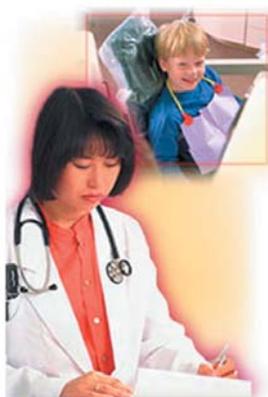


## Survey of Dental Prophylaxes Rendered by Pediatric Dentists in New England

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### Abstract

**Background:** The objective of this anonymous postal survey was to assess the provision of dental prophylaxis by pediatric dentists in New England.

**Methods:** The questionnaire survey was sent by first class mail in September, 2001 to all 217 American Academy of Pediatric Dentistry (AAPD) members in active private practice in the six New England States of Connecticut, Massachusetts, Maine, New Hampshire, Rhode Island, and Vermont. A self-addressed, stamped envelope was provided to facilitate the returned response.

**Results:** The survey had a response rate of 70%. Most practitioners (93%) routinely recommended dental prophylaxis for their recall patients. The proportion of practitioners who considered the following indications for recommending dental prophylaxis was: plaque, stain, and/or calculus removal – 99%; caries prevention – 75%; prior to topical fluoride application - 82%; prior to sealant application - 58%; and for behavioral modification - 68%. Almost two thirds of the practitioners (62%) defined dental prophylaxis as referring to both rubber cup pumice prophylaxis as well as to toothbrush prophylaxis. However, only one in four practitioners (26%) had modified her/his clinical practice to substitute toothbrush prophylaxis in lieu of rubber cup pumice prophylaxis.

**Conclusion:** Pediatric dentists in New England routinely provide dental prophylaxis to their recall patients.

**Keywords:** Dental prophylaxis, New England, pediatric dentist, caries prevention

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## Introduction

Dental prophylaxis has a long historical tradition in clinical practice with its first recorded mention being made by Paul of Aegina in the seventh century.<sup>1</sup> In contemporary dental practice, rubber cup pumice prophylaxis has become ubiquitous for caries prevention



ever since Knutson in 1948 advocated it prior to professional topical fluoride application.<sup>2</sup> The American Academy of Pediatric Dentistry (AAPD) lists the following "indications for a dental prophylaxis, including:

1. Removal of plaque from teeth
2. Removal of extrinsic stains from teeth
3. Polishing teeth after removal of calculus
4. Facilitation of a thorough clinical oral examination
5. Education and introduction of the child to dental procedures.<sup>3</sup>

In contemporary preventive dental practice, rubber cup prophylaxis has been de rigueur for children presenting for recall dental examinations. It has been part of the three-procedure preventive protocol consisting of oral examination, dental prophylaxis, and professional topical fluoride application provided to all children during six-month recall dental visits.<sup>4</sup> A study of 15-year (1980-1995) utilization patterns of dental care by privately insured patients in Michigan showed there has been a steady increase in the average number of dental prophylaxes per child with the number approaching two per annum.<sup>5</sup> The increasing role of prevention and of dental prophylaxis in clinical practice has been reflected in numerous assessments.

Analysis of data from the 1996 Medical Expenditure Panel Survey "showed that the percentage of children that received a diagnostic and preventive service was higher than any other type of service, regardless of age, gender, race/ethnicity, or poverty status."<sup>6</sup> The American Dental Association data has shown the percentage of dental patients receiving prophylaxes doubled from 19% to 39% during the period 1959-1990.<sup>6</sup>

Increasing importance of the preventive dollar for clinical practice revenue is emphasized by an analysis of 1980-1995 dental income from privately insured patients in Michigan which demonstrated that while the per-child inflation-adjusted total income declined during the period, the income drawn from examinations, prophylaxes, and topical fluoride treatments increased during the same period.<sup>7</sup> Prophylaxes alone accounted for 50% of the preventive dollar in these Michigan children.<sup>7</sup>

