



# A survey of private pediatric dental practices in North Carolina

Tegwyn Hughes, DDS James W. Bawden, DDS, MS, PhD

*Dr. Hughes is a pediatric dental resident and oral epidemiology fellow and Dr. Bawden is the Alumni Distinguished Professor, Department of Pediatric Dentistry, School of Dentistry, University of North Carolina—Chapel Hill, Chapel Hill, North Carolina.*

## Abstract

**Purpose:** In response to concerns about current and future demands for specialized pediatric dental care in North Carolina, a survey of private pediatric dental practices was conducted.

**Methods:** Data were collected on the demographics and other practice variables. Information was also collected on the ages, caries activity, Medicaid status, estimated treatment needs, fluoridation status, and location of residence (urban/rural) of all new patients seen in each practice during three designated, consecutive days in November 1996.

**Results:** The survey response rate was 76%. The data indicated that most pediatric dentists in North Carolina are quite busy. A total of 519 new patients were seen during the three-day survey period. The mean age was 4.7 years and 22% had advanced caries. Forty seven percent were caries free. Most of the disease was found in the primary dentitions of young children.

**Conclusions:** The findings indicate that the specialized pediatric dental care system in North Carolina is operating close to its capacity and is overtaxed in many areas of the state. (*Pediatr Dent* 21:104–108, 1999)

In lieu of the changes made by Congress to improve the health care of uninsured or underinsured children, there are many issues with which to contend regarding access to and delivery of care for a possibly increasing number of children who may receive oral health benefits. These changes have empowered individual states to make their own health benefit and coverage decisions through the Children's Health Insurance Program (CHIP). This underscores the importance of awareness needed by the private practice sector to optimize the delivery of oral health care to children in their state.<sup>1</sup>

In late 1996, information was gathered informally from the pediatric dentists in North Carolina to evaluate the demand for specialized pediatric dental care in the state. Results suggested that a significant number of practitioners in the state were having difficulty meeting the demand for care presenting in their practices. In addition, a relatively high percentage of the children seen in these practices had serious dental disease. This reinforced the concern that the pediatric dental care system in the state was, in certain areas, unable to meet the dental care demands of the population. Concurrently, the clinics at the Department of Pediatric Dentistry at the University of North Carolina have in recent years experienced lengthy appointment waiting lists and a continuous flow of emergency

patients. A comparison of clinical procedures over a 4-year period (1992–1996) showed a significant increase in the number of pulpotomies, stainless steel crowns, extractions, and other procedures associated with more severe caries in the primary dentition of a younger age group.<sup>2</sup> These findings have created concern regarding the demographics of the pediatric dental care system, patterns of disease presenting in the private sector, and how the expansion of oral health benefits to

Fig 1. Data Collection Form: Private Pediatric Dental Practices

1. I practice alone \_\_\_\_.  
I practice with other dentist(s) \_\_\_\_.
2. I am located in a city with a population of :  
more than 100,000 people \_\_\_\_.  
50,000–100,000 people \_\_\_\_.  
less than 50,000 people \_\_\_\_.
3. I practice \_\_\_\_ days, \_\_\_\_ hours a week.
4. I feel that I am:  
not busy enough \_\_\_\_.  
about as busy as I want to be \_\_\_\_.  
too busy \_\_\_\_.
5. Do you feel that another pediatric dentist is needed in your area?  
Yes \_\_\_\_  
No \_\_\_\_
6. Do you feel that you are seeing significantly more children with extensive caries now than you did 6 or 7 years ago?  
Yes \_\_\_\_  
No \_\_\_\_
7. Do you regularly accept new patients with Medicaid assistance?  
Yes \_\_\_\_  
No \_\_\_\_  
If yes,  
Do you limit the number of new patients with Medicaid assistance you accept?  
Yes \_\_\_\_  
No \_\_\_\_  
About how many new patients with Medicaid assistance do you accept each month? \_\_\_\_  
Do you feel that the children with rampant caries are largely confined to the population with Medicaid assistance?  
Yes \_\_\_\_  
No \_\_\_\_
8. How long must a new patient wait to get a regularly scheduled appointment in your office? \_\_\_\_

