined through consultation with the ADA Survey Center was mailed in July 2001, with a cover letter and a stamped self-addressed envelope, to the directors of the predoctoral pediatric dentistry programs in all fifty-five U.S. dental schools. One follow-up mailing was made to nonresponders in August 2001, and follow-up telephone calls were made to nonresponders in September 2001.

The survey questionnaire was composed of twenty-three questions, some with multiple parts. Questions requested information about the departmental workforce and the departmental organization. Other questions asked about the adequacy of the patient pool to achieve program competencies and the availability of additional patient populations through importing patients or external rotations. A large section asked about didactic curricular content and which specific clinical procedures were taught, how they were taught, and whether all students had actual patient experiences with the procedures. Finally, respondents were asked about predoctoral program competency statements, the availability of alumni information concerning their pediatric dentistry education and their continuing education needs, and whether there was a graduate or residency program in their school.

Data from the survey were entered using professional data entry personnel, reported as percentages and frequency tables, and analyzed using descriptive statistics. Open-ended questions were categorized by response and reported.

Results

Forty-eight schools returned the survey for a response rate of 87 percent. Responses fall into the following categories.

Workforce

The responses to workforce issues indicated that, on average, pediatric dentistry department/divisions have 3.9 full-time faculty (range 0.8-13; median 4) and 2.1 FTE of part-time faculty (range 0 to 9.2). Of the 3.9 full-time faculty, 2.8 on average are devoted to the predoctoral program. The average faculty-student ratio is 1:6.4 with a range of 1:3 to 1:11.

Thirty-six percent of programs reported fewer faculty members today than five years ago. About one-third have the same number, and one-third have more faculty. Approximately one-third of programs have general dentists teaching predoctoral pediatric dentistry, and 40 percent have an average of 1.3 unfilled full-time faculty positions. Twenty-five percent of the programs have an average of 1.3 unfilled part-time positions.

Departmental Organization

Responses about departmental organization indicated that almost two-thirds (63 percent) of the pediatric dentistry departments are stand-alone departments, while the rest are components of a larger division. The most frequently identified divisions were orthodontics, combined divisions of pediatric dentistry and orthodontics, and divisions of growth and development. The vast majority of the departments are chaired by pediatric dentists (77 percent), and most of the rest are chaired by orthodontists (13 percent) or dual-trained individuals (6 percent). More than half of the respondents (51 percent) reported
that chairs have budgetary control of departments, followed by deans (40 percent) and the division chair (9 percent).

**Patient Pool and Clinical Experiences**

More than half (55 percent) of the programs reported that patient pools have increased over the past ten years. Only 19 percent reported a decrease in patient numbers. The distribution of caries levels in predoctoral pediatric patient pools is summarized in Figure 1. The caries distribution in these pools seems adequate, on average, with approximately half (45 percent) having moderate caries (one to six teeth) and the other half evenly split between being caries-free and having severe caries (over six teeth). Fewer than half the programs (42 percent) reported that the caries level in their patient pools has stayed the same, while the remaining are evenly divided between reporting an increase or a decrease in caries level in the last five years.

The distribution by age of patients assigned to predoctoral students is summarized in Figure 2. Only 6 percent of patients are three years of age or younger. The majority of patients (60 percent) were four to ten years of age. The average minimum age for acceptance into the patient pool was 3.9 years (range birth to six), and the most frequently given age was four years.

The distribution of patients by payer source is summarized in Figure 3. Almost half of patients are funded by Medicaid, and all the answers to “Other” indicated children from low-income families. Therefore, fully 88 percent of patients treated in the predoctoral programs are from low-income families or families without insurance.

When asked to identify criteria used to select patients for acceptance into the patient pool, respondents identified behavior (87 percent), age (77 percent), and extent of disease (70 percent). Not quite half the programs (42 percent) reported that their pool was inadequate to provide each predoctoral student with a sufficient number of patients to achieve program competencies. Factors contributing to this inadequacy were lack of patients requiring restorative care (56 percent), followed by inadequate numbers of patients to screen (47 percent). “Clinic fees too...
high” (41 percent) and “location of dental school” (39 percent) vied for third place. Twenty-nine percent blamed an insufficient number of faculty to cover clinics. Written answers indicated that the actual number of patients needing restorative care was not the problem, but rather the number of patients with restorative needs within the scope of the predoctoral student’s ability.

