

Scientific Article

Survey of Treatment Provided for Young Children by West Virginia General Dentists

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Abstract: Purpose: The purpose of this study was to survey the treatment provided by West Virginia general dentists (GDs) for young children. **Methods:** A survey was mailed to 683 GDs in West Virginia. Respondents were questioned about their referrals to pediatric dentists, the youngest age for which they perform specific procedures, conscious sedation utilization, and whether they treat Medicaid-covered children. **Results:** The response rate was 72%. Half of the GDs responded that they frequently referred children younger than 3 years old, and only one third reported performing dental examinations on a child 2 years old or younger. All responding GDs performed the surveyed procedures in 5-year-olds, but fewer respondents performed complex procedures for children ≤ 2 years old. More than half of the GDs responded that they frequently had difficulty with referrals to a pediatric dentist due to distance/transportation or not accepting new Medicaid patients. Medicaid-covered children were not treated by 25% of general dentists. **Conclusions:** Most GDs in West Virginia treat older children, but care is limited for children ≤ 2 years old. Further studies are needed to uncover the specifics of these findings to improve the access and care for young West Virginia children. (*Pediatr Dent* 2008;30:352-7) Received February 16, 2007 / Last Revision June 27, 2007 Revision Accepted August 21, 2007

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The Surgeon General's 2000 Report on Oral Health in America highlighted both improvements in oral health that had occurred since the 1950s and the significant disparity that still existed in some segments of the population.¹ The Centers for Disease Control and Prevention (CDC) published a 2005 update, which included the findings of 2 National Health and Nutrition Examination Surveys.² Of particular note was a 15% increase in dental disease among the 2- to 5-year-olds and a decrease in caries prevalence in the 6- to 19-year-olds.

In 2000, Cotton et al surveyed Texas general dentists (GDs) about their willingness to provide certain types of dental procedures for the young children.³ Most GDs (95%) were willing to provide examinations and cleanings to children ≤ 5 years old or younger, but only 18% and 46% performed examinations of children younger than age 1 and of 2-year-olds, respectively.

In 2003, Seale and Casamassimo surveyed GDs across the United States and reported that, while 91% see children in their practices, only 7% see Medicaid-covered children < 4 years old with a high levels of caries.⁴ In addition, the survey found that only 27% of the dentists treated children 6 to 18 months old, while 72% treated 19-month- to 3-year-old children.

A 2005 study by McQuistan et al showed that only approximately 50% of Iowa GDs refer children < 3 years old to a pediatric dentist. They concluded that many Iowa GDs were not adhering to American Dental Association (ADA) and the American Academy of Pediatric Dentistry (AAPD) recommended treatment guidelines that children should receive their first dental visit by 1 year of age.⁵ This conclusion may not have been valid since ensuring that children receive their first dental visit by 1 year of age does not equate with a GD referring a child to a pediatric dentist. The concept of a "dental home" refers to any dentist, not just a pediatric dentist.

West Virginia also faces a similar oral health crisis. In 1997 to 1978, a survey of 135 schools involving 3,635 children in 10 West Virginia counties revealed that 62% of third-, sixth-, ninth-, and 12th-grade children had experienced decay in the primary and permanent dentitions.⁶ This finding is significantly higher than the 42% national prevalence reported in the CDC 2005 publication.² Furthermore, many of these West Virginia children did not have the benefit of routine dental care, since this same study showed that 33% had untreated decay in both the primary and permanent dentitions.

In 2002, a survey of West Virginia GDs found that only 68% of them accepted Medicaid-covered children.⁷ Most (77%) disagreed that children should have their first dental visit by 1 year of age. Financial and distance/transportation issues were the most common problems experienced when a GD referred a child to a West Virginia pediatric dentist.

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To date, there is no published information on the ages of children treated by West Virginia GDs nor what procedures they will perform on young children. This information would be particularly useful in light of the small numbers of West Virginia pediatric dentists and the fact that most care is therefore rendered by GDs.

