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The Impact of Medicaid Reform on Dental Practice Setting

A thesis submitted in partial fulfillment of the requirements for  
the degree of Master of Science in Dentistry at Virginia Commonwealth University.

by

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In Honor of  
Lochlan T. R. Peters  
and  
Truitt D. W. Peters,  
my beloved children

In Memory of  
Dr. Ronald R. Peters (1943-1995),  
a world-class hurdler, an orthodontist and my wonderful father

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## Abstract

### THE IMPACT OF MEDICAID REFORM IN DENTAL PRACTICE SETTING

by Barrett W. R. Peters, DDS

A thesis submitted in partial fulfillment of the requirements for  
the degree of Master of Science in Dentistry at Virginia Commonwealth University.

Virginia Commonwealth University, 2013

Director: Tegwyn H. Brickhouse, DDS, PhD  
Chair, Department of Pediatric Dentistry

**Purpose:** To assess the impact of dental Medicaid reform in Virginia on dental practice settings (private practice, corporate practice and safety net clinics).

**Methods:** This retrospective cohort study of 16.2 million dental claims is from the Virginia Department of Medical Assistance Services, which included claims for providers participating in Virginia's Medicaid program during a 10-year period (2002-2012). The dividing date for the reform was July 1, 2005. The outcome measure was mean claims per participating provider. A Poisson regression model was used to predict the mean number of claims per provider with the following predictors: reform period, practice setting, provider specialty, practice location.

**Results:** The mean number of claims after program reform was significantly higher depending on practice setting and provider specialty, but not practice location.

**Conclusion:** Medicaid reform has resulted in a significant increase in the number of dental claims, providers, and practice settings in Virginia.

## Introduction

Since its establishment in 1965, millions of children rely on the Title XIX Medicaid program for their medical and dental needs. Under federal law, the Early and Periodic Screening, Diagnosis and Treatment Program (EDPST) is intended to improve access to health care for Medicaid eligible individuals under the age of 21 by requiring states to provide periodic screening for various diseases, including dental diseases.<sup>1,2</sup> Despite systems put into place at the federal level, dental Medicaid programs for low-income populations have difficulty nationwide with both participant utilization of dental services and provider participation. This difficulty directly affects the access that low-income populations have to preventative and urgent dental needs, with the primary barrier to care being dentist participation; however, lack of insurance does not appear to be related with untreated decay in the permanent dentition.<sup>1,3-5</sup> The U.S. Department of Health and Human Services reports that only one in five Medicaid enrolled children receive any dental services annually.<sup>6</sup> It has also been reported that an estimated 51 million school hours per year are lost to dental related illnesses.<sup>7</sup>

Various studies have shown that low participation is partially due to *programmatic* factors<sup>8</sup> that can be altered by internal streamlining of the assistance program (i.e. Medicaid);<sup>9</sup> however, there are other variables that deter providers from participation that cannot be directly managed. These other variables, referred to as *patient-related* factors,<sup>8</sup> may include participant awareness of the importance of regular dental care (i.e. broken appointments, poor oral health literacy, etc.) and the lack of flexible appointments for working participants due to traditional provider practice

schedules.<sup>8,10-14</sup> Many of the programmatic barriers to participation such as a complicated filing process, low reimbursement rates, limited procedure coverage, pre-authorizations, denial of payments have been improved in the last decade with Medicaid reform in the Commonwealth of Virginia.<sup>8,10-15</sup> This reform has since led to increased participation and utilization of Virginia's dental Medicaid program.<sup>16,17</sup>

In 2005, Virginia initiated its dental Medicaid reform program, *Smiles for Children*. This program "carved out" approximately eight managed care organizations that had been responsible for providing dental benefits to enrolled members of the Medicaid program prior to the reform. The state then contracted their dental Medicaid services with a single payer, Doral Dental (now DentaQuest, LLC). The "carve out" consisted of a concerted effort between the leadership at the Virginia Department of Medical Assistance Services (VDMAS) and efforts of stakeholders in the dental community across the state. These efforts culminated in significant program reform to a single-payer model that included increases in provider reimbursement rates. There was a 28% increase in reimbursement for all procedures in 2005 with an additional 2% rate increase for oral surgery procedures in 2006.<sup>17,18</sup> These collaborative efforts led to both significant increases in reimbursement and streamlining of the dental Medicaid program in Virginia. It has been shown that adequate reimbursement rates are a necessary but not sufficient in increasing provider participation in state Medicaid dental programs. Increasing rates alone will not increase provider number and participation level significantly, the approach must be multifaceted in order to ensure better dental care for enrolled children.<sup>13,19,20</sup>

