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# NOT ALL CAVITIES ARE TREATED EQUAL

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INCREASING ACCESS TO PREVENTIVE DENTAL CARE IN TEXAS

Final Report

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## TABLE OF CONTENTS

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Children’s Oral Health .....	1
Low-income Children Lack Dental Care Access .....	2
Children in Texas .....	4
Texas’ Oral Health Obligations .....	4
Preventive Dental Care .....	6
Dental Examinations.....	6
Radiograph Exams .....	6
Topical Fluoride Treatments .....	6
Sealants.....	7
Fluoridated Water .....	7
Cost-Benefit Analysis .....	8
Measure of Costs .....	8
Measure of Benefits.....	9
Sealants.....	10
Sealant Analysis .....	11
Fluoride Varnish .....	12
Fluoride Varnish Analysis .....	12
Net benefits of Preventive Care .....	13
Community Fluoride .....	14
What is Access to Care?.....	16
Barriers to Access .....	16
Dentist Availability.....	17
Low Reimbursement Rates.....	18
Dental Hygienist Regulation .....	23
Rural/Urban Divide .....	25
Lack of DiversiTY AMONG Care Professionals.....	28
Lack of Knowledge & Education .....	29
Conclusion .....	30
Appendix 1: Acronym Listing.....	36
Appendix 2: Oral Health Care Programs .....	37

Education Initiatives .....	37
Increasing the Dental Professional Supply Initiatives .....	37
Rural Oral Health Initiatives .....	38
School Based Initiatives.....	38
Dental Home INITIATIVES.....	39
Appendix 3: Texas Demographics.....	40
Dentist Demographics.....	41
Student Demographics.....	43
Dentist Availability by County .....	44
Appendix 4: Access and Barriers .....	46
Availability Supply: Dental Professionals.....	46
Barriers to a Higher Availability.....	48
Medicaid Reimbursement Rates .....	48
Regulations on Dental Hygienists .....	50
A Canceled Loan Repayment Program .....	51
Utilization Demand: A Patient Shortage .....	52
Barriers to Higher Utilization.....	52
Education .....	53
Rural/Urban Divide .....	54
Affordability .....	55
Cultural Differences.....	56
Appendix 5: Texas Legal Environment.....	60
Frew v. Hawkins .....	60
Dentist Professional Regulations .....	61
Dentists.....	61
Dental Hygienists.....	62
Dental Assistants.....	62
Conclusion .....	62
Appendix 6: House Bill 1248 .....	64
Appendix 7: Texas Oral Health Programs.....	65
Medicaid/ CHIP.....	65

Medicaid/ Chip Spending .....	67
Texas Health Steps .....	67
The Oral Health Program .....	69
Texas Oral Health Coalition .....	70
Texas Oral Health Surveillance System .....	71
Texas Dental Sealant Program .....	72
Head Start Dental Home .....	73
Parents, it's up to You! Oral Health Program .....	73
Children's Medicaid Loan Repayment .....	73
St. David's Dental Program .....	74
Appendix 8: Preventive Care .....	77
Daily Oral Care.....	77
Dental Examinations.....	77
Fluoridated Water .....	78
Topical Flouride treatments.....	80
Radiograph Exams.....	80
Sealants.....	81
Appendix 9: Cost-benefit Analysis of Care Methods .....	85
Summary of Findings .....	85
Methodology.....	85
Measure of Costs .....	85
Measure of Benefits.....	86
Sealants.....	88
Sealant Analysis .....	89
Fluoride Varnish .....	90
Fluoride Varnish Analysis .....	90
Community Fluoride .....	91
Conclusions.....	93
Recommendations.....	95
Appendix 10: Oral Care Delivery Methods.....	97
The Dental Home .....	97

Pros.....	100
Cons .....	100
The I-Smile Dental Home Example .....	100
Mobile Dentistry Facilities .....	100
Considerations for Practitioners: .....	101
School Based Considerations for Practitioners .....	101
Pros.....	102
Cons .....	102
Current Program Example: St. David’s Dental Program. ....	102
School Based Dental Programs .....	103
Considerations for Practitioners .....	103
Pros.....	104
Cons .....	104
Example of Current Program: New Mexico School-Based Dental Sealant Program .....	105
Comparison of Delivery Methods .....	105
Appendix 11: Delivery Methods Cost Benefit Analysis .....	110
Benefits and Drawbacks of Delivery Methods .....	111

The purpose of this report is to examine oral health care for children in Texas. United Ways of Texas is concerned with the disproportionate levels of access that low-income children face. This research team was charged by United Ways to:

- Develop appropriate measures of access to preventive dental care for children
- Analyze the geographic and socioeconomic patterns of such access measures in Texas
- Calculate the expected benefits and costs of expanding access

There are significant disparities in access to oral health care for children in Texas. These disparities are frequently based on income levels, ethnic status, and if a child lives in an urban or rural area. Because disparity continues to exist among Texans, this report offers the following recommendations to improve access to dental care.

### Report Recommendations

1. Explore State Subsidies for Fluoridated Water
2. Increase Medicaid Reimbursement Rates and Annual Limit
3. Decrease Dental Hygienist Regulations
4. Expand the Use of School-Based Clinics
5. Foster Diversity among Dental Professionals
6. Improve Oral Health Awareness

To support these recommendations, this report will:

1. Describe the importance of children’s oral health.
2. Show disparities that exist among children.
3. Describe the types of preventive care that can improve children’s oral health
4. Demonstrate that preventive care can be cost-effective.
5. Identify barriers to access in Texas through literature and research

## CHILDREN’S ORAL HEALTH

In 2000, the U.S. Surgeon General redefined oral health by linking it to general health and making the two inseparable.<sup>1</sup> For the first time in American history, oral health became equal to general health, in terms of importance.<sup>2</sup> The Surgeon General stated, “Oral health is a critical component of health and must be included in the provision of health care and the design of community programs.”<sup>3</sup> The Surgeon General admonished health practitioners not to ignore the importance of oral health and the effects poor oral health has in the general health of their patients.

Twelve years later, many Americans still do not receive sufficient oral health care. In 2011, over 30 million Americans lived in dental Health Professional Shortage Areas,<sup>4</sup> limiting access to care and causing dental caries (tooth decay and cavities) to remain a “silent epidemic.”<sup>5</sup> This

epidemic affects everyone’s health, adults and children, but is particularly problematic for children.

Poor oral health in children is detrimental to a child’s overall development and growth, negatively affecting speech, nutrition, class attendance, and quality of life. Tooth decay is the most common chronic childhood disease and is five times more common than asthma.<sup>6</sup> The National Center for Chronic Disease Prevention and Health Promotion estimates that tooth decay affects 25% of children aged 6 to 11 years and 59% of adolescents 12 to 19 years old.<sup>7</sup> Many children with poor oral health suffer daily pain from dental caries and miss instructional time to receive restorative treatment.<sup>8</sup> In 2000, the Department of Health and Human Services estimated that children lost 51 million school hours per year throughout the nation because of the lack of oral health.<sup>9</sup>

### Federal Poverty Line

The minimum amount a household needs for food, clothing, transportation, housing, and other essentials. The line varies depending upon the number of members residing in each household, but does not vary geographically. The poverty line is the same in rural Texas as it is in New York City.

The 2012 federal poverty level for a family of four is \$23,050.

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## LOW-INCOME CHILDREN LACK DENTAL CARE ACCESS

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Children in low-income families, like those enrolled in Medicaid and Children’s Health Insurance Program (CHIP), are twice as likely to experience tooth decay and are less likely to receive preventive dental care than children from middle to upper-class homes.<sup>10</sup> The Kaiser

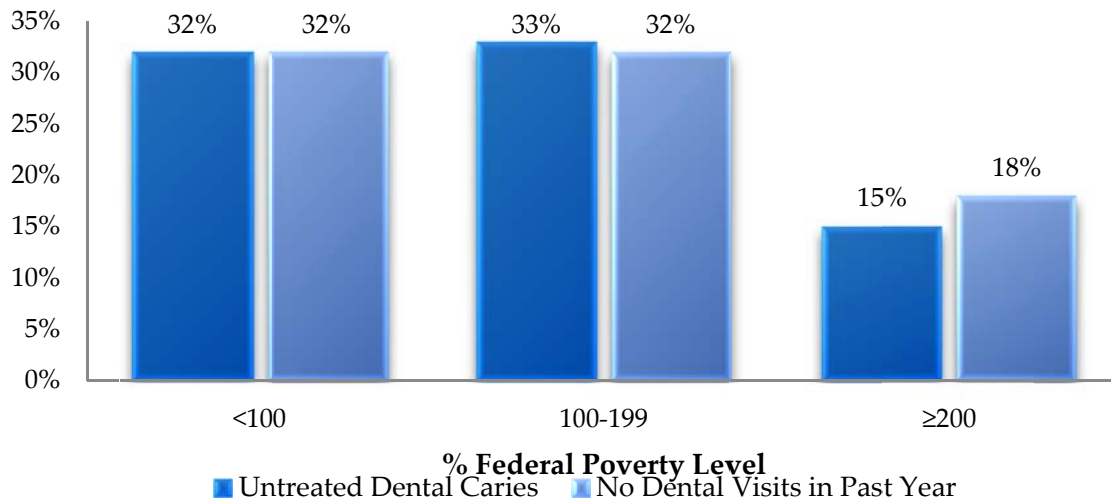
### Low-income Children

Children currently enrolled in the free and reduced lunch program, and/or Medicaid. They are also commonly referred to as economically disadvantaged (ED).

Commission on Medicaid and the Uninsured conducted a study on dental access among children by their income level, using the federal poverty level as the measure of income. According to their report, 32% of children living in a home with an income less than the federal poverty level have untreated dental caries and have not seen a dentist within the last year.<sup>11</sup>

Individuals with higher-socioeconomic status are generally able to receive dental care, whereas individuals with lower-socioeconomic status are not.<sup>12</sup> As Figure 1 demonstrates, low-income children are twice as likely to have untreated caries compared to children living at 200% or higher than the federal poverty level. The figure indicates that not only do low-income children suffer from a higher percentage of untreated dental caries, but they also have a higher likelihood of not seeing a dentist. As a result, dental caries are significantly more common among low-income children.

**FIGURE 1: LACK OF DENTAL CARE AMONG CHILDREN, BY INCOME**



**Source:** Julia Paradise, “Dental Coverage and Care for Low-Income Children: The Role of Medicaid and SCHIP,” The Kaiser Commission on Medicaid and the Uninsured, (2008): 1-5.

Minority groups experience disparities similar to those experienced by those of low-socioeconomic status.<sup>13</sup> For example, 24 % of African Americans have experienced tooth decay, compared to only 15 % of Caucasians.<sup>14</sup> In addition, Hispanics are four times more likely to have severe caries than Caucasians.<sup>15</sup> Figure 2 compares the oral health of eight-year-old children in Texas based on their ethnicity. Minority children have a much higher percentage of reported caries and untreated decay. For example, Hispanic children experience 11 percentage points more caries than White children.<sup>16</sup>

**FIGURE 2: DENTAL CARIES EXPERIENCED AND UNTREATED DECAY AMONG EIGHT-YEAR-OLD CHILDREN IN TEXAS.**



**Source:** Texas Department of State Health Services, “Basic Screening Survey,” Oral Health Program 2004-2006.



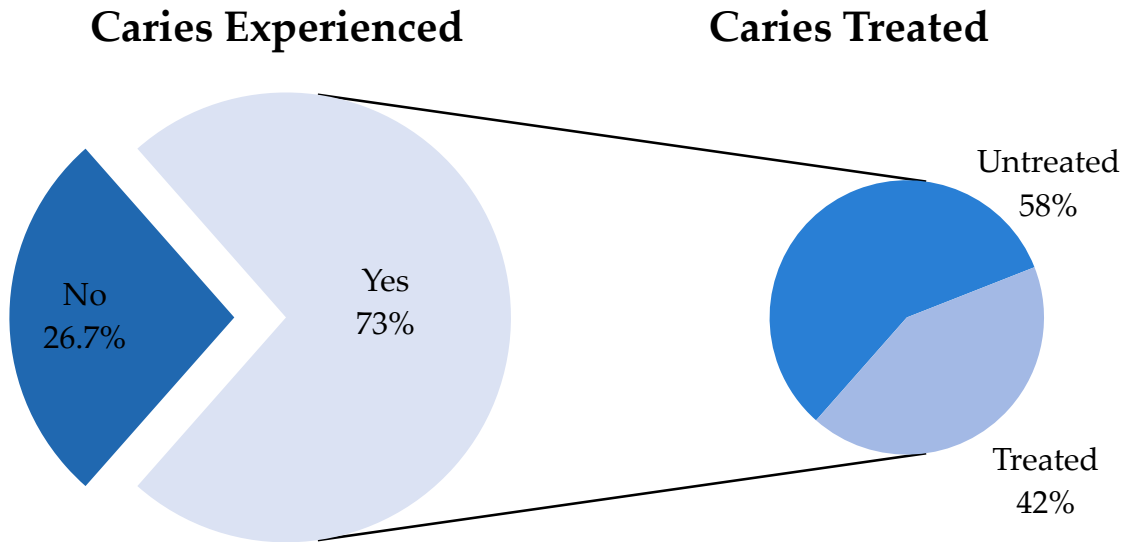
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## CHILDREN IN TEXAS

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Texas ranks below the national average with respect to children's oral health. During the 2007-2008 school year 73% of third graders in Texas had had some experience with tooth decay,<sup>17</sup> but of those who had experienced caries, only 42% had received treatment.<sup>18</sup> Compared to other states, Texas had the highest percentage of third graders with untreated caries and the second highest percentage of children with tooth decay.<sup>19</sup>

**FIGURE 3: CARIES EXPERIENCED BY TEXAS THIRD GRADERS, 2007-2008**



**Source:** Centers for Disease Control, National Oral Health Surveillance System, 2011

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## TEXAS' ORAL HEALTH OBLIGATIONS

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**M**edicaid is an entitlement program that provides health care through a combination of state and federal funding. Founded in 1965 as part of Title XIX of the Social Security Act, the program is designed to provide medical coverage to low-income individuals.<sup>20</sup> The Texas Medicaid program was established in 1967 and is administered through Health and Human Services Commission (HHSC).<sup>21</sup> Also in 1967, the federal government created the Early and Periodic Screening, Diagnosis, and Treatment (EPSDT) program, requiring state Medicaid programs to provide certain services to children enrolled in the program.<sup>22</sup>

In 1989, Texas developed Texas Health Steps (THSteps) as a mechanism to implement EPSDT standards. THSteps is designed to ensure that Texas Medicaid beneficiaries receive the federally recommended services.<sup>23</sup> EPSDT or THSteps preventive dental services include:

- Dental examinations (initial or periodic)
- Cleaning (prophylaxis)
- Oral health education

- Topical fluoride
- Sealants to certain teeth

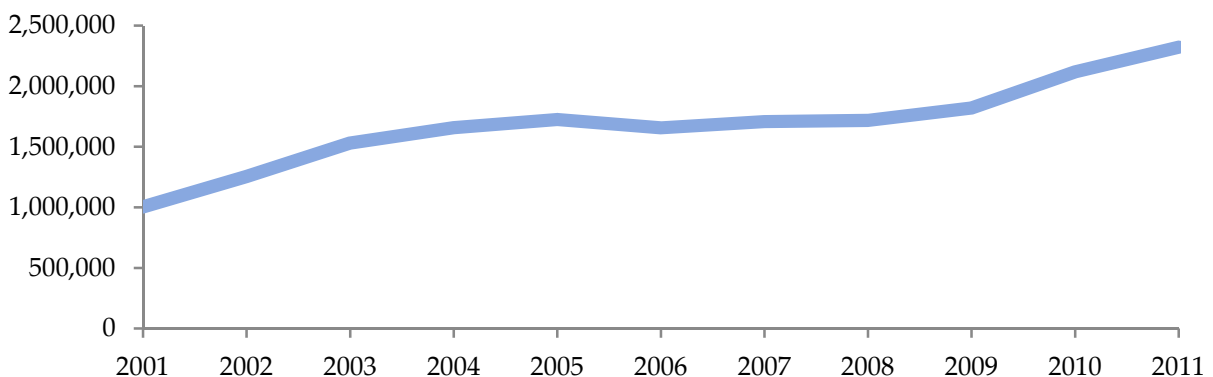
In 1993, the class action lawsuit *Frew v. Hawkins* was filed on behalf of all children under 21 in Texas on Medicaid. The plaintiffs alleged the state of Texas was not fulfilling federal Medicaid EPSDT requirements. Specifically, the case argued that Texas children on Medicaid lacked access to check-ups and follow-up medical and dental care. The plaintiffs originally filed the case in the federal courts in the eastern district of Texas.

In 1996, a consent decree was filed, in which the state and plaintiffs agreed on actions the state should take to comply with federal EPSDT mandates. The consent decree required Texas Medicaid to increase the number and proportion of children receiving check-ups, increase training, outline provider roles, increase accountability and management, and improve managed care.<sup>24</sup> Following the verdict, the plaintiffs and state agreed on a set of corrective action orders to ensure compliance with the consent decree and increase children’s access to EPSDT. In 2007, the 80<sup>th</sup> Texas Legislature appropriated a total of \$1.8 billion dollars to comply with the consent decree, raise Medicaid reimbursement rates, fulfill the corrective action plans, and establish and fulfill strategic initiatives.<sup>25</sup> HSSC then submitted to the courts House Bill 15, *Frew Expenditures*, which outlined how they would use the appropriations. (For more information on *Frew* and the Texas legal environment, please see Appendix 5.) There are four overarching objectives that HSSC identified in HB 15 that would fulfill the state’s requirements in the consent decree:

- Increase the number of children who receive THSteps medical and dental checkups
- Increase participation of medical and dental providers who service children in the Texas Medicaid program
- Improve appropriate utilization of medically necessary services
- Improve coordination of care

The case remains open as the courts, HHSC, and THSteps continue to work toward the fulfilling the 1996 consent decree. Meanwhile, the number of children enrolled in Medicaid continues to rise each year (see Figure 4).

**FIGURE 4: NUMBER OF CHILDREN ENROLLED IN TEXAS MEDICAID**



**Source:** Texas Medicaid Enrollment Statistics, 2011

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## PREVENTIVE DENTAL CARE

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**P**reventive dental care encompasses multiple practices and techniques, all aimed at improving children’s oral health. Usually, these techniques or best dental practices vary slightly by state, dental school, and oral health organization. This section will define the common treatments required by EPSDT—dental examinations, radiograph exams, topical fluoride treatment, sealants—in addition to one of the key preventive treatments from the literature—fluoridated water.

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### DENTAL EXAMINATIONS

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Dental examinations include teeth cleaning, as well as observation of gums and teeth to identify any potential problems, such as inflammation or dental caries.<sup>26</sup> During the dental examination, the care provider may also provide brief oral health education and dental care recommendations, evaluate the risk of potential tooth decay, or perform diagnostic procedures such as a radiograph examination.<sup>27,28</sup>

Medicaid recommends that children visit the dentist every six months, that their teeth be examined and cleaned, and that appropriate preventive care be provided.<sup>29</sup> The ADA also recommends that individuals visit the dentist twice a year. For children, this practice should start no later than the child’s first birthday.<sup>30</sup> More specifically, the American Academy of Pediatric Dentistry (AAPD) suggests children should visit a pediatric dentist between 6 and 12 months.<sup>31</sup> The early examination and preventive dental care protects children from tooth decay in the future and help children stay cavity-free.<sup>32</sup> Without a professional cleaning, children often face severe dental problems later in their life.

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### RADIOGRAPH EXAMS

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Radiograph exams commonly identify caries during early stages of development. According to the ADA, new patients should receive a comprehensive radiograph exam, regardless of age.<sup>33</sup> By decreasing the amount of time between radiograph exams in higher risk patients, dentists can identify caries much earlier. For all patients that dentists identify to have a high risk for developing caries, the ADA states that radiograph exams are necessary every 6-12 months.<sup>34</sup> However if patients have a low risk of caries, dentists do not need to use radiographs in exams as often. In fact, if patients have seen a dentist and have no increased risk factors for caries, the ADA recommends radiograph exams every 12-24 months.<sup>35</sup>

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### TOPICAL FLUORIDE TREATMENTS

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Topical fluoride treatments applied by dentists include fluoride gels and varnishes, which vary by the strength of the sodium fluoride and the length of time the treatment remains on the tooth surface.<sup>36</sup> The AAPD recommends that children with a high risk of developing caries should receive a professional fluoride treatment every three to six months.<sup>37</sup> For those children with moderate risk, the AAPD recommends a less frequent treatment schedule, but at least every six months. The AAPD acknowledges that many children with high risk may not have regular access to a dentist, and thus, trained non-dental healthcare professionals could effectively apply fluoride

varnish to decrease the frequency of early childhood caries.<sup>38</sup> Other fluoride treatments include fluoride toothpaste, mouth rinses, and supplements.

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## SEALANTS

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Dental sealants are clear protective coatings placed on molars to prevent caries and to protect deep cracks and grooves on chewing surfaces. Sealants act as a shield for vulnerable areas where normal brushing and flossing cannot reach. To apply sealants, the dental professional places the sealant gel on a cleaned tooth and then shines an ultraviolet light that dries the coating.<sup>39</sup> After application, the patient can immediately begin eating food.

Health care organizations recommend sealants because of their effectiveness. One study found that sealants reduced caries by 87 % after 12 months in children.<sup>40</sup> Sealants continue to reduce caries in children and will generally protect teeth while they remain intact. After two years, 75 % of sealants were still intact and protecting children's teeth, according to a survey of dentists completed by the ADA.<sup>41</sup> Sealants are generally effective for five years, but some can last much longer. Due to their long lifetime and effectiveness in preventing future caries, sealants are a very popular treatment for children.