This study's objective was to obtain baseline information on the practices of West Virginia GDs regarding the age groups they treat, treatment of children on Medicaid, and what procedures they perform in their office. This survey's results will help determine what effect Medicaid coverage has on a young child's dental access and whether barriers still exist when referring children to pediatric dentists.

Methods

A 9-question survey was developed via a literature review to survey the practice patterns of the treatment of young children by West Virginia GDs (Figure). This study was approved by the Institutional Review Board of West Virginia University, Morgantown, WV. The following topics were included in the survey:

1. the frequency of referrals to pediatric dentists for children <3 years old or for 3- to 5-year-old children;
2. the youngest child they treated for examinations, prophylaxis, sealants, and restorative with local anesthesia;
3. if they utilized conscious sedation or nitrous oxide analgesia;
4. the percent of the patients in their practice that were children and the percent of the Medicaid-covered children;
5. whether they had difficulty referring a child to a pediatric dentist and what caused the problem; and
6. when they graduated from dental school.

The survey was mailed to all 683 licensed GDs practicing in West Virginia, as determined by a list obtained from the State Board of Dental Examiners in 2006. A second mailing was done 3 weeks later to the nonrespondents. The surveys were identified by numbers corresponding to the county in which the dentist worked. The data were collected and categorized by counties.

Descriptive statistics were derived from the data to determine numbers, percentages, and means of the variables. Contingency tables and chi-square tests were utilized to determine whether there were significant relationships between various procedures and the age at which they were first performed. Confidence intervals were determined for the referral frequency and problems encountered for referrals. The confidence level was set at $P < .05$. JMP statistical software was used for data analysis (v.6, SAS Institute, Cary, NC).

Results

A total of 491 of the 683 surveys were returned, yielding a 72% response rate. Fifteen surveys were returned by dentists not yet seeing patients in their practice or who were fully retired. These were not included in the study. Sixty-one percent of the dentists had graduated from dental school before 1985 and had likely been practicing for over 21 years.

Table 1. FREQUENCY OF WEST VIRGINIA GENERAL DENTISTS REFERRING CHILDREN TO A PEDIATRIC DENTIST FOR CARE (%)*

Age in ys (n)=total responses	Never	Sometimes	Often	Always
<3 (463)	7	43	31	19
3-5 (462)	9	70	14	6

* The distribution of responses was significantly different between each age group for all but the 'Never' category ($P < .001$). Statistical analysis was done using a binomial test.

Table 1 shows the response of West Virginia GDs on their likelihood to refer children for care. Only 20% of the GDs often or always referred 3- to 5-year-old children who came to their practice in the last 12 months. The percent referred increased dramatically to 50% for children ≤ 2 years old. GDs significantly referred more children ≤ 2 years old compared to the 3- to 5-year-olds. Significance was determined using a binomial test and found to be $P < .001$ for all frequencies of referrals except the "never" group.

Table 2 depicts the responses to questions concerning the youngest age of a child whom GDs were willing to treat for certain types of dental procedures, varying from examinations to restorative care with local anesthesia. Results were significantly different ($P < .05$) for an examination compared to the other procedures within all age groups. The prophylaxis was also

Table 2. PERCENT OF WEST VIRGINIA GENERAL DENTISTS WILLING TO PERFORM SPECIFIC PROCEDURES BY AGE (PERCENTAGES WITH CONFIDENCE INTERVAL)

Procedures (n)=total responses	< 1 y: % (95% CI)	2 ys: % (95% CI)	3 ys: % (95% CI)	4 ys: % (95% CI)	5 ys: % (95% CI)
Examination (379)	37 (32-42) †	74 (70-78) †	98 (97-99) ‡	99 (98-100) ‡	100
Prophylaxis (380)	8 (5-11) †	45 (40-50) †§	93 (90-96) ‡	99 (98-100) ‡	100
Sealants (324)	2 (0-4) †	9 (6-12) †	33 (28-38) †	48 (43-53)	100
Restorative with local anesthetic (363)	4 (2-6) †	14 (10-18) †	62 (57-67) †	84 (80-88)	100

* Significantly different when compared to other procedures within the age group ($P < .05$).