**Fig 2. Data Collection Form: New Patients in Private Dental Practices**

1. How many patients were "scheduled new patient exams" \_\_\_.
2. How many new patients were seen today \_\_\_.
3. How many new patients were emergencies \_\_\_.
4. How many new patients were referrals \_\_\_.
5. Patient number \_\_\_.
6. Child's age \_\_\_.
7. Medicaid assistance status  
Yes \_\_\_.  
No \_\_\_.
8. Record the amount of caries:  
-No caries-0  
-Minor caries (small pit and fissure)-1  
-Moderate caries (moderate pit and fissure and/or small smooth surface)-2  
-Advanced caries (large lesions)-3
9. Of new patients with "advanced caries", was the decay mostly in the:  
Primary dentition \_\_\_.  
Permanent dentition \_\_\_.  
Mixed dentition \_\_\_.
10. Fluoride status of new patient's drinking water.  
Fluoridated water \_\_\_.  
Nonfluoridated water \_\_\_.  
Fluoride water status unknown \_\_\_.
11. Residence of new patient.  
Patient lives in town \_\_\_.  
Patient lives in rural area \_\_\_.
12. Practitioner's best estimate of number of procedures required to treat new patient.  
Pulpotomies \_\_\_.  
Stainless Steel Crowns \_\_\_.  
Extractions \_\_\_.

uninsured children may influence access to care for children in North Carolina.

Most estimates of disease come from national surveys such as the National Health and Nutrition Examination Survey (NHANES) school screenings, and publicly funded clinics. National surveys such as NHANES III, indicate that caries rates in children are not changing significantly, with 62% of children ages 2-9 being caries-free.<sup>3</sup> However, it is more difficult to access the burden of disease at a local level.<sup>4</sup> Information on the demographics and various characteristics of the pediatric dental care system at the local level is also limited.

The present study attempts to describe the demographics and to make estimates of the level of disease in the new patient population of private pediatric dental offices in a single state. The information, when put in context with other relevant data, is unique and useful in gaining better insight to the problems confronting a critical component of the pediatric dental care system in North Carolina and in planning for the impact of new initiatives.

## Methods

The study was approved by University of North Carolina School of Dentistry Committee on Investigations Involving Human Subjects. The questionnaire was pretested on a convenience sample of practitioners and revised to correct questions that were unclear or of limited value. The survey was presented on two one-page forms, designated as form A and form B. Form A (Fig 1) included questions about demograph-

ics of the practice, business, perceived trends in caries patterns, and treatment of patients with Medicaid assistance. Form B (Fig 2) was designed to collect information about new patients seen in the respective practices on three specific days in November 1996. One form was completed for each of the designated days of the study. Data were sought concerning numbers of new patients seen, level of dental disease seen in these patients, fluoridation status of the individual patients, rural or urban setting of the home, and the estimated collective treatment needs of the new patients seen on each of the three days. It was also of interest to learn if the new patients were emergency visits. If the participant did not practice on one or more of the designated days, they were asked to record data on form B from the first succeeding three consecutive days they saw patients. The forms were accompanied by a cover letter explaining the intent of the study and provided instructions on completion of the forms. An enclosed card was returned indicating the practitioner's willingness to participate in the study.

The survey was sent to all pediatric dentists known to be active in private practice in North Carolina. The list was compiled from membership directories of the American Academy of Pediatric Dentistry, and the North Carolina Dental Society, and from State licensure records. Because of the relatively small and stable population of pediatric dentists in the state, it was considered likely that all of the practitioners were known to the faculty at the School of Dentistry and that no practitioners were overlooked. Participants were asked to return the survey within three days after the last day of patient data collection. All surveys were coded numerically to confirm receipt of the data. Follow-up letters were sent to those individuals from whom information had not been received within the expected period of time. Once surveys were received, codes were removed and participants could no longer be individually identified.

Descriptive statistics were used to summarize the data. Associations among selected variables were evaluated by means of the SAS software package (SAS Institute Inc., version 6.12).<sup>8</sup> As agreed when participation was requested, preliminary results of the survey were mailed to the participants in March 1997.