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## FLUORIDATED WATER

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Fluoride is one of the most widely used mechanisms to prevent tooth decay. The Center for Disease Control (CDC) classifies fluoridation of drinking water as one of the top ten great public health achievements.<sup>42</sup>

The U.S. Department of Health and Human Services recommends a fluoride level of 0.7 parts per million (ppm).<sup>43</sup> The Environmental Protection Agreement (EPA) sets the Maximum Contaminant Level for fluoride at 4 ppm. In addition, the EPA has set a non-enforceable secondary maximum standard for fluoride at 2.0 ppm.<sup>44</sup> This secondary standard seeks to regulate the contaminants in drinking water that may cause aesthetic or cosmetic effects such as skin or tooth discoloration.

Currently, 82 % of Texas water is fluoridated,<sup>45</sup> making Texas one of two states (North Dakota), west of the Mississippi River that has achieved the Healthy People 2010 target.<sup>46</sup> However, 20.4% of Texas public water systems have not reached the ideal level of fluoride based on the recommended level of HHP.<sup>47</sup> This leaves nearly 5 million of the 24 million Texans served by public water systems without access to fluoridated water.<sup>48</sup>

## COST-BENEFIT ANALYSIS

The three most commonly studied forms of preventive care are sealants, fluoride treatments, and fluoridated water. There are costs and benefits associated with each treatment. The capstone team performed a cost-benefit analysis on fluoride varnish and sealants, and summarized research by the CDC on fluoridated water. The team calculated the cost of restorative and preventive treatment using two different numbers: the ADA 75<sup>th</sup> percentile from the West South Central Region *2011 Survey of Dental Fees*, and the 2012 Medicaid reimbursement rates in Texas. The ADA survey shows the market rate according to dentists, and is a measure of the cost to society.<sup>49,50</sup>

**Market Rate**

We used the 75<sup>th</sup> percentile of fees for the market rate, as is common in the literature

### MEASURE OF COSTS

Total cost equals the treatment fee and the explicit and implicit costs to the patient and their parent, i.e. the cost to the parent for leaving his/her job to take a child to the dentist and the cost of the child for leaving school. The time spent to conduct the dental procedure plus the patient and parent travel costs are included in this calculation. Table 1 summarizes the parameters of this analysis.

**TABLE 1: COST ASSUMPTIONS OF PREVENTIVE CARE AT MARKET REIMBURSEMENT RATES**

Parameter	Sealant	Fluoride Varnish
<b>Cost of one time application of treatment<sup>51</sup></b>	<b>\$400.00</b>	<b>\$35.00</b>
Opportunity Cost:		
Miles to Dentist (roundtrip) <sup>52</sup>	20.4 miles	20.4 miles
Mileage Rate <sup>53</sup>	\$0.55	\$0.55
<b>Mileage Cost (Distance*Rate)</b>	<b>\$11.22</b>	<b>\$11.22</b>
Travel Time (minutes) <sup>54</sup>	44	44
Visit Time <sup>55</sup>	40	2
Total Time (minutes)	84	46
Student Time Rate (per hour) <sup>56</sup>	\$6.72	\$6.72
Parent Time Rate (per hour) <sup>57</sup>	\$10.00	\$10.00
Total Rate	\$16.72	\$16.72
<b>Cost of Time (<math>\frac{Total\ Rate}{60} \times Total\ Time</math>)</b>	<b>\$23.41</b>	<b>\$12.82</b>
<b>Total Cost of Preventive Care</b>	<b>\$434.63</b>	<b>\$59.04</b>
<b>Total Cost of Preventive Care per Tooth</b>	<b>\$54.33</b>	<b>\$7.38</b>

As illustrated in Table 1, the market fee for placing sealants on eight teeth is \$400.00. The capstone team calculated that the average patient would travel twenty miles round-trip to find a dentist, which we then multiplied by the federal mileage reimbursement rate to calculate our mileage cost. The capstone team determined that patients would travel for forty-four minutes, to arrive at the dental office and based on the ADHA estimation that time to place a sealant is five minutes. We only looked at the time for a sealant, and chose not to include the time for the entire visit. The team then calculated the average school district expenditures per pupil-hour, assuming a seven hour school day, and added it to the average hourly wage calculation to get our student and parent time rate (total rate). The team then multiplied that by the visit time (forty-nine minutes) to get our cost of time. We added our cost for the treatment, the mileage cost, and the cost of time together to get our total cost of preventive care.

Based on our calculation, it would cost \$54.33 to seal one tooth and \$7.38 to provide fluoride varnish at the market rate. However, this estimate is far from complete. Children in rural areas must travel much further than the national average to receive dental care. Therefore, it is likely that our calculation underestimates the total cost.

## MEASURE OF BENEFITS

Calculating the benefits is more complex than calculating the costs. First, the team estimated the averted future costs of restorative treatment, including time. Then we multiplied the total cost by the probability that a child would get a cavity, if they received the preventive treatment. These benefits are then discounted to the present value using a conservative interest rate of 1% in a time frame of five and ten years. The research team used 1% because of the low real interest rates in the U.S. today. After computing the present value of benefits, we compared the difference to the cost of preventive care.

**TABLE 2: COST CALCUATIONS**

Parameter	Cost
<b>Cost of one filling<sup>58</sup></b>	<b>\$133.00</b>
Opportunity Cost:	
Miles to Dentist <sup>59</sup>	22.4 miles
Mileage Rate <sup>60</sup>	\$0.55
<b>Mileage Cost (Distance*Rate)</b>	<b>\$11.22</b>
Travel Time (minutes) <sup>61</sup>	44
Visit Time <sup>62</sup>	20
Total Time (minutes)	64
Student Time Rate (per hour) <sup>63</sup>	\$6.72
Parent Time Rate (per hour) <sup>64</sup>	\$10.00
Total Rate	\$16.72
<b>Cost of Time</b>	<b>\$ 17.83</b>
<b>Total Cost of Restorative Care</b>	<b>\$ 162.05</b>

One caveat of this calculation is the impossibility to estimate certain intangible benefits. For example, discomfort and pain resulting from tooth decay is major issue that can be avoided but cannot be easily estimated. Therefore, our estimate of benefits is a lower bound on the full benefits from sealants.

Table 3 describes the relative effectiveness of sealants and fluoride varnishes at five and ten years. As the table illustrates sealants are more effective than fluoride varnishes at preventing caries. After five years, 15% of sealed teeth, 36% of teeth treated with fluoride varnish, and 66% of untreated teeth will develop caries.<sup>65</sup>

**TABLE 3: EFFECTIVENESS OF PREVENTIVE TREATMENTS**

Probability	Treatment Type			
	Sealants		Fluoride Varnish	
	5 years	10 years	5 years	10 years
<b>Probability of a cavity with preventive care</b>	15.0%	26.6%	35.7%	55.8%
<b>Probability of a cavity without preventive care</b>	63.6%	76.7%	65.6%	76.7%

Source: Bravo, M., et. al. 2005. "Sealant and Fluoride Varnish in Caries: A Randomized Trial." Journal of Dental Research (84).

To calculate the net benefit of preventive care, we will take the probability that a child will develop a cavity in the future without preventive care and subtract from that the probability of a cavity developing with preventive care. We will then multiple the probabilities by the cost of the treatment and then subtract from the difference the cost of preventive treatment. This will provide us a net benefit or cost. The calculations will be performed over different time periods and discount rates to measure the sensitivity of our calculations. We discount the future costs to show how much money a person would need to have in the bank today to pay for the treatment costs in the future. The calculations are shown for sealants and fluoride varnish. The Center for Disease Control and Prevention completed a cost-benefit analysis for community fluoridation, and the findings are described below.

## SEALANTS

Table 4 illustrates the net benefit to society of sealants. The calculations performed in Table 4 and 5 are found using the reimbursement rate from ADA, the cost of time and travel to the parent and child, and discounting the cost to the present. The net benefit for sealants is positive with any plausible discount rate. For example, if that interest rate were 1%, which is plausible given current low interest rates, the net benefit to society for sealing a single tooth is \$20.61 at five years and \$30.94 at ten years. As the interest rate rises, the net benefit to society decreases but does not turn negative.

**TABLE 4: NET BENEFIT TO SOCIETY OF SEALANT USING MARKET RATE**

Discount Rate	R = 1%		R = 2%		R = 3%	
	5 years	10	5 years	10 years	5 years	10 years
Cost without Sealant	\$98.06	\$124.30	\$93.35	\$101.97	\$88.91	\$92.49
Cost with Sealant	\$23.13	\$39.02	\$22.02	\$35.36	\$20.97	\$32.08
<b>Difference</b>	<b>\$74.94</b>	<b>\$85.27</b>	<b>\$71.33</b>	<b>\$66.60</b>	<b>\$67.94</b>	<b>\$60.41</b>
Sealant Application	\$54.33	\$54.33	\$54.33	\$54.33	\$54.33	\$54.33
<b>Net Benefit</b>	<b>\$20.61</b>	<b>\$30.94</b>	<b>\$17.01</b>	<b>\$12.28</b>	<b>\$13.61</b>	<b>\$6.08</b>

Furthermore, given our assumptions, these estimates are a lower bound. We assumed that the filling used would be an amalgam filling on one side of the tooth. We purposely used the lowest restorative cost we could find. The amalgam filling on one side only effectively fills a tooth only when the cavity is very small and caught early. If the cavity is more severe the cost to repair the cavity increases, and the net benefit of sealants increases. This is why preventive care is so valuable for low-socioeconomic children. These children are less likely to regularly visit a dentist. This means that their cavities are also less likely to be caught early, which, in turn, increases the likelihood that they will need an expensive procedure. If the cavity can be prevented in the first place (using preventive care like fluoride or sealants), it will be less expensive in long run. Again, we are not able to quantify the pain and suffering a child feels while waiting for a tooth to be filled or during the filling itself. The pain felt is real, but we are unable to quantify it.

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### SEALANT ANALYSIS

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We will now calculate the net benefit only looking at the cost the state would incur to reimburse dental care providers, and ignoring the cost of time and travel. Table 5 shows the net benefits from the perspective of the state.

**TABLE 5: NET BENEFIT OF SEALANTS – COST TO STATE USING MARKET COST**

Discount Rate	1%		2%		3%	
	5	10	5	10	5	10
Years	5	10	5	10	5	10
Cost without Sealants	\$80.48	\$92.35	\$76.61	\$83.68	\$72.97	\$75.91
Cost with Sealants	\$18.98	\$32.03	\$18.07	\$29.02	\$17.21	\$26.32
<b>Difference</b>	<b>\$61.50</b>	<b>\$60.32</b>	<b>\$58.54</b>	<b>\$54.66</b>	<b>\$55.76</b>	<b>\$49.58</b>
Preventive Treatment	\$50.00	\$50.00	\$50.00	\$50.00	\$50.00	\$50.00
<b>Net Benefit</b>	<b>\$11.50</b>	<b>\$10.32</b>	<b>\$8.54</b>	<b>\$4.66</b>	<b>\$5.76</b>	<b>-\$0.42</b>



As shown above, with a 1% discount rate, and over a 10 year period of time the net benefit of sealants is \$10.32 per tooth. If the state used the market rate as a basis for reimbursements, the net benefit of sealants for all children on Medicaid would be \$192.4 million.<sup>66</sup> Even assuming a 2% discount rate, the net benefit would be at least \$4.66 per tooth, per child, for a total of \$86.9 million.

The state can save money using sealants because of the cost-effectiveness of sealants using these conservative estimates. We assumed that all children who needed restorative care would use a 1-side amalgam filling. As more expensive restorative care is used, the net benefit will only increase.

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### FLUORIDE VARNISH

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Table 6 shows the net benefit to society of fluoride varnishes, assuming that the varnish is reapplied every six months as recommended by the ADA. We measured fluoride varnish to have a negative net benefit. Children need to receive fluoride varnish every 6 months for fluoride to be effective, increasing the opportunity costs that they and their parents face. If parents and students have to travel to the dentist office every six months to receive preventive care, it is more cost-effective to fill cavities instead of prevent them.

**TABLE 6: NET BENEFIT TO SOCIETY OF FLUORIDE VARNISH USING MARKET RATE**

Discount Rate	R = 1%	
	5 years	10 years
Cost without Fluoride	\$98.06	\$112.52
Cost with Fluoride	\$55.05	\$81.86
<b>Difference</b>	<b>\$43.02</b>	<b>\$30.66</b>
Fluoride Application	\$86.40	\$154.60
<b>Net Benefit</b>	<b>-\$43.38</b>	<b>-\$123.94</b>

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### FLUORIDE VARNISH ANALYSIS

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The initial net benefits for the application of fluoride varnish are negative. When we analyzed the results for sealants without considering the opportunity cost of parent’s time, we found that the state could save money by providing sealants to children to prevent cavities from forming. Here we conduct the same analysis for fluoride varnish using the market rate.

**TABLE 7: NET BENEFIT OF FLUORIDE - COST TO STATE USING MARKET RATE**

Discount Rate	1%	
	5	10
Years		
Cost without Fluoride	\$80.48	\$92.35
Cost with Fluoride	\$45.18	\$67.18
<b>Difference</b>	<b>\$35.31</b>	<b>\$25.16</b>
Preventive Treatment	\$51.22	\$91.62
<b>Net Benefit</b>	<b>-\$15.91</b>	<b>-\$66.46</b>

Only looking at the cost to the state using the market rate, we find that over 10 years and with a 1% discount rate, the net benefit is negative. It is more cost-effective to restore cavities after forming than to provide fluoride varnish. There is a large difference between 5 and 10 years across all discount rates. This is because of the large rise in cavities observed after 5 years. Table 3 showed the effective rates of fluoride treatment. After 5 years, 35.7% of children who used fluoride varnish had cavities, but after 10 years, the percentage increased to 55.8%

### NET BENEFITS OF PREVENTIVE CARE

It is cost-effective to provide preventive dental care at the dentist office—but only for sealants, not for fluoride varnish. When the opportunity costs are included, the net benefit is even larger. However, preventive care is not foolproof. The ADA recommends reapplying fluoride varnish every 6 months and having sealants checked frequently to verify no cracks develop.<sup>67</sup> As long as the sealant remains intact, it will prevent cavities from forming. The state legislature can save money now and in the future by implementing preventive care. Sealants are more cost-effective than fluoride varnish as our study has shown. They are also more effective at preventing cavities. Sealants require a one-time visit to the dentist, while fluoride varnish requires semiannual visits for reapplication.

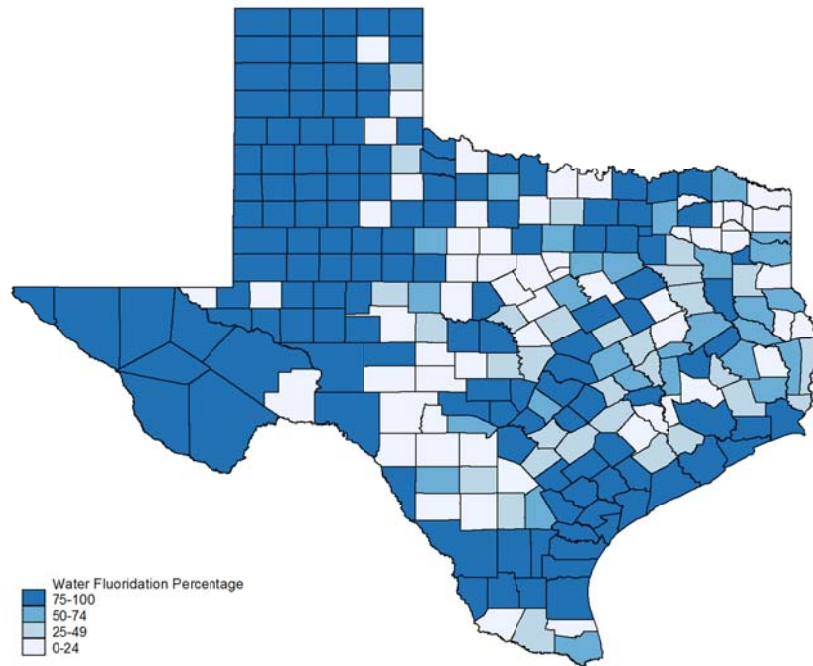
**Preventive Care**

Sealants are cost-effective and by placing sealants, the state can save money on future dental treatments

We did attempt to remain conservative in our estimations. We used a one-side amalgam filling, which can only be used in the smallest cavities. As the restorative treatment cost increases, it becomes even more apparent that sealing children’s teeth is cost-effective and will save the state money.



**FIGURE 6: PERCENTAGE OF FLUORIDATED WATER IN TEXAS**



**Source:** Centers for Disease Control and Prevention, Water Fluoridation, 2006.

Figure 6 shows the percentage of fluoridated water in Texas by county. The darker counties have a higher percentage of fluoridated water. Much of the water in Texas is naturally fluoridated, but this figure only shows if there is some level of fluoride in the tap water. It does not show the levels of fluoride in the water or if it meets the recommended .7 parts per million.

Communities must pay to fluoridate their own water; however the state receives the benefit of reduced future restorative costs. In light of the national recession and corresponding shrinking city budgets, many communities are choosing to stop fluoridating water based on the costs. For



example, last year, the city of College Station decided to stop adding fluoride to drinking water. By not fluoridating water, the city is expecting to save \$41,480.<sup>72</sup> The city estimated its population to be 96,666, which means that it cost the city \$0.43 per person to fluoridate the water. The water naturally contains approximately half of the recommended fluoridation level. With the economic downturn and forced budget cuts, and because fluoridation is not legally required,

the city cut the program. Other cities have also chosen to stop fluoridating their tap water for budget reasons, including Marble Falls, Corsicana, and Lufkin.

Texas cities do not receive all the benefits for fluoridating water because they do not pay dental fees or Medicaid reimbursements. Therefore, to induce cities to make the right decision from the states perspective we recommend exploring state subsidies for fluoridated water.

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## WHAT IS ACCESS TO CARE?

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The definition of access to health care is the product of years of research, practice, and understanding. Research has recognized two main definitions of access. First, according to the Academy of General Dentistry (AGD), access is not only the availability of dental care, but also the utilization of care.<sup>73</sup> Access to health care is more than simply having health or dental insurance.<sup>74</sup> Individuals can still have dental insurance but if they never go to the dentist to seek care, they continue to lack access. Many factors influence utilization of dental care:<sup>75</sup>

### Definition of Access

1. Availability & utilization of dental care
2. Absence of barriers

- Race and Ethnicity
- Insurance status
- Language spoken at home
- If a child's mother has regular dental care
- Poor oral health literacy

The second common ways to define access is to measure the barriers that prevent individuals from accessing health care. Therefore, the presence of barriers to dental care reveals the access problem. This is the definition used in this report. (For a review of the literature on defining access to oral care, please see Appendix 4.)

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## BARRIERS TO ACCESS

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Access is the combination of the availability of dental care to a specific population and their utilization of that care. A lack of access arises when a barrier prevents either the availability or the utilization of care. Strategies are needed to decrease barriers for certain at risk populations. For example: non-English speaking populations require a dentist that speaks their language; parents must believe in the importance of dental care before they take their children to a dentist; and rural populations need dental professionals within a closer proximity.

Albert Guay published an article in the Journal of American Dental Association and argued, "The problem of inadequate access to dental care for some segments of the population is complex and cannot be solved simply... As with most complex problems, a single, simple solution will not be effective, and generally, the 'one size fits all' concept will generate inadequate solutions."<sup>76</sup> There is no single solution that will increase access to dental care for all children in Texas.

The following section discusses the main barriers to access identified by this capstone team: dental professional availability and dental care education. Barriers that exist include Medicaid reimbursement rates, dental hygienist regulations, a large urban/rural divide, lack of ethnically diverse dental workforce, and differences in cultural awareness for the need of dental care.

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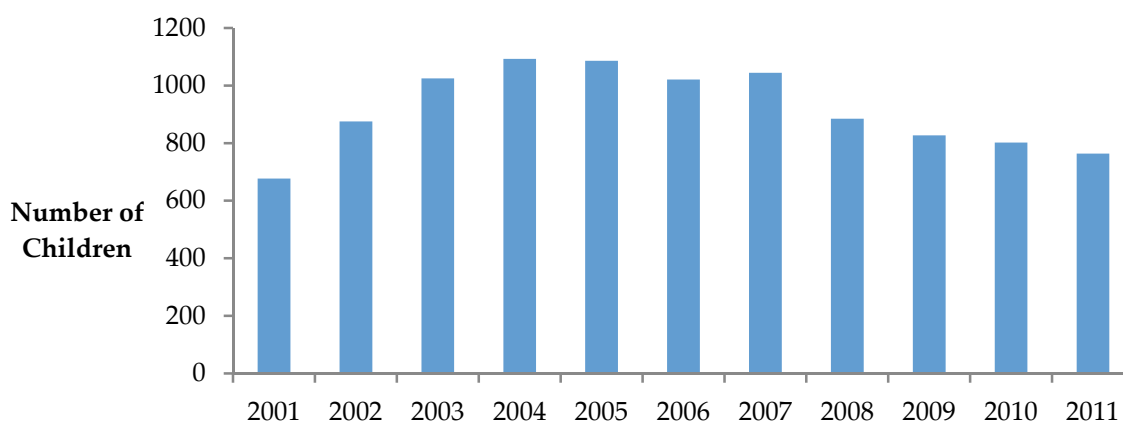
## DENTIST AVAILABILITY

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In 2011, 11,751 dentists provided services in the state of Texas.<sup>77</sup> This number includes orthodontists, other specialists and dentists who do not treat children. Only 25% of these dentists accept Medicaid. However, even if all of the dentists in Texas accepted Medicaid, there would still be a shortage of dental professionals to adequately serve the Texas population. Currently, there is one dentist to serve 2,203 people in Texas.