Dental Medicaid reform in other states has been aimed to increase provider participation and dental utilization of enrolled children. In order to increase providers, all state reforms raised reimbursement rates and decreased administrative burdens; however, reforms have been

implemented differently from state to state. Virginia and Tennessee proceeded with “carve out” model for their dental Medicaid reform and contracted out services to a single-payor, while Alabama kept their reforms in-house at the state level.<sup>18</sup> Indiana changed payment from capitation-based system to a fee-for-service based system.<sup>15</sup> A more incremental approach was taken by South Carolina by implementing a conditional and provisional rate increase, which was contingent on an increase in provider participation. Targets for participation in South Carolina were surpassed within a couple of years and as a consequence rates were raised to 75 percentile of usual, customary and reasonable fees.<sup>18,21</sup> In Michigan, the commercial insurer (Blue Cross Blue Shield) that was successful in operating the states’ S-CHIP program began to manage dental Medicaid allowing existing providers to remain familiar with the system and enrollees to gain access to a large pool of providers.<sup>18</sup> These state reforms noted that increasing fees were necessary but not sufficient alone in increasing participation and improving access to dental care for enrolled children. Other than market level rates, it has been suggested by Shulman et al. that Medicaid could be improved by a streamlined and simplified claims process (i.e. standard claims forms, terminology, electronic filing, reducing amount of preauthorization); a stronger case management component; and contact point for dentists to assist patients in navigating the Medicaid system.<sup>13</sup> These improvements to the Medicaid system are results of policy solutions that are needed to strengthen the dental workforce.<sup>22</sup>

Dentists’ perception and attitudes of Medicaid also play a role in provider participation.

Numerous studies have shown that the main sources of dissatisfaction were broken appointments, low reimbursement levels, and patient noncompliance.<sup>8,13</sup> In California denials of payments are also a major factor of non-participation.<sup>12</sup>

These perceptions alter behavior. Many participating providers limit participation by scheduling Medicaid patients at different times or by double booking patients to offset the high rate of no-shows. It is clear the importance of dentists' having positive perceptions of Medicaid policies and reimbursement rates to ensuring continued participation.<sup>19</sup> Even providers that have been heavily involved as advocates for children's oral health have stated that it may be easier and cheaper to treat Medicaid-insured children for free, than to put up with the time consuming hoop-jumping of the Medicaid system.<sup>23</sup> While these perceptions greatly influence participation they also have been shown to affect the Medicaid enrollee. According to qualitative research with Medicaid enrollees, the demeaning and discriminatory attitude and behavior of the front desk personnel has led to some postponing and/or canceling appointments due to the indignity, shame and stigma associated with being on public assistance. These focus groups also revealed that attitudes of dentists, while not as severe as the front desk staff, have also been reported as impersonal and disrespectful towards parents/enrollees, due to dentist perceiving poor patients as uncooperative and unappreciative.<sup>24</sup>

Patient-related factors that limit provider participation still exist despite reimbursement rates and administrative improvements at the state level. However, Greenberg et al. reports on the use of a dental case management model in a rural part of New York State. It was found that this model contributed to increased utilization and participation of Medicaid by significantly reducing the rate of missed appointments, minimizing administrative burdens, and increasing oral health literacy and treatment compliance. The case management model may not be cost-effective for a more urban setting or solve patient-related factors, but it did improve a few of the factors that many dentists cite as barriers or frustrations of participation.<sup>11</sup>

Practice location (e.g. rural, urban) and provider type (e.g. general dentist, pediatric dentist) play a key role in distribution of Medicaid dental services. Rural areas have a higher percentage of participating Medicaid providers than urban areas; and rural providers, regardless of specialty, tend to perform more restorative procedures than urban providers.<sup>9</sup> As far as provider specialty, general dentists tend to perform more diagnostic, but fewer corrective (e.g. operative, endodontic, prosthodontic, surgical) procedures than pediatric dentists; however the amount of preventive procedures completed by each was not significantly different.<sup>9</sup> Pediatric dentists have a greater likelihood and magnitude of participation than other dentists in Medicaid as well as spend more time treating enrollees than their general dentist colleagues.<sup>8,14</sup> Of all pediatric dentists, the ones practicing in rural locations have been found to be most likely to participate.<sup>9,12,14</sup>

To date few studies have studied the impact on the effect of Medicaid reforms on dental practice settings and the distribution of provided services. The purpose of this study is to evaluate the impact of Medicaid reform on the dental practice settings within the Commonwealth of Virginia. A cohort (2002-2012) of dental providers participating in Virginia's Department of Medical Assistant Services (VDMAS) dental program has been categorized into practice settings of: private practice, corporate practice, or safety net clinic. These practice settings will be compared before and after the Medicaid program reform (2005) according to the volume of dental claims and mean number of claims per dental provider.

