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DENTAL PLAN PERFORMANCE WITH MEDICAID REFORM IN VIRGINIA

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

By

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Abstract

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ABSTRACT

Purpose: To assess the effect of dental Medicaid reforms in the state of Virginia on dental plan performance.

Methods: This project is a retrospective cohort study of 825,000 dental claims obtained from the Virginia Department of Medical Assistance Services. This cohort includes dental claims for children enrolled in Virginia's Medicaid program from July 1, 2002 through June 30, 2008. The independent variable was enrollment pre or post policy reform with July 1, 2005 as the period dividing date. The dependent variable was dental benefit utilization measured as the average number of restorative, preventative, and total procedures. Statistical methods include Welch's t-test and repeated measures mixed model ANOVA controlling for gender, race, age, length of enrollment, gaps in patient enrollment, citizenship status, and geographic location.

Results: This cohort of data showed a significant increase in the total number of procedures utilized by enrolled children (P value < 0.001). There were also significant increases in restorative services across all periods of enrollment.

Conclusion: The consolidation of Virginia's multiple managed care programs into a single vendor with increased reimbursement levels resulted in increased in access to care and improved utilization of dental services for children enrolled in Medicaid.

INTRODUCTION

Dental caries continue to be a common chronic disease of childhood and has even increased in the younger age groups. While the collective oral health of children has improved over the past several decades, between 1988-1994 and 1999-2004, prevalence of caries in primary teeth increased for youths aged 2 to 11 years.^{1,2} Oral diseases can have implications beyond the oral cavity and can cause significant problems for children with possible development of other chronic diseases. Oral health disparities are common in lower SES segments, especially in that of young children. As a group, young children constitute a vulnerable population because of their dependence on adults for assistance, an inability to communicate their needs, and their relative poverty. Although disparities amongst children can be found in nearly every marker of health, a disparity in oral health is commonly encountered due to the incidence of dental caries in low-income populations.³

Dental insurance coverage and access to care are critical components that affect the administration and delivery of dental care to the adults and children of the United States. This is especially true when examining segments of the population that are from low socioeconomic segments. Children who do not have any form of insurance are more likely to have untreated dental caries than those who have both medical and dental insurance.^{4,5} Studies have shown that children from low-income families (incomes below 200% of the federal poverty level) are less likely to receive dental care and more likely to have unmet dental needs than children from

higher income families.^{6,7} Oral health and hygiene habits established in childhood will often translate to a similar oral health status in adulthood. Several examples are available in the literature illustrating the link between poor oral hygiene with the progression of other health concerns including cardiovascular disease and pre-term, low birth weight babies if poor oral health continues into adulthood^{8,9} Access to care at an early age will allow children to receive dental care and become educated about the importance of oral health at an earlier point in their lives, in hopes of shaping their opinions and habits with regards to their overall health at an early age.

Prior to 2003, Virginia's dental benefits were administered by multiple managed care organizations. Approximately eight managed care organizations (MCO's) were responsible for providing the dental benefits to the enrolled members of the Medicaid program in the Commonwealth of Virginia. Each MCO operated independently and required the dental providers to complete separate contracts and credentialing to become authorized providers. These MCO's reimbursed dental providers at varying, independent rates, and had varying preauthorization requirements and procedures that were covered benefits.¹⁰ Across the nation dentists commonly cite the following reasons for not participating in Medicaid: low reimbursement rates, complex forms, and burdensome administrative requirements.^{11, 12} Expansions of public health insurance programs after enactment of the State Children's Health Insurance Program (SCHIP) in 1997 led to increases in low-income children's access to dental benefits. By 2000, all states had enacted some type of coverage expansion policy for children by expanding Medicaid, using a separate non-Medicaid program, or using some combination of these 2 strategies.⁶ In 2001, The Virginia Family Access to Medical Insurance Security program