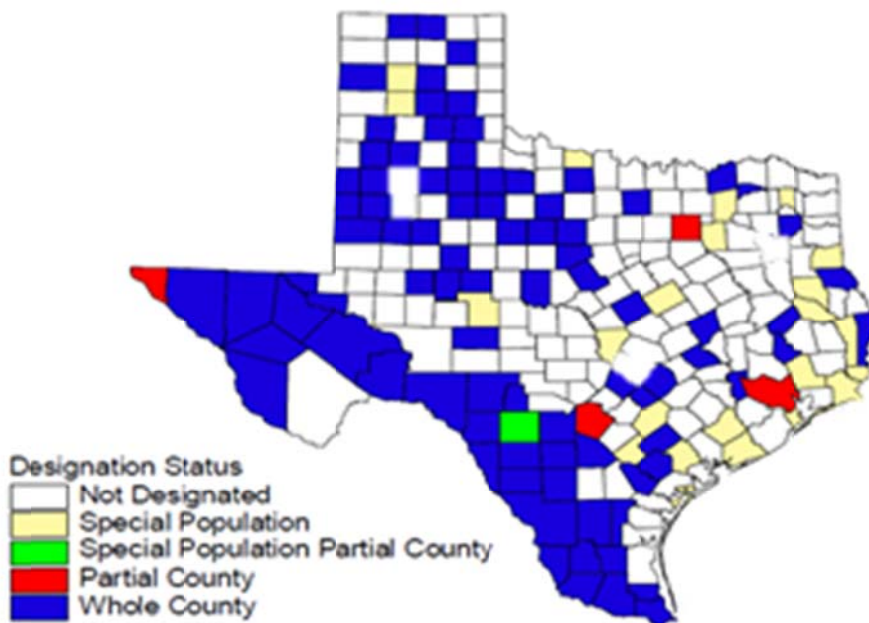
Figure 7 shows the ratio of low-income children to dentists who accept Medicaid. In 2011, for every dentist who accepted Medicaid, there were 760 children who were enrolled in the free or reduced school lunch program. However, even if all of the dentists in Texas accepted Medicaid, there would still be a shortage of dental professionals to adequately serve the Texas population. Figure 8, below, shows the federally designated dental health professional shortage areas.

**FIGURE 7: LOW INCOME STUDENTS PER MEDICAID DENTIST**



**Source:** THSteps Active and Enrolled Dental Provider Participation Report, 1996 – Current. Texas Medicaid Enrollment Statistics.

**FIGURE 8: HEALTH CARE PROFESSIONAL SHORTAGE AREAS IN TEXAS**



Source: U.S. Department of Health and Human Services, 2011

One of the requirements needed to qualify as a shortage area, the county needs a certain population to dentist ratio (5,000 to 1). Additionally, there are others ways to qualify, such as having a large travel time, or large average waiting time to see the dentist.<sup>78</sup> There are many counties in Texas that qualify as shortage units, especially in rural areas. The lack of available dentists in areas is a barrier that restricts individuals from receiving oral health care. Texas has 352,802 children that are economically disadvantaged that live in rural areas.

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### LOW REIMBURSEMENT RATES

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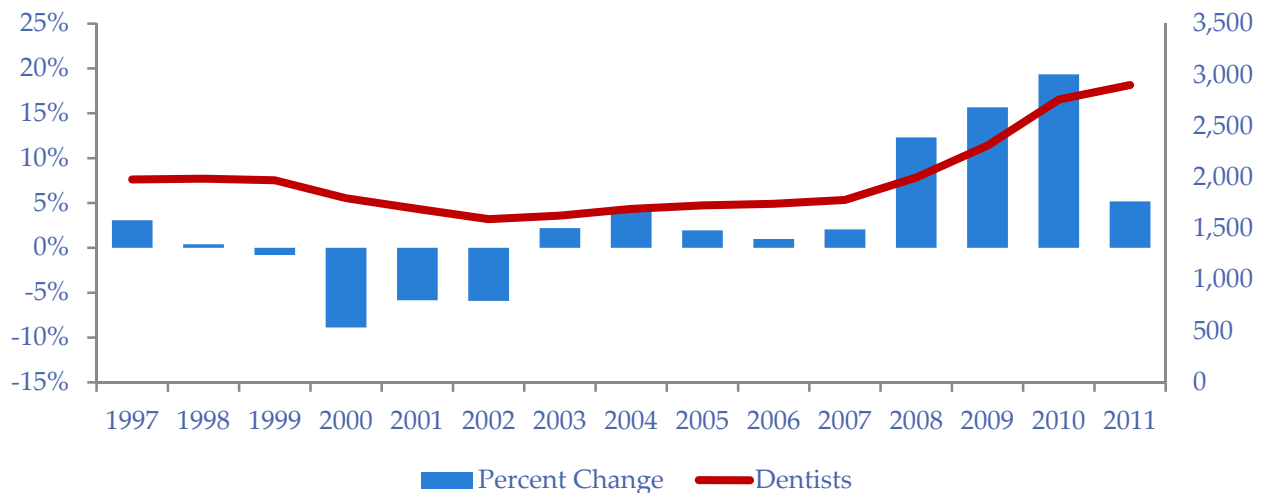
Non-participating professionals cite poor reimbursement rates as the formative reason behind their reluctance to accept Medicaid.<sup>79</sup> On a national level, the Government Accountability Office (GAO) calculated that, in 2000, Medicaid and CHIP reimbursement rates for dental services were equal to or less than fees charged by the lowest 10<sup>th</sup> percentile of dentists. Simplified, this means that 90% of dentists in the U.S. charged a higher fee for their services than Medicaid or CHIP reimbursed.<sup>80</sup> After comparing the current Medicaid reimbursements to the 2011 Survey of Fees, the research team found that Medicaid reimbursements are still equal or less than the fees charged by the lowest 10<sup>th</sup> percentile. Depending on the service, Medicaid pays anywhere from 50% to 66% as much as the market rate. In a joint report by the Henry J. Kaiser Foundation and the National Academy for State Health Policy, dental professionals acknowledged that their primary reason for refusing to accept Medicaid was the low reimbursement rates.

In 2008, the Academy of General Dentistry published a white paper on increasing access to oral care and stated, “When states have raised the Medicaid reimbursement rates, the number of

provider dentists have increased, which, in turn, has led to a direct increase in patients in underserved areas receiving care.”<sup>81</sup> The report suggests that states should raise Medicaid reimbursement rates to at least the 75<sup>th</sup> percentile to adequately incentivize dentists to accept Medicaid.

Because of the funds allocated by the Texas legislature to the Frew Advisory Committee, in 2007 Texas doubled the most common dental procedure reimbursement rates.<sup>82</sup> The number of dentists actively participating in Medicaid sharply increased after the rate raise in 2007 (see Figure 9).

**FIGURE 9: TEXAS DENTISTS ACTIVELY PARTICIPATING IN MEDICAID**



**Source:** THSteps Active and Enrolled Dental Provider Participation Report, 1996 – Current.

After Medicaid reimbursement rates increased in 2007, the percentage of dentists participating in Medicaid increased by 10 to 15% over the next few years. The state’s Medicaid reimbursement rate rise in 2007 is consistent with the literature that analyzes how reimbursement rates can increase dentists who accept Medicaid.

Table 8 compares the 2004 and 2012 Medicaid payment rates to the ADA 75<sup>th</sup> percentile rates for 2011. As the table illustrates, the Texas Medicaid reimbursement rates are still lower than the market rate. If Medicaid increases its rates closer to the market rate, more dentists will have an incentive to accept Medicaid.



**TABLE 8: MEDICAID DENTAL REIMBURSEMENT RATES**

CDT4 Procedure Description	2004 Medicaid Payment Rate	2012 Medicaid Payment Rate	ADA – 75 <sup>th</sup> percentile	Ratio of 2012 Medicaid to ADA – 75 <sup>th</sup> percentile
<b>Diagnostic</b>				
Periodic Oral Evaluation	\$14.72	\$29.44	\$46.00	64%
Limited Oral Evaluation, Problem Focused	\$18.02	\$19.16	\$68.00	28%
Comprehensive Oral Exam	\$36.04	\$36.04	\$76.00	47%
Bitewing X-rays- 2 Films	\$11.93	\$23.86	\$40.00	60%
Panoramic X-ray Film	\$32.54	\$65.08	\$97.00	67%
<b>Preventive</b>				
Prophylaxis (cleaning) - Child	\$18.75	\$37.50	\$60.00	63%
Topical Fluoride Application – Child	\$7.50	\$15.00	\$30.00	50%
Topical Fluoride Varnish	\$7.50	\$15.00	\$35.00	43%
Dental Sealant, per tooth	\$18.55	\$28.82	\$50.00	58%
<b>Restorative</b>				
Amalgam, 1 surface, primary or permanent tooth	n/a	\$65.72	\$133.00	49%
Amalgam, 2 surfaces, primary or permanent tooth	\$43.73	\$87.46	\$166.00	53%
Resin-based Composite, 2 surfaces, anterior tooth	\$52.57	\$105.14	\$186.00	57%
Prefabricated Resin Crown	\$78.03	\$156.06	\$295.00	53%

**Source:** Innovative Medicaid programs improve children’s access to Dental Care, 2009. Texas Medicaid Fee Schedule – Dental, 2012. Participating Dental Provider Fee Schedule, 2011.

**TABLE 9: RECOMMENDED TREATMENTS AND COSTS**

ADA Recommended Treatments	Cost (Medicaid)	Market Rate
Comprehensive Oral Exam	\$72	\$152
Professional Cleaning	\$76	\$120
X-Rays	\$65	\$97
Fluoride Varnish	<u>\$30</u>	<u>\$70</u>
<b>Total Recommended Treatment</b>	\$243	\$439
Sealants (8)	\$232	\$400
<b>Total Treatments</b>	<b>\$475</b>	<b>\$839</b>
<b>Texas Annual Limit</b>	<b><u>\$250</u></b>	<b><u>\$250</u></b>
<b>Difference</b>	<b>\$225</b>	<b>\$589</b>

An additional barrier to access for low-income children in Texas is the limit on the amount of money a child can spend on preventive services in one year. The chart to the left displays the recommended treatments a child receives when visiting the dentist.

The calculated total recommend treatment includes two oral exams and professional cleanings, an

X-ray, and two fluoride varnish treatments per year. The total recommended treatment cost falls under the annual Medicaid cap for preventive care of \$250. However, this leaves no money to place sealants on children’s teeth. If a child were to receive eight sealants, even at the Medicaid reimbursement rate of \$29 per sealant, the cost would exceed the annual limit by \$225.

**RECOMMENDATION 1: INCREASE MEDICAID REIMBURSEMENT RATES AND RAISE THE ANNUAL LIMIT ON PREVENTIVE REIMBURSEMENTS**

Increasing reimbursement rates for dentists who choose to accept Medicaid patients is necessary to improve access to preventive dental care for low-income children. Several studies show that increasing reimbursement rates has a positive correlation to an increase in dental participation in the Medicaid program.<sup>83, 84</sup> This same type of increase in Medicaid provider participation was seen in 2007 when the state legislature increased reimbursement rates. Yet, a dental professional shortage in Texas remains. The capstone team recommends that the state increase Medicaid reimbursement rates to the National Oral Health Policy Center’s recommended 75<sup>th</sup> percentile rate or to the private insurance rates. The 75<sup>th</sup> percentile represents the fees that most dentists charge for their services. This team also recommends either removing the annual limit on

Recommendation
Increase reimbursement rates to the 75 <sup>th</sup> percentile of fees.
Raise annual limit in order to cover all necessary preventive care at market rates and introduce a separate lifetime cap on sealant coverage.

preventive dental care for Medicaid or increasing it to \$525 in order to cover all of the necessary preventive procedures a high risk Medicaid child may require in a given year.

Although, double the annual limit for children on Medicaid may seem a substantial increase, \$525 is half of the amount allotted to Medicaid beneficiaries in other states comparable to Texas. For example, the state of Florida has \$1,000 annual

limit for dental procedures for children and adults enrolled in Medicaid.<sup>85</sup> The state of

Mississippi has a \$2,500 annual limit for dental procedures for children and adults enrolled in Medicaid.<sup>86</sup>

A cost benefit analysis was already calculated for the market rate. The research team also used the current Medicaid reimbursements to calculate the cost effectiveness of preventive care. The Medicaid reimbursement rates are calculated follow the same format as Tables 1 and 2 in the Cost-Benefit Analysis section. The results for a sealant and fluoride varnish are displayed in Tables 11 and 12.

**TABLE 10: COST ASSUMPTIONS USING CURRENT MEDICAID REIMBURSEMENT RATES**

	Sealant	Fluoride Varnish	Restorative Care
<b>Cost of One Treatment</b>	\$28.82	\$15.00	\$65.72
<b>Total Cost</b>	\$53.69	\$39.04	\$94.77

**TABLE 11: NET BENEFIT OF SEALANTS – COST TO STATE USING CURRENT MEDICAID REIMBURSEMENT RATES**

Discount Rate	1%		2%		3%	
	5	10	5	10	5	10
Years						
Cost without Sealants	\$39.77	\$45.63	\$37.86	\$41.35	\$36.06	\$37.51
Cost with Sealants	\$9.38	\$15.83	\$8.93	\$14.34	\$8.50	\$17.48
<b>Difference</b>	<b>\$30.39</b>	<b>\$29.81</b>	<b>\$28.93</b>	<b>\$27.01</b>	<b>\$27.55</b>	<b>\$20.03</b>
Preventive Treatment	\$28.82	\$28.82	\$28.82	\$28.82	\$28.82	\$28.82
<b>Net Benefit</b>	<b>\$1.57</b>	<b>\$0.99</b>	<b>\$0.11</b>	<b>-\$1.81</b>	<b>-\$1.27</b>	<b>-\$8.79</b>

**TABLE 12: NET BENEFIT OF FLUORIDE - COST TO STATE USING MEDICAID REIMBURSEMENT**

Discount Rate	1%		2%		3%	
	5	10	5	10	5	10
Years						
Cost without Fluoride	\$39.77	\$45.63	\$37.86	\$41.35	\$36.06	\$37.51
Cost with Fluoride	\$22.32	\$33.20	\$21.25	\$30.08	\$20.24	\$36.67
<b>Difference</b>	<b>\$17.45</b>	<b>\$12.43</b>	<b>\$16.61</b>	<b>\$11.27</b>	<b>\$15.82</b>	<b>\$0.84</b>
Preventive Treatment	\$15.00	\$15.00	\$15.00	\$15.00	\$15.00	\$15.00
<b>Net Benefit</b>	<b>\$2.45</b>	<b>-\$2.57</b>	<b>\$1.61</b>	<b>-\$3.73</b>	<b>\$0.82</b>	<b>-\$14.16</b>

The state experiences a positive net benefit using current Medicaid reimbursement rates when sealing teeth when discounted by a reasonable interest rate of 1%. The net benefit is \$1.57 per sealant placed on a child. If the state sealed all eligible children's teeth, the total net benefit would be \$29.3 million. The state incurs a cost for sealing teeth, but the savings that result from averted restorative care, and the obligation Texas has to Medicaid children make the cost today worthwhile.

The states of Alabama, Michigan, South Carolina, Tennessee, Virginia, and Washington have all used increased reimbursement rates as a method to improving access to dental care. Two states, Michigan and Alabama, have seen great success and increased participation of dentists in the Medicaid program since making changes to their reimbursement rates in 2000. Both states used private insurer's fee schedules and reimbursement rates to generate new higher state reimbursement rates and encourage participation of dentists throughout the states. Michigan, through the *Healthy Kids Dental Program*, strengthened a currently existing contract with commercial dental insurers by reimbursing most dentists 100% of what they normally charged for procedures.<sup>87</sup>

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## DENTAL HYGIENIST REGULATION

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Medicaid is not the only factor influencing Texas' shortage of dental professionals. As previously discussed, even if all of the dentists in Texas were to accept Medicaid, many Texas counties would still not have convenient access to a dentist. Approaches to eliminating this problem have varied across the nation; one strategy is decreasing regulations on dental hygienists and allowing new genres of dental professionals, such as the dental therapist or the Advanced Dental Hygiene Practitioner to practice within the state.

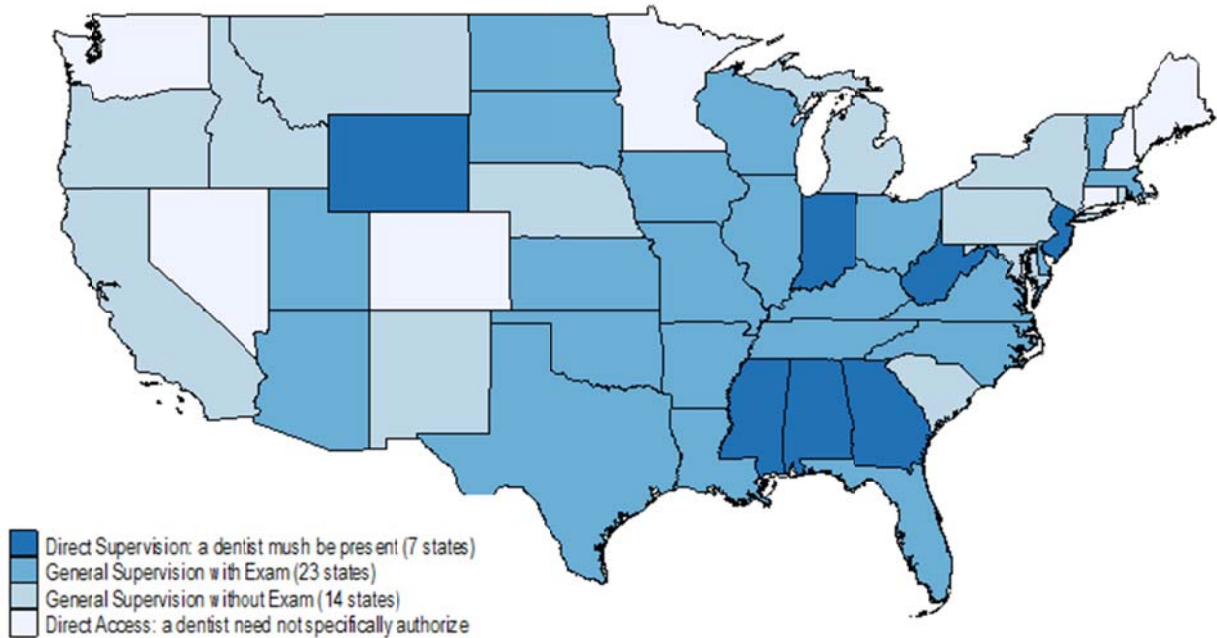
Texas' regulations on dental hygienists are among the strictest in the nation (see Figure 10). Texas requires that a professional dentist observe a hygienist patient at least once a year when the hygienist is performing dental work. Other states require that the dentist give permission to the hygienist to provide care, without being physically present. The least strict states have no regulations specifying what hygienists can do. Currently, 15 states allow dental hygienists to receive reimbursement directly from Medicaid.<sup>88</sup>

Research has found that when dental hygienists are unable to operate their own practice, the demand for dentists will increase.<sup>89</sup> With fewer restrictions on the type of care that hygienists can provide and lower regulations for where hygienists can operate, the state could increase the number of dental professionals to meet growing demand.

Furthermore, the dentist population continues to age. The average age of dentists in Texas is 49 years.<sup>90</sup> The age of dentists is particularly alarming because dental schools have not increased their attendance in the last 10 years.<sup>91</sup> The Department of State Health Services reviewed the growing general population in 2006 and compared it to dentists demographics and warned Texas that "the supply of dentists is not evenly distributed throughout the state, and that the supply of dentists is unlikely to keep pace with population growth."<sup>92</sup>

Licensed dentists worry about decreased regulations on dental hygienists because they fear that it will hurt their private practices. In some states, this may be a valid concern; however, in the state of Texas, the number of patients (both current and potential) substantially overwhelms the current number of practicing dentists. Decreased regulations on dental hygienists will not hurt private dental practices and will only provide increased opportunities for Texas residents to receive dental care.

**FIGURE 10: DENTAL HYGIENISTS REGULATION BY STATE**

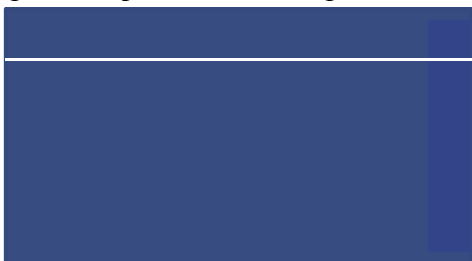


Source: American Dental Hygienist Association, 2011

**RECOMMENDATION 2: DECREASE DENTAL HYGIENIST REGULATION**

PEW’s *Center on the States* lists the state of Minnesota as an innovator when increasing the supply of dental professionals. In 2009, the state of Minnesota created a new avenue to increasing access for low-income populations in the form of a dental therapist. The dental therapist “is licensed to perform such duties as filing cavities and extracting teeth.”<sup>93</sup> Since its inception, dental schools within the state started to formulate curriculum and train willing individuals in this new field. The first class graduated in 2011 and it is expected that each would add an additional 2,000 dental visits per year.<sup>94</sup>

The state of Texas should decrease the regulations on dental hygienists and allow them to perform preventive care procedures without the direct supervision of a dentist. This would not only increase access to care for low-income children, but would also decrease costs to the state.



