

Are U.S. Dentists Adequately Trained to Care for Children?

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Abstract: For decades, dental educators have noted changes in predoctoral dental education in pediatric dentistry, beginning with shifts in patients' characteristics and their availability for dental schools. During the same period, national data exposed a lingering dental caries epidemic in U.S. children yet reported more treatment of young poor children. The professional literature suggests a reluctance of the general dental community to care for children, particularly the very young who would most benefit from a dental home. The purpose of this commentary was to weigh evidence of several decades of studies on this seeming contradiction and provide the perspectives of dental students in training, those seeking advanced pediatric dentistry education or providing it, and end-users of our educational system who employ U.S. dental graduates to care for children. The usefulness of dental education establishment indicators is also reviewed, and recommendations for improvement are proposed. (*Pediatr Dent* 2018;40(2):93-7) Received January 5, 2018 | Last Revision February 16, 2018 | Accepted February 16, 2018

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The epidemic of early childhood caries (ECC) continues in children under five years of age. The most recent estimates from the National Health and Nutrition Evaluation Survey (NHANES) indicate that ECC remains the most common infectious disease in preschool children, with 22.7 percent of children affected and disparities continuing for poor and minority children.¹ Evidence suggests that ECC, once established, is difficult to eliminate and predicts future decay later in childhood.² Costs for treating ECC are higher than those for caries in older children and adolescents, with additional expenses of emergency department care and general anesthesia adding to family and societal burdens. In spite of its growth in recent years, the specialty of pediatric dentistry cannot overcome the sheer numbers of children affected, and the general dental community remains critical to prevention and treatment of ECC.

The trail of evidence questioning the adequacy of predoctoral education in pediatric dental care is long and well-established (Table 1). McKnight et al.³ and Walker et al.⁴ noted changes in predoctoral dental student experiences beginning over 20 years ago. Subsequently, Seale and Casamassimo⁵ and others⁶ have documented problems with providing predoctoral dental students adequate experiences and procedures that prepare them to treat children in general dental practice, where most U.S. children receive care. These problems include lack of faculty, concerns about child behavior in the dental school setting, inadequate disease pools, changing demographics and disease distribution, competing curricular additions such as implantology, and difficult-to-access dental schools, to name a few.

A study by Garg et al.⁷ validated what earlier authors had noted in the academic environment: most general dentists do not see children, especially preschoolers, and one reason reported

was inadequate education in dental school. Yet, national data suggest that poor children, especially the very young, are receiving treatment,¹ with less untreated dental caries reported in that population today. This bump in services in a population seen as the most challenging and often shunned by dental schools as too behaviorally complex for training purposes begs explanation; it prompted us to begin a series of studies to characterize the status of predoctoral pediatric dental education.

Hence, the purposes of this paper were to report existing and newer evidence, in addition to the aforementioned, on the state of pediatric predoctoral education, suggest possible answers linking improved delivery of services to young children with better education, and examine lingering ethical and logistic questions as well as sources of evidence and their validity and utility.

A trail of evidence confirms the problem and raises questions. In 2013, we initiated a series of four national studies designed to assess training as a factor in dentists' seeming reluctance to treat young children and which elements of dental education contribute, if any, to a problem. The study plan involved four key groups in the educational process: (1) predoctoral program directors; (2) recent graduates pursuing advanced education in pediatric dentistry; (3) postdoctoral program directors; and (4) end-users at the patient-dentist interface using dental service organizations that employ recent graduates. Previous work over decades suggested that reduction in clinical experiences and procedures^{3,8} was a factor, yet recent literature suggested that deficiencies in dental school-based care were being addressed by community-based clinical education in some schools.⁹ Another factor implicated in the decline in skills was a shifting of accreditation standards away from the hard metrics of procedures to a softer and more general emphasis on critical thinking and non-technical aspects of care.

Our first study asked predoctoral program directors whether their graduating students were competent to care for children.¹⁰ That study identified numerous deficiencies, including areas considered essential to the care of ECC children. Most disconcerting was admission by predoctoral program directors that these students were not really competent in their

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opinion yet were graduating, having met school-specific competency measures. This seeming contradiction was explained by a set of competencies shaped by decreased clinical experiences, patient pools characterized by low disease/good behavior, and competition with other care sources more appealing to patient populations traditionally loyal to dental schools. The faculty admitted being caught in the ethical conundrum of certifying graduates competent yet not believing them.

Our next two studies had two goals: (1) ask postdoctoral students in pediatric dentistry to look back on their predoctoral education in pediatric dentistry; and then (2) ask postdoctoral program directors in pediatric dentistry about the readiness of a group of advanced training students in pediatric dentistry who should have the best preparation in caring for children. The report of these two studies¹¹ showed strong concordance between the residents and the advanced program directors on patterns of readiness and an unexpected similarity in skill weaknesses, as reported by the predoctoral program directors in the first study. All three groups identified weaknesses in pulp therapy, care of special needs patients, and pediatric restorative care, among other areas.