## Methods

The outcome variable of interest in this study was mean number of dental claims for each provider. A provider is defined as a dentist providing services and registering claims with VDMAS (Virginia Department of Medical Assistant Services). Each provider was given one or more provider IDs based on their practice setting (private, corporate or safety net). It was possible for a single named provider to have multiple provider IDs depending on their practice setting. The dental claims were limited to just in-state claims and dental service claims other than diagnostic, preventive and caries related treatments were excluded. Medicaid dental claims filed by providers in any of Virginia's dental Medicaid programs that had ten or more claims per year between July 1, 2002 and June 30, 2005 were included the pre-reform period. Likewise, claims filed by providers in Virginia's Smiles of Children dental Medicaid program that had ten or more claims per year between July 1, 2005 and June 30, 2012 were included the post-reform period.<sup>21</sup> The authors excluded providers with less than 10 claims per year from the analysis to obtain a cohort of providers that were actively participating. The authors also excluded providers with claims originating from out-of-state to limit the study and inferences to the state of Virginia. In total, 222,426 claims and 176 providers in the pre-reform cohort and 1,476,252 claims and 415 providers in the post-reform cohort were excluded from the analysis. As a result the retrospective cohort data during the two time periods: the pre-reform managed care period (2002-05) and post-reform period (2005-12), had 3,342 providers filing 16,234,819 dental claims with 712 providers filing 2,223,122 and 2,630 providers filing 14,011,697 claims during the pre- and post-reform

periods, respectively. This study was approved for exemption by the Virginia Commonwealth University Institutional Review Board for Human Subjects Protection.

The purpose of the study was to test whether there was a significant change in the mean claims per provider between pre- and post-reform periods by practice setting. The dichotomous variable, reform period (pre-reform/post-reform), became the main effect variable. Dental practice setting was the stratification variable and first covariate. It was categorized as a private practice, corporate practice, or safety net clinic. This categorization was done by service center location on the dental claim. The second covariate was provider specialty. Providers were categorized as a general dentist, pediatric dentist or other specialist as designated within the provider dataset. Other specialists were defined as any dental provider with a designation other than general dentist or pediatric dentist in the dataset. The third and final covariate was practice location. These practice locations were based on Federal Information Processing Standard (FIPS) codes that correlated to each provider's listed locality in Virginia. This covariate used Isserman definitions of Urban, Mixed Urban, Mixed Rural and Rural.<sup>25</sup> Based on the desire to analyze the VDMAS dataset of claims from the provider perspective, a summary statistic was devised and called mean claims per participating dental provider – this became the outcome variable. Relevant information was extracted from all Medicaid dental claims filed for Virginia Medicaid providers from data provided by VADMAS. All analyses were conducted using SAS 9.3. Descriptive statistical tables and graphs were built to define the study cohort using PROC FREQ in SAS 9.3. The bivariate analysis examined claims pre- vs. post-reform with a One-way Analysis of Variance using the non-parametric Wilcoxon's test for pair-wise comparison according to practice settings, provider specialty and practice location. A generalized linear model was built assuming the outcome variable: claims per provider to be Poisson distributed;

and with the reform period (pre- vs. post-reform) being the main effect variable, the relevant covariates were chosen to be: practice setting (private, corporate and safety net clinics); provider specialty (general dentist, pediatric dentist and other specialty) and practice location (Urban, Mixed Urban, Mixed Rural and Rural). Based on the initial run we excluded the covariate practice location since it was statistically not significant and kept only practice setting and provider specialty as significant covariates to explain the variability in the outcome variable between pre- and post-reform eras. A final adjusted Generalized Linear Model using Poisson regression with a log link function of the mean claims per provider as outcome; reform period (pre- vs. post-reform) as the main effect variable, included the significant two and three way interactions between period, practice setting, and provider specialty. Based on the model results, we present the expected claims per provider in each reform period, by setting (private, corporate and safety net) and by specialty categories (general dentist, pediatric dentist and other specialty) with 95% confidence limits for their mean claims per provider estimates. The implication of these results was presented in the discussion section of the report.