## Results

Forty-five practitioners were identified as active in the practice of pediatric dentistry in North Carolina. Seventy-six percent of the dentists completed the survey. Forty-four percent of the respondents were in solo practice while the remaining 56% were associated with one or more pediatric dentists or other dental practitioners. The mean number of hours practiced a week was 33.9 ( $\pm 0.82$  h). Eighteen percent felt that they were not busy enough, 52% were about as busy as they wished to be, and 30% felt that they were too busy. The mean waiting time for a non-emergency new patient examination was 10 ( $\pm 2.3$ ) weeks. Fifty percent felt that another pediatric dentist was needed in their area.

Twenty-nine percent of the respondents felt that they were seeing more untreated decay than they did six or seven years ago. Those practitioners who lived in communities with greater than 100,000 people were more likely to feel that they were seeing more caries ( $P=0.021$ ). Forty-seven percent of the respondents accepted patients with Medicaid assistance, but

**Table 1. Practice Data**

Practice type	Solo practice 44%	Practice with > 1 dentists 56%	
Level of Business	Not busy enough 18%	Sufficiently busy 52%	Too busy 30%
Practice Area Population	> 100,000 52%	50,000–100,000 30%	< 50,000 18%
Another Pediatric Dentist needed in the area	Yes 50%	No 50%	
Seeing more untreated decay	Yes 29%	No 71%	
Accept patients with Medicaid assistance	Yes 47%	No 53%	
Hours practiced per week*	33.9±0.8		
Waiting time in weeks for "new patient exam"	10.0±2.3		
Number of patients with Medicaid assistance accepted per month	21.5±27.4 (Range 1–120)		
Practitioner seeing "more caries"	Pop.>100,000	Pop.<100,000	x <sup>2</sup>
	86%	14%	P=0.021

\* Mean ± SD

100% of these practitioners limited the number of such patients they see to some extent. The number of patients with Medicaid assistance accepted per month ranged from 1 to 120 with a mean of 21.5 (±27.4) patients. There was no association between how "busy" the practitioner reported to be and whether or not they accepted patients with Medicaid assis-

tance. There was no significant relationship between the population of the area in which they practiced and the acceptance of patients with Medicaid assistance. Data collected from Form A is summarized in Table 1. The respondents recorded a total of 519 new patient exams during the days surveyed with a range of 3 to 39 new patients recorded for each practitioner. The mean age of the children was 4.7 (± 2.9) years with a range of 1 to 17 years. Of these, 11% were scheduled as emergencies and 21% were classified as patients with Medicaid assistance. Two-thirds of the patients were recorded as living "in town", with 64% of the patients having fluoridated water in their homes. Thirty-four percent of the patients reported as having nonfluoridated water with the majority of those living in rural areas. Forty-seven percent of the children examined had no caries, 18% had minor caries, 12% had moderate caries, and 22 % had advanced caries. In the latter group, 38% were patients with Medicaid assistance of whom 56% lived in fluoridated areas (44% non-fluoridated) and 58% lived in town (42% rural). Of the 111 patients reported to have advanced caries, 94% of the caries was found in the primary dentition. Those patients that had detectable caries were four times as likely to be pa-

**Table 2. Patient Data**

Patients screened	N=519			
Percent of screenings that were emergencies	11%			
Child's age*	4.7±2.9			
Patient referrals per pediatric dentist	2.67			
Patient Medicaid assistance status	Yes 21%	No 79%		
Fluoride status of drinking water	Fluoridated 65%	Non-Fluoridated 34%	Unknown 1%	
Residence of patient	Town 66%	Rural 34%		
Amount of Decay	No Decay 47%	Minor Decay 18%	Moderate Decay 12%	Advanced Decay 22%
Dentition with "advance decay"	Primary 94%	Permanent 5%	Mixed 1%	
Procedures estimated to treat new patients with decay: N=270	Pulpotomies N=285	Stainless Steel Crowns N=456	Extractions N=228	

\* Mean ± SD

tients with Medicaid assistance (Mantel-Haenszel Odds Ratio=3.7, 95% CI [2.3, 6.0]). Thirty-one percent of the children with Medicaid assistance had treatment needs beyond simple restorative procedures. The seriousness of the disease in the advanced caries group is illustrated by the number of pulpotomies (285), stainless steel crowns (456), and extractions (228) estimated to be needed by these children. A mean of 2.67 patients per practitioner were referred by another dentist. Table 2 summarizes the patient-based data collected on Form B.