(FAMIS) was established as Virginia's Title XII State Children's Health Insurance Program (S-CHIP), replacing the Children's Medical Security Insurance Program (CMSIP). Beginning in fiscal year 2003, children aged 6 through 19 who were members of families that fell between 100% and 133% of the federal poverty level were enrolled in the Commonwealth's Medicaid program. These new parameters were implemented in order to standardize the eligibility criteria for Medicaid enrollment and to prevent families from having children enrolled in two different programs. (i.e.—children under the age of 6 being enrolled in Medicaid and children from the same family, age six and over, being enrolled in FAMIS). Since that time, VaDMAS enrollment numbers have increased, reaching almost 79,000 in 2006.¹³

When the FAMIS program replaced the former CMSIP program on August 1, 2001 there were 32,587 children enrolled. A year later the legislature in the state of Virginia redesigned their state Medicaid program and implemented several policy changes. These changes had a dramatic effect on enrollment numbers, which grew by almost 42% to 53,863 by the end of 2003. However, under this administrative model, utilization rates for dental services among Medicaid enrollees were still quite low. For fiscal years 2002 and 2003, VDMAS reported overall pediatric dental utilization rates of 23.4% and 28.9% respectively.^{10, 14} As reported in Winheim's work, the national utilization rate based on NHANES 3, was 39%, with only 81% of eligible citizens enrolling in the Medicaid dental programs.¹⁵ Brickhouse et al determined that in changes implemented in North Carolina's S-CHIP (NCHC) program appeared to provide children with increased access to dental care compared to children in the previous Medicaid programs.¹⁶ In 2004, Pettinato et al determined that general, pediatric, and public health dentists in metropolitan and urban areas of the commonwealth of Virginia perform slightly more

diagnostic services and fewer corrective services than practitioners in more rural areas.¹⁷ In 2004, the Commonwealth of Virginia enacted further legislation in an attempt to overcome the state's low utilization rates of Medicaid dental benefits. Due to the positive changes enacted in other states, the Virginia Department of Medical Assistance Services set out to enact their version of Medicaid reform with the intentions of increasing both the overall number of Medicaid enrollees and the number of dental providers that participate in Virginia's Medicaid programs.¹⁴

After reviewing other states' policies, the dental advisory committee made several recommendations for change in administration of Virginia's Medicaid dental programs and the state legislature enacted sweeping policy reform. First, Virginia streamlined the filing process for dental claims to a single vendor, secondly raised reimbursement levels for dental procedure codes predominately delivered to children, and thirdly, had focused efforts of dental provider recruitment into the dental Medicaid program. In 2006, VaDMAS reported that 235 new dental providers began offering care to Medicaid patients as a result of the Smiles for Children program, and further reported that the program was responsible for 40,000 more children utilizing dental services under Medicaid.^{14, 18}

In this study we examined a cohort of children enrolled in VaDMAS dental program (2002-2008) according to specific dental plan performance measures, which included the average number of restorative, preventative, and total procedures. The purpose of this study was to determine effect of dental Medicaid reform in the state of Virginia on dental plan performance.

METHOD AND MATERIALS

Sample and data collection

Data from 825,000 dental claims filed during the pre-reform managed care period from 2002-2005 and the post-reform period from 2005-2008 were collected through the Virginia Department of Medical Assistance Services (VDMAS). Any Medicaid dental claim filed for an enrollee who had at least one dental visit as a participant in any of Virginia's Medicaid dental programs from July 1, 2002 through June 30, 2008 was included in this cohort. The pre-reform group included 559,820 enrollees and the post-reform group included 690,538 enrolled in Virginia Medicaid from 2002 through 2008. The data sets were reviewed and analyzed to see if 1) the Medicaid dental program reform impacted the utilization of various types of dental services (preventative and restorative), 2) if the reform efforts effectively reduced the access-to-care burden through an analysis of the overall percentage of the population currently receiving dental care, not just those with a previous history of benefit utilization. Pertinent data from all Medicaid dental claims filed for Virginia Medicaid enrollees was extracted based on data provided by the Virginia Department of Medical Assistance Services. The Virginia Commonwealth University Institutional Review Board for Human Subjects Protection approved this study.