## Results

### *Descriptive Analysis*

Descriptive statistics for both pre- and post-reform periods are described in Table 1. The cohorts are described through the covariate categories of practice setting, provider specialty, and practice location using FIPS coding based on Isserman definitions of Urban, Mixed Urban, Mixed Rural and Rural locations. Significant increases in total number claims were observed from pre- to post-reform for each of the covariates. Table 1 also displays the number of dental providers in the pre- and post-reform periods that had at least 10 dental claims per year total as well as the number of providers by setting, specialty and location. There were 712 providers in the pre-reform period with total of 2,223,122 claims and 2,630 providers in the post-reform period with 14,011,697 claims. Figure 1 shows the total amount of claims in each setting by period. Practice setting, provider specialty and practice location all significantly and independently interacted with the reform periods ( $p < .0001$ ).

### *One-way Analysis of Variance Study Results*

A One-way ANOVA using the non-parametric Wilcoxon's test for pair-wise comparison was conducted on the mean claims per provider by practice setting, provider specialty and practice location. In the pre-reform period statistically significant differences were found in mean claims per provider between private vs. corporate settings ( $p=0.0049$ ), general dentists vs. other specialists ( $p=0.0003$ ) and urban vs. rural locations ( $p=0.0421$ ). In the post-reform period

statistically significant differences were still found between private vs. corporate settings ( $p=0.0059$ ) and general dentists vs. other specialists ( $p=0.0004$ ); however, there was nothing statistically significant to compare within locations. This difference between practice locations was mitigated in the post-reform period demonstrating that reform period had an effect on distributing the mean claims per provider more evenly over the four location categories thus helping to bridge access to care in rural areas.

### *Poisson Regression Model Results*

There were a total of 3,342 provider records with claims associated with each provider and classified as participating in pre-reform, post-reform or both periods. The outcome variable was volume of claims segmented the predictor variable period (pre- vs. post-reform). All relevant covariates were included in the Generalized Linear Model with the claim counts assumed to be distributed Poisson: practice setting (private, corporate and safety net clinics); provider specialty (general dentist, pediatric dentist and other specialist) and practice location (urban, mixed urban, mixed rural and rural) as covariates. Practice location was found to be not significant in predicting the outcome variable ( $p\text{-value}=0.5208$ ) as was subsequently removed from inclusion in the final model.

The model showed a three way significant interaction between period, setting and specialty ( $p\text{-value}=0.0482$ ); shown in Table 2. We therefore present the expected values of the outcome variable: mean claims per provider for each of the three variables: reform period (pre- vs. post-reform); practice settings (private, corporate and safety net) and provider specialty (general dentist, pediatric dentist and other specialist) in a  $2 \times 3 \times 3$  table of mean claims with 95% confidence limits. The Poisson Regression Model was built in PROC GENMOD using volume

of claims as the outcome variable, reform period (pre- vs. post-reform) as the predictor variable and provider setting, provider specialty and period in a three way interaction while including all two level interactions and main effect variables in the model. The results of the model are displayed in Tables 3 and Figure 2.

The parameter estimates with the 95% confidence intervals in Table 3 were used to generate the estimated mean claims per provider histograms under each provider setting and provider specialty in the pre- vs. post-reform periods shown in Figure 2. For example, general dentists in the private setting have a mean of 2,891 claims per provider in the three pre-reform years and 4,728 mean number of claims per provider in the seven years of the post-reform era. Pediatric dentists in the private setting have a mean of 9,988 claims per provider in the three pre-reform years and 20,666 claims per provider in the seven years of the post-reform era. Other specialists in the private setting have 507 claims per provider over three pre-reform years and 1,093 claims per provider in the seven years of the post-reform era. The confidence limits for these estimates are presented in Table 3. A pictorial comparison of these mean claims per provider, under period (pre- vs. post-reform); practice setting (private, corporate and safety net) and provider specialty (general dentist, pediatric dentist and other specialist) are displayed in contrasting bar graphs in a 3x3 matrix of histograms in Figure 2.

## Discussion

The evaluation of policy reform on dental Medicaid programs is essential to understand the impact of these reforms and improve the efficacy of state programs funded by public dollars. There have been notable changes in the practice settings of dentists in addition to an expansion of group practices, clinics, and businesses that provide dental services.<sup>28, 29</sup>