Some institutions, recognizing their limitations in providing meaningful services within dental schools, have chosen to place dental students in community settings. These experiences are positive in their exposure of students to a broadly diverse and representative dental patient population.¹² These efforts are not without their own challenges, which are well-described by Friedman et al. in a wide-ranging article on international medical and dental activities and include ethical challenges and limited preparedness of students.¹³

Closure on preparedness: a study of end-user employers. In 2016, we conducted an Institutional Review Board-approved study of end-user employers to determine their opinion of preparedness of recent graduates to provide care for children. We used a sample of clinical directors of managed care programs belonging to the Association of Dental Service Organizations (ADSO) from those member organizations that traditionally have hired recent graduates of U.S. dental schools. The sample was designed to provide a broad geographic and cross-sectional representation of employers who had been identified as employing recent graduates, and providing care to children by these graduates. In addition, the sample was selected so that respondents could provide information on any quality assurance programs aimed at these young graduates to improve identified issues with clinical care.

This study used a modification of a questionnaire recently reported in the dental literature^{10,11} assessing perceived competency of new dental school graduates to perform basic pediatric dentistry procedures. The 21-question survey was sent to administrative leaders of selected respondent organizational members of the ADSO between January and July, 2016, with a request for completion or referral to the appropriate organization representative for completion. An additional e-mailing followed approximately two months after the second mailing to capture additional respondents.

Data were analyzed using appropriate descriptive statistics, and the aggregate responses from this survey were compared to those received from educational sources in the referenced studies.^{10,11} A series of six questions asked the dental service organization (DSO) respondents to describe the level of preparedness among newly graduated general dentists working in their facilities. They were asked to rate as adequate (AP), neither

Table 1. SELECTED STUDIES ADDRESSING INADEQUACIES IN PREDOCTORAL PEDIATRIC DENTAL EDUCATION OVER THREE-AND-A-HALF DECADES

Year	Authors	Comment
1980 ²²	Abrams RG	Increases in class size, alternatives to care, increase in fees, and time constraints noted to affect patient supply.
1983 ⁸	McTigue DJ, Lee MM	Reports patient shortages affecting predoctoral dental education.
1986 ²³	Ripa LW	Notes a decrease in pediatric dental experiences for dental students.
1986 ²⁵	Bell RA, Barenie JT, Myers DR	Notes a decrease in pediatric dental experiences for dental students.
1994 ²⁴	Rodd HD	Notes the decline of pediatric dentistry predoctoral experiences.
1996 ³	McKnight-Hanes, Myers DR, Russell CM, Barenie JT, et al.	The procedures required by dental students declined over time in this 15-year retrospective.
1999 ⁴	Walker JD, Pinkham JR, Jakobsen J	Notes a decline in procedures in a predoctoral dental clinic.
2003 ⁵	Seale NS, Casamassimo PS	Notes decline in patient numbers and experiences.
2005 ²⁶	Lekic P-C, Sanche N, Odum O, deVries J, Wiltshire WA	Increasing student clinical experiences resulted in fewer referrals to pediatric dentists in classes graduating after changes were instituted.
2006 ²⁷	Rich JP, Straffon L, Inglehart MR	Approximately two thirds of general dentists indicated that their predoctoral clinical education had not trained them adequately to treat children.
2015 ¹⁰	Casamassimo PS, Seale NS	Addresses decline in patient pools for predoctoral education and its effects.
2015 ¹¹	Rutkauskas JS, Seale NS, Casamassimo PS, Rutkauskas JS, II	Provides support for inadequacies in predoctoral education from faculty and pediatric dentistry residents.
2016 ⁶	Nainar SMH	Addresses longstanding inadequacies and makes proposals for predoctoral education.
2017 ¹⁷	Formicola A	Notes that dental school patient pools do not provide the learning needed to develop skills.

Table 2. COMPARISON OPINIONS OF PREDOCTORAL PROGRAM DIRECTORS (PPD), FIRST-YEAR PEDIATRIC DENTISTRY RESIDENTS (FYR), POSTDOCTORAL PROGRAM DIRECTORS (PD), AND DENTAL SERVICE ORGANIZATION RESPONDENTS (DSO) ON PREPAREDNESS OF RECENT GRADUATES TO PROVIDE PEDIATRIC DENTAL SERVICES*†‡