Given the predominant role of dental prophylaxis in preventive dental practice, information regarding its use for New England children has not been reported in the literature. The National Survey of Dental Caries in U.S. School Children: 1986-1987, reported children in the New England region had the highest mean DMFS of 3.6 ( $\pm$  0.19 SE) in the nation.<sup>8</sup> Pediatric dentists likely provide a significant share of dental services to New England children since the 2002 AAPD Foundation and Oral-B Checkup on Children's Oral Health Study reported, based upon national data, that about half of the children who visited a dentist saw a pediatric dentist.<sup>9</sup> Therefore, the objective of the present survey was to assess the provision of dental prophylaxis by pediatric dentists in New England.

## Materials and Methods

An anonymous survey was conducted in the six New England States of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. The study was approved (review: exempt) by the Institutional Review Board of The University of Connecticut Health Center. The list of pediatric dentists in active private practice in New England was culled from the AAPD's 2000-2001 Membership Directory. (The membership of the AAPD is estimated to represent 94% of pediatric dentists in active practice; John S. Rutkauskas, Executive Director of the AAPD, written communication, September 2002). In September, 2001, the survey questionnaires were sent to all the 217 pediatric dentists on the above list. To improve survey response, the mailing was



personalized by individually typing the dentists' names on each outgoing envelope instead of using computerized address labels, and then the envelopes were sent by first-class mail.<sup>10</sup> Each survey questionnaire was mailed along with a stamped (first-class mail) and pre-addressed return envelope.<sup>10</sup> No follow-up mailing was done.

The survey instrument consisted of closed-ended questions with preset response options to reduce "no response" to individual items and, thus, yielding a better overall completion rate.<sup>11</sup> The five-item survey measured the following aspects of dental prophylaxes rendered by pediatric dentists in New England:

1. Routine or selective recommendation of dental prophylaxis for recall patients. If selectively recommended, then the proportion of recall patients who received dental prophylaxis, i.e., <25 percent, 25 to <50 percent, or  $\geq 50$  percent.
2. Indications (Yes or No) considered for recommending dental prophylaxis: plaque, stain, and/or calculus removal; caries prevention; prior to topical fluoride application; prior to sealant application; and for behavioral modification.
3. Definition of dental prophylaxis: rubber cup pumice prophylaxis only, toothbrush prophylaxis only, or both.
4. Modification of clinical practice (Yes or No) to perform toothbrush prophylaxis in lieu of rubber cup pumice prophylaxis. If the practitioner reported modifying her/his practice, then the method of reimbursement for the toothbrush prophylaxis was determined as follows: Gratis, ADA Code 01120, or Other.
5. Two demographic characteristics of the respondent: Location of primary clinical practice: CT, MA, ME, NH, RI, or VT. Year of completion of pediatric dentistry training: 1960s, 1970s, 1980s, 1990s, or Other.

Traditionally, the term dental prophylaxis has been used to refer to rubber cup prophylaxis using pumice (prophylaxis) paste. However, anecdotal information suggests that, in light of the scientific evidence, some practitioners have modified their clinical practice and substituted rubber cup pumice prophylaxis with toothbrush prophylaxis. This change in practice pattern has been

buttressed by the AAPD endorsing that "dental prophylaxis can be performed using a (tooth) brush or rotary cup or brush."<sup>3</sup> Consequently, in contemporary clinical practice, the term dental prophylaxis has been used to refer to both rubber cup pumice prophylaxis as well as to toothbrush prophylaxis. Therefore, the survey instrument retained this ambiguity to reflect clinical practice while simultaneously attempting to ascertain specific information with regard to rubber cup pumice prophylaxis and toothbrush prophylaxis. This was done in a twofold manner by asking the respondents: their definition of dental prophylaxis and as to whether they had modified their clinical practice to perform toothbrush prophylaxis in lieu of rubber cup pumice prophylaxis.



Frequency distribution analyses and Chi Square tests were performed. Statistical significance was set at  $p = 0.05$ .