The results of this study show that the 2005 dental Medicaid reform in the Commonwealth of Virginia had a positive impact on the volume of dental services according to practice setting. Even when controlling for likely covariates, the relationship between reform period and mean number of claims per provider remains strong. It is clear that all practice settings; private, corporate, and safety net, studied had been affected significantly by the reform period and that mean claims per provider in all settings increased dramatically due to the reform. Two of the most interesting findings is how the reform impacted corporate settings and practice location. In the pre-reform period corporate settings only filed 1% of all the dental claims; however, post-reform this setting captured a significantly higher amount of 28% of all the claims by setting. In addition to that, the number of corporate providers with more than 10 claims/year skyrocketed from 9 to 656 providers between reform periods. The benefits of the reform allowed the corporate model of practice have significant growth within Virginia. Perhaps the most important finding is that pre-reform there was a statistical difference in mean claims per provider between urban vs. rural locations, but after the reform we fail to see a significant statistical difference between locations. This is important because due to the reform the disparities in access to basic

types of dental services across various geographic practice locations has been reduced showing more claims as well as providers in the rural areas.

The main strengths of this study come from the large sample size of the cohort and claims as well as the length of time studied. Given that statistical significance was found between reform periods with relevant covariates, the options for future study are promising. We are unable to determine which parts of the reform were more influential in the post-reform findings, but it is certain that the reform had a significant impact on the dental practice setting. Future study would benefit from analyzing the impact of reform on practice setting over the 10-year period. This would allow analysis by conducting a time-based study, not limited to a pre/post analysis. Other future study would be to use provider specialty, practice location and/or claim type (diagnostic, preventive, and caries related treatment) as the main stratification variable allowing the reform to be analyzed by levels of differing types of dental services.

This is a retrospective cohort study over 10 years and is one of the only studies analyzing the impact of dental Medicaid reform on practice setting. Other states that have implemented their own reforms should use this study and its findings to analyze the effects of their reform on practice settings. The results from this study should be used to further improve the Medicaid system across the country and ultimately make a positive impact on the oral health of children.

## Conclusion

The 2005 dental Medicaid reform in the Commonwealth of Virginia had a significant impact on the volume of dental claims according to practice setting. Not only did the number of participating providers significantly increase, but the mean number of claims in comparing reform periods was significantly different for practice setting, provider specialty and practice location. Virginia's reform and measures of this nature should be highly considered as states and legislators make policy decisions that impact dental practice settings and access to dental services for enrolled children that these settings provide.

## References

1. Venezie RD, Vann WF, Cashion SW, Rozier RG. Pediatric and general dentists' participation in the North Carolina Medicaid program: Trends from 1986 to 1992. *Pediatr Dent*. 1997;19(2):114-117.
2. Lindahl RL, Young WO. *A guide to dental care for the early and periodic screening, diagnosis and treatment program (EPSDT) under medicaid*. Washington, DC: U.S. Social and Rehabilitation Service; 1973:86.
3. Lang WP, Weintraub JA. Comparison of Medicaid and non-medicaid dental providers. *J Public Health Dent*. 1986;46(4):207-211.
4. Nainar SM, Tinanoff N. Effect of medicaid reimbursement rates on children's access to dental care. *Pediatr Dent*. 1997;19(5):315-316.
5. Brickhouse TH, Unkel JH, Porter AS, Lazar EL. Insurance status and untreated dental caries in virginia schoolchildren. *Pediatr Dent*. 2007;29(6):493-499.
6. U.S. Office of the Inspector General. Children's' dental services under Medicaid: Access and utilization. 1996;DHHS OEI-09-93-00240.
7. Gift HC, Reisine ST, Larach DC. The social impact of dental problems and visits. *Am J Public Health*. 1992;82(12):1663-1668.
8. Blackwelder A, Shulman JD. Texas dentists' attitudes toward the dental medicaid program. *Pediatr Dent*. 2007;29(1):40-46.
9. Pettinato FC, Farrington FH, Mourino A, Best AM, Brickhouse TH. Rural versus urban analysis of dental procedures provided to Virginia Medicaid recipients. *Pediatr Dent*. 2004;26(5):440-444.
10. Damiano PC, Brown ER, Johnson JD, Scheetz JP. Factors affecting dentist participation in a state Medicaid program. *J Dent Educ*. 1990;54(11):638-643.
11. Greenberg BJ, Kumar JV, Stevenson H. Dental case management: Increasing access to oral health care for families and children with low incomes. *J Am Dent Assoc*. 2008;139(8):1114-1121.
12. Morris PJ, Freed JR, Nguyen A, Duperon DE, Freed BA, Dickmeyer J. Pediatric dentists' participation in the California Medicaid program. *Pediatr Dent*. 2004;26(1):79-86.