Total number of respondents returning surveys													
	PPD N=49	FYR N=159	PD N=58	DSO N=14	PPD	FYR	PD	DSO	PPD	FYR	PD	DSO	
	Adequately prepared (AP)				Neither adequately nor inadequately prepared (NAIP)				Inadequately prepared (IP)				
Reported as a percentage of those responding to the question													
<i>Prevention</i>													
Topical fluoride	---	91	86	90	---	7	9	10	---	3	5	---	---
Infant oral exam	71	47	32	30	---	16	33	20	29	27	35	50	---
Exam 1- to 3-year-old	---	49	39	20	---	16	29	30	---	29	32	50	---
Sealants primary teeth	98	59	51	30	---	20	37	30	2	14	12	40	---
Sealants permanent teeth	98	90	86	80	---	6	11	20	2	4	4	---	---
Diet counseling	---	73	40	30	---	15	32	40	---	11	28	30	---
<i>Behavior management</i>													
Tell-show-do	98	80	61	50	---	9	23	40	2	11	16	---	---
Voice control	39	39	23	30	---	23	28	40	61	27	49	30	---
Parent present	---	51	49	---	---	19	25	---	---	19	26	---	---
Immobilization	18	33	17	20	---	15	21	40	82	23	62	40	---
<i>Restorative dentistry</i>													
On 1- to 3-year-olds	---	32	11	---	---	19	30	30	---	31	60	70	---
2-surface amalgam primary tooth	92	58	35	20	---	19	33	30	8	13	32	50	---
2-surface composite primary tooth	92	68	41	50	---	15	33	50	8	13	26	---	---
Preventive resin restoration	--	68	75	50	---	16	18	30	---	11	7	20	---
Atraumatic restorative treat	--	40	32	20	---	21	30	60	---	21	38	20	---
Stainless steel crown	59	42	17	10	---	26	29	60	41	29	53	20	---
<i>Primary tooth pulp therapy</i>													
IPC-primary teeth	57	48	25	25	---	13	34	38	43	24	41	37	---
Direct pulp cap	57	34	20	13	---	15	35	62	43	21	46	25	---
Pulpotomy	57	45	13	62	---	19	23	25	43	33	64	13	---
<i>Sedation and anxiolysis</i>													
Nitrous oxide	63	61	41	75	---	10	27	25	37	22	32	---	---
Oral sedation	---	13	4	---	---	8	14	37	---	26	82	63	---
N2O + sedation	---	15	4	---	---	6	13	25	---	25	84	75	---
<i>Surgery</i>													
Extract primary tooth on a 1- to 3-year-old	---	41	24	12	---	18	28	38	---	21	49	50	---
Extract primary tooth on a 4- to 12-year-old	---	68	55	50	---	15	27	50	---	11	18	---	---
Extract permanent teeth	---	78	68	75	---	14	23	12	---	7	9	13	---

* --- = no responses available.

† Totals across table for a survey do not equal 100 percent because of partial answers by respondents.

‡ Data are excerpted from the following referenced studies: PPD=Casamassimo PS, Seale NS. Adequacy of patient pools to support predoctoral students' achievement of competence in pediatric dentistry in U.S. dental schools. J Dent Ed 2015;79(6):644-52. FYR, PD=Rutkauskas J, Seale NS, Casamassimo PS, Rutkauskas JS. Preparedness of entering pediatric dentistry residents: advanced pediatric dentistry directors' and first-year residents' perceptions. J Dent Educ 2015;79(11):1265-71.

adequate nor inadequate (NAIP), or inadequate (IP) how well-prepared these new graduates were to practice in six specific areas of pediatric dentistry: (1) prevention; (2) behavior management; (3) restorative; (4) pulp therapy; (5) sedation; and (6) surgery. Table 2 indicates responses to this last study, described earlier (in gray highlight), and those of three earlier respondent groups for comparison.

For this commentary, we chose to report these most recent study findings in the context of our previous studies to emphasize consistency across the dental education and care system, particularly on the production side of the equation. Table 2 suggests some consistencies as well as differences across the four respondent groups; initial providers of pediatric education seem most optimistic, but consumers of advanced education (residents), super-users in advanced education (postdoctoral directors), and marketers of services to the public (DSOs) seem less supportive. Readers are encouraged to make their own judgment, as respondent numbers and design differences prevent a pure apples-to-apples comparison. The sets of respondents seem to agree that basic services were within the skill set of recent graduates, but DSO respondents were not as convinced as the others. This corresponds with the DSO respondents volunteering that upgrading basic skills in pediatric dentistry was a part of their quality improvement agenda for new employees (non-tabulated comments). Postdoctoral program directors and DSO respondents seemed somewhat hesitant to attribute new graduates skills in anything other than basic behavioral guidance, which supports the suggestion that schools seek out cooperative child patients. Restorative assessment followed a similar pattern, with the postdoctoral directors and DSO respondents less willing to attribute adequate preparation to recent graduates, particularly for more complicated restorative care. Pulpal therapy seemed to follow diagnostic rather than therapeutic concerns, suggested by a reluctance to recognize indirect capping but acknowledging pulpotomy skills. Surgery readiness seemed to also follow patterns related to patient age and perceived behavior challenges.