Dental Hygienists are able to perform basic dental care at a lower cost than dentists because of the lower level of training they receive. Studies show that for preventive care procedures, dental hygienists can perform the tasks with the same precision and effectiveness as a dentist.<sup>95</sup>

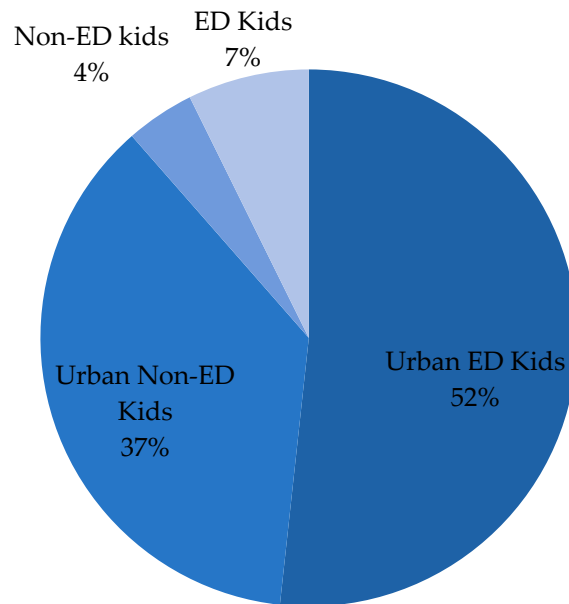
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### RURAL/URBAN DIVIDE

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One of the challenges to providing dental care in Texas is the differences between rural and metropolitan cities and counties. Because of the size of the state and the variety of towns, cities, and counties, children who do not live in urban cities may have a difficult time finding a dental professional to provide care. The rural/urban divide is a problem of dentist distribution; there are not enough dental professionals or it is too far for families to travel to receive care. As Figures 11 and 12 demonstrate, there is a strong urban/rural divide in the state of Texas. Low-income children that live in urban counties can access a dental professional more easily than low-income children in a rural area. For both figures, TEA's number of free and reduced lunch children was used as a close estimate for the number of low-income children in rural and urban areas. Figure 12 shows the percentages of urban and rural free and reduced lunch children, which used as a way to estimate low-income and Medicaid children. While there are more children in urban areas, Figure 12 shows that there are 200 more children per dentist in rural areas than in urban areas.<sup>96</sup>

**FIGURE 11: PERCENTAGE OF FREE-AND REDUCED LUNCH STUDENTS BY LOCATION**



**Source:** TEA, Enrollment in Texas Public School, THSteps Active and Enrolled Dental Provider Participation Report, 1996 – Current.

**FIGURE 12: THE NUMBER OF FREE- AND REDUCED LUNCH STUDENTS PER DENTIST**

**Source:** TEA, Enrollment in Texas Public School, THSteps Active and Enrolled Dental Provider Participation Report, 1996 – Current.

In addition to there being more rural children per dentists, the distance between children and dentists is another barrier that rural children must overcome. Especially in areas of west Texas, where there are many remote rural areas, distance is a barrier. Although Medicaid covers dental visits and procedures, there are also opportunity costs (time and transportation) associated with taking a child to the dentist. In many cases, a parent living in a rural district may have to take their child to another county to visit a dentist. For any parent working an hourly job, time is money and any visit to the dentist takes away from the paycheck. However, rural areas exacerbate the opportunity costs associated with time and transportation for parents residing there because the dentist dispersion is skewed in favor of urban communities. Urban children may have more dentists in close proximity than rural children, but their parents still face time and travel costs.

Aware of differences between the rural and urban areas of Texas, the capstone team evaluated how different delivery locations could help mitigate barriers for those children. Three different locations were compared and then we determined which location mitigates rural and urban barriers. These location options include a fixed dentist office or dental home, mobile dental vans and portable equipment, and school-based health centers. For more information regarding the delivery methods and associated costs, please see Appendix 10 and 11. Each delivery method was researched and the combined advantages and disadvantages were analyzed with respect to the level of care for patients, patient and dentist responsibilities, as well as logistical issues for each option. Table 13 compares some of the advantages and disadvantages that the literature describes for each delivery method.

**TABLE 13: COMPARISON OF DELIVERY METHODS**

	<b>Advantages</b>	<b>Disadvantages</b>
<b>Dental Home</b>	<ul style="list-style-type: none"> <li>• Ability to interact with and educate patients</li> <li>• Develop lasting relationships</li> <li>• Medicaid Reimbursement</li> <li>• Cultural background is recognized, valued, and respected</li> <li>• Develop individualized treatment schedule</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of available dentists in rural areas</li> <li>• Parents must be present for Medicaid reimbursement</li> <li>• Children must visit same dentist</li> <li>• Parent and child must travel to office</li> </ul>
<b>Mobile Dental Units</b>	<ul style="list-style-type: none"> <li>• Care is delivered at locations near patients</li> <li>• High visibility</li> <li>• Reduces parent time involvement</li> <li>• Serve multiple populations</li> </ul>	<ul style="list-style-type: none"> <li>• Inconsistent with Dental Home</li> <li>• High initial costs</li> <li>• Large operating costs to travel between locations</li> <li>• Challenge finding providers</li> <li>• Limited space for staff, supplies, and records</li> <li>• Community misperceptions</li> </ul>
<b>School-Based Clinics</b>	<ul style="list-style-type: none"> <li>• Reduce lost school time and parent travel time</li> <li>• Target underserved populations</li> <li>• Eligible for Medicaid reimbursements</li> <li>• Equipment can be portable</li> <li>• Care given at stable location</li> </ul>	<ul style="list-style-type: none"> <li>• High start-up costs</li> <li>• Difficult to sustain financially without a critical mass of students</li> <li>• Treatment given without thorough risk-assessment</li> <li>• If equipment is stationary, dental unit cannot expand coverage</li> </ul>

Preventive care can be given at any of the locations shown above. Matching up the most cost-effective location with the most cost-effective treatment will increase access that children have to preventive care. For example, rural areas can benefit from mobile dental vans or portable dental equipment because it decreases the travel time for treatment and allows dental professionals to go where the patients live. For urban children, a combination of care locations could make it easier for parents to get children to dental professionals. When analyzing the differences between rural and urban areas in Texas, it is important to remember that delivery methods can mitigate barriers to dental care.

**RECOMMENDATION 3: EXPAND THE USE OF SCHOOL BASED CLINICS**

The urban/rural divide is not something unique to Texas; other states experience this barrier as well and have instituted programs to alleviate it. For example, the state of California used video conferencing for dentists, including specialists, to “advise on complex cases” seen at rural clinics,<sup>97</sup> recognizing that not all of these clinics were able to attract or maintain on-site dental professionals to serve the needs of the rural populations. Alaska, on the other hand, went a step further and developed specialized equipment to facilitate consulting between local dental



therapists in remote villages and dentists located hundreds of miles away.<sup>98</sup> These high-tech approaches to dental care mean that dentists can give more thorough and accurate diagnoses and treatment without having to permanently relocate to rural areas.

To combat costs associated with parental lost wages, community members across the nation are partnering with schools to provide children with excellent oral care without undue expense on the parent. Tennessee targets children from kindergarten through eighth grade with their Department of Health’s School Based Dental Prevention Program. Since the program’s conception, the state has been able to provide 50% more students enrolled in the free and reduced lunch program with dental care.<sup>99</sup> Using portable equipment, dentists are able to screen and refer students in need of dental checkups. In recognition of its accomplishments, the Association of State and Territorial Dental Directors awarded this program as the “Best Practice Project” in August 2009.<sup>100</sup>

Texas has an obligation to ensure that the same care is accessible to both rural and urban children. Children in rural areas face a disproportionate barrier to access than peers who may reside in urban counties. One less costly method is to deliver services in rural areas is through portable dental equipment that can be set up in schools. The equipment needs to be portable so the dental team is not fixed to one specific school, but can travel to other areas as well. Combining schools with mobile dentistry allows dentists to visit with low-income children without parents having to transport their child to a dentist office.

Recommendation
Utilize portable equipment in a school-based setting to treat students in rural areas

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### LACK OF DIVERSITY AMONG CARE PROFESSIONALS

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Data analysis in Texas indicates a disparity in dentist dispersion among demographic regions, such as minority populations. Currently, the state of Texas and the state of California have the largest Hispanic population in the nation. Based on the U.S. Census Bureau (USCB), both states have a 37.6% population of Hispanic Americans.<sup>101</sup> Estimates project the Hispanic/Latino population to be the ethnic group with the most significant population increase, from 10.8 % to almost 25% of the U.S. population.<sup>102</sup> This population of children has one of the highest dental disease rates and receives some of the lowest amount of oral care.<sup>103</sup> Under these rapid demographic changes in Texas, the oral care workforce and total supply of dentists need to be prepared to serve this diverse and vulnerable population.

Increasing total supply of dentists removes an access barrier for low-income children to receive dental care, but there is also a need for cultural specialization. Parents are more comfortable taking their children to visit dentists who speak the same language and understand their culture better.<sup>104</sup> Matching non-English speaking patients to dental professionals who accept Medicaid must include a language component.<sup>105</sup> Otherwise, parental education and treatment is severely limited.

## RECOMMENDATION 4: FOSTER DIVERSITY

### Recommendation

**Provide scholarships for minority students to receive dental professional training and licensing.**

The state of Texas should improve the diversity of the dental field in the state. Language and cultural barriers prevent many children from access to preventive dental care in Texas.<sup>106</sup> By increasing the number of minority dentists, especially those who speak Spanish fluently, more low-income children would have access to preventive care. The capstone team recommends that the state provide funding for scholarships for minority

students to attend dental school and dental hygienist school. Additionally, dental programs as well as dental hygienist programs should seek minority students in their recruitment processes.

## LACK OF KNOWLEDGE & EDUCATION

Oral health education informs parents and children how to improve or maintain a level of good oral health and prevent oral disease. A lack of knowledge about oral care is a factor that strongly contributes towards the high number of caries in low-income children.<sup>107</sup> Furthermore, parents' socioeconomic background directly affects the amount of knowledge a child will receive at home.<sup>108</sup> By expanding a family's knowledge of oral health, many low-income children can break the practices established by their parents, gain a stronger understanding of their own personal oral health, and seek access to dental care in future years.

Promoting proper dental hygiene early, especially while children are impressionable, helps ensure the continuance of good dental hygiene throughout that child's lifetime. During early developmental years children grow physically, begin to understand social norms, and develop cognitively as well as emotionally.<sup>109</sup> This development stage shows how positive and negative influences<sup>110</sup> can have dramatic effects on oral health in later years.

## RECOMMENDATION 5: IMPROVE ORAL HEALTH AWARENESS

Increasing education and general knowledge of what constitutes good overall oral health care remains a vital aspect to improving access to preventive dental care for low-income children. As previously defined, access is not only the absence of barriers, but also the utilization of services. Education programs are the most effective way to increase general knowledge of proper oral health. The state of Texas should seek to improve oral health literacy, especially in underserved areas.<sup>111</sup> Additionally, these programs must emphasize disease prevention and the importance of preventive care.<sup>112</sup> The capstone team recommends that the state use Public Service Announcements (PSAs) to improve general knowledge. There are programs, such the Early Head Start program, that the state could partner with to help improve knowledge.

### Recommendation

**Improve oral health literacy and general knowledge about the importance of oral health**

## CONCLUSION

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**A**s Texas implements some or all of the recommendations described in this report, access to oral health care will increase for low-income and minority populations, as well as for children living in rural areas. Access is not only the availability of care, but also the utilization of care. Educational initiatives are important to improve knowledge about oral health care. As individuals understand the importance of preventive care, they will seek to utilize it to improve their oral health. The state has a moral obligation to help provide dental care to low-income children. Without the state's help, many children would be unable to receive care through no fault of their own. As Texas improves access to oral health care for low-income children, the collective health of the state will increase. Texas is unique because of the vast population, large dispersion between urban/rural dentists, and a large minority population. Texas can become a leading state in the health care for children and an example for other states if these recommendations are followed and disparities between children in Texas decrease.

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- <sup>110</sup> *Ibid.*
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- <sup>112</sup> *Ibid.*



## APPENDIX 1: ACRONYM LISTING

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- **AAPD** - American Academy of Pediatric Dentistry
- **ADA** – American Dental Association
- **ADHA** – American Dental Hygienists Association
- **AEGD** - Advanced Education in General Dentistry
- **AGD** - Academy of General Dentistry
- **ASTDD** - Association of State and Territorial Dental Directors
- **BLS** - Bureau of Labor and Statistics
- **CDC** - Center for Disease Control
- **CHIP** – Children’s Health Insurance Program
- **CMS** - Centers for Medicare and Medicaid Services
- **EPA** - Environmental Protection Agreement
- **EPSDT** - Early and Periodic Screening, Diagnosis, and Treatment
- **DH** – Dental Hygienists
- **DHPPI** - Dental Hygiene Professional Practice Index
- **GAO** - Government Accountability Office
- **GPR** - General Practice Residency
- **HMO** - Health Maintenance Organization
- **NHENES** - National Health and Nutritional Examination Survey
- **NORC** - National Opinion Research Center
- **TDA** -Texas Dental Association
- **TSHHS** - Texas State Health and Human Services
- **USCB** – United States Census Bureau

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## APPENDIX 2: ORAL HEALTH CARE PROGRAMS

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The need for oral health care for children is not limited to the State of Texas. Many states have formulated initiatives and created programs to help combat the specific problems they face in providing access and care to their citizens. The following list of programs have been chosen based on two specifications: either the state has had documented success by a third party regarding the program, or the state has similar characteristics to Texas and the program is trying to accommodate one of the barriers the team has identified as a problem within Texas (i.e. the rural/urban divide). This team has not evaluated these programs as to their success or attributes; the team has simply identified them as possible starting points for future Texas initiatives.

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### EDUCATION INITIATIVES

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- **The ABCD Program, Washington:** By starting early, infant and toddler years, the ABCD program informs parents about the importance of oral health and to receive care. It is estimated that this program has increased the number of Medicaid eligible and currently enrolled actually visiting dental professionals before issues begin. Website: <http://abcd-dental.org/>
- **Healthy Kids Dental Program, Michigan:** This program is provided through a third party contract with the state of Michigan to provide information and further services through identified dental providers. The program plays a matchmaker role of informing parents and children on the importance of oral health and getting them in contact with a dentist who can provide adequate care. Website: <http://www.deltadentalmi.com/Individuals/Healthy-Kids-Dental-and-MIChild/Healthy-Kids-Dental.aspx>
- **Smile Alabama!, Alabama:** Through grant funding, the state of Alabama launched *Smile Alabama!* in 2000. This program focuses on educating local providers on the needs of at risk populations, supplying free patient education materials and providing professional support from the Alabama Medicaid Agency. Website: [http://www.medicaid.state.al.us/programs/dental/dental\\_smile\\_alabama.aspx?tab=4](http://www.medicaid.state.al.us/programs/dental/dental_smile_alabama.aspx?tab=4)

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### INCREASING THE DENTAL PROFESSIONAL SUPPLY INITIATIVES

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- **Every Smile Counts, Department of Public Health Office of Oral Health, Connecticut:** Known to have the most lax regulations on dental hygienists, the State of Connecticut has placed a high value on analyzing specific populations within the state and identifying the specific treatment or programs that population will benefit from. This occurs mainly through collaborations with local community entities. Website: <http://www.ct.gov/dph/cwp/view.asp?a=3125&q=388844>.
- **Minnesota Oral Health Program, Minnesota:** After formulating a statewide plan to increase the availability and use of dental care, the State of Minnesota created a new dental professional, the *dental therapist*. Additionally, the state is working towards

connecting underserved populations with dental professionals and educating the public on the importance of oral health. Website: <http://www.health.state.mn.us/oralhealth/index.html>

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## RURAL ORAL HEALTH INITIATIVES

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- **Maternal, Child and Adolescent Health (MCAH) Programs, California:** MCAH collaborates with other public health organizations and state programs, to provide information regarding good oral health to pregnant mothers, parents, and children. Additionally, the program facilitates “preventive dental services such as fluoride (toothpaste, fluoride varnish, mouth rinse and other forms of fluoride), dental sealants and xylitol chewing gum.” Website: <http://www.cdph.ca.gov/healthinfo/healthyliving/childfamily/Pages/OHP.aspx>
- **Into the Mouths of Babes, North Carolina:** Recognizing the time and travel costs of sending dentists into rural communities year after year, the state of North Carolina has founded this program to train medical providers (i.e. pediatricians) with the basic knowledge and skills to examine infants and toddlers for oral health problems, provide education, and apply fluoride varnishes. Website: <http://www.ncdhhs.gov/dph/oralhealth/partners/IMB.htm>

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## SCHOOL BASED INITIATIVES

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- **School Based Dental Prevention Project, Tennessee:** Half of all students in Tennessee are considered low-income children qualifying for the free and reduced lunch program. In order to serve this population, the state determined a school-based dental screening and sealant program would help combat the issues of poor oral health. Using portable equipment, dentists are able to travel from school to school and service students that would otherwise not see a dentist at all. Website: <http://health.state.tn.us/oralhealth/schoolbased.html>
- **School Based and School Linked Sealant Programs for Low-Income Populations, Pennsylvania:** The state of Pennsylvania has made efforts to provide programs for “populations that have limited access to dental preventive and treatment sources and information”. Since 1996 the State’s department of health has operated a sealant program for low-income students within schools. Website: [http://www.portal.state.pa.us/portal/server.pt/community/oral\\_health/14180](http://www.portal.state.pa.us/portal/server.pt/community/oral_health/14180)
- **School Based Dental Sealant Program, New Mexico:** The state provides the service to 125 schools that participate in free and reduced lunch program. They provide oral health education, screening services, and apply dental sealants. State staff apply and administer most of the program, but will occasionally contract with private dental clinics to reach some schools. Website: <http://nmhealth.org/PHD/OOH/index.shtml>

## DENTAL HOME INITIATIVES

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- **I-Smile Dental Home Initiative, Iowa:** Through the relationships formed within the dental home between dentist and patient care has been expanded within Iowa. 34,320 fluoride varnish applications, 43,490 oral screenings, and 41,354 coordinated care visits occurred within the State of Iowa in 2008. Additionally, the program has provided more full-time employees to promote oral health awareness and oversee the referral and movement of patients throughout the state. Website: <http://www.ismiledentalhome.iowa.gov/>

## APPENDIX 3: TEXAS DEMOGRAPHICS

In order to understand access to dental care in Texas, one must first understand the state’s demographic profile, including the racial and ethnic population breakdown, the population growth rates, and the number of children enrolled in social service programs within the state. This appendix provides an environmental backdrop to the public policy concerns broached in this by fully describing the relevant demographic information for the state of Texas. However, the demographic descriptive statistics are at different scopes: for the number of children enrolled in Medicaid is at the state level, while the descriptive statistics for the number of children enrolled in free and reduced lunch is at county level.<sup>1</sup> Descriptions concerning the population of dentists relates to both the number of children and their geographic location.

In 2010, Texas had a population of 25,145,561.<sup>2</sup> Of that, 27% were children under 18 years, somewhat higher when compared to the national average of 24%. Texas has a higher proportion of children than the U.S. average, which presents additional problems to improve access to dental care. Of the reported population, 38% individuals were of Hispanic or Latino Origin, and 12% were Black. Texas has a large minority population that requires additional sensitivities when dealing with cultural barriers and education initiatives.