† Significantly different from other age groups for that procedure.

‡ Significantly different when compared to sealants or restorative with local anesthesia within the age group ($P < .05$).

§ Significantly different when compared to sealants or restorative with local anesthesia within the age group ($P < .05$).

WEST VIRGINIA GENERAL DENTIST SURVEY

1. In the past 12 months, when children came to your practice requesting care, how likely were you to refer those children for care? **Mark one for each age group**

< 3 years old	Never <input type="checkbox"/>	Sometimes <input type="checkbox"/>	Often <input type="checkbox"/>	Always <input type="checkbox"/>
3 to 5 years	Never <input type="checkbox"/>	Sometimes <input type="checkbox"/>	Often <input type="checkbox"/>	Always <input type="checkbox"/>

2. **If you marked “never or sometimes” anywhere in question 1, what is the youngest age patient you treat for the procedures listed below?**
Circle only **one** age for each procedure.

Examination	≤ 1 yr	2 yr	3 yr	4 yr	5 yr
Prophylaxis	≤ 1 yr	2 yr	3 yr	4 yr	5 yr
Sealants	≤ 1 yr	2 yr	3 yr	4 yr	5 yr
Restorative with local anesthesia	≤ 1 yr	2 yr	3 yr	4 yr	5 yr

3. Do you perform conscious sedation on children in your office? Yes No

4. Do you perform nitrous oxide analgesia on children in your office? Yes No

5. What percentage of your patients are children (<18 years old)? _____%

6. What percent of the children treated in your office are covered by Medicaid?
Circle the percentage on the chart below.

7. Do you have difficulty finding a pediatric dentist to refer to when the child requires care beyond what you can provide?

Often Sometimes Rarely
Never (if “never” go directly to question 9 otherwise go to question 8)

8. What are the most common problems you experience when referring a child to a pediatric dentist? *Check all that apply.*

Distance/Transportation <input type="checkbox"/>	Financial Reasons <input type="checkbox"/>
Long wait for appointment <input type="checkbox"/>	Parent not interested <input type="checkbox"/>
Not accepting new patients <input type="checkbox"/>	Not accepting new Medicaid patients <input type="checkbox"/>

9. When did you graduate from dental school?

2000-2006 <input type="checkbox"/>	1995-1999 <input type="checkbox"/>	1990-1994 <input type="checkbox"/>
1985-1989 <input type="checkbox"/>	Before 1985 <input type="checkbox"/>	

Figure. West Virginia General Dentistry Survey.

significant compared to sealants and restorative with local anesthesia within age groups for children ≥2 years old. When comparing each procedure across age groups, significance was found ($P<.05$) for all procedures for the 0- to 1-year-old, 2-year-old, and 3-year-old children. Only sealants and restorative with local anesthesia showed significance when comparing the 3-year-old and 4-year-old children. Statistical analysis was performed using percentages with margins of error to determine the 95% confidence level, and the significance is shown in Table 1. All GDs were willing to

treat 5-year-old children for all the procedures listed. Fewer GDs, however, were willing to perform more complex procedures, such as restorative dentistry with local anesthesia for younger children.

Table 3 shows other practice characteristics found from the survey. Conscious sedation on children was performed by 9% of the respondents, and 43% used nitrous oxide analgesia. Table 3 also shows that children composed an average of 26% of the patients in the dental practices surveyed; 28% of these children were covered by Medicaid, with practices reporting a range from 0%-95%. It was found that 111 dentists (25%) did not accept Medicaid-covered children in their practice.