Half of the programs brought pediatric patient populations into the school to represent patient types not readily available through their regular intake mechanisms. Head Start and children from low-income families were cited most frequently as these patient populations, and these children provide nearly one-fourth (23 percent) of the total clinical experience for these programs.

Forty percent of programs reported that auxiliaries are always available, and 31 percent provide them upon request. Therefore, over 70 percent have the ability to provide predoctoral dental students with help at some level while they treat children.

Two-thirds (67 percent) of program directors reported that they have external rotations for predoctoral students outside the dental school-based predoctoral program. The responses describing the external rotations are summarized in Table 1. City public health clinics (69 percent) were the most common site for these rotations, followed closely by hospital clinics (63 percent) and community health centers (60 percent). One-third of programs had rotations off-site for patients with disabilities and settings with infants. The experiences that program directors report as provided by these rotations are summarized in Table 2. The following experiences were mentioned frequently: children with high levels of caries (83 percent), higher volume patient care (89 percent), Medicaid patient populations (70 percent), and more advanced behavior management (54 percent). For the majority of the time, student supervision in these clinics was provided by pediatric dental school faculty (87 percent). The other most frequently mentioned supervisors were dentists employed by the clinics in which the students were assigned (61 percent) and graduate students (56 percent).

More than one-third (35 percent) of programs reported issues/challenges that preclude taking predoctoral students to off-site locations for pediatric patient experiences. A “lack of faculty supervision/not enough FTEs” was by far the most frequent reason, cited by all 17 programs identifying issues/challenges. Surprisingly, only two schools identified loss of clinic income as a reason not to send students to an off-site location.

### Treatment Procedures

Treatment procedures taught, how they were taught, and whether all students received actual patient experiences with each procedure are summarized in Table 3. Only one program in four (27 percent) reported hands-on educational experiences with treatment of the very young, infant oral examination, and atraumatic restorative treatment. Only 14 percent said that all students received actual patient experiences with these procedures. Fewer than half the programs provided hands-on educational experiences with special needs patients, and only about one-third reported that all students receive actual encounters with special needs patients.

Behavior management procedures taught, how they were taught, and whether all students received actual patient experiences with each procedure are summarized in Table 4. The only procedure thoroughly taught is tell-show-do, a technique of behavior shaping. Hands-on educational experiences in voice control (a controlled alteration of voice volume, tone, or pace to influence and direct the patient’s behavior) and nitrous oxide, both of which are well within the purview of a general dentist if properly taught, were provided by fewer than two-thirds of

| Table 1. Description of external rotations for predoctoral pediatric dentistry programs |
|--------------------------------------|------------------|
| External Rotations                           | Percentage Responding |
| City/public health clinics                   | 69%               |
| Hospital clinics                             | 63%               |
| Community health centers                     | 60%               |
| Other, please specify                        | 44%               |
| Mobile clinic                                |                   |
| School-based programs                        |                   |
| Private practice                             | 33%               |
| Clinics for patients with disabilities       | 33%               |
| Women, infants and children's clinics        | 33%               |
| Indian reservation                           | 13%               |

| Table 2. Additional pediatric patient experiences provided by external rotations |
|--------------------------------------|------------------|
| Added Experiences                           | Percentage Responding |
| Higher volume patient care                 | 89%               |
| Children with high levels of caries       | 83%               |
| Medicaid patient population               | 70%               |
| More advanced behavior management         | 54%               |
| Infant oral exams                          | 48%               |
| Operating room/general anesthesia         | 44%               |
| Special needs patients                     | 42%               |
| Sedated pediatric patients                 | 19%               |
programs. All students received actual patient experiences with voice control in about half of the programs and with nitrous oxide:oxygen analgesia in about one-third.

**Competency**

Three-quarters of programs reported that they had competency statements, but only 43 percent said pediatric dentistry was identified as a specific department or specialty in their dental school competency document. The most frequently identified mechanism to measure competency was the clinical competency exam with live patients followed by a preclinical competency exam.