**TABLE 14: TEXAS POPULATION**

People Quick Facts	Texas	USA
<b>Population, 2011 estimate</b>	25,674,681	311, 591,917
<b>Population, 2010</b>	25,145,561	308,745,538
<b>Population, Percent Change, 2000 to 2010</b>	20.6%	9.7%
<b>Population, 2000</b>	20,851,820	281,421,906
<b>Persons under 5, percent, 2010</b>	7.7%	6.5%
<b>Persons under 18, percent, 2010</b>	27.3%	24.0%
<b>Persons 65 and over, percent, 2010</b>	10.3%	13.0%
<b>Female persons, percent, 2010</b>	50.4%	50.8%
<b>White persons, percent, 2010 (a)</b>	70.4%	72.4%
<b>Black persons, percent, 2010 (a)</b>	11.8%	12.6%
<b>American Indian and Alaska Native persons, percent, 2010 (a)</b>	0.7%	0.9%
<b>Asian persons, percent, 2010 (a)</b>	3.8%	4.8%
<b>Native Hawaiian and Other Pacific Islander, percent 2010 (a)</b>	0.1%	0.2%
<b>Persons reporting two or more races, percent, 2010</b>	2.7%	2.9%
<b>Persons of Hispanic or Latino origin, percent, 2010 (b)</b>	37.6%	16.3%
<b>White persons not Hispanic, percent, 2010</b>	45.3%	63.7%

Source: U.S. Census Bureau: <http://quickfacts.census.gov/qfd/states/48000.html>

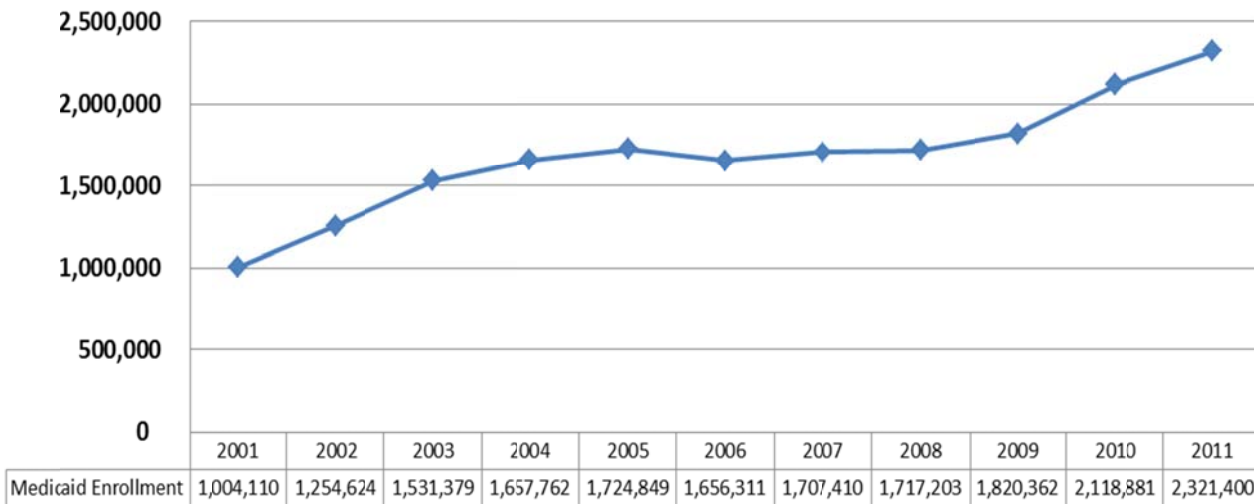
**TABLE15: POPULATION GROWTH RATES**

Population Growth		
1	Nevada	35%
2	Arizona	24.6%
3	Utah	23.8%
4	Idaho	21.1%
5	Texas	20.6%
6	North Carolina	18.5%
7	Georgia	18.3%
8	Florida	17.6%
9	Colorado	16.9%
10	South Carolina	15.3%

In terms of population, only California has a larger population, but Texas is also one of the fastest growing states (20.6%). With a population of over 25 million, the rapid population growth will cause problems as people move into the state and as the population of children under age 5 continues to grow.

Texas has a large population of children and a large proportion of children who enrolled in Medicaid. Over two million children enrolled in Medicaid in 2010. Medicaid enrollment also grew 16% from 2009. During 2010, Medicaid enrolled 31% of all children.

**FIGURE 13: CHILDREN ENROLLED IN MEDICAID 2001 - 2011**

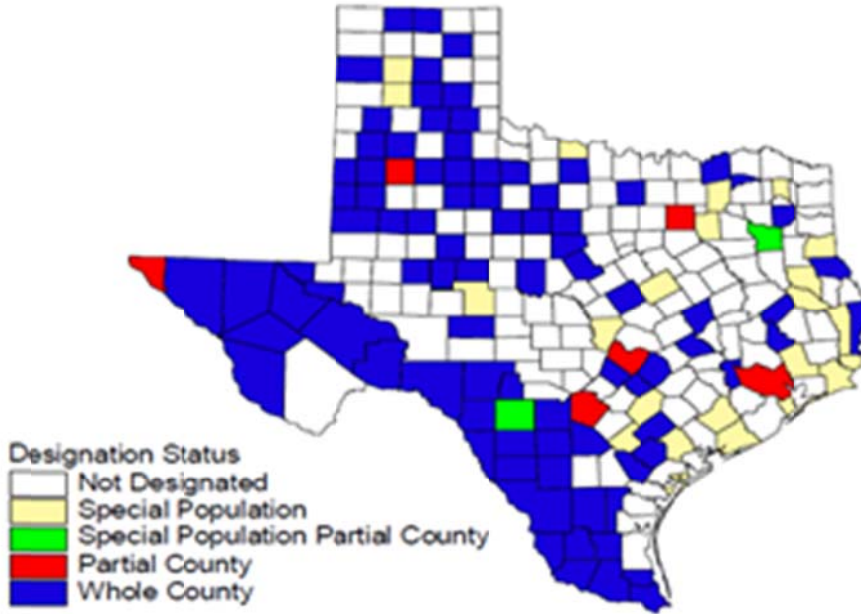


**Source:** Texas Health and Human Services Commission 2010: <http://www.hhsc.state.tx.us/research/MedicaidEnrollment/MedicaidEnrollment.asp>.  
 Texas Health and Human Services Commission 2010: <http://www.dshs.state.tx.us/chs/hprc/DENT-lnk.shtm>

## DENTIST DEMOGRAPHICS

In 2010, there were 11,301 dentists licensed to practice in Texas. Of those dentists, only 812 practiced in a rural area. Currently, there are 46 counties in Texas without a practicing dentist. In addition, Health and Human Services has designated certain areas in Texas as Dental Health Professional Shortage Areas, with a large proportion in rural areas.

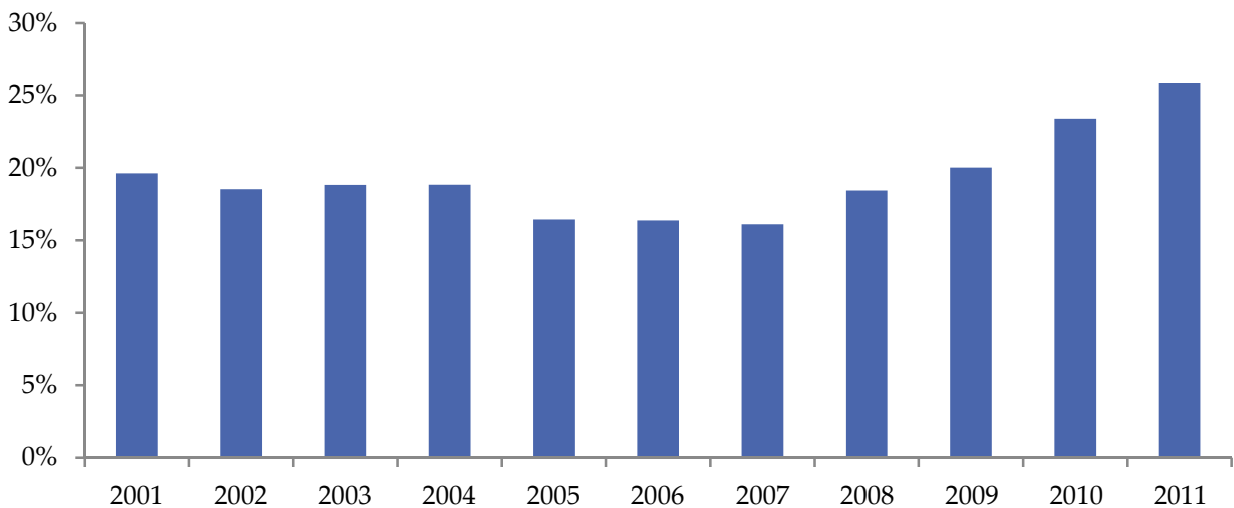
**FIGURE 14: DENTAL HEALTH PROFESSIONAL SHORTAGE AREAS IN TEXAS**



**Source:** Health Professions Resource Center, Center for Health Statistics, Texas Department of State Health Services, 2011

The chart below indicates the percentage of dentists who accept Medicaid. These dentists are available to serve children from low-income households. Over the last few years, there has been a growth of dentists who accept Medicaid, but in 2011, only 25% of all dentists accepted Medicaid.

**FIGURE 15: PERCENT OF DENTISTS WHO ACCEPT MEDICAID**



**Source:** THSteps Active and Enrolled Dental Provider Participation Report, 1996-2011.

## STUDENT DEMOGRAPHICS

In 2010, 4,828,778 children were enrolled in primary and secondary education in Texas. The ethnic breakdown of students can be seen in the table below.<sup>3</sup>

**TABLE 16: PRIMARY EDUCATION ENROLLMENT BY ETHNICITY**

Ethnicity	Native American	Asian/Pacific Islander	Black	Hispanic	White	Other	Total
<b>No. of kids in 2010</b>	18,749	178,665	676,523	2,342,680	1,607,212	19,698	4,843,527
<b>Percentage</b>	0.4%	3.7%	14.0%	48.4%	33.2%	0.4%	100%

**Source:** Texas Education Agency 2010: <http://ritter.tea.state.tx.us/perfreport/aeis/2010/DownloadData.html>

Of the total number of children enrolled in primary and secondary schools in Texas, 2,848,067 received free and reduced lunches. Table 17 shows the percentage of economically disadvantaged children living in rural and urban areas in Texas.

**TABLE 17: PERCENTAGE OF STUDENTS ENROLLED IN THE FREE AND REDUCED LUNCH PROGRAM**

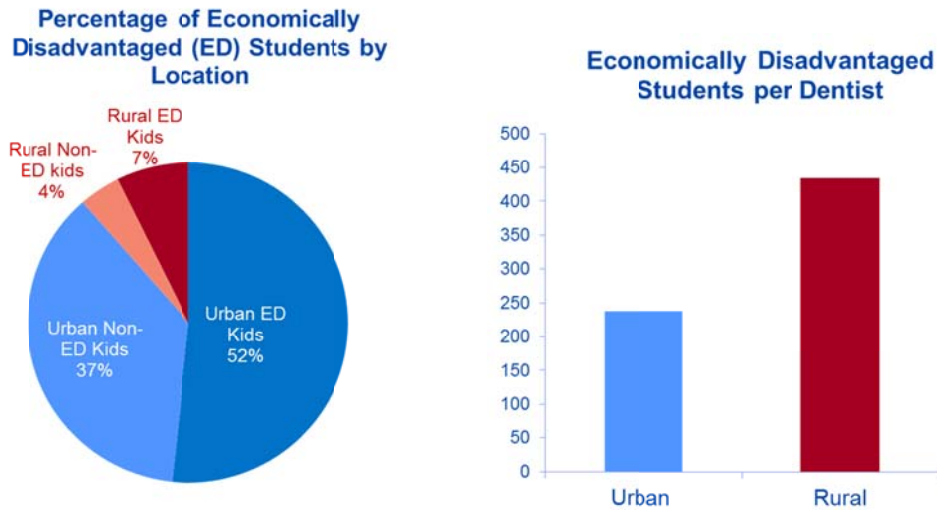
	Free and Reduced Lunch Children in 2010	All Students in 2010	Proportion
<b>Rural</b>	352,802	552,777	64%
<b>Urban</b>	2,495,265	4,290,750	58%
<b>Total</b>	2,848,067	4,843,527	59%

**Source:** Texas Education Agency 2010: <http://ritter.tea.state.tx.us/perfreport/aeis/2010/DownloadData.html>

The rural/urban divide is a problem of dentist distribution, there are not enough dental professionals or it is too far for families to travel to receive care. The pie chart in Figure 16 shows the percentage of economically disadvantaged children living in rural and urban areas, as measured by free and reduced lunch enrollment to approximate low-income children. While there are more children living in urban areas in Texas, the bar graph shows the difference in dentist distribution throughout the state. There are 200 more economically disadvantaged children per dentists in rural areas of Texas than in urban areas. This means that rural children have fewer dentists available to provide care when compared to children in urban areas. Therefore, low-income children that live in urban counties can access a dental professional more easily than low-income children in a rural area.



**FIGURE 16: DISTRIBUTION OF FREE AND REDUCED LUNCH CHILDREN AND DENTISTS**



**Source:** Texas Education Agency 2010: <http://ritter.tea.state.tx.us/perfreport/aeis/2010/DownloadData.html>  
 Texas Health and Human Services Commission 2010: <http://www.dshs.state.tx.us/chs/hprc/DENT-lnk.shtm>

### DENTIST AVAILABILITY BY COUNTY

Figure 17 depicts the number of dentists per 100,000 by county in Texas. The dark blue counties are those that have more than 54 dentists per 100,000 people, which correspond to urban areas around large cities in Texas. The lighter blue and white counties indicate the regions that have less than 38 dentists per 100,000 people. Finally, gray counties in this map are those places with no dentist within the county. In 2010, there were 27,246 children who lived in counties without a practicing dentist. This figure depicts the dentist distribution throughout Texas counties and shows that there are areas with few dentists per person.

**FIGURE 17: NUMBER OF DENTISTS PER 100,000 PEOPLE, BY COUNTY**

**Source:** Texas Health and Human Services Commission 2010. <http://www.dshs.state.tx.us/chs/hprc/DENT-lnk.shtm>

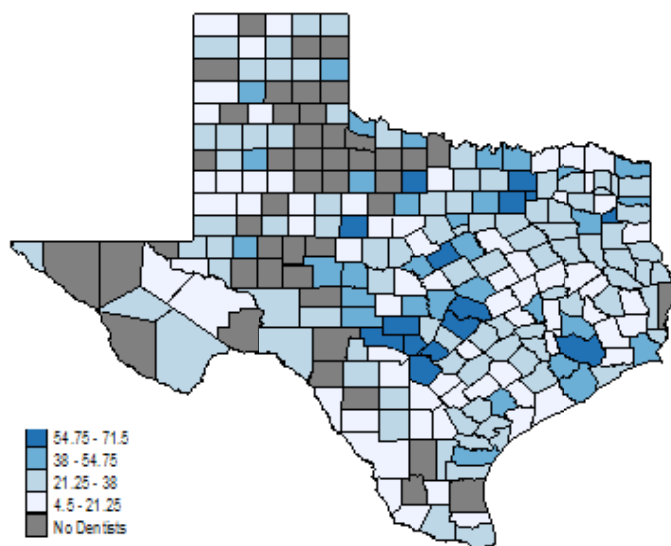
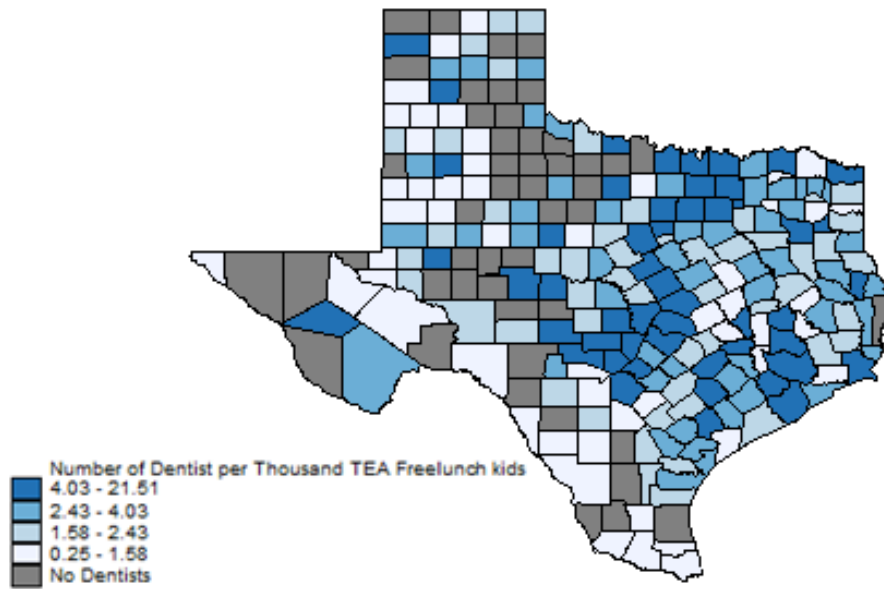


Figure 18 shows the number of dentists per thousand free and reduced lunch child as identified by TEA. The darker blue counties have most dentists per economically disadvantaged children. The gray counties indicate there is no dentist in that area.

**FIGURE 18:** DENTAL COVERAGE BY COUNTY AND FREE AND REDUCED SCHOOL-LUNCH CHILDREN



**Source:** Texas Health and Human Services Commission 2010: <http://www.dshs.state.tx.us/chs/hprc/DENT-lnk.shtm>  
Texas Education Agency 2010: <http://ritter.tea.state.tx.us/perfreport/aeis/2010/DownloadData.html>

<sup>1</sup> This research team was unable to determine the number of Medicaid children per county, so children enrolled in free and reduced lunch are used to describe low-income children and the number of children that could potentially enroll in Medicaid.

<sup>2</sup> U.S. Census Bureau: <http://quickfacts.census.gov/qfd/states/48000.html>

<sup>3</sup> Texas Education Agency 2010: <http://ritter.tea.state.tx.us/perfreport/aeis/2010/DownloadData.html>

## APPENDIX 4: ACCESS AND BARRIERS

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Different populations require different forms of care and access strategies for them to receive care. Non-English speaking populations require a dentist that speaks their language. Parents must be convinced of the importance of dental care before they take their children to a dentist. In many cases, rural populations need a dentist in a closer proximity. The list of population-specific needs is unending. An article published in the *Journal of American Dental Association* supports this assertion: “The problem of inadequate access to dental care for some segments of the population is complex and cannot be solved simply. . . As with most complex problems, a single, simple solution will not be effective, and generally, the ‘one size fits all’ concept will generate inadequate solutions.”<sup>1</sup> Other reports that support the need for complex solutions include: the U.S. Department of Health & Human Services,<sup>2</sup> the Center for Disease Control,<sup>3</sup> Center for Health Administration Studies and the National Opinion Research Center,<sup>4</sup> the Institute of Medicine,<sup>5</sup> Pew, Newman and Gift,<sup>6</sup> and the Omnibus Budget Reconciliation Act of 1989.<sup>7</sup>

A lack of access arises when a barrier prevents utilization of care, specifically for this report, dental care. Using this basis, Ronald M. Anderson offers an intuitive organizational structure for measuring access. He breaks down access to care by dividing access into sections: potential access, realized access, equitable access, and inequitable access. Potential access is the combination of the types of care available. Andersen notes that greater variety of care likely results in greater use. Realized access is the “actual use of services.” Equitable access occurs when the need for care results in the use of that care, without other determining factors impeding care accessibility [social structure, health beliefs, and enabling resources (such as income) are examples of determining factors]. Inequitable access occurs when determining factors hinder a patient from receiving care.<sup>8</sup> This analysis focuses on two of these four dimensions: potential access and inequitable access.

Throughout the literature referenced previously, researchers focus on the factors preventing a patient from using adequate care and define these factors as barriers to access. Identifying these barriers reveals areas in which access can be improved.

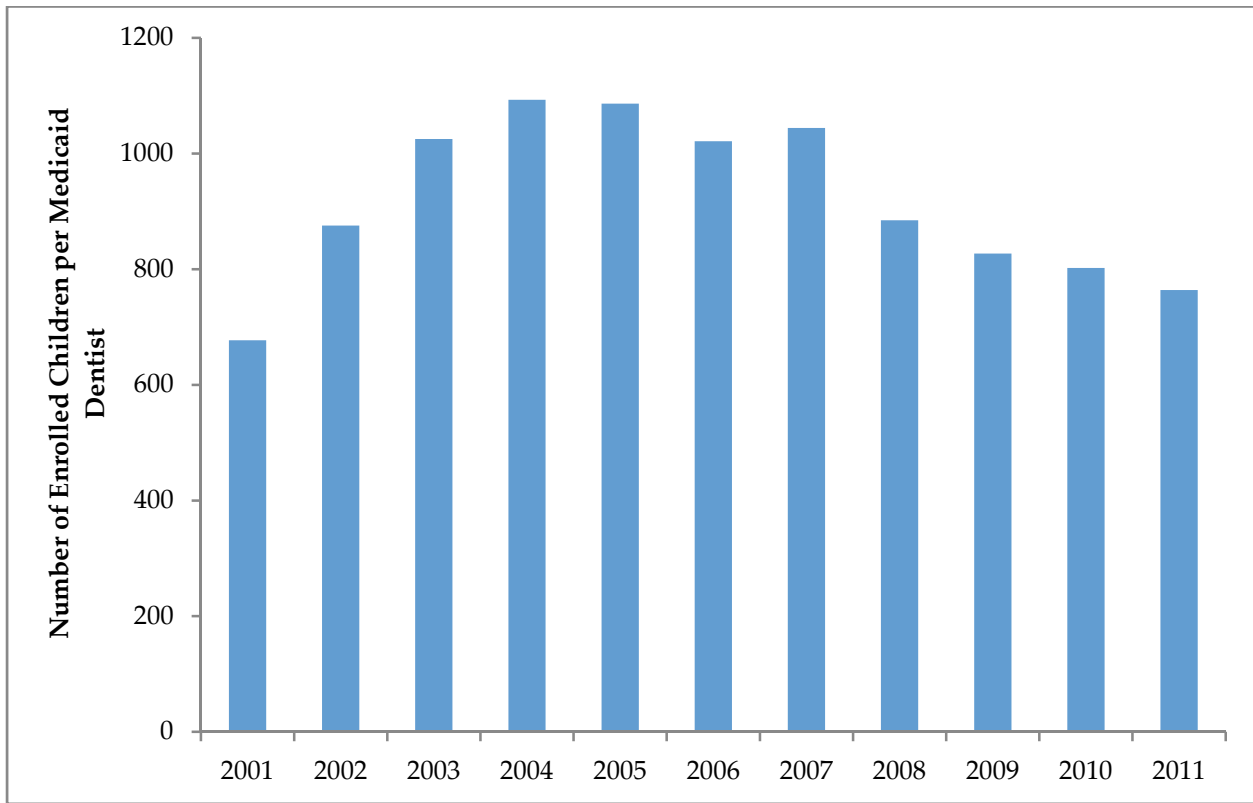
The subsequent discussion describes access using the economic terms of supply and demand. Availability of dental care is supply and the utilization of dental care is demand. Access is the interplay of the two, where they intersect. Barriers describe the theories behind the current state of access and utilization.