## Discussion

A significant but undefined amount of dental care is provided to North Carolina children by general practitioners in the state. A separate study is to be undertaken to estimate the amount and kind of dental care provided to North Carolina children by general practitioners. The current study focused only on the specialty pediatric dental care system as a critical segment in the state's system of dental care providers. It is a segment of the system where a significant number of very young children with advanced dental disease, handicapping conditions, and other circumstances that complicate dental care receive treatment. The relative accuracy and usefulness of the type of survey used in this study has been documented.<sup>8,9</sup> The use of three designated days for data collection is an accepted method of randomizing the day-to-day variations that occur in practice activity and to avoid possible bias that may have been introduced if practitioners were allowed to select the three days of data collection<sup>8</sup>.

The survey results included 76% of the practitioners known to be active in the private practice of pediatric dentistry in North Carolina. This was a relatively high response rate, suggesting that the findings of this study were representative of North Carolina's privately practicing pediatric dentists. It also indicates that there was considerable interest in the practitioner group in obtaining information about the issues addressed in the survey.

While only 30% of the respondents indicated that they were too busy, the mean waiting time for a nonemergency new patient examination was ten weeks, suggesting that the typical practice was very busy. This perception is re-enforced by the fact that 50% felt that another pediatric dentist was needed in their area.

Medicaid fees have been deemed unrealistically low in North Carolina and there is a perceived problem of access to care for some of the patients with Medicaid assistance. Nevertheless, 21% of all new patients seen had Medicaid assistance. In the case of the respondents who stated that they accepted patients with Medicaid assistance, it was noted that most of the patients were being seen by a relatively small number of practices that were organized to see numerous patients with Medicaid assistance during selected times of the week.

With a mean age of 4.7 years, the new patients seen by North Carolina pediatric dentists were typically quite young and the patients with "advanced caries" were concentrated in this age group. Ninety-four percent of the advanced caries in children with untreated decay were found in the primary dentition, again bringing the focus of disease on the preschool age or kindergarten children. Forty-seven percent of the children seen were reported to be caries-free. These data are of interest when viewed in the context of data collected from a state screening of 80% of North Carolina's kindergarten children

in 1996.<sup>8</sup> Sixty-two percent of those children were designated as caries-free. The data were collected under field conditions and are known to be an overestimate of the true caries-free population.<sup>6</sup> In the state screening of kindergarten children, 38% were reported as having caries, an underestimate of the true caries prevalence,<sup>6</sup> while 53% of all the children seen in the present study had caries. The sample in this study was biased in respect to the percentage of children with caries, due to the fact that they were seeking care in a pediatric dental office. These two data sets collected on North Carolina children suggest that caries rates in North Carolina maybe significantly higher than levels reported in some national studies.<sup>5,7</sup> One reason for this difference is that some of the nationally based studies did not record caries in the primary dentition where the advanced caries problem appears to be most severe in the North Carolina child population. Caries in children, continues to be an important public health issue in North Carolina.

In addition, the findings reported here indicated that the majority of pediatric dentists in North Carolina were quite busy and that at least 30% of them were having difficulty meeting the demand for care in their locality. The number of North Carolina children being seen by general dentists is unknown, but the system for the delivery of specialized pediatric dental care is currently overtaxed in certain locations in the State. In 1993; the number of pediatric dentists per 100,000 children was 3.4, one of the lowest ratios in the United States.<sup>1</sup> The number of actively practicing pediatric dentists in the state apparently has not increased since then, and projections indicate that it will be difficult to keep the ratio from becoming more unfavorable in the future.<sup>4</sup> These collective observations and projections support the concern that the problem of insufficient access to specialty care for North Carolina children will become even more severe. This situation requires further study to define the problem concerning untreated decay in younger children, especially in light of impending changes in federally funded dental care programs for children in North Carolina. The need for new interventions to reduce the prevalence of caries in young North Carolina children seems clear. The concerns identified in this study may apply to other states with similar demographic and socioeconomic characteristics.