The frequency of the GD having difficulty referring a child who required care beyond what the GD could provide is shown in Table 4. Fifty-five percent of the respondents in this survey had difficulty “often or sometimes” when referring the child.

Table 5 depicts the specific difficulties that the GD encountered. Statistical analysis was performed using percentages with margins of error to determine the 95% confidence level. Financial issues and distance/transportation were the most frequent reasons given at 57% and 56%, respectively and were significantly different from all the other responses. The next most common problem was that the pediatric dentist was not accepting new Medicaid patients (48%), which was found to be only significant when compared to the “parent not interested” or “not accepting new patients.” This is interesting considering that only 18% of the dentists reported that the pediatric dentist was not accepting any new patients at all.

Analysis of the data concerning the 55 West Virginia counties revealed some interesting findings. One of the counties had no response from the dentists located there. There were 8 counties in West Virginia where no GDs would perform an exam on 1-year-old children and 1 county where no dentist will see children until they are 4 years old. Nine counties have no dentists who will place sealants on primary teeth. In 5 counties, over 50% of the dentists will not accept Medicaid-covered children. In 7 counties, 100% of the GDs in that county had problems referring children to pediatric dentists.

Table 3. MISCELLANEOUS PRACTICE DEMOGRAPHICS OF WEST VIRGINIA GENERAL DENTISTS

Variable	Responses
Perform conscious sedation (460)	(41) 9%
Perform nitrous oxide analgesia (461)	(198) 43%
Have child patients (457)	(119) 26%
Have Medicaid-covered children in (449)practice	(126) 28%
Do not accept Medicaid (449)	(112) 25%

Table 4. ABILITY OF WEST VIRGINIA GENERAL DENTISTS TO REFER CHILDREN TO A PEDIATRIC DENTIST (% [95% CONFIDENCE INTERVAL])*

Responses (n)	Never	Rarely	Sometimes	Often
Referral difficult (460)	22 (18-26)	24 (20-28)	35 (31-39) †	20 (16-24)

* Statistical analysis was done using percentages with margins of error at a 95% confidence interval

† Significantly different than other responses ($p < .05$).

Table 5. FREQUENCY OF PROBLEMS EXPERIENCED BY WEST VIRGINIA GENERAL DENTISTS WHEN REFERRING CHILDREN TO A PEDIATRIC DENTIST (% [95% CONFIDENCE INTERVAL])*

Distance/transportation	Long wait	No new Medicaid patients	Financial	Parent not interested	No new patients
56 (51-61) †	45 (40-50) ‡	48 (43-53) ‡	57 (52-62) †	23 (19-27)	18 (14-22)

* Statistical analysis was done using percentages with margins of error at a 95% confidence interval.

† Significant compared to all other referral problems ($P < .05$).

‡ Significant when compared to Parent not interested or No new patients ($p < .05$).

Discussion

This study found that 97% of West Virginia GDs treat children in their practices compared to 91% found nationwide in 2003 by Seale and Casamassimo.⁴ This is quite remarkable and important when one considers that a majority of the care of children is accomplished by West Virginia GDs. It must, however, be viewed with some caution, considering the limited number of pediatric dentists in the state. It is possible that more West Virginia GDs treat children in their practices because they have no other easy alternative such as routinely referring children to pediatric dentists. Conversely, Texas GDs can easily refer children if they do not want to treat them. Also, the Seale and Casamassimo study defined children from birth to 14 years old, while this study used birth to <18 (do not underline) years old. This could account for some of this increased percentage.

The current survey found that 50% of the GDs “often or always” refer children <3 years old for care in West Virginia. This nearly matches the 49% response garnered from the same question asked of the Iowa dentists by McQuistan et al in 2005.⁵ This could mean 1 of 2 things. First, nearly half of the GDs do not believe in the need for dental examinations for children <3 years old and, therefore, do not refer them. This viewpoint does not hold up, since this study also found that 73% of West Virginia GDs performed dental exams on children <3 (do not underline) years old (Table 2). It is more likely that the dentists surveyed in this study and the Iowa survey interpreted the phrase in question no. 1—“how likely were you to refer those children for care?”—to include restorative or other definitive treatment, thereby increasing the response frequency. This may also apply to the dentist’s responses in the Iowa survey, since the question was worded exactly the same.