Is there a need for change? A most recent assessment of this area by dental education would say yes.¹⁴ So, how does dental education measure adequacy of the educational effort? Accreditation remains the primary determinant of adequacy; however, as stated earlier, current predoctoral training standards may have diluted technical assessment and opted for more general competencies, and each dental school has the freedom to define student readiness.¹⁵ The self-assessment of competency has the advantage of allowing schools a degree of freedom in tailoring competency with experiences available that are perceived as relevant. A disadvantage is the possibility of setting a low bar, as suggested by the results of recent studies (Table 2).

The American Dental Education Association exit survey of graduating senior dental students suggests that they are confident in the amount of training in pediatric dentistry, but it begs the question of “how would they know”; additionally, other data in that report suggest that care of diverse and challenging populations is not a priority of students.¹⁶ Examinations designed to test knowledge for licensure are weak on pediatric dentistry in areas of knowledge assessment and clinical testing with patients. The evidence to support adequacy of predoctoral pediatric dental education seems to reside in the system’s established metrics, which are in conflict with studies cited here. More telling, perhaps, is the very recent assessment made by a select and impartial panel taking a contemporary look at

dental education. The 2017 Advancing Dental Education in the 21st Century Project identifies pediatric predoctoral education as an area in need of improvement.¹⁷

Why change? Dentistry is undergoing significant transformation. Data from the American Dental Association’s Health Policy Institute show that children’s dental visits are increasing, particularly in the Medicaid population.¹⁸ In our studies, we asked respondents about the readiness of graduates to handle concentrations of ECC in poverty. Responses were guarded if not skeptical. In the case of the DSO respondents, a group often engaged in the care of underserved children, we found (data not tabulated) that recent graduates’ preparedness to treat very young children six months to three years old was rated AP by 12 percent, NAIP by 38 percent, and IP by 50 percent. Treating children with moderate caries (three to six teeth) was rated AP by 50 percent, NAIP by 37 percent, and IP by 13 percent. Treating children with severe caries (more than six teeth) was rated AP by 25 percent, NAIP by 25 percent, and IP by 50 percent. No threshold exists for these measures, but it appears that, in several of these case categories, only half of graduates leave with necessary skills; this raises ethical questions across many poles, ranging from access to patient care to return on investment for highly indebted students.

Adequacy of training to care for special needs patients paralleled that of the poverty-based population. Preparedness to care for children with medical compromise, cerebral palsy, or intellectual differences was rated inadequate by 87 percent of DSO respondents. These results were similar to the opinions of our other three study groups, posing additional ethical questions about new graduates’ ability, since the general dental community is supposed to assume care of special needs patients as they age out of pediatric dental care.¹⁹

What can be done to improve the readiness of dentists to care for children? Casamassimo and Seale²⁰ propose that a first step is to move beyond the dental school and truly integrate the pediatric dentistry curriculum into a community-based and institution-based hybrid that provides the best offerings of both. This is the education model that has served medical education well for well over a century. They also recommend that traditional institutions consider closer ties with dental service organizations, community-based programs like federally qualified health centers (FQHCs), and other organizations that have addressed many of the considerations related to provision of care associated with ethical challenges.¹³ The Advancing Dental Education in the 21st Century report identifies dental education’s limited contribution to the safety net¹⁴; consequently, moving in this direction would improve predoctoral education as well as the stature of dental education within the oral health care community.

In the case of standards for dental education and their role, the loosely based competency model to which the current standards conform does not support significant exposure to pediatric dentistry. Standard two, which outlines the requirements for educational experiences, does not expressly mention the need to pay particular attention to pediatric dentistry but simply suggests competency to **treat** patients in all stages of life.¹⁵ The current standards may have strayed too far to the conceptual—such as critical thinking—and away from the practical and real hands-on care of diverse and challenging populations of children. With the societal recognition of distinct age groups with specific medical, psychological, dental,

and other needs (such as the geriatric, the developmentally impaired, and infants) it may be time for dental education to focus **on specific techniques** rather than dilute and homogenized patient care.

Table 1 lists numerous reports over almost 40 years that have identified or addressed declining predoctoral pediatric education. The consistency of respondents (Table 2) and the supporting data from these numerous studies (Table 1) should suggest closer investigation of the adequacy of pediatric dental predoctoral education now and in the future.

Conclusions

This report aimed to review previous and contemporary studies testing the adequacy of predoctoral dental education. We felt it was important to report the consistency of these current studies along with the trail of declining quality and quantity of student experiences documented over several decades. Continued deterioration of predoctoral education in pediatric dentistry may endanger children, weaken the dental care system, and ultimately bring to adulthood a population not only demonstrably less likely to seek care²¹ but with poorer oral health and greater oral health needs than previous generations.

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