The study has the limitation that multiple survey responses obtained from within individual dental practices might have biased the results. It is plausible that decisions regarding the provision of dental prophylaxis may have been made at the practice level rather than the individual dentist level. However, this would still reflect the delivery of dental prophylaxis to children in New England.

### Results

One hundred and fifty two survey forms were returned for a response rate of 70%. The largest proportion of respondents had completed their pediatric dentistry training in the 1970s (37%), followed by those who had completed their training in the 1990s (31%), and the 1980s (24%). The respondents represented all the six New England states as denoted below:

- Connecticut = 51/64 (80%)
- Maine = 3/3 (100%)
- Massachusetts = 77/116 (66%)
- New Hampshire = 8/16 (50%)
- Rhode Island = 8/9 (89%)
- Vermont = 5/9 (56%)

(The denominator refers to the total number of practitioners surveyed in each state).

**Table 1. Demographic Assessment of Dental Prophylaxis Rendered by Pediatric Dentists in New England.**

Characteristic	Practitioner Cohort*			
	1970s (n=56)	1980s (n=37)	1990s (n=47)	Total (n=152)
<b>Definitions of dental prophylaxis :</b>				
Rubber cup pumice prophylaxis only	45%	41%†	26%	38%
Both rubber cup pumice as well as toothbrush prophylaxis	55%	57%†	74%	62%
<b>Indications for dental prophylaxis:</b>				
Caries prevention	80%	76%	68%	75%
Prior to topical fluoride application	93%	73%	75%	82%
Prior to sealant application	68%	54%	47%	58%
Behavioral modification	66%	68%	68%	68%
<b>Modification of clinical practice to substitute toothbrush prophylaxis in lieu of rubber cup pumice prophylaxis</b>	16%	24%	38%	26%

\*12 practitioners belonged to other age cohorts

†One practitioner did not respond to this question

Most of the pediatric dentists (93%) routinely recommended dental prophylaxis for their recall patients. Almost all of the practitioners (99%) considered the removal of plaque, stain, and/or calculus as an indication for dental prophylaxis. A majority of the practitioners recommended dental prophylaxis for the following indications: prior to topical fluoride application, caries prevention, behavioral modification, and prior to sealant application (Table 1).

Almost two thirds of the practitioners defined dental prophylaxis as referring to both rubber cup pumice prophylaxis as well as to toothbrush prophylaxis, while to the rest of the practitioners the term meant only rubber cup pumice prophylaxis (Table 1). However, only one-quarter of the practitioners reported they had modified their clinical practice to substitute toothbrush prophylaxis in lieu of rubber cup pumice prophylaxis (Table 1). The proportion of practitioners who recommended dental prophylaxis for the following indications, even as they persisted with the unmodified practice of rubber cup pumice prophylaxis, was: prior to topical fluoride application – 62%; caries prevention – 54%; and prior to sealant application – 43%.

The proportion of practitioners using the inclusive definition of dental prophylaxis as referring to both rubber cup pumice prophylaxis as well as to toothbrush prophylaxis increased significantly (Chi-square = 4.06;  $p = 0.04$ ) from the 1970s graduating cohort to the 1990s graduating cohort (Table 1). Similarly, a significantly greater (Chi-square = 6.90;  $p = 0.01$ ) proportion of 1990s graduating cohort as compared to the 1970s graduating cohort reported having modified their clinical practice to perform toothbrush prophylaxis in lieu of rubber cup pumice prophylaxis (Table 1). These demographic trends were somewhat reversed with regard to the indications considered for dental prophylaxis (Table 1). The proportion of practitioners who recommended dental prophylaxis for the following two indications declined significantly from the 1970s graduating cohort to the 1990s graduating cohort: caries prevention (Chi-square = 6.27;  $p = 0.01$ ) and prior to sealant application (Chi-square = 4.64;  $p = 0.03$ ).