### AVAILABILITY SUPPLY: DENTAL PROFESSIONALS

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Figure 19 below illustrates the number of children enrolled in Medicaid per Medicaid-accepting dentist in Texas. The number of children were divided by the number of dentists who accept Medicaid over a period of time. As this graphic demonstrates, each Medicaid-accepting dentist would need to see more than 800 Medicaid children per year. Dentists with a 3 chair office can see between 1000-1800 patients in a year, and would undoubtedly have adult patients as well as children. There is an alarming mismatch between the number of Medicaid accepting dentists and Medicaid children.

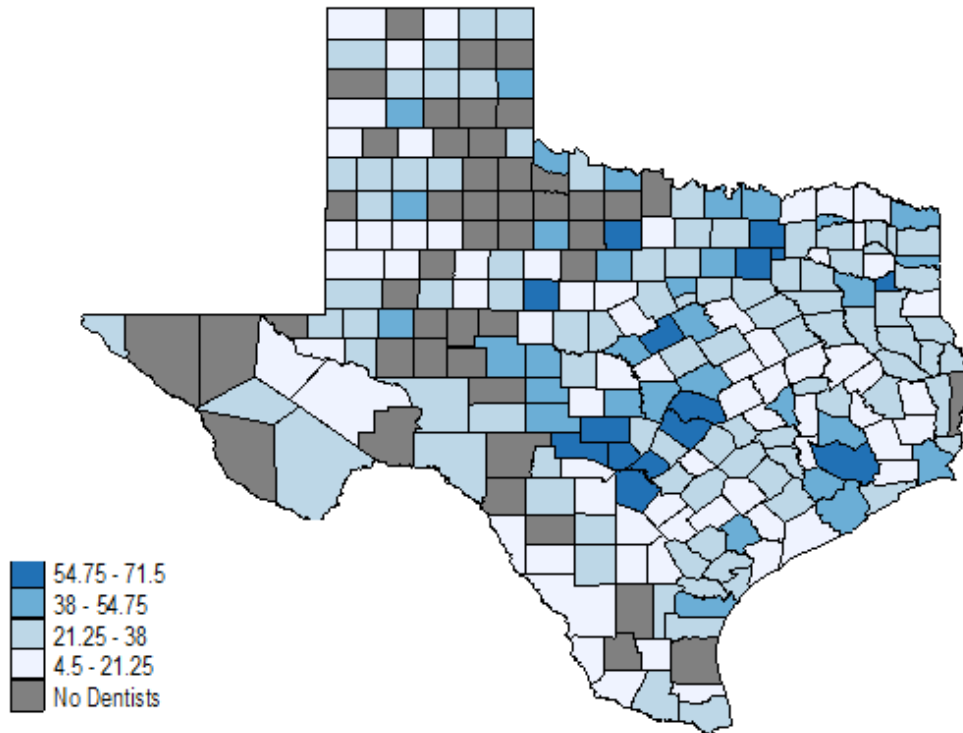
**FIGURE 19: CHILDREN ENROLLED IN MEDICAID PER MEDICAID DENTIST**



**Source:** THSteps Active and Enrolled Dental Provider Participation Report, 1996 – Current. Texas Medicaid Enrollment Statistics.

Figure 19 shows the number of enrolled Medicaid children to dentists who accept Medicaid. In 2011, there were nearly 800 children for one dentist. The number is improving from a high of 1100 in 2004. However, as the following map illustrates, even if all of the dentists in Texas accepted Medicaid, there would still be a shortage of dental professionals to adequately serve the Texas population. There are simply too many children and too few dentists. Unless something is done to increase the number of dental professionals, Texas children will never receive adequate care. Although Texas shows improvement in the number of dentists who accept Medicaid and the proportion of children to dentist, Texas still falls short in meeting the needs of economically disadvantaged children.

**FIGURE 20:** 2011 DENTAL COVERAGE AREAS: NUMBER OF DENTISTS PER 100,000 PEOPLE



**Source:** THSteps Active and Enrolled Dental Provider Participation Report, 1996 – Current

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## BARRIERS TO A HIGHER AVAILABILITY

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The barrier to access of a greater availability of dental professionals in the state of Texas is a serious and complicated barrier with two main contributing factors. Thus, the capstone team has broken down this barrier by each of these contributing factors, and addressed each factor individually with specific recommendations. These contributing factors include: Medicaid reimbursement rates and dental hygienist legislation.

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## MEDICAID REIMBURSEMENT RATES

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Non-participating professionals cite poor reimbursement rates as the formative reason behind their reluctance to accept Medicaid.<sup>9</sup> On a national level, the Government Accountability Office (GAO) calculated that Texas' 2000 Medicaid and CHIP reimbursement rates for dental services were equal to or less than fees charged by the lowest 10<sup>th</sup> percentile of dentists. Simplified, this means that 90% of dentists in the U.S. charge a higher fee for their services than what Medicaid or CHIP reimburses in Texas.<sup>10</sup>

In 2008, the Academy of General Dentistry published a white paper on increasing access to the oral care and stated, "When states have raised the Medicaid reimbursement rates, the number of provider dentists have increased, which, in turn, has led to a direct increase in patients in

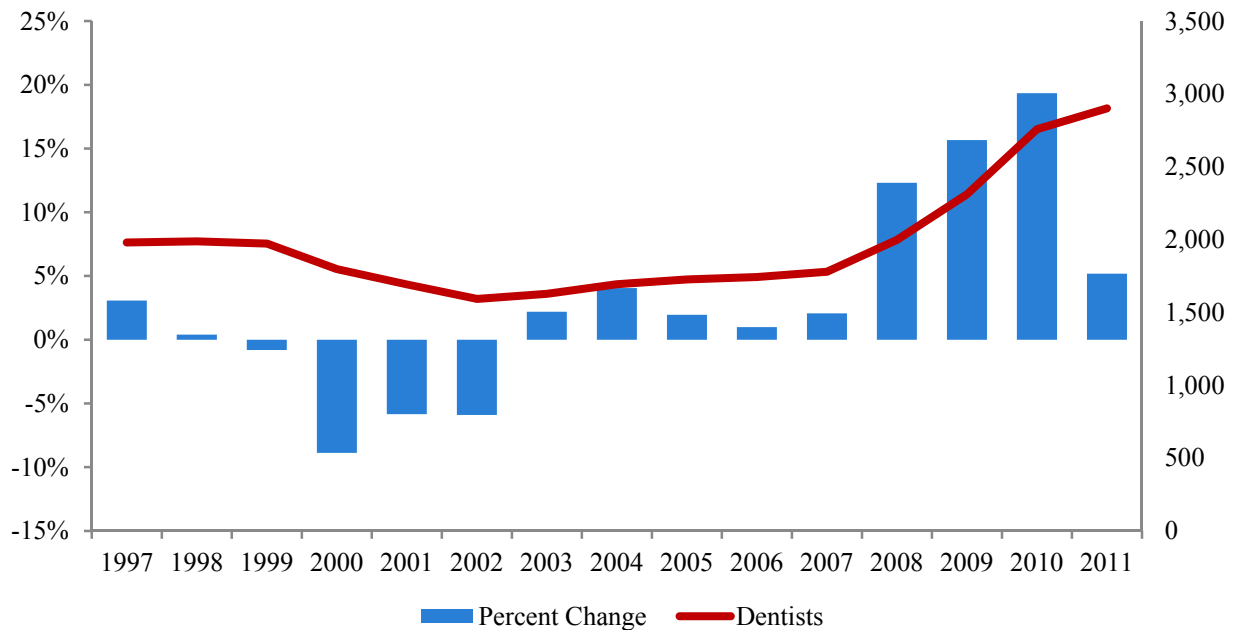
underserved areas receiving care.”<sup>11</sup> The report suggests that states should raise Medicaid reimbursement rates to at least the 75<sup>th</sup> percentile to adequately incentivize dentists to accept Medicaid.

Dental professionals agree with this assessment. A joint report by the Henry J. Kaiser Foundation and the National Academy for State Health Policy acknowledged that dentists’ primary reason for refusing to accept Medicaid was the low reimbursement rates. Low Medicaid reimbursement rates not only severely reduce profit margins in dental practices, but also in some states, the rates are so low that they do not even cover the cost of the procedure.<sup>12</sup>

The states of Alabama, Michigan, South Carolina, Tennessee, Virginia, and Washington have used increased reimbursement rates as a method to improve access to dental care. Michigan and Alabama have seen great success in increasing access of care and heightened levels of dental participation in the Medicaid program since changes were made to their reimbursement rates in 2000. Both states used private insurer’s fee schedules and reimbursement rates to generate new higher state reimbursement rates to encourage participation of dentists throughout the states. Michigan, through the *Healthy Kids Dental Program*, strengthened a currently-existing contract with commercial dental insurers by reimbursing most dentists 100% of what they normally charged for a procedure.<sup>13</sup>

As a result of the funds allocated by the Texas legislature to the Frew Advisory Committee in 2007, Texas nearly doubled the Medicaid reimbursement rates for many dental procedures.

**FIGURE 21: TEXAS DENTISTS ACTIVELY PARTICIPATING IN MEDICAID**

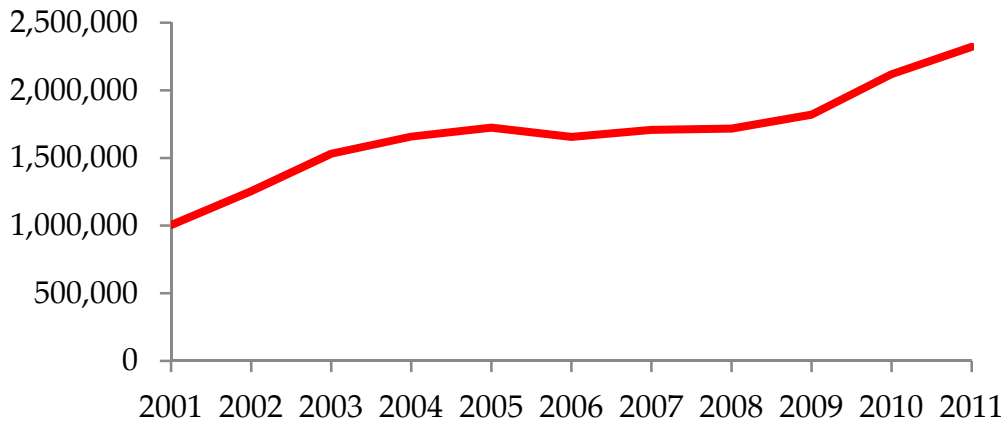


**Source:** THSteps Active and Enrolled Dental Provider Participation Report, 1996 – Current

Figure 21 indicates changes over time in the number of Texas dentists who accept Medicaid. The line represents the actual number of dentists; the bars indicate the annual growth rate. The

pattern is consistent with the literature’s finding that raising reimbursement rates results in higher dentist participation. The number of dentists actively participating in Medicaid did sharply increase after the rate raise in 2007.

**FIGURE 22:** NUMBER OF CHILDREN ENROLLED IN TEXAS MEDICAID



**Source:** Texas Medicaid Enrollment Statistics, 2011

Following the increase in Medicaid accepting dentists, the number of children participating in Medicaid rose. Figure 22 shows approximately a 67% increase in the amount of children enrolled in Medicaid since 2009. As the economic recession continued, more children began using Medicaid for health insurance.

Studying the state’s Medicaid reimbursement rate rise in 2007 is a tangible example of how reimbursement rates affect access to dental care for low-income children. In this case, taking a step towards fair reimbursement rates expanded the number of dentists participating in the Medicaid program. In turn, more dentists are now available to treat the increasing number of children on Medicaid. However, the increased number of children on Medicaid means that the access gap only widening and there are still not enough dentists for all of the children that needed them.

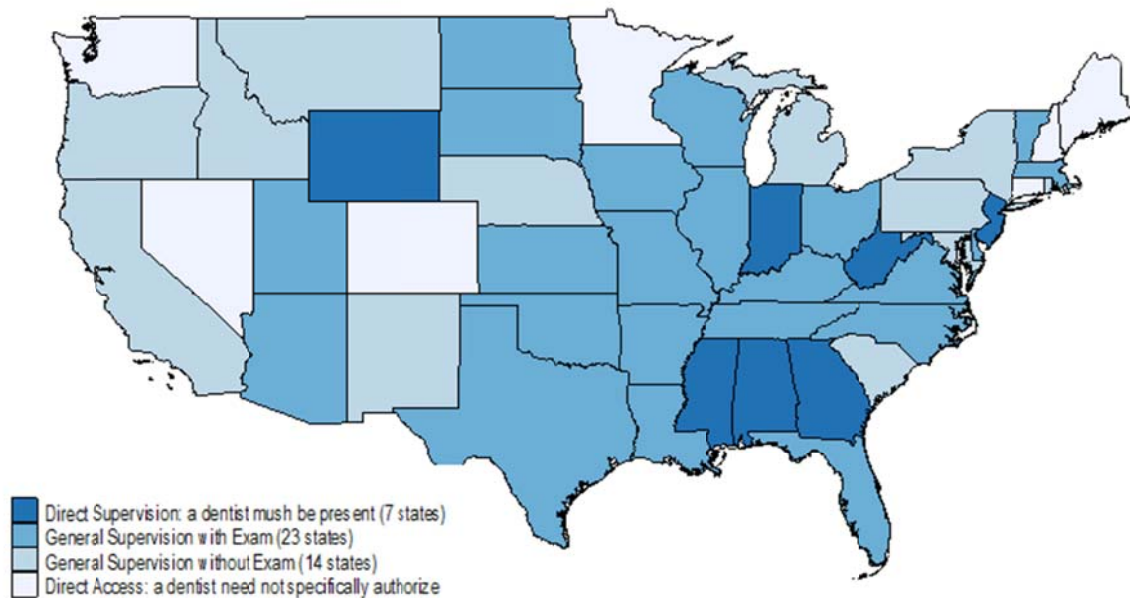
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## REGULATIONS ON DENTAL HYGIENISTS

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Medicaid reimbursement rates are not the only factor influencing Texas’ shortage of dentists. As previously discussed, even if all of the dentists in Texas were to accept Medicaid, many counties would still be left without access to a dentist. Approaches to eliminating this problem have varied across the nation; one strategy is decreasing regulations on dental hygienists and creating new dental professionals (dental therapists) to participate in providing dental care.

**FIGURE 23: STATE DENTAL HYGIENIST REGULATIONS**



Texas’ regulations on dental hygienists are among the strictest in the nation. In Texas, a dental hygienist is able to perform dental work as long as the dentist has given permission and views the mouth within 12 months of the work being performed. Across the country, states noticed an increase in access to dental care after deregulating their policies on dental hygienists.

PEW’s *Center on the States* lists the state of Minnesota as an innovator when increasing the supply of dental professionals. In 2009, the State of Minnesota created a new avenue to increasing access for low-income populations in the form of a dental therapist. The dental therapist “is licensed to perform such duties as filing cavities and extracting teeth.”<sup>14</sup> Since its inception, dental schools within the state started to formulate curriculum and admit individuals who are willing to be trained in this new field. Since the creation of this position, dental therapists facilitated an additional 2,000 dental visits per year.

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### A CANCELED LOAN REPAYMENT PROGRAM

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The State of Texas attempted to reduce the dentists’ financial barriers associated with treating Medicaid children through a loan forgiveness program. The Children’s Medicaid Loan Repayment Program offers up to \$210,000 over a four-year period to dental students from schools in Dallas, Houston, and San Antonio.<sup>15</sup> The prospective dentist must commit to accepting Medicaid children for four consecutive years, have received their dental license to practice dentistry in the state of Texas, have eligible outstanding loans (i.e. loans cannot already be paid), and have a specific number of official Medicaid patients in their practice.<sup>16</sup> HHSC pays a portion of the dentist’s loans depending on the number of Medicaid children he or she see each month. Up to 300 new participants can enroll each year.<sup>17</sup> Texas adopted this loan repayment program in 2009.<sup>18</sup> In the first year, 107 students were approved for the loan.<sup>19</sup> However, HHSC



was forced to suspend this program in August 2011 because of a lack of funding allocated by the 82<sup>nd</sup> Texas Legislature.<sup>20</sup>

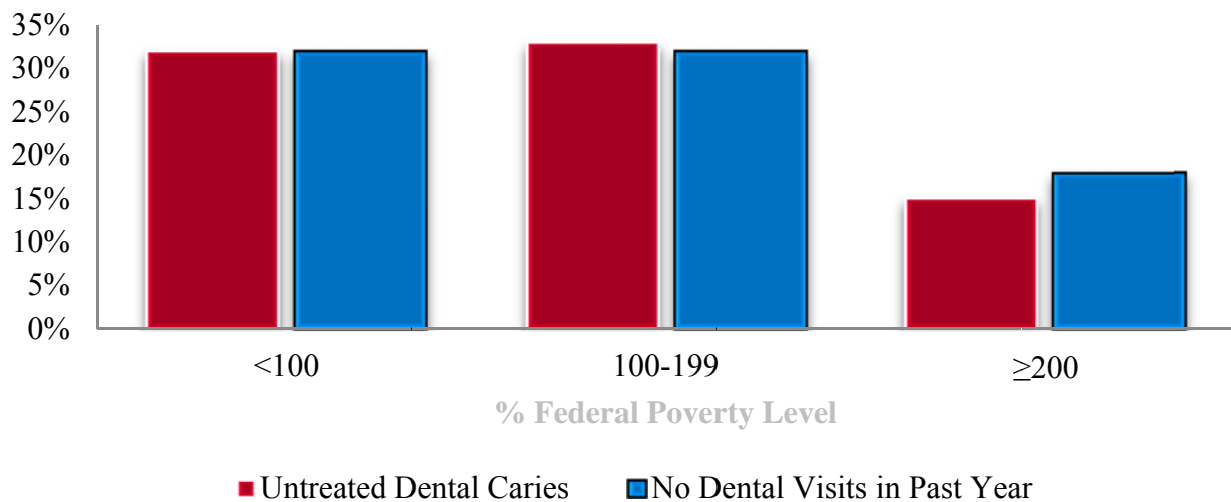
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## UTILIZATION DEMAND: A PATIENT SHORTAGE

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Even after the increased emphasis on oral health care by the Surgeon General in 2001, only 37 % of children on Medicaid had seen a dentist in 2008.<sup>21</sup> Unfortunately, this number is not representative of a lack of need. Tooth decay is the most common chronic childhood disease. Tooth decay is five times more common than asthma and affects 25% of children between the ages of 6-11 years of age. This percentage increases to 59% for 12 – 19 year olds.<sup>22</sup>

**FIGURE 24:** DISPROPORTIONAL EFFECTS ON LOW-INCOME CHILDREN NATIONWIDE



**Source:** Julia Paradise, “Dental Coverage and Care for Low-Income Children: The Role of Medicaid and SCHIP,” The Kaiser Commission on Medicaid and the Uninsured, (2008): 1-5

According to the graph, children in low-income families, like those enrolled in Medicaid, are twice as likely to experience tooth decay, but are less likely to receive dental care than children from middle to upper-class homes. According to the Agency for Healthcare Research and Quality, children from low-socioeconomic families are five times more susceptible to caries than children from families with higher-socioeconomic backgrounds; however, only 36 % of low-income children see a dentist for treatment compared to the 70 % of children from higher-income families that seek treatment.<sup>23</sup>

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## BARRIERS TO HIGHER UTILIZATION

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The barriers to higher patient utilization of oral care are just as complicated and serious as the dental professional availability barriers. There are four contributing facets: oral health education, the rural/ urban divide, the affordability of health care, cultural differences. Each of these facets greatly varies in severity as well as the means in which to resolve the problems these facets

create. The capstone team has also included specific recommendations to address these four areas of the barrier to higher patient utilization.

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## EDUCATION

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Good oral health education informs parents and children on the topic of oral health to help them improve or maintain a level of good oral health and prevent oral disease. One factor that strongly contributes towards the high number of caries in low-income children, and the socioeconomic background of parents directly affects the amount of knowledge a child will receive at home “Limited knowledge about oral hygiene.”<sup>24,25</sup> By expanding a family’s knowledge of oral health, many low-income children can break the practices established by their parents, gain a stronger understanding of their own personal oral health, and seek out access to care in future years.

Promoting proper dental hygiene early, especially while children are impressionable, helps ensure the continuance of good dental hygiene throughout that child’s lifetime. During early developmental years children grow physically, children begin to understand social norms, and develop cognitively as well as emotionally.<sup>26</sup> This development stage shows how “positive and negative influences” can have dramatic effects on oral health in later years.<sup>27</sup>

In Washington, the Access to Baby and Child Dentistry (ABCD) program took advantage of a child’s development stage and took great strides in educating the people of Washington State on the importance of oral health and on ways to ensure good oral health over their lifetime. By focusing on “Medicaid-eligible children under age six,” the state facilitated 2.4 dental visits on average per year for the children enrolled in the program. In addition to demonstrating an increase in dental health, this average also shows a trend developing of children making the dentist a regular part of their routine and beginning to place value on having good oral health.<sup>28</sup>

*The Official Journal of the American Academy of Pediatrics* recommends that pediatricians take the primary role of educating parents of the importance of oral health. Pediatricians are instrumental in improving the dental care of patients “by increasing their involvement...during well-child care visits.”<sup>29</sup> Because pediatricians play such a crucial part in a child’s early years, this oral health education method might be the key in reaching children without early dental hygiene habits.

Developing good oral health during a child’s early years is a theme that caregivers in the state of Texas have picked up on. The primary objective of the *Parent, It’s Up to You! Oral Health Program* is to educate and empower students to improve individual oral health hygiene.<sup>30</sup> This program provides preparatory information for expecting parents, including adult and teen parents. The curriculum consists of three lesson plans and includes information on dental care for pregnant mothers, infants, and preschoolers. It also includes additional information on preventing and/or identifying tooth decay. The instruction material also includes a video in English or Spanish as well as a poster depicting tooth decay.