Statistical Analyses

Data from 825,000 dental claims filed during the pre-reform managed care period from 2002-2005 and the post-reform period from 2005-2008 were examined. The data was stratified based on gender, race, age at first dental visit, length of enrollment in the Commonwealth's Medicaid dental programs, if there were any gaps in a patient's enrollment, the geographic location within the commonwealth based on FIPS code, Isserman definitions, the enrollee's citizenship status, and after considering the accepted taxonomies for classification based on the position paper put forth by the Center for Rural Health Policy Education and Research.²⁵

Statistical analysis included a descriptive analysis of the cohort using Welch's t-test and multivariate modeling using repeated measures mixed model ANOVA analysis using SAS 9.2 and JMP 9.²⁶

RESULTS

Descriptive Analysis of the Data Set

Descriptive statistics of each cohort covering both the pre- and post-reform data groups are available in Table 1. The cohorts are described through the categories of gender, race, citizenship status, geographic location in the state of Virginia using FIPS coding based on Isserman definitions, any gaps in enrollment in the Medicaid program, and the length of enrollment based on 6-month intervals. Table 2 lists the descriptive statistics pertaining to the outcome variables selected for the secondary analysis of the data set. The average age of the patient was 8.7 years old in the pre-reform group and 9.4 years old in the post-reform group. The pre-reform group patient experienced 9.93 procedures, while the average post-reform cohort member experienced 12.09 procedures. The average number of restorative procedures increased slightly from 1.54 restorative procedures per pre-reform patient to 2.17 restorative procedures per patient in the post-reform group. The data shows the average number of preventive procedures also increased from the pre-reform period average of 4.03 procedures to 4.38 in the post reform group.

Unadjusted ANOVA

The data was then analyzed using ANOVA for restorative, preventive, and total procedures. The data points were compared across the reform periods. Comparison of the unadjusted least squares means values across the cohort periods shows an increase of 0.6261, 95%CI [0.6087, 0.6436], ($\chi^2_{(df=1)} = 5,000.7$) in the average number of restorative procedures

between the cohort periods, an increase of 0.4693, 95%CI [0.4513, 0.4874], ($\chi^2_{(df=1)} = 2,599.9$) in the average number of preventive procedures between the cohort periods, and an increase of 2.3065, 95%CI [2.2632, 2.3498], ($\chi^2_{(df=1)} = 10,902$) in the total number of procedures experienced between the cohort periods. Each of the least squares means comparisons of the unadjusted, ANOVA indicate the increases to be statistically significant data with each comparison having a p-value ($Pr > ChiSq$) of $<.0001$ and a test statistic equal or greater than $\chi^2_{(df=1)} = 2,599.9$.

Adjusted ANOVA

The adjusted ANOVA compared the average number of restorative, preventive, and total procedures experienced within each cohort, adjusting for the six descriptive variables of race, gender, FIPS code, citizenship, length of enrollment, and gaps in enrollment. The data points were compared across the pre and post reform periods. Comparison of the least squares means from the adjusted ANOVA across the cohort periods shows an increase of 0.5523, 95%CI [0.5350, 0.5697], ($\chi^2_{(df=1)} = 3,904.6$) in the average number of restorative procedures between the cohort periods, an increase of 0.3029, 95%CI [0.2854, 0.3204], ($\chi^2_{(df=1)} = 1,152.4$) in the average number of preventive procedures between the cohort periods, and an increase of 1.9093, 95%CI [1.8673, 1.9513], ($\chi^2_{(df=1)} = 7925.8$) in the total number of procedures experienced between the cohort periods. Again, comparison of each of the least squares means of the adjusted ANOVA data indicates statistically significant data with each comparison having a p-value ($Pr > ChiSq$) of $<.0001$ and a test statistic equal or greater than $\chi^2_{(df=1)} = 1,152.4$.