13. Shulman JD, Ezemobi EO, Sutherland JN, Barsley R. Louisiana dentists' attitudes toward the dental medicaid program. *Pediatr Dent*. 2001;23(5):395-400.
14. Venezie RD, Vann Jr. WF. Pediatric dentists' participation in the North Carolina Medicaid program. *Pediatr Dent*. 1993;15(3):175-181.
15. Hughes RJ, Damiano PC, Kanellis MJ, Kuthy R, Slayton R. Dentists' participation and children's use of services in the Indiana dental Medicaid program and SCHIP: Assessing the impact of increased fees and administrative changes. *J Am Dent Assoc*. 2005;136(4):517-523.
16. Winheim MA, Brickhouse TH. *The effect of medicaid policy reform on dental utilization rates in children*. [MPH]. Richmond, VA: Virginia Commonwealth University; 2010.
17. Reed JA, Berry EJ. *Dental plan performance with Medicaid reform in Virginia*. [MSD]. Richmond, VA: Virginia Commonwealth University; 2011.
18. Borchgrevink A, Snyder A, Gehshan S. The effects of medicaid reimbursement rates on access to dental care. *National Academy for State Health Policy*. 2008.
19. Al Agili DE, Pass MA, Bronstein JM, Lockwood SA. Medicaid participation by private dentists in Alabama. *Pediatr Dent*. 2007;29(4):293-302.
20. Brickhouse TH, Rosier RG, Slade GD. Effects of enrollment in medicaid versus the state children's health insurance program on kindergarten children's untreated dental caries. *American Journal of Public Health*. 2008;85(5):876-881.
21. Nietert PJ, Bradford WD, Kaste LM. The impact of innovative reform to the South Carolina dental Medicaid system. *Health Serv Res*. 2005;40(4):1078-1091.
22. Edelstein B. The dental safety net, its workforce, and policy recommendations for its enhancement. *J Public Health Dent*. 2010;70:S32-S39.
23. Casamassimo PS. I'm fed up and I won't take it (medicaid) anymore. *Pediatr Dent*. 1992;14(3):148-149.
24. Mofidi M, Rozier RG, King RS. Problems with access to dental care for Medicaid-insured children: What caregivers think. *American Journal of Public Health*. 2002;92(1):53-58.
25. Virginia Department of Health. Virginia rural health plan: Supporting rural health through action. 2008(Appendix D: Defining Rural):33-38.
26. U.S. Dept of Health and Human Services, National Institutes of Health, National Institute of Dental and Craniofacial Research. Oral health in America: A report of the surgeon general. 2000.
27. Vargas C, Crall J, Schneider D. Sociodemographic distribution of pediatric dental caries: NHANES III, 1988-1994. *JADA*. 1998;129:1229-1238.

28. Guay AH, Wall TP, Petersen BC, Lazar VF. Evolving trends in size and structure of group dental practices in the United States. *J Dent Educ.* 2012;76(8):1036-44.
29. American Dental Association, Survey Center. 2010 survey of dental practice: Income from the private practice of dentistry. 2011.

Appendices

Table 1: Descriptive statistics for both reform periods, total claims

	Pre-Reform			Post-Reform			Pre- vs. Post-p-value
	Claims (n)	Providers (n)	% Claims	Claims (n)	Providers (n)	% Claims	
<b>Setting</b>							< .0001
Private	1,776,198	560	80%	8,528,673	1630	61%	
Corporate	32,892	9	1%	3,878,786	656	28%	
Safety Net	414,032	143	19%	1,604,238	344	11%	
<b>Specialty</b>							< .0001
General Dentist	1,651,643	568	74%	10,977,577	2171	78%	
Pediatric Dentist	533,207	60	24%	2,711,864	146	19%	
Other Specialist	38,272	84	2%	322,256	313	2%	
<b>Location</b>							< .0001
Urban	1,483,974	421	67%	9,222,536	1822	69%	
Mixed Urban	249,061	88	11%	1,292,118	289	10%	
Mixed Rural	166,307	79	7%	1,453,625	248	11%	
Rural	323,780	124	15%	1,343,418	271	10%	

Table 2: Generalized Linear Model with setting and specialty as covariates and including interactions, but excluding practice location that was not significant (p=0.5208)

Score Statistics For the Final Poisson Regression Model Type 3 GEE Analysis			
Source	DF	Chi-Square	p-value
Period (Main effect)	1	8.80	0.0030
Provider Setting (Covariate 1)	2	10.11	0.0064
Provider Specialty (Covariate 2)	2	47.13	<.0001
Period * Setting	2	2.44	0.2950
Setting * Specialty	4	18.10	0.0012
Period* Setting *Specialty (Interaction)	4	9.58	0.0482