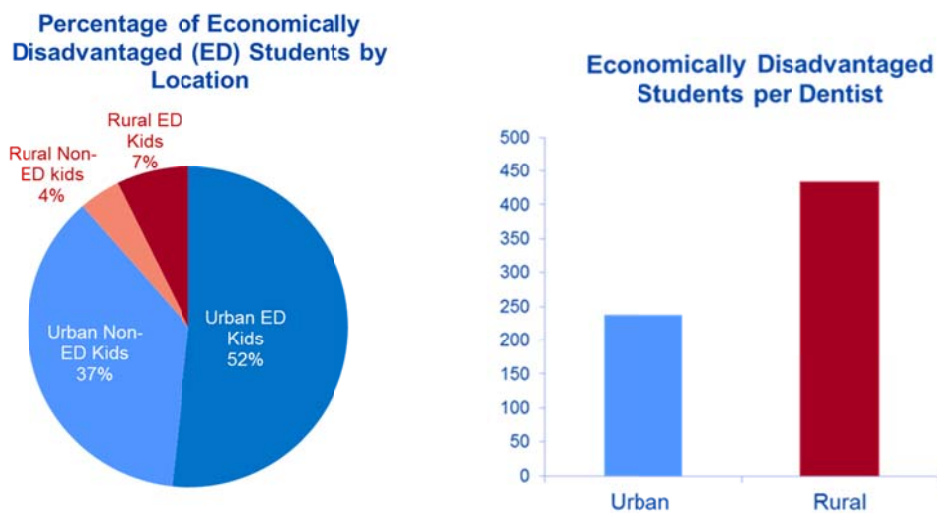
The Head Start Dental Home is a joint venture between the Head Start Bureau (HSB) and the AAPD that began in 2008. This program is another way Texas children are being exposed to

dental care at an early age.<sup>31</sup> The HSB and the APPD’s main objective is to establish a local dental home for every child participating in Head Start. Within the state of Texas, this initiative is overseen by Dr. Paul Kennedy, Jr., who is coordinating the efforts of the Texas Academy of Pediatric Dentists, TDA, Texas Academy of General Dentistry, TDHA, Texas State Head Start Collaboration Office, Texas Head Start Grantees, and the OHP. Shortly after the initiation of the program, an assessment of the dental access of HS facilities in Texas was conducted, identifying each facility as no, low, medium, or high access needs. Currently, efforts are being made to connect high access need HS programs to local dentists that accept Medicaid.

### RURAL/URBAN DIVIDE

One of the challenges to providing dental care in Texas is the differences between rural and metropolitan counties. Because of the size of the state and the variety of towns, cities, and counties, children who do not live in urban cities may have a difficult time finding a dental professional to provide care. The rural/urban divide is a problem of dentist distribution, there are not enough dental professionals or it is too far for families to travel to receive care. As Figure 25 demonstrates, there is a strong urban/rural divide in the state of Texas. Low-income children that live in urban counties can access a dental professional more easily than low-income children in a rural area. For both graphs in Figure 25, TEA’s number of free and reduced lunch children was used as a close estimate for the number of low-income children in rural and urban areas. While there are more children in urban areas, Figure 25 shows that there are 200 more children per dentist in rural areas than in urban areas.<sup>32</sup>

**FIGURE 25: PERCENTAGE OF FREE-AND REDUCED LUNCH STUDENTS BY LOCATION AND NUMBER OF DENTISTS PER CHILD BASED ON LOCATION**



**Source:** TEA, Enrollment in Texas Public School, THSteps Active and Enrolled Dental Provider Participation Report, 1996 – Current.

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## AFFORDABILITY

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Although Medicaid completely pays for a dental visit/procedure, there are time costs involved in the visit. In addition to revealing the lack of dental professionals, the previous section shows that dentist dispersion is skewed in favor of urban communities. To visit a dentist, a parent living in a rural district may have to take the child to another county. In addition to transportation costs, time must be factored in as well. For a parent working an hourly job, time is money and any visit to the dentist takes away from their paycheck. To combat these costs, community members across the nation are partnering with schools to provide children with excellent oral care without undue expense on the parent.

An additional barrier to access for low-income children in Texas is the limit on the amount of money a child can spend on preventive services in one year. A fluoride varnish is recommended for high risk children every six months. Sealants are also recommended for high risk children. Sealants are only applied once, but need to be checked occasionally to verify no cracks develop. With all of these preventive services combined, a high risk student on Medicaid could need up to \$520.78 in preventive care in one year. Medicaid set an annual limit of \$250.<sup>33</sup> This team also recommends either removing the cap on preventive dental care for Medicaid or increasing it to \$525 in order to cover all of the necessary preventive procedures a high risk Medicaid child may require in a given year.

Tennessee targets children from kindergarten through eighth grade with their Department of Health's School Based Dental Prevention Program. Since the program's conception, the state has been able to provide dental care to 50% more students in the free and reduced lunch category with dental care. Using portable equipment, dentists are able to screen and refer students in need of dental checkups. In recognition of its accomplishments, it was selected by the Association of State and Territorial Dental Directors as a "Best Practice Project" in August 2009. The state of Pennsylvania also found success within schools when it helped to renovate a vacant school building to create the Hamilton Health Center in 2006. This school-based health center and pediatric practice allowed dental hygienists to work within classrooms to screen and refer students to a dentist. Instead of constantly asking the parent to go to the dentist, Pennsylvania sends the dentist directly to the patient in school.

Privately-funded organizations in Texas are also trying to lift the affordability barrier by going directly to schools. St. David's Foundation is a non-profit organization that gives grants to smaller, community-based non-profits. One of their collaborative efforts is the St. David's Dental Program. This effort uses mobile dental trucks to provide dental care (free dental screenings, sealants, and critical care) to students at elementary schools at Austin, Del Valle, Hays, Manor, Pflugerville, and Round Rock Independent School Districts. Each "mobile clinic" has two exam rooms and digital x-ray equipment.

Campus visits are a four week process, beginning with the distribution of permission slips to students' parents. These slips only pertain to the initial dental screening that occurs the week after the slips are distributed. If the screening reveals that a patient has "visible decay and is a candidate for treatment on the mobile clinic,"<sup>34</sup> St. David's provides an additional permission

slip to parents. St. David's provides gift certificates to teachers when all diagnosed students return their permission slips, as an incentive to follow up with parents.

In 2010, the St. David's program visited 34 different schools, screened 13,525 students and sealed 14,904 teeth.<sup>35</sup> Of the \$4.2 million provided in dental services, 42 % of the services were restorative and 58 % of the services were preventive.<sup>36</sup>

The TDSHS currently operates the Texas Dental Sealant Program (TDSP) underneath the umbrella of the Oral Health Program.<sup>37</sup> This particular program targets low-income children in underserved areas, including Austin, Lubbock, and Houston, by visiting elementary schools to promote oral health and provide preventive care.<sup>38</sup> The TDSP has a three-fold mission to: first, expand the knowledge, acceptance, and application of dental sealants through collaboration with school administrators, healthcare providers, and parents; second, deliver preventive oral health services primarily through sealants; and third, encourage oral health as a critical aspect of overall health.<sup>39</sup>

In the state of Texas, dental professionals working for the state visit elementary schools to provide preventive care, such as examining children's teeth, providing fluoride treatments and applying sealants. Children are not required to participate, but if they wish to participate, their parents must submit a signed release form authorizing the school to perform preventive services. The State of Texas funds the program, which allows them to serve all children regardless of dental health insurance.

In 2010, this program provided over 18,000 dental sealants to children.<sup>40</sup> Dental professionals placed sealants on elementary, middle school, and high school students. The program served 212 different schools and performed services valued at \$1.27 million.<sup>41</sup> However, the program could improve this statistic and the number of children served through the acquisition of additional staff and funding. Texas has more than 2.3 million children enrolled in Medicaid, each of whom has 8 molars to seal; 18,000 sealants is only a drop in the bucket.

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## CULTURAL DIFFERENCES

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Currently, the state of Texas and the state of California have the largest Hispanic population in the nation. Based on the U.S. Census Bureau (USCB), both states have a 37.6 % population of Hispanic Americans. Estimates project the Hispanic/Latino population to be the ethnic group with the most significant population increase, from 10.8 % to almost 25 % of the U.S. population. Therefore, the Hispanic children population is also one of the fastest growing populations in the U.S. This population of children has the highest dental disease rate and receives the lowest amount of oral care. However, while the population of Hispanics is growing rapidly, in 2011, only 7.7% of all dentists were Hispanic.<sup>42</sup>

Data analysis in Texas also indicates a disparity in dentist dispersion among demographic regions, such as minority populations. Most of the heavily-Hispanic counties on the border with Mexico are federally designated Dental Health Care Provider Shortage areas.

Under these rapid demographic changes in Texas, the oral care workforce and total supply of dentists need to be prepared to serve this diverse and vulnerable population. The special needs of minority children and language barriers cannot be overlooked.

For instance, in the United States, 10 million children live in non-English-primary-language (NEPL) households. Data from the National Survey of Childhood Health suggests that NEPL children experience several disparities in accessing medical and dental care as well as service utilization compared to their English-speaking counterparts.

Research also shows that NEPL households are more likely to report issues with their health care providers because they are unable to provide proper explanation, advice or help in an understandable way.

To overcome these barriers resulting from limited language proficiency, professionals must employ translators and interpreters to diagnose which increases the chances of communication breakdowns between the patient and the doctor. This problem is further exacerbated with the lack of medical interpreters. One study found that no interpreter was used in 46% of emergency cases with patients with English proficiency problems in the United States.

All of these issues lead to lack of utilization of dental services by minority patients. According to ADA, minority patients are more likely to see a dentist on a regular basis who shares their language and culture. Parents are more comfortable taking their children to visit dentists who speak the same language and understand their culture better. Matching non-English speaking patients to Medicaid accepting dental professionals must include a language component. Otherwise, there is no parental education and treatment is severely limited. The total supply of dentists removes an access barrier for low-income children to receive dental care, but there is also a need for cultural specialization and language training.

<sup>1</sup> Guay, Albert H. 2004. "Access to Dental Care: Solving the Problem for Underserved Populations." JADA 135(November) 1599.

<sup>2</sup> U.S. Department of Health & Human Services Agency for Healthcare Research. "National Healthcare Disparities Report." Agency for Healthcare Research. 2010. <http://www.ahrq.gov/qual/nhdr10/Chap9.htm> (accessed April 13, 2012).

<sup>3</sup> U.S. Department of Health and Human Services: Centers for Disease Control and Prevention. "Health, United States, 2007 With Chartbook on Trends in the Health of Americans." Centers for Disease Control. 2007. <http://www.cdc.gov/nchs/data/hs/hs07.pdf> (accessed April 13, 2012).

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- <sup>15</sup> Texas Department of State Health Services, "Texas Children's Loan Repayment Program," accessed April 2, 2012, <http://www.dshs.state.tx.us/chpr/CMLRP.shtm>
- <sup>16</sup> Texas Department of State Health Services, "Texas Children's Loan Repayment Program," accessed April 1, 2012, <http://tamhsc.edu/education/finaid/forms1/medicaid-children-loan-repayment.pdf>
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- <sup>38</sup> *Ibid.*
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## APPENDIX 5: TEXAS LEGAL ENVIRONMENT

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Each state is unique in its demographics and policy environment, and the state of Texas is no exception. Texas especially is unique in many regards because of the physical size of the state, the immense and diverse population, the numerous large cities, the vast rural territory, and the distribution of wealth. The state of Texas has appropriate public policies and legislation to regulate services distributed to constituents within the state. Thus, this chapter describes the major regulations that have shaped and currently regulate state-provided dental insurance, the provision of dental care, as well as dental professionals.

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### FREW V. HAWKINS

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In 1993, a class action lawsuit was filed as *Frew v. Hawkins* against Texas Medicaid on behalf of all children under 21 in Texas on Medicaid. The *Frew v. Hawkins* lawsuit alleged the state of Texas was not fulfilling federal EPSDT Medicaid requirements. Specifically, the case argued that Texas children on Medicaid lacked access to check-ups and follow-up medical and dental care. The case was originally filed in the federal courts in the eastern district of Texas. In 1996, a consent decree was filed in which the state and plaintiffs agreed on actions the state should take to comply with federal EPSDT mandates. The consent decree required Texas Medicaid to increase the number and proportion of children receiving check-ups, increase training, outline provider roles, increase accountability and management, and improve managed care<sup>1</sup>. Reporting requirements and access to dentistry were also key components of the consent decree. Following the verdict, the plaintiffs and state agreed on a set of corrective action orders to ensure compliance with the consent decree and to increase children's access to EPSDT health services. In 2007, the 80<sup>th</sup> Texas Legislature appropriated a total of \$1.8 billion dollars to comply with the consent decree, raise Medicaid reimbursement rates, fulfill the corrective action plans, and establish and fulfill strategic initiatives<sup>2</sup>.

Texas Health and Human Services Commission established an advisory board to advise and report on the state's progress in fulfilling the strategic initiatives, Corrective Action Plans, and reporting the progress for meeting the consent decree to the courts. Eleven Correction Action Plans resulted from the court ordering corrective action because the state had not fulfilled the 1996 consent decree. Also, eleven strategic initiatives align with the consent decree. The combination of correction actions, provider payments increases, and strategic initiatives should increase access and utilization of Medicaid-provided health care services for children.<sup>3</sup>

The eleven corrective action plans are as follows:

- Training for health care providers
- Reporting on check-up rates and plans to improve those rates in lagging counties
- Improving check-up completeness
- Access to medications, medical equipment and supplies
- Toll-free number performance
- Medical transportation
- Health outcomes measures and dental assessment (e.g. immunization, lead screening, hearing screens, vision, mental health, etc.)

- Outreach and informing and reporting
- Case management
- Special issues in Medicaid Managed Care (e.g., monitoring frequency and completeness of checkups, and reporting what percentage of children enrolled in Medicaid Managed Care get no health care during a 12 month period)
- Adequate supply of health care providers (standards for travel distance, time to wait for appointments, accurate information on provider availability, adequate reimbursement to meet these standards).<sup>4</sup>

In 2007, HSSC submitted House Bill 15, Frew Expenditures to the courts which outlined how they would use the appropriations. There are four overarching objectives that fulfill the state’s requirements in the consent decree:

1. Increase the number of children who receive THSteps medical and dental checkups
2. Increase participation of medical and dental providers who service children in the Texas Medicaid program
3. Improve appropriate utilization of medically necessary services
4. Improve coordination of care

In accordance with the consent decree, the Frew Advisory Committee accepted twenty proposals to move the state of Texas towards compliance with the federal Medicaid requirements and as required by House Bill 15, of the 80<sup>th</sup> Texas Legislature, Regular Session, 2007<sup>5</sup>, the committee submitted a report on “the background, purpose, and status” of these twenty projects every three months<sup>6</sup>. Each report is divided up into three sections: the initiative purpose, target population, and status of the project.

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## DENTIST PROFESSIONAL REGULATIONS

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There are three main types of oral health professionals that function within the dental field: dentists, dental hygienist, and dental assistants. Each of these oral health professionals has different rules and regulations governing their profession and/ or practice within the state of Texas.

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### DENTISTS

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To practice dentistry in Texas, an individual must graduate from a dental school accredited by the Commission on Dental Accreditation of the American Dental Association with a Doctor of Dental Surgery (DDS) or Doctor of Dental Medicine (DMD). The ADA states that there is no difference between the DDS and DMD, with most degrees being DDS.<sup>7</sup> Most dental schools require a bachelor’s degree, with courses in biology, chemistry, and anatomy. Dental school lasts four years. Dental candidates spend the first two years completing classroom and laboratory work. During the last two years, students treat patients under the supervision of professors and licensed dentists.<sup>8</sup> There are three dental schools in Texas: Baylor College of Dentistry, the University of Texas School of Dentistry at Houston, and the University of Texas Health Science Center at San Antonio Dental School. Nearly 900 students graduate each year from the three dental schools in Texas.

Upon graduation, the state of Texas requires the licensing of prospective dentists through the American Dental Association Joint Commission on National Dental Examinations and a dental clinic examination through one of the six regional boards. The applicant then completes an application with the State Board of Dental Examiners. The fee is \$400, with annual registration required.<sup>9</sup> After approval from the Board, the applicant receives the right to practice dentistry in Texas. State rights are nontransferable but an individual can obtain a license from every state.<sup>10</sup>

The Texas Administrative Code specifies what treatments dentists can prescribe. Included is the right to diagnose and treat, provide surgical treatment, and assist an individual's oral health.<sup>11</sup> A full detailed list is available through the Occupations Code, Title 3: Health Professionals, Subtitle D.: Dentistry, Chapter 251: General Provisions Relating to Practice of Dentistry. Dentists do not need permission from any other person to treat patients or prescribe medication.

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## DENTAL HYGIENISTS

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Dental hygienists work closely with dentists to provide oral care to patients. Dental hygienists clean, polish, and take x-rays. Dentists can grant hygienists permission to perform any task as long as the dentist examines the patient within 12 months of performing the service. The dentist does not have to be present for the hygienist to perform acts delegated. The state requires hygienists to work with a dentist. The state of Texas does not permit dental hygienists to open private clinic or work without the direction of a dentist.<sup>12</sup>

Hygienists receive training at professional schools. There are 25 professional schools in Texas, spread throughout the state, that provide required training and certification.<sup>13</sup> Texas law requires the licensing of dental hygienists as well. The licensing process consists of passing a written exam administered by the American Dental Association's (ADA) Joint Commission on National Dental Examinations and an assessment administered through the State Board of Dental Examiners.<sup>14</sup>

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## DENTAL ASSISTANTS

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Assistants are under the direct supervision of a dentist. They help prepare a patient to be seen by the dentist. Assistants can receive a certification to place sealants, perform x-rays, and polish teeth. Prior to receiving certification, they are required to attend training and practice as assistants for a minimum of two years.<sup>15</sup> There are no formal requirements to work as a dental assistant. Only assistants who perform radiographs need to register with Texas.

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## CONCLUSION

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In conclusion, the state of Texas operates in a unique environment, with policies that exist only within the state. *Frew v. Hawkins* ramifications continue to be felt today and have been the major driver for change in Texas. Furthermore, the *Frew v. Hawkins* lawsuit led to changes in Medicaid reimbursement rates, the structure of Medicaid, and the decision to implement the First Dental Home in Texas to increase dental care access for children. Although, the *Frew v. Hawkins* has not directly affected regulations concerning the licensing of dental professionals, the lawsuit greatly affected the employment environment in which these individuals operate.

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- <sup>2</sup> Texas Health and Human Services Commission. 2011. Texas Medicaid and CHIP in Perspective. Eight edition. (1-11)
- <sup>3</sup> HB 15. Frew Expenditure Plan. September 2007. 3
- <sup>4</sup> A Fist Full of Dollars or A Frew Dollars More? <http://www.cppp.org/files/3/POP%20282%20Truth%20Frew.pdf>
- <sup>5</sup> Frew Strategic Initiatives Background Summary and Update.  
[http://www.hhsc.state.tx.us/about\\_hhsc/AdvisoryCommittees/Frew/Reports/January-2010.pdf](http://www.hhsc.state.tx.us/about_hhsc/AdvisoryCommittees/Frew/Reports/January-2010.pdf).
- <sup>6</sup> Frew Strategic Initiatives. [http://www.hhsc.state.tx.us/about\\_hhsc/AdvisoryCommittees/Strategic-Initiatives.shtml](http://www.hhsc.state.tx.us/about_hhsc/AdvisoryCommittees/Strategic-Initiatives.shtml).
- <sup>7</sup> “Oral Health Topics,” American Dental Association, <http://www.ada.org/3049.aspx?currentTab=1> (accessed March 2, 2012).
- <sup>8</sup> Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2010-11 Edition*, Dentists, on the Internet at <http://www.bls.gov/oco/ocos072.htm> (visited March 2, 2012).
- <sup>9</sup> Texas Administrative Code, Title 22, Part 5, Chapter 102, Rule 102.1.  
[http://info.sos.state.tx.us/pls/pub/readtac\\$ext.TacPage?sl=R&app=9&p\\_dir=&p\\_rloc=&p\\_tloc=&p\\_ploc=&pg=1&p\\_tac=&ti=22&pt=5&ch=102&rl=1](http://info.sos.state.tx.us/pls/pub/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=22&pt=5&ch=102&rl=1) (accessed on March 2, 2012).
- <sup>10</sup> Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2010-11 Edition*, Dentists, on the Internet at <http://www.bls.gov/oco/ocos072.htm> (visited March 2, 2012).
- <sup>11</sup> Occupations Code, Title 3, Subtitle D, Chapter 251, Sec 251.001.  
<http://www.statutes.legis.state.tx.us/Docs/OC/htm/OC.251.htm> (accessed March 2, 2012).
- <sup>12</sup> *Ibid.*
- <sup>13</sup> Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2010-11 Edition*, Dental Hygienists, on the Internet at <http://www.bls.gov/oco/ocos097.htm> (visited March 02, 2012).
- <sup>14</sup> Texas Administrative Code, Title 22, Part 5, Chapter 103, Rule 103.1.  
[http://info.sos.state.tx.us/pls/pub/readtac\\$ext.TacPage?sl=R&app=9&p\\_dir=&p\\_rloc=&p\\_tloc=&p\\_ploc=&pg=1&p\\_tac=&ti=22&pt=5&ch=103&rl=1](http://info.sos.state.tx.us/pls/pub/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=22&pt=5&ch=103&rl=1) (accessed March 2, 2012).
- <sup>15</sup> Occupations Code, Title 3, Subtitle D, Chapter 265.  
<http://www.statutes.legis.state.tx.us/Docs/OC/htm/OC.265.htm#265.0001> (accessed March 2, 2012).