Adjusted, Stratified ANOVA

Based on the analysis conducted by Winheim et al, the effect of enrollment in either of the two study periods on utilization rates was found to depend significantly on the length of time that a child was enrolled in their respective study period (Cochran-Mantel-Haenszel $X^2 = 6508$, $df=1$, $p<0.0001$).¹⁴ We decided to utilize a repeated measures, mixed model ANOVA test to provide stratified, adjusted testing of the data to compare the number of restorative, preventive, and total procedures experienced within each cohort while comparing similar enrollment periods.

Comparison of the least squares means within similar enrollment periods across the two cohorts for preventive procedures from the stratified, adjusted ANOVA across the cohort periods shows an increase of 0.061, 95%CI [-0.01, 0.14] in the average number of preventive procedures between the cohort periods at 0-6 month enrollments and an increase of 0.469, 95%CI [0.44, 0.49] in the average number of preventive procedures between the cohort periods at 31-36 month enrollments. However, comparison of the least squares means from the stratified, adjusted ANOVA across the cohort periods showed a decrease of 0.004, 95%CI [-0.05, 0.04] at 7-12 months of enrollment, 0.113, 95%CI [-0.16, -0.07] at 13-18 months of enrollment, 0.104, 95%CI [-0.15, 0.06] at 19-24 months of enrollment, and 0.051, 95%CI [-0.10, 0.00] 25-30 months of enrollment. The comparison of the least squares means for the enrollment periods greater than 12 months enrollment (i.e.—13-18, 19-24, 25-30 and 31-36 months) were found to be statistically significant ($Pr > ChiSq < .0001$). Through stratification of the data, we were able to assess comparable enrollment periods in the pre and post reform groups in regards to the type of procedures experienced as well as assessing overall dental benefit utilization.

Comparison of the least squares means from the stratified, adjusted ANOVA across the cohort periods for restorative procedures showed an increase of 0.379, 95%CI [0.27, 0.49] at 0-6 months of enrollment, 0.361, 95%CI [0.31, 0.42] at 7-12 months of enrollment, 0.292, 95%CI [0.23, 0.35] at 13-18 months of enrollment, 0.337, 95%CI [0.29, 0.39] at 19-24 months of enrollment, 0.407, 95%CI [0.36, 0.46] at 25-30 months of enrollment, and 0.677, 95%CI [0.65, 0.70] at 31-36 months of enrollment. All of the comparisons of the least squares means for average restorative procedures in all enrollment periods were found to be statistically significant ($Pr > ChiSq < .0001$).

Comparison of the least squares means from the stratified, adjusted ANOVA across the cohort periods for total procedures experienced showed an increase of 1.005, 95%CI [0.82,, 1.19] at 0-6 months of enrollment, 0.921, 95%CI [0.81, 1.03] at 7-12 months of enrollment, 0.602, 95%CI [0.48, 0.72] at 13-18 months of enrollment, 0.880, 95%CI [0.79, 0.99] at 19-24 months of enrollment, 1.157, 95%CI [1.04, 1.27] at 25-30 months of enrollment, and 2.449, 95%CI [2.39, 2.51] at 31-36 months of enrollment. All of the comparisons of the least squares means for the total number of procedures in all enrollment periods were found to be statistically significant ($Pr > ChiSq < .0001$). The summation of the above information indicates that as length of enrollment and participation in the Medicaid program increases, a general trend is apparent that utilization of services also increases.

DISCUSSION

Oral diseases are progressive and cumulative; ignoring oral health problems can lead to needless pain and suffering, infection, loss of function, increased health care costs, and life-long consequences in educational, social, and occupational environments. When oral health care is not accessible, the health implications, effects on quality of life, and societal costs are enormous.