Table 3: Model results of mean claims per provider estimates from the Generalized Linear Model with significant covariates – setting and specialty interaction with period

	<b>Pre-Reform</b> (Mean Claims per Provider)			<b>Post-Reform</b> (Mean Claims per Provider)		
	<b>General Dentist</b>	<b>Pediatric Dentist</b>	<b>Other Specialist</b>	<b>General Dentist</b>	<b>Pediatric Dentist</b>	<b>Other Specialist</b>
<b>Private</b>						
<b>Mean</b>	2,891	9,988	507	4,728	20,666	1,093
<b>95% CI</b>	(2,418 - 3,457)	(6,169 - 16,172)	(280 - 916)	(4,275 - 5,229)	(15,191 - 28,114)	(720 - 1,660)
<b>Corporate</b>						
<b>Mean</b>	3,655	0	0	6,122	1,841	298
<b>95% CI</b>	(1,164 - 11,473)	-	-	(5,195 - 7,215)	(883 - 3,838)	(118 - 753)
<b>Safety Net</b>						
<b>Mean</b>	2,915	4,904	77	4,192	17,299	677
<b>95% CI</b>	(2,126 - 3,997)	(2,177 - 11,049)	(45 - 131)	(3,352 - 5,243)	(9,117 - 2,825)	(365 - 1,255)