Another finding in our study was that 98% percent of dentists performed a dental exam on children ≤ 3 years old. The Seale and Casamassimo¹ study found that fewer than 50% “very often or often” performed examinations on 1- to 3-year-old children, which was significantly less than our study.⁴ This difference can be explained by the terms used in the Seale and Casamassimo study, that dentists “very often or often” performed the exams in their office. In our study, the frequency of exams being conducted on this age group was not surveyed. The dentist was only asked if he or she would perform an exam on children of various ages. Therefore, a dentist could treat just one child in this age group and could have responded affirmatively to our survey question.

In West Virginia, the percentage of GDs willing to perform a dental exam on children dropped significantly with age. While 74% were willing to examine patients ≤ 2 years old, only 37% would examine a 0- to 1-year-old patient. When this is compared to the 46% for ≤ 2 -year-olds and the 18% for ≤ 1 -year-olds in the Cotton et al study in Texas, it is apparent that the profession has made great strides in having GDs perform the first dental visit by 1 year of age.³ The more interesting finding is that, while 74% of the West Virginia GDs were willing to examine a 0- to 2-year-old child, it also means that 26% do not perform a dental examination on a child until they are 3 years old. Since most dental care on children is provided by GDs in the United States and there are only 13 practicing pediatric dentists in West Virginia, it is essential that the GDs treating children follow the guidelines published by the ADA and the AAPD on performing a dental exam by age 1. Clearly, our results showed that dentistry still has a way to go in implementing the age 1 dental visit. This will take a concerted educational effort to bridge this gap and may require a nationwide effort to attain this goal.

Only 48% of West Virginia GDs placed sealants on primary teeth in 4-year-olds compared to 32% polled in Texas in 2001.³ This was surprising, since this question did not ask dentists whether they placed many sealants on primary teeth in their practices, but asked the youngest age for which they would place a sealant. All West Virginia GDs were found to place sealants once the patient reached 5 years old, compared to only 49% in the Cotton et al study in Texas.³ This discrepancy is possibly due to the West Virginia study having had no response available to select for a child older than 5 years, as the Texas study had done. This may have driven dentists to select the 5-year-old response as their only option.

A clear improvement occurred for performing restorative dentistry with local anesthesia in West Virginia. In 2006, 62% of West Virginia GDs treated children ≤ 3 years old, compared to 34% in Texas in 2001.³ This large difference could be explained by the willingness of West Virginia GDs to treat younger children or by inherent differences between West Virginia and Texas dentists.

Conscious sedation on children is practiced by only 9% of West Virginia GDs, as one might expect considering new state dental board regulations that went into effect in 2005 requiring special permits and inspections. It is interesting that 43% utilize nitrous oxide analgesia in their practices when treating children, compared to fewer than 33% found nationwide in the Seale and Casamassimo study.⁴ West Virginia now also offers nitrous oxide certification for dental assistants and hygienists, so the utilization of this modality may increase in future years.

Across the United States, only 41% of dentists treat children covered by Medicaid, as determined by the Seale and Casamassimo study.⁴ In contrast, this study showed that 77% of West Virginia GDs accept children covered by Medicaid. This could be misleading, since our study did not determine how many offices accept "new" Medicaid patients, which would be far fewer in number. Of particular interest is the finding that West Virginia pediatric dentists are not accepting new Medicaid referrals from GDs 48% of the time. This could be a very significant issue with the small number of West Virginia pediatric dentists. When analyzing this information by counties, it was noted that most of the problem counties are along the state's borders near Maryland, Virginia, and Ohio. The close proximity to dentists in these other states may be having a significant influence on the practice characteristics of West Virginia GDs.