¹⁹ Access to dental care for low-income children has been assured through administration of health benefits on both the state and federal level. Provision of such benefits by the government is essential to providing care to a segment of the population that may not otherwise have the means to obtain that type of care. Provision of benefits without removing barriers to care leads to a system that is inefficient and will likely fail to meet all the needs of the population that the system is designed to serve. As Winheim et al noted in prior work , the policy reforms enacted in 2005 by the State of Virginia were significantly associated with an increase in dental utilization rates among Medicaid participants in the state of Virginia. ¹⁴

Previous analyses indicate that children with longer enrollment times benefit from as much as a 53% increase in likelihood of having a dental visit. ¹⁴ The Medicaid dental plan reform enacted by the state increased access to care by making it more desirable for providers to participate in the state's plan due to improved efficiencies and increasing reimbursement rates. The on average 30% increase of the pre-reform rates bring them into the 60-75% range of (UCR) established fees typically covered through private insurances. ¹⁸

This study found that regardless of the length of enrollment, increases in the utilization of both restorative procedures and overall procedures were found to be statistically significant. After 12 months of enrollment, a comparison of pre-reform and post-reform data shows that utilization of preventive services also increased. The segments of the population that were previously untreated would have likely had unmet restorative dental needs and the initial encounters with providers would have included the need for more diagnostic and restorative services than preventive. However, after being enrolled for a period greater than twelve months, an increase in the number of preventive services being provided to the participants of Smiles for Children is evident.

Nietert et al found that the January 2000 dental Medicaid reform in South Carolina had marked impact on Medicaid enrollees' access to dental services. Although the reform was multifactorial, their main recommendation for reform was to "consider emulating the South Carolina experiment of setting reimbursement rates at the 75th percentile of dentist's fees." ²²

A review of other practices and policies implemented around the country illustrate positive changes in access-to-care and benefit utilization using a variety of approaches to promote reform of the Medicaid system. In Alabama, legislative reform increased provider participation by 39% through increasing reimbursement rates and streamlining administrative requirements. In Michigan, the Medicaid reimbursement rates were identical to private insurances, which resulted in increased utilization rates by 39%. New York legislators elected to attempt to remove a known barrier to care and went so far as to provide transportation as part of their policy reform, which resulted in increased utilization rates. The utilization of dental

services under the Medicaid program in New York went from 9% to 41%. Another approach that has proven effective in promoting positive reform in regards to the Medicaid system is reducing the administrative burden commonly encountered within the Medicaid system. In 2002, as part of their Medicaid policy reform the state of Tennessee removed dental services from their medical managed care system, known as TennCare, and contracted with Doral Dental, a specialized dental benefits manager. Tennessee coupled this reform package with increased reimbursement rates.²³ In 2005, utilizing the best practices evident in other state's policy reform packages, Virginia implemented a system very comparable to Tennessee's TennCare "carve out" and increased reimbursement rates by 28% over previous reimbursement rates.²⁴

In a review paper published in 2008 published by the National Academy for State Health Policy, after reviewing the reform policies enacted to date the authors found that "rate increases are necessary – but not sufficient on their own – to improve access to dental care. Easing administrative processes and involving state dental societies and individual dentists as active partners in program improvement are also critical. Administrative streamlining and working closely with dentists can help maximize the benefit of smaller rate increases, and mitigate potential damage when state budgets contract". Another critical component of effective reform was found to include parental and patient education through the use of "case management, educational brochures, and patient support provided by contractors to reduce barriers to care".²⁴

CONCLUSION

Medicaid reform in the Commonwealth of Virginia enacted in the form of program reform where Virginia's multiple managed care programs were discontinued and a single vendor was contracted to administer the dental benefits with increased reimbursement rates. This reform resulted in increased utilization of dental services for children enrolled in Medicaid especially for restorative dental services. The Smiles for Children program for dental services have been successful in reducing the access-to-care burden for the children of Virginia.