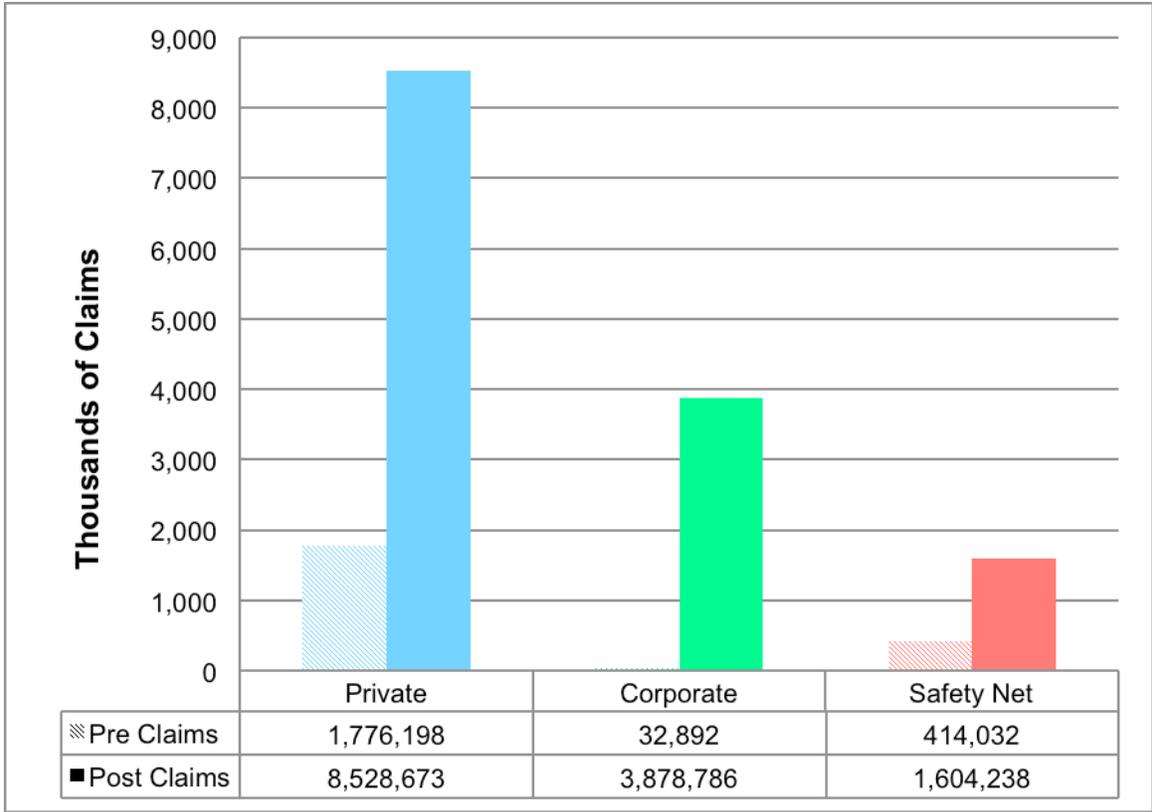


Figure 1: Total claims by practice setting

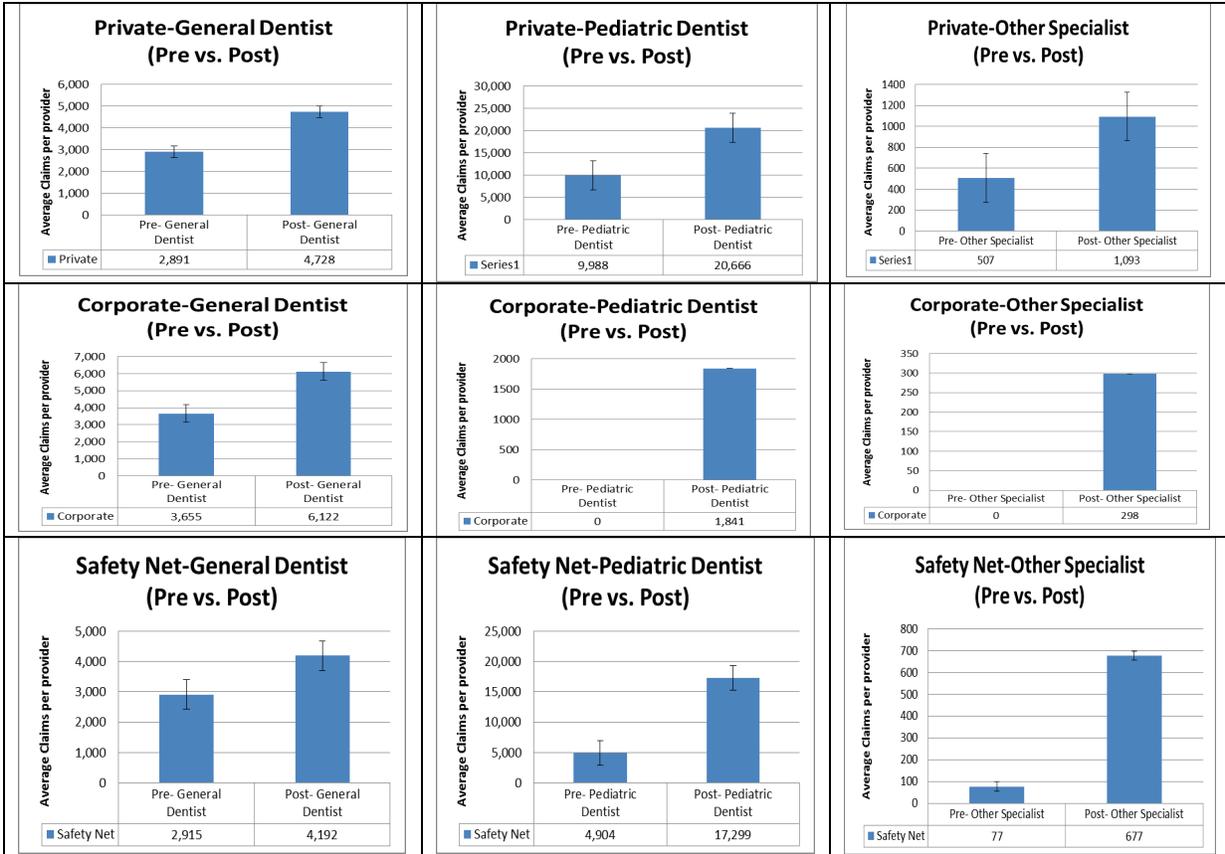


Figure 2: Pre- vs. post-reform estimated mean claims by practice setting and provider specialty, predicted by the Generalized Linear Model – period interacting with setting and specialty

## Vita

Dr. Barrett W. R. Peters was born on May 13, 1979 in Kansas City, Missouri and is a citizen of the United States of America. He graduated with a College Preparatory Degree from St. Anne's-Belfield School, Charlottesville, Virginia in 1998 and a Bachelor of Science in Biology from Hampden-Sydney College, Hampden-Sydney, Virginia in 2002. Dr. Peters worked for a number of years post-college prior to deciding to pursue a dental education. In 2011, he received a Doctor of Dental Surgery from the Virginia Commonwealth University, Richmond, Virginia, where he served as class president, student body president and delegate to the American Student Dental Association.

Following dental school, Dr. Peters attended a post-doctoral residency program within the specialty of Pediatric Dentistry at Virginia Commonwealth University. During his residency, he was selected as the annual recipient of the Samuel D. Harris Research and Policy Fellowship by the American Academy of Pediatric Dentistry and received the Who's Who Among American Colleges and Universities recognition. After receiving his Specialty Certificate in Pediatric Dentistry in June 2013, Dr. Peters and his family will move to Charlottesville, Virginia where he will enter private practice.