**Alumni Information/Needs**

Half the programs had alumni information concerning their graduates’ satisfaction with their pediatric dentistry experiences. About 80 percent of schools offered continuing education courses in pediatric dentistry, and half said the demand for these courses was increasing. Only 40 percent of the programs offered continuing education in special needs dentistry, and about one-fourth said the demand for these courses was increasing.

Seventy-two percent of programs reported that their dental school had a graduate program or residency in pediatric dentistry, and fewer than half (42 percent) said the clinical component was located in the same facility as the predoctoral program. One-fifth (21 percent) reported that the residency clinical components were in the same city, but at a different location than the dental school. About three-fourths of these predoctoral program directors used graduate students to teach in the predoctoral pediatric dentistry program, and their efforts contributed, on average, 11 percent of the total department teaching workforce.

**Discussion**

This study was undertaken to determine the validity of concerns expressed by the practicing dental community that a barrier to access to care for children may be the result of inadequacies in U.S. predoctoral dental education in pediatric dentistry. The assumption was made that, with the exception of specialized procedures such as interceptive orthodontics, management of children with significant behavioral challenges, sedation, dental rehabilitation under general anesthesia, and management of children with significant medical, physical, and growth abnormalities, the general dentists would take care of the basic dental needs of children of all ages including infant oral examinations. Training standards for predoctoral dental education are general and include patients of all ages.
without distinction by procedure. These data appear to confirm some of the anecdotal concerns identified in the introduction to this paper.

First, the workforce in pediatric dentistry dental education is inadequate. One out of every three pediatric dentistry predoctoral departments has fewer faculty than five years ago, and one in three has one or more unfilled full-time lines. These findings are corroborated by a recent study by the American Academy of Pediatric Dentistry related to residency training.11 National data suggest that while the number of unfilled faculty positions has increased, the number of dental students has increased as well.12 One in three programs uses general dentists to teach pediatric dentistry to dental students. The average faculty-student ratio is 1:6.4, with ranges as high as 1:11.

These findings have profound implications for the types of patients programs can accept. Patients demonstrating behavior management challenges or complex restorative care requiring close faculty supervision are not going to be accepted with these kinds of faculty-student ratios. Pediatric dentistry faculty who teach in a predoctoral clinic can verify that a difficult patient paired with an inexperienced dental student creates a demanding situation and requires a faculty-student ratio closer to 1:3.

Furthermore, the difficulty of providing treatment to frightened uncooperative children with complex restorative needs goes beyond faculty-student ratios. For this reason, we queried programs about additional personnel who can assist. Seventy percent of the programs report dental assistants are available for their predoctoral dental students, but we did not ask the nature of the interaction and it is reasonable to assume that few programs dedicate dental assistants, one-on-one, to students for chairside assisting.

The fact remains that we must have better faculty-student ratios in order to see more difficult patients. Programs are caught between a rock and a hard place and naturally move to a model with the fewest complications. In order for the system to work without sufficient faculty, programs select children who are manageable and have a low disease acuity. As a result, half the programs don’t have sufficient numbers of complex patients to teach to their competencies. However, many schools cannot take students to off-site locations to find more patients because they do not have enough faculty to do so.

Our data suggest that departments are understaffed, and perhaps as a result, faculty other than pediatric dentists provide significant pediatric dentistry supervision to predoctoral dental students. This type of faculty supervision may also result in less complicated patient care, involving only basic behavior management techniques. It is possible to teach more students with nonspecialists when the dental procedures are simpler and the children well behaved.

A second issue is the adequacy of patient pools to provide procedures that must be learned to produce a general practitioner who can meet the dental needs of the children. Many patients presenting with the types of carious lesions needed for students have multiple lesions and are young. The speed with which dental students work and their limited behavior management skills preclude them from caring for young children with many large and deep carious lesions. Patient pools may have increased in numbers of patients compared with ten years ago, but almost one of every two predoctoral program directors report that they are inadequate to provide the necessary procedures to support competencies. Their responses indicate that two-thirds must take students to off-site locations to find children with higher levels of caries (and perhaps more advanced behavior management needs, whether desired or not). The literature on the adequacy of the pediatric dentistry patient pool confirms that patient number per student often increases, but this occurs in order to ameliorate a declining “procedure-richness” that was enjoyed a generation ago.5,13