In summary,

- Medicaid reform in Virginia resulted in an increased utilization of all dental services, including preventive and restorative, as well as a general overall increase in utilization of dental benefits available under the Smiles for Children Insurance programs.
- The policy model enacted in Virginia is consistent with positive changes in dental benefit utilization and a reduction in the access-to-care problems seen in other states.
- Implementing Medicaid reform in a focused campaign to raise awareness of oral health may be linked to increase in dental benefit utilization in low-income populations

APPENDIX: TABLES AND FIGURES

Table 1: Descriptive Statistics of Pre and Post Reform Data

| | | 2002-2005 | | 2005-2008 | |
|-----------------------------|-----------------------|------------------|-------------|------------------|-------------|
| | | n | % | n | % |
| Sex | <i>Male</i> | 96010 | 49.9 | 150460 | 49.3 |
| | <i>Female</i> | 96346 | 50.1 | 154909 | 50.7 |
| Race | <i>White</i> | 79659 | 41.4 | 116654 | 38.2 |
| | <i>Black</i> | 88136 | 45.8 | 139510 | 45.7 |
| | <i>Hispanic</i> | 17692 | 9.2 | 36100 | 11.8 |
| | <i>Other</i> | 6715 | 3.5 | 11493 | 3.8 |
| | <i>Unknown</i> | 154 | 0.1 | 1612 | 0.5 |
| Citizenship Status | <i>US Citizen</i> | 188818 | 98.2 | 298906 | 97.9 |
| | <i>Non-US Citizen</i> | 3538 | 1.8 | 6463 | 2.1 |
| Geographic Location | <i>Rural</i> | 45714 | 23.8 | 67769 | 22.2 |
| | <i>Mixed Rural</i> | 25934 | 13.5 | 41751 | 13.7 |
| | <i>Mixed Urban</i> | 17514 | 9.1 | 29182 | 9.6 |
| | <i>Urban</i> | 103191 | 53.7 | 166662 | 54.6 |
| Enrollment Gaps | <i>>1 Gap</i> | 51746 | 26.9 | 103479 | 33.9 |
| | <i>No Gap</i> | 140610 | 73.1 | 201890 | 66.1 |
| Length of Enrollment | <i>0-6</i> | 3978 | 2.1 | 3912 | 1.3 |
| | <i>7-12</i> | 15178 | 7.9 | 19287 | 6.3 |
| | <i>13-18</i> | 14829 | 7.7 | 22112 | 7.2 |
| | <i>19-24</i> | 21514 | 11.2 | 31493 | 10.3 |
| | <i>24-30</i> | 25072 | 13.0 | 31493 | 11.9 |
| | <i>31-36</i> | 111785 | 58.1 | 31493 | 63.0 |

Table 2: Outcome Variables of Pre & Post Reform Data

| | | 2002-2005 | 2005-2008 |
|---------------------------------------|-------------|------------------|------------------|
| Average Age | <i>Mean</i> | 8.7 | 9.37 |
| | <i>SD</i> | 4.1 | 4.86 |
| Average # Total Procedures | <i>Mean</i> | 9.93 | 12.09 |
| | <i>SD</i> | 7.43 | 6.85 |
| Average # Restorative | <i>Mean</i> | 1.54 | 2.17 |
| | <i>SD</i> | 2.95 | 3.43 |
| Average # Preventive | <i>Mean</i> | 4.03 | 4.38 |
| | <i>SD</i> | 3.27 | 3.44 |

Table 3: Unadjusted ANOVA Results

| | | <i>LS Means</i> | <i>CI 95%</i> | | <i>DF</i> | <i>Chi- Square</i> | <i>Pr > ChiSq</i> |
|-------------------------|------------|---------------------|---------------|---------|-----------|------------------------|--------------------------|
| <i>Restorative</i> | 2005-08 | 2.1592 | 2.1471 | 2.1714 | | | |
| | 2002-05 | 1.5332 | 1.52 | 1.5463 | | | |
| | Difference | 0.6261 | 0.6087 | 0.6434 | 1 | 5000.7 | <.0001 |
| <i>Preventive</i> | 2005-08 | 4.329 | 4.3169 | 4.3412 | | | |
| | 2002-05 | 3.8597 | 3.8452 | 3.8742 | | | |
| | Difference | 0.4693 | 0.4513 | 0.4874 | 1 | 2599.9 | <.0001 |
| <i>Total Procedures</i> | 2005-08 | 12.0222 | 11.9916 | 12.0528 | | | |
| | 2002-05 | 9.7157 | 9.6826 | 9.7487 | | | |
| | Difference | 2.3065 | 2.2632 | 2.3498 | 1 | 10902 | <.0001 |