## Conclusions

The results of this survey indicate that the specialty pediatric dental care system in North Carolina is experiencing difficulties in meeting the demand for dental care. It is clear that the most serious dental disease observed by pediatric dentists in the state is seen in the primary dentitions of young children.

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## References

1. Waldman BA: Pediatric dentistry and national health insurance: A more than favorable opportunity. *ASDC J Dent Child* 61:361-364, 1994.

2. University of North Carolina Dept. of Pediatric Dentistry, McIver FT (unpublished data) 1996.
3. Kaste, LM et al: Coronal Caries in the Primary and Permanent Dentition of Children and Adolescents 1–17 Years of Age: United States, 1988–1991. *J Dent Res* 75:631–641, 1996.
4. Waldman BA: Planning for the children of your current pediatric dental patients. *ASDC J Dent Child* 62:418–425, 1995.
5. King RS et al. Division of Dental Health North Carolina: NC Calibrated Screening Data 1996–97, Conference Report.
6. Long LM, Rozier RG, Bawden JW: Estimation of actual caries prevalence and treatment needs from field survey information on a child population in the U.S.A. *Community Dent Oral Epidemiol* 7:322–329, 1979.
7. Burt BA: Trends in caries prevalence in North American children. *Int Dent J* 44:403–413, 1994.
8. DeFriesse GH, Konrad T: The dental office practice productivity study: methodology, in planning for dental care on a statewide basis. Bawden J, DeFriesse GH. Eds. Chapel Hill; The Dental Foundation of North Carolina, pp 85–89, 1981.
9. Bader JD, Rozier RG: Children's Dental Treatment in General and Pedodontic Practices. *J Pediatr Dent* 6:139–144, 1984.

## ABSTRACT OF THE SCIENTIFIC LITERATURE



### PRILOCAINE-PHENYLEPHRINE TOPICAL ANESTHESIA FOR REPAIR OF MUCOUS MEMBRANE

In this prospective, randomized, blinded trial that compared the effectiveness of prilocaine-phenylephrine (Prilophen), a new topical anesthetic that does not contain codeine, to that of lidocaine infiltration during repair of lacerations on or near mucous membranes in children when used in an emergency department (ED) setting.

In this ED, a combination of topical tetracaine, adrenaline, and cocaine (TAC) is routinely used as an anesthetic agent during dermal laceration repair. However, serious adverse reactions, including seizures and death, can occur if the solution comes into contact with mucous membranes and a sufficient amount of cocaine is absorbed.

Prilphen is comprised of prilocaine local anesthetic and phenylephrine, a vasoconstrictor. Forty children one year of age or older with a laceration of 5 cm or less in length on or near a mucous membrane were randomly assigned to one of two anesthetic treatment groups. One group received 3.56% prilocaine with 0.1% phenylephrine (Prilphen) topically and the other group received 1% lidocaine infiltration.

As an outcome measure, pain during suturing was scored by five different individuals using a visual analog scale (VAS). The performance of Prilophen was rated by two of the observer groups as statistically inferior to that of lidocaine infiltration; however, the differences in pain scores were small and may not be clinically significant.

**Comment:** This study is important for its documentation of a topical anesthetic used in the ED. If we asked to use it for our dental trauma cases, knowledge of the results of this study seem to indicate that lidocaine infiltration may be as good or better. LPN

Smith GA, Strausbaugh SD, Habeck-Weber C, Cohen DM, Shields BJ, Powers JD: Prilocaine-phenylephrine topical anesthesia for repair of mucous membrane lacerations. *Ped Emerg Care* 14: 324-328, 1998.

*Reprint requests to: Gary A. Smith MD DrPH; Division of Emergency Medicine; Children's hospital; 700 Columbus Drive; Columbus OH 43205*

38 references