There are even fewer opportunities for educational experiences with patients with special needs, since only slightly more than one-third of programs have actual clinical experiences with these patients for all students. There are also very few opportunities for dental students to practice treatment with the very young child and perform infant oral exams because only 6 percent of the assigned patient pool are children in these age groups. As a result, the new general dentist is not adequately trained to feel comfortable and competent to treat the very young child. No wonder general dentist practitioners report that they are not accepting young children into their practices.14

These findings have strong implications for AAPD’s dialog with the American Academy of Pediatrics (AAP) concerning the availability of referral sources to provide the first dental visit at twelve months of age. These data indicate that the AAP may be correct in saying that there are not enough dental providers to see these very young children. Training pediatricians to perform infant oral exams and recognize dental disease in young children will not solve the problem and, in fact, may exacerbate the demand for care for the birth-to-three-year-old who relies on
the medical community for oral health care. To what dentists will pediatricians refer all of the very young children for treatment of the oral disease they find? Workforce changes through improved education are undeniably part of the solution to access. General dentists will need to be better trained to take care of these young children, or the pediatric dentistry workforce must be dramatically increased.

A third issue is the inadequacy of access to dental care for the Medicaid population. The distribution of predoctoral patients by payer source in this survey clearly indicates that the majority of patients in predoctoral programs, both in schools and at off-site locations, are children from low-income families. Pediatric dentistry programs are serving as a safety net for these children’s dental care. However, fewer than one in six general practitioners treats young Medicaid children, according to recent data collected in this project’s sister study and in national data as well. Educational experiences with Medicaid patients, which are common in our programs, do not ensure that dentists treat Medicaid patients when they graduate. One reason may be that economic and cultural issues predominate in practice, and educational exposure has little to do with Medicaid treatment. If true, this finding would have profound implications for the success of the latest Robert Wood Johnson Pipeline Program, which is intended to sensitize dental students to the needs of low-income and underserved communities. Its aim is to increase dental students’ experiences with the low-income patient populations with the expectation of increasing their care following graduation. Other explanations to account for the failure of programs to inculcate this ethic in graduates are that: 1) graduates feel they’ve made their contribution to society’s needy while in school, and 2) graduates get firsthand exposure to broken appointments and other Medicaid-related complaints and develop prejudices against this population.

Conclusions

Our findings suggest that our educational system has a shortage of faculty trained in the care of children and increasingly relies on general dentists to teach pediatric dentistry. As a result, we select a teaching pool of manageable children with a low level of disease, and that is exactly who our practitioner-graduates treat. Our data suggest that the Texas Resolution was correct: general dentists are not being prepared to take care of difficult children.

Our study resulted in four primary findings:

1. The predoctoral pediatric dental workforce is inadequate, with one in three programs having one or more unfilled lines, fewer faculty than five years ago, and a reliance on general dentists.
2. Nearly half of programs report patient pools with inadequate oral disease to provide predoctoral students with sufficient experiences to achieve program competencies.
3. On average, predoctoral pediatric dentistry programs teach students to treat children four years of age and older, who are generally well behaved and have low levels of caries.
4. Predoctoral pediatric dental program patient pools are composed predominantly of children from low-income families.

The good news is that practitioners are taking care of children. The bad news is that they are not taking care of all types of children. We in dental education are at a fork in the road and have to decide whether to take on the challenge of teaching general dentists to care for young, behaviorally challenging, and special needs patients. Dental education has addressed access in its patient care, but is dental education to take responsibility for oral health disparities and lack of access in this country through its training mission? If we decide to do so, then it will require profound changes in our education system.

If we want our graduates to address the needs of the poor, children with high caries, very young children, and handicapped patients, we have to do something different. It may be that we can’t train all predoctoral students to do this. We may need alternative pathways such as teaching more pediatric dentistry to select groups of students who have greater interest in treating children. We may need to come to the realization that we can’t be all things to all people. The bottom line is this: we have to find ways to get general dentists to take care of these patients, or we need to produce more pediatric dentists.

REFERENCES