* Adjusted controlling for all 6 descriptive variables (race, gender, FIPS code, citizenship, length of enrollment, gaps in enrollment)

Table 4: ANOVA Result Adjusted for Covariance

| | | <i>LS Means</i> | <i>CI 95%</i> | | <i>DF</i> | <i>Chi-Square</i> | <i>Pr > ChiSq</i> |
|-------------------------------|------------|-----------------|---------------|---------|-----------|-------------------|----------------------|
| Restorative Procedures | 2005-08 | 2.5359 | 2.4809 | 2.5909 | | | |
| | 2002-05 | 1.9836 | 1.928 | 2.0392 | | | |
| | Difference | 0.5523 | 0.535 | 0.5697 | 1 | 3904.6 | <.0001 |
| Preventive Procedures | 2005-08 | 3.3699 | 3.3293 | 3.4104 | | | |
| | 2002-05 | 3.067 | 3.0249 | 3.109 | | | |
| | Difference | 0.3029 | 0.2854 | 0.3204 | 1 | 1152.4 | <.0001 |
| Total Procedures | 2005-08 | 10.5914 | 10.4786 | 10.7043 | | | |
| | 2002-05 | 8.6821 | 8.5672 | 8.797 | | | |
| | Difference | 1.9093 | 1.8673 | 1.9513 | 1 | 7925.8 | <.0001 |

* Adjusted controlling for all 6 descriptive variables (race, gender, FIPS code, citizenship, length of enrollment, gaps in enrollment)

Table 5: Adjusted Stratified ANOVA by Enrollment Period Length

| | Enrollment Lengths | 2005-08 | | 2002-05 | | Diff | | | DF | ChSq | Pr > ChiSq |
|-------------------------|--------------------|------------|-------|----------|-------|----------|--------|-------|------|---------|------------|
| | | LS Means | SE | LS Means | SE | LS Means | 95% CI | | | | |
| Preventive | 0-6 | 2.164 | 0.068 | 2.103 | 0.071 | 0.061 | -0.01 | 0.14 | 1 | 2.56 | 0.110 |
| | 7-12 | 2.466 | 0.035 | 2.471 | 0.038 | -0.004 | -0.05 | 0.04 | 1 | 0.04 | 0.838 |
| | 13-18 | 2.826 | 0.045 | 2.939 | 0.048 | -0.113 | -0.16 | -0.07 | 1 | 22.20 | <.0001 |
| | 19-24 | 3.365 | 0.055 | 3.469 | 0.057 | -0.104 | -0.15 | -0.06 | 1 | 21.07 | <.0001 |
| | 25-30 | 4.049 | 0.075 | 4.100 | 0.076 | -0.051 | -0.10 | 0.00 | 1 | 4.59 | 0.032 |
| | 31-36 | 4.992 | 0.055 | 4.523 | 0.055 | 0.469 | 0.44 | 0.49 | 1 | 1384.70 | <.0001 |
| | Restorative | 0-6 | 1.795 | 0.230 | 1.416 | 0.204 | 0.379 | 0.27 | 0.49 | 1 | 46.08 |
| 7-12 | | 2.065 | 0.065 | 1.704 | 0.065 | 0.361 | 0.31 | 0.42 | 1 | 165.48 | <.0001 |
| 13-18 | | 2.342 | 0.066 | 2.051 | 0.069 | 0.292 | 0.23 | 0.35 | 1 | 93.34 | <.0001 |
| 19-24 | | 2.654 | 0.085 | 2.316 | 0.085 | 0.337 | 0.29 | 0.39 | 1 | 167.52 | <.0001 |
| 25-30 | | 2.805 | 0.084 | 2.397 | 0.085 | 0.407 | 0.36 | 0.46 | 1 | 248.05 | <.0001 |
| 31-36 | | 3.127 | 0.060 | 2.450 | 0.060 | 0.677 | 0.65 | 0.70 | 1 | 3289.10 | <.0001 |
| Total Procedures | | 0-6 | 6.986 | 0.304 | 5.981 | 0.276 | 1.005 | 0.82 | 1.19 | 1 | 108.82 |
| | 7-12 | 8.152 | 0.110 | 7.231 | 0.110 | 0.921 | 0.81 | 1.03 | 1 | 290.03 | <.0001 |
| | 13-18 | 9.220 | 0.134 | 8.618 | 0.141 | 0.602 | 0.48 | 0.72 | 1 | 96.70 | <.0001 |
| | 19-24 | 10.697 | 0.157 | 9.807 | 0.159 | 0.880 | 0.79 | 0.99 | 1 | 238.41 | <.0001 |
| | 25-30 | 12.290 | 0.193 | 11.133 | 0.194 | 1.157 | 1.04 | 1.27 | 1 | 373.39 | <.0001 |
| | 31-36 | 14.610 | 0.142 | 12.161 | 0.143 | 2.449 | 2.39 | 2.51 | 1 | 6754.60 | <.0001 |