We found that 55% of West Virginia GDs reported having difficulty referring children to pediatric dentists "sometimes or often." In her study, Kohli et al found that financial issues (72%) and distance/transportation (58%) were the most frequent problems for referrals in 2002.⁷ Our study showed that financial issues have dropped significantly as a reason for referral problems while distance and transportation have remained a major issue 5 years later. In several counties, all of

the dentists had problems referring children. This is generally due to a lack of pediatric dentists practicing in some areas of West Virginia.

This study's survey results should be applicable to the total population of West Virginia GDs, considering the 72% response rate. There are, however, several limitations. First of all, the data collected are self-reported by the dentists. Additionally, while we know that a significant portion of dentists do not perform dental examinations on the 1-year-old children, we do not know why. A follow-up study could be conducted to find a solution to help GDs meet this need.

We also know that a significant portion of West Virginia pediatric dentists do not accept new Medicaid-covered children, but we do not know why this is happening. We also do not know why 25% of GDs do not accept Medicaid-covered children when we know that they, in fact, treat children in their office. This may be due to low reimbursement rates but will require further study to understand.

This survey has determined many characteristics of the dental practices of GDs who treat West Virginia children and uncovered issues that need to be addressed in the future. Future studies are needed to resolve these issues to improve the oral health of young West Virginia children

Conclusions

Based on this study's results, the following conclusions can be made:

1. The great majority of West Virginia GDs report treating children in their practices.
2. Only 37% of West Virginia GDs are willing to perform a dental exam on a child ≤ 2 years old.
3. More than half of the GDs will not place a sealant on a primary tooth in a 4-year-old.
4. Medicaid-covered children are treated by 77% of GDs, but 48% of the time pediatric dentists do not accept new Medicaid-covered children, as reported by GDs—potentially creating an access problem for those most in need.
5. Distance/transportation, financial problems, and refusal to accept new Medicaid-covered children affected the ability of the GD to refer a patient to a pediatric dentist. Therefore, the access to West Virginia pediatric dentists is limited either due to a deficient quantity, distribution, or both.

Acknowledgements

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Abstract of the Scientific Literature

Effect of pulp obliteration on pulpal vitality of orthodontically intruded traumatized permanent maxillary incisors

The purpose of this study was to investigate the influence of pulp obliteration on the pulpal vitality of orthodontically intruded permanent maxillary incisors that were traumatized prior to orthodontic treatment. Two groups of patients were compared from the orthodontic records of one practice. Both groups comprised individuals with Class II division 1 malocclusions with traumatized permanent maxillary incisors. One group of patients underwent orthodontic treatment (n=186) while controls (n=173) did not. The degree of pulp obliteration was classified as total, partial, or none. Pulp vitality was assessed via radiographs, crown color, and sensitivity to cold. At the final examination there was a significant difference between the two groups in signs of pulp necrosis, with a higher prevalence among those who underwent orthodontic treatment (10% vs. 2% of teeth, $p<.001$). Among the treatment group, the number of teeth with pulp necrosis increased after orthodontic care as the degree of pretreatment pulp obliteration worsened (5%, 15%, and 42%). A significantly higher number of teeth with pulp necrosis was found in the total obliteration group when compared to both the partial ($p=.025$) and no obliteration ($p<.001$) groups. This study reveals that teeth deemed to have been traumatized prior to orthodontic treatment, specifically orthodontic intrusion, are susceptible to subsequent pulpal complications.

Comments: Results from this survey might be useful for practitioners who are contemplating orthodontic treatment for individuals whose maxillary incisors have experienced occlusal trauma. Careful examination for signs of obliteration prior to orthodontic care is warranted. Patients should also be informed of the potential risks for pulp necrosis during or following treatment. **RJS**

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