A majority of the 26% of practitioners who had modified their clinical practice to perform toothbrush prophylaxis in lieu of rubber cup pumice prophylaxis reported they charged for the toothbrush prophylaxis using ADA code 01120.

## Discussion

Most of the practitioners in the present study routinely provided dental prophylaxis to their recall patients. The AAPD recommends “a patient-appropriate dental prophylaxis should be performed when indicated, in conjunction with oral hygiene instruction, periodic oral examination visits, and other indicated preventive care.”<sup>3</sup> Though counterintuitive, it is possible that routine provision of a dental prophylaxis in New England pediatric dental practices likely reflects the practitioners’ application of caries risk stratification. New England children have the highest regional caries experience in the nation as per The National Survey of Dental Caries in U.S. School Children: 1986-1987.<sup>8</sup> This observation of high caries activity in the New England region has withstood historical scrutiny since the Civil War, i.e., for the past 150 years or so.<sup>12</sup>

The University of North Carolina Caries Risk Assessment Study found that dentists’ personal clinical judgment of a child’s predicted caries increment was a major contributor to the risk assessment models<sup>13</sup>, and three-fourths of the practitioners in the present study considered caries prevention as an indication for dental prophylaxis. This reflects a 1982 preventive dentistry survey of U.S. dentists which concluded that practitioners emphasize oral hygiene for caries prevention.<sup>14</sup> Numerous studies in the 1970s had demonstrated a cariostatic effect for intensive rubber cup pumice prophylaxis when performed at two week to one month intervals.<sup>15-18</sup> However, following a systematic review of the cariostatic effect of rubber cup prophylaxis, it has been observed that there is “poor evidence to include (rubber cup) prophylaxis in recall dental visits strictly to prevent caries.”<sup>19</sup>

Almost all of the practitioners in the present study considered plaque, stain, and/or calculus removal as an indication for dental prophylaxis, while two-thirds of the practitioners also used it for behavioral modification. These indications were in concordance with the AAPD’s guideline on the role of prophylaxis in pediatric dentistry.<sup>3</sup> These two indications by themselves might be responsible for most of the dental prophylaxis



procedures provided to New England children in pediatric dental practices. In addition to having the highest regional caries experience in the nation, The National Survey of Dental Caries in U.S. School Children: 1986-1987 also found that the lowest proportion of caries free children (44%) was seen in New England.<sup>8</sup> It seems logical that the majority of New England children, therefore, would have more plaque accumulation as a precursor to the formation of caries lesions. Also it has been reported, as compared to general dentists, pediatric dentists perceived treating children with behavior problems as critical as treating younger children with greater caries activity.<sup>20</sup>

The routine use of rubber cup prophylaxis as a behavior modification modality in pediatric dental practices in New England would seem to logically address alleviation of child anxiety associated with restorative dental treatment in a patient population, many of whom likely require restorative therapy.

Four out of five practitioners in the present study recommended prophylaxis prior to professional topical fluoride application. It has, however, been shown that there is no cariostatic benefit in performing a rubber cup prophylaxis as compared to toothbrushing prior to professional topical fluoride application.<sup>21-23</sup> Therefore, the AAPD in its clinical guidelines on fluoride therapy notes “there is no evidence that a pumice prophylaxis is an essential prerequisite” for professional topical fluoride treatment.<sup>24</sup> Similarly, three out of five practitioners in the present study advocated prophylaxis prior to sealant application. But in vivo studies have shown undertaking pumice prophylaxis prior to the sealant procedure has no effect on sealant retention rates.<sup>25,26</sup>

It is plausible some of the reported dental prophylaxis services provided by practitioners in the present study might be due to the ambiguity of the term - dental prophylaxis. Almost two thirds of the practitioners in the present study defined dental prophylaxis as referring to both rubber cup pumice prophylaxis as well as to toothbrush prophylaxis. It cannot, therefore, be presumed all practitioners were alluding to rubber cup

prophylaxis in their responses to the individual questions since some might be referring to toothbrush prophylaxis. The routine provision of a toothbrush prophylaxis as part of positive preventive reinforcement for children at their recall visits might also be partly responsible for some of the reported delivery of dental prophylaxis. However, only one out of four practitioners reported having modified her/his clinical practice to substitute toothbrush prophylaxis in lieu of rubber cup pumice prophylaxis. The provision of a rubber cup prophylaxis is further reinforced by the following findings:

- Sixty-two percent of practitioners indicated a need for prophylaxis prior to topical fluoride application even though they persisted with the unmodified practice of rubber cup pumice prophylaxis.
- Fifty-four percent of practitioners indicated prophylaxis for caries prevention even though they had not modified their practice to substitute toothbrush prophylaxis in lieu of rubber cup pumice prophylaxis.
- Forty-three percent of practitioners indicated a need for prophylaxis prior to sealant application even though they persisted with the unmodified practice of rubber cup pumice prophylaxis.

Therefore, even though some of the practitioners might be alluding to toothbrush prophylaxis, most of them were likely referring to rubber cup prophylaxis in their responses. This may help underscore the importance of delineating toothbrush prophylaxis and rubber cup prophylaxis as distinct procedures in clinical practice rather than under the current inclusive term – dental prophylaxis.

### Discussion

It is possible parents have become used to the notion of their children routinely receiving rubber cup prophylaxis. Therefore, it is conceivable some parents may resist the practitioner's decision to not provide a rubber cup prophylaxis by demanding the service since it is a covered procedure in many third party plans. But this is likely to be a minor issue since "patients are



more likely to participate in a preventive program if their physician recommends it than if he or she does not. This influence over patients is acceptable provided that optimistically enthusiastic or pessimistically nihilistic physicians do not intentionally or inadvertently use their authority to coerce patients into decisions that they do not really think are in their best interests."<sup>27</sup>

Analyzing the prophylaxes rendered using the practitioner's age cohort provided for interesting trends (Table 1). As compared to those who had completed their pediatric dentistry training in the 1970s, the 1990s graduates showed a significant increase in two aspects:

- Practitioner definition of dental prophylaxis as referring to both rubber cup pumice prophylaxis as well as to toothbrush prophylaxis.
- Practitioner modification of clinical practice to perform toothbrush prophylaxis in lieu of rubber cup pumice prophylaxis

These two ascending trends were contrasted by the following descending trends which decreased significantly from the 1970s cohort to the 1990s cohort:

- Practitioner recommendation of prophylaxis for caries prevention.
- Practitioner recommendation on the need for prophylaxis prior to sealant application.

The above age-related trends suggest that modification of clinical practice is an ongoing process, albeit a slow one, and is partly attributable to educational inculcation of new practitioners who gradually replace existing practitioners. It has been remarked that clinicians are slow to modify their practice with the estimated half-life for change being 20 years in physicians and 45 years in surgeons.<sup>28</sup>

The findings of the present study suggests pediatric dentists in New England should be apprised regarding the lack of a need for rubber cup prophylaxis for caries prevention prior to professional topical fluoride application and prior to sealant application. It has been

observed that to change practitioner behavior and to improve the quality of pediatric care, one must begin with the measurement of practitioner behavior.<sup>29</sup> Such measurement would provide a basis to generate baseline evidence since many practitioners believe their practices are up-to-date, while the evidence suggests that practitioners tend to “often overestimate how good their own practice adheres to local or national standards.”<sup>29</sup> The present study has, therefore, provided baseline information on the practice of dental prophylaxis by pediatric dentists in New England.

## Conclusions

- Pediatric dentists in New England routinely provided dental prophylaxis to their recall patients.
- The majority of New England pediatric dentists recommended dental prophylaxis based upon the following indications: plaque, stain, and/or calculus removal; caries prevention; prior to topical fluoride application; prior to sealant application; and for behavioral modification.
- The majority of pediatric dentists in New England defined dental prophylaxis as referring to both rubber cup pumice prophylaxis as well as to toothbrush prophylaxis.

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