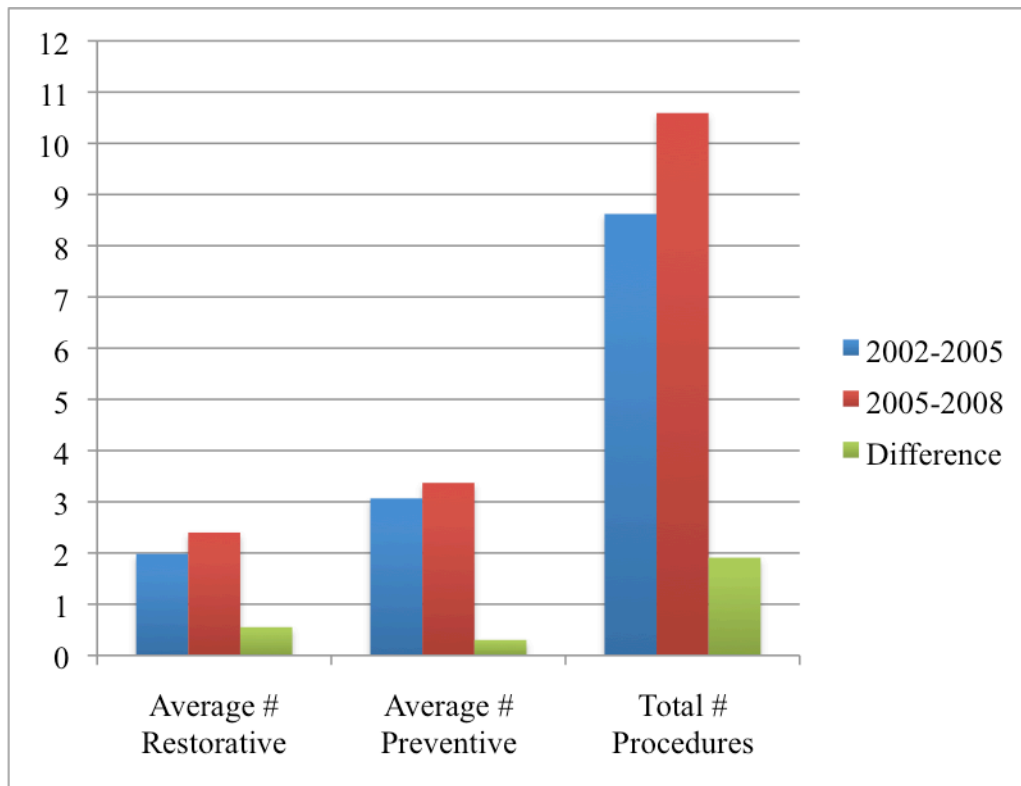


Figure 1: ANOVA Results Adjusted for Covariance

Comparison of LS means for types of procedures utilized by pre and post reform groups, adjusted for gender, race, age, citizenship, geographic location, and gaps in enrollment.

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