## APPENDIX 6: HOUSE BILL 1248

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House Bill 1248 was introduced and filed in the 82<sup>nd</sup> Regular Session of the House of Representatives in the state of Texas on February 10, 2011. The bill sought to allow “the provision of certain dental services to children at certain schools under the medical assistance program.”<sup>1</sup> The bill would permit state or local government entities to provide dental services such as application of sealants on the permanent molars of children outside of the child’s dental home. The bill would allow these entities to use mobile dental units or facilities to provide services at schools where at least 51 % of the students participated in the national free or reduced lunch program. The bill, which was captioned, “Relating to the provision of certain dental services to children at certain schools under the medical assistance program” was authored by Representatives Mike Villarreal, Susan King, Veronica Gonzales, and Diane Patrick; and coauthored by Representative Alvarado.<sup>2</sup>

The bill has certain eligibility requirements of the entities that will provide these dental services:

1. The entity would be required to have a written consent form from the child’s parent or guardian that is not more than a year old, and was not recently revoked;
2. They would be required to hold a permit which is issued by the State Board of Dental Examiners;
3. Educate each participant on the need for regular dental visits and provide the contact information for local dental care providers under the medical assistance program; and
4. Provide all services at a fixed location on the school premise.

No significant fiscal implication to the state was anticipated, according to the fiscal note<sup>3</sup>. This means that the bill was estimated to be revenue neutral, and would not have resulted in a significant fiscal burden to the state. The bill would have amended the human resource code as it relates to the medical assistance program allow dentists using a mobile dental unit or portable facility to receive Medicaid reimbursements. The medical assistance program in Texas is coordinated by the Texas Medicaid Program. The Public Health Committee read and referred to the document for the first time on March 1, 2011. On April 6, 2011, the bill was considered in public hearing; however, the bill was left pending in the committee on the same day.

<sup>1</sup> House Bill 1248, 82<sup>nd</sup> Legislature, Regular Session (2011), Bill files, Texas Legislature. Archives and Information Services Division, Texas State Library and Archives Commission.

<sup>2</sup> Texas Legislature Online, “HB 1248” Texas Legislature Online, <http://www.legis.state.tx.us/BillLookup/History.aspx?LegSess=82R&Bill=HB1248> Accessed April 20, 2012.

<sup>3</sup> Legislative Budget Board. Fiscal Note, 82nd Legislative Regular Session, 2011. Austin, TX: Legislative Budget Board, 2011.

## APPENDIX 7: TEXAS ORAL HEALTH PROGRAMS

Texas has several different dental health programs, which targets at-risk, low-income children. These programs range from administrative oversight, data collection, education promotion, and dental service provision. This section highlights several of these programs and the impact each program makes on its target population and also includes a description of the geographical presence of each program within the state of Texas.

### MEDICAID/ CHIP

Medicaid is a state and federally funded entitlement program that provides health care through a combination of state and federal funding.<sup>1</sup> The Clinton Administration expanded Medicaid with the Children’s Health Insurance Plan (CHIP) passed in 1997, and most recently revised in 2009. CHIP expanded Medicaid to include children from low and moderate income working families that did not previously qualify for Medicaid.<sup>2</sup>

**FIGURE 26: INCOME GUIDELINES FOR CHIP/ CHILDREN'S MEDICAID**

1 Family Members (Adults plus children)	2 May Qualify For Children's Medicaid		3 May Qualify For CHIP	
	Monthly Family Income	Yearly Family Income	Monthly Family Income	Yearly Family Income
1	\$931	\$11,170	\$1,862	\$22,340
2	\$1,261	\$15,130	\$2,522	\$30,260
3	\$1,591	\$19,090	\$3,182	\$38,180
4	\$1,921	\$23,050	\$3,842	\$46,100
5	\$2,251	\$27,010	\$4,502	\$54,020
6	\$2,581	\$30,970	\$5,162	\$61,940
7	\$2,911	\$34,930	\$5,822	\$69,860
8	\$3,241	\$38,890	\$6,482	\$77,780

Source: CHIP/ Children’s Medicaid, “Can I Get It,” CHIP/ Children’s Medicaid, accessed April 13, 2012, <http://www.chipmedicaid.org/en/Can-I-Get-It>

Medicaid was established in Texas in 1967 and is administered through Health and Human Services Commission (HHSC) in Texas.<sup>3</sup> In 2009, the federal government funded 69.3 % of Medicaid and the state funded the remaining 30.97 %. In accordance with federal Medicaid requirements, HHSC acts as the single state agency to administer Texas’ Medicaid programs.

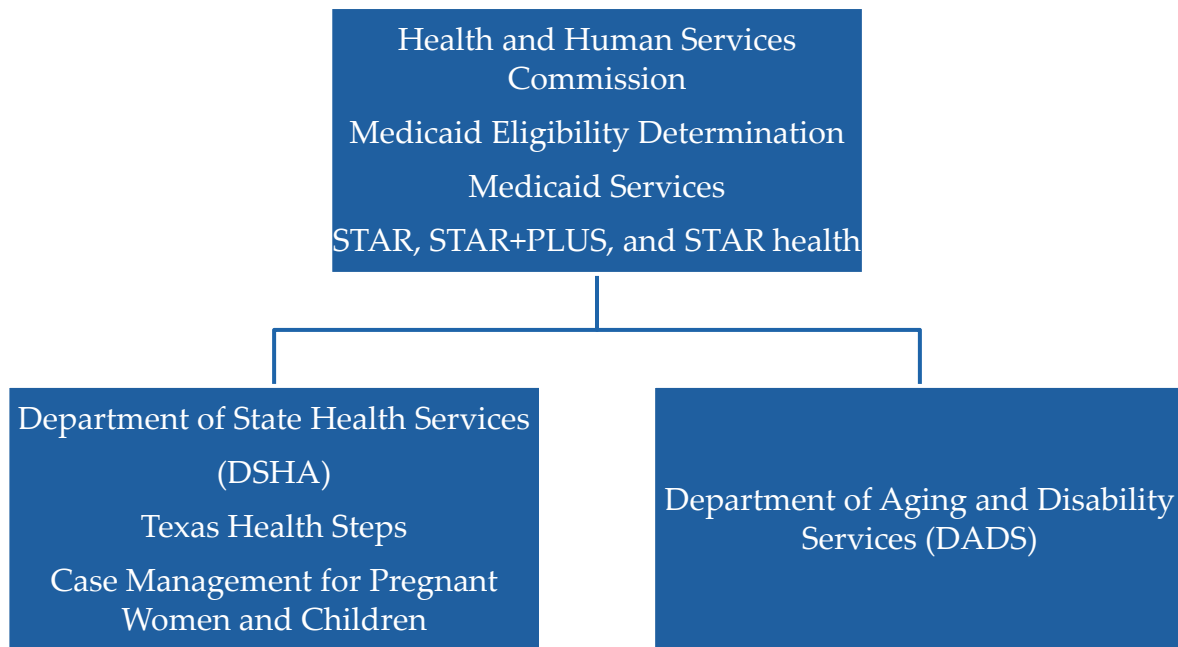
HHSC oversees the following responsibilities:

- Serving as the primary point of contact with the federal government



- Establishing policy directions for the Medicaid program
- Administering the Medicaid State Plan
- Contracting with the various state departments to carry out certain operations of the Medicaid programs
- Operating the state’s acute care, vendor drug, and Medicaid managed care programs
- Determining Medicaid eligibility
- Approving Medicaid policies, rules, reimbursement rates, and oversight of operations of the state departments contracted to operate Medicaid programs
- Organizing and coordinating initiatives to maximize federal funding
- Administering the Medical Care Advisory Committee (MCAC) mandated by federal Medicaid law. The MCAC reviews and makes recommendations to the State Medicaid Director on proposed Medicaid rules

**FIGURE 27: TEXAS MEDICAID ORGANZATIONAL CHART**



In 2004, Texas contracted with a third party management company, Texas Medicaid and Healthcare Partnership (TMHP), to handle all payments made on the behalf of Medicaid/ CHIP beneficiaries.<sup>4</sup> TMHP processes and tracks all claims billed to Medicaid/ CHIP and issues payment for services received by individuals enrolled in one of the programs.<sup>5</sup> TMHP is made-up of multiple organizations, which handle different aspects of the claims process:<sup>6</sup>

- **Affiliated Computer Services:** provides contract management
- **Accenture:** administers information technology systems infrastructure
- **Computer Associates:** directs software development and maintenance
- **Hewlett Packard:** supervises hardware and technical assistance
- **MMC Group:** oversees staffing technical and operations personnel
- **Health Management Systems Inc.:** audits claims and handles over-payment recovery

- **SBC Communications:** manages data, phone, and network functions

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## MEDICAID/ CHIP SPENDING

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According to the *Journal of the American Medical Association*, in 2010, Medicaid and CHIP provided medical coverage for 33% of children in the United States.<sup>7</sup> In 2008, 38% of Medicaid eligible children received any type of dental care.<sup>8</sup> However, this percentage is much better in the state of Texas, where, in 2009, approximately 61% of Medicaid children between the ages of one and nine received some type of preventive dental care.<sup>9</sup>

During fiscal year 2010, the U.S. Medicaid program spent 1.22% of its total budget on adult and child dental care, which translated to over \$2.5 billion dollars.<sup>10</sup> Although, this number appears large at first glance, the percentage and dollar amount spent on dental healthcare decreased since 2004 by 6.28%.<sup>11</sup> Decreased dental healthcare spending and decreased Medicaid and CHIP reimbursement rates discourage many dentists from participating in these programs.

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## TEXAS HEALTH STEPS

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In 1989, federal legislators created the Omnibus Budget Reconciliation Act, which included the federal definition of Early and Periodic Screening, Diagnosis, and Treatment (EPSDT).<sup>12</sup> EPSDT is the preventive and treatment medical and dental health services recommended by Medicaid for children.<sup>13</sup> Shortly after the creation of the Omnibus Budget Reconciliation Act, the state of Texas developed Texas Health Steps (THSteps) as a mechanism to implement EPSDT standards and to ensure that Medicaid beneficiaries receive the recommended services in the state of Texas.<sup>14</sup> Moreover, THSteps “provides medical and dental prevention and treatment services for children of low-income families from birth through age 20.”<sup>15</sup> Currently, the Department of Health and Human Services oversees the THSteps program.<sup>16</sup>

The THSteps has a two-part mission. First, their goal is to improve awareness of medical, dental, and case management services. Second, they want to increase the number of providers who accept Medicaid through health professional recruitment and talent retention.<sup>17</sup> THSteps has eleven different regional offices throughout the state of Texas. A minimum of one up to four THSteps offices exists within each of those eleven regions. Please see Figure 28 for the geographical location of THSteps regional boundaries in Texas. THSteps ensures the provision of EPSDT, designed to provide Medicaid enrolled children with regular medical and dental preventive health check-ups and education in the state of Texas. A THSteps medical visit should include<sup>18</sup>

- Medical history
- Complete physical examination
- Screening of nutritional, developmental, and mental-health needs
- Age appropriate laboratory tests (including lead screening)
- Routine immunizations
- Health education
- Vision and hearing screening



- Oral health screening and referral to a dental home

The THSteps dental health services covered for Medicaid beneficiaries under the age of 20 years include the following:

- **Preventive Services:**
  - Dental examinations (initial or periodic)
  - Cleaning (prophylaxis)
  - Oral health education
  - Topical fluoride
  - Sealants to certain teeth
- **Treatment Services:**
  - Restorations (fillings, crowns)
  - Endodontic treatment (pulp therapy, root canals)
  - Periodontic treatment (gum disease)
  - Prosthodontics (full or partial dentures)
  - Oral surgery (extractions)
  - Implant services and Maxillofacial prosthetic
- **Emergency Dental Services:**
  - Procedures that control bleeding, relieve pain, and eliminate acute infection
  - Procedures that prevent imminent loss of teeth
  - Treatment of injuries to the teeth or supporting structures
- **Orthodontic Services:** (prior authorization needed)
  - Correction of cleft palate
  - Cross-bite therapy
  - Treatment for severe, handicapping malocclusion
  - Treatment for facial accidents involving severe traumatic deviation

**FIGURE 28:** TDSHS - THSTEPS PROVIDER RELATIONS REGIONAL STAFF



**Source:** Texas Department of State Health, “Regional Staff- Texas Health Steps Provider Relations and Oral Health,” February 2012, pg 1-2.

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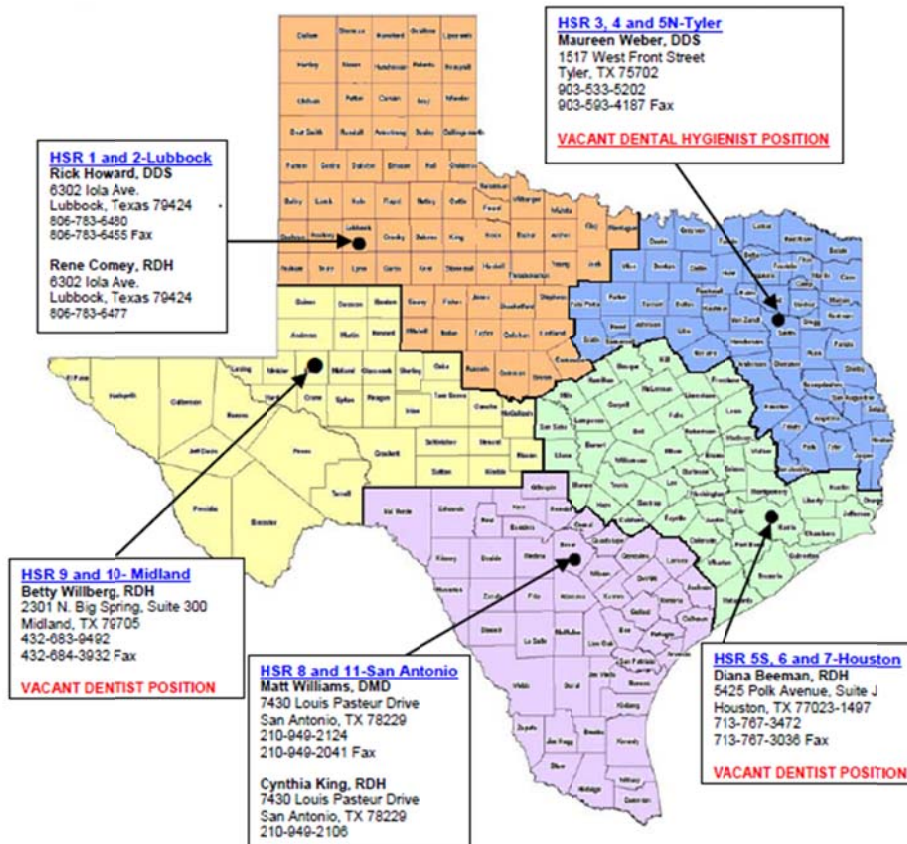
## THE ORAL HEALTH PROGRAM

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The Oral Health Program (OHP) is run by the state of Texas. OHP’s mission is to promote “oral health through leadership in public health practices, policy development, education, and population-based preventive services.”<sup>19</sup> The OHP accomplishes this mission in two ways. First, OHP is responsible for collecting and analyzing oral health data and publishes this information in reports such as *A National Call to Action to Promote Oral Health*.<sup>20</sup> Then, the state uses this information and other national benchmarks to develop new strategies or programs to improve oral health within the state.<sup>21</sup> Second, the OHP also provides preventive and restorative dental care to at-risk, low-income children, such as children enrolled in Medicaid and/ or CHIP.<sup>22</sup>

The Oral Health Program divides the state of Texas into 11 regions, mimicking THSteps 11 regions, to focus on the core needs of each region.<sup>23</sup> Please see Figure 29 for the geographical locations of the OHP regional offices. For example, Regions 8 and 11 provide on-site preventive care to low-income children, both in pre-school and school-aged.<sup>24</sup> Regions 8 and 11 also focus on oral health data collection, to better target preventive care treatments.<sup>25</sup> Regions 5 and 6, on the other hand, act as a liaison between the local community and public health programs to encourage teamwork, while tackling the problem of tooth decay.<sup>26</sup> Both of these regions have had successful initiatives within the last few years.

**FIGURE 29: ORAL HEALTH PROGRAM - REGIONAL STAFF**



**Source:** Texas Department of State Health, “Regional Staff- Texas Health Steps Provider Relations and Oral Health,” February 2012, pg 1-2.

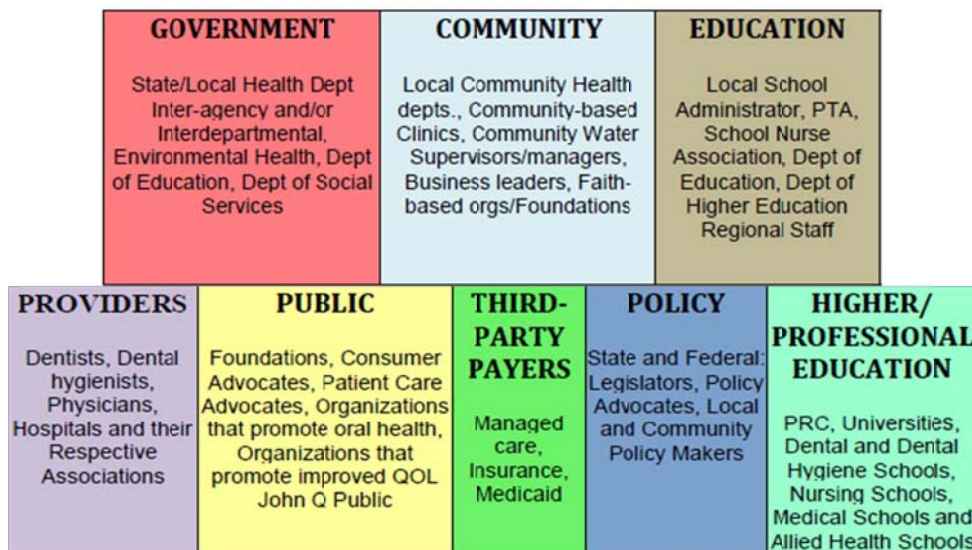
## TEXAS ORAL HEALTH COALITION

In response to the *A National Call to Action to Promote Oral Health* report, the OHP founded the Texas Oral Health Coalition (TxOHC) as a nonpartisan-nonprofit-state oral health coalition in 2004.<sup>27, 28</sup> The TxOHC is comprised of eight types of collaborators: government, community, educators, providers, public advocates, third-party payers, policymakers, and higher/professional educators.<sup>29</sup> Through this partnership, TxOHC’s mission is to “promote optimal oral health for all Texans” for the full duration of their lifetimes.<sup>30</sup> Specifically, TxOHC has six main goals to ensure that Texans receive the best possible oral health care. These goals are as follows:

- Classify oral health issues for Texans.
- Revisit and operationalize the Texas State Oral Health Plan.
- Create a burden of disease report for Texas.
- Increase access to dental services by educating legislators, stakeholders, and the public.
- Promote oral health policy.
- Develop partnerships with current regional oral health coalitions in Texas.

The TxOHC also fulfills its mission by ensuring that oral health education as well as preventive and restorative dental services are readily obtainable, inexpensive, and culturally appropriate.<sup>31</sup> The TxOHC believes that community-based solutions to oral health care are best facilitated with the cooperation between patients, parents, providers, employers, insurers, and local and state governments.<sup>32</sup>

**FIGURE 30: TEXAS ORAL HEALTH COALITION FRAMEWORK**



**Source:** Texas Oral Health Coalition, “Texas Oral Health Coalition Framework,” Texas Oral Health Coalition (2011).

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### TEXAS ORAL HEALTH SURVEILLANCE SYSTEM

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The Texas Oral Health Surveillance System (TOHSS) began in 2005 and is an important aspect of the OHP.<sup>33,34</sup> The TOHSS is a mechanism utilized by the OHP to collect data concerning oral health care within the state of Texas.<sup>35</sup> After the data collection process, the OHP analyses the TOHSS data to determine what type of dental services will provide the greatest benefit to Texas’ overall oral health.<sup>36</sup> The OHP also uses the TOHSS as a means to keep public health and public policy officials up-to-date on changes and trends in Texas oral health, allowing them to allocate resources efficiently in order to address emerging or critical oral health needs within the state.<sup>37</sup>

The OHP designed the TOHSS similarly to the National Oral Health Surveillance System (NOHSS), enabling the national system to closely observe oral disease, dental care availability, and water fluoridation levels within Texas.<sup>38</sup> Designing the TOHSS to closely resemble the NOHSS also allows for clear communication between the state system and the national system, enabling well-coordinated collaboration between the two systems.<sup>39, 40</sup>

NOHSS tracks eight main indicators of oral health:

- Number of dental visits
- Number of professional dental examinations

- Number of individuals 65 or older with complete tooth loss
- Percent of the population with fluoridated water
- Percent of third graders with dental caries
- Percent of third graders with untreated dental caries
- Percent of third graders with sealants on at least one permanent molar
- Number of people with cancer of the oral cavity or throat.<sup>41</sup>

Although not all of these indicators relate to children’s oral health, five to six of the eight indicators do directly measure children’s oral health. This emphasis demonstrates that children’s oral health is of tremendous importance on both a state and national level. Furthermore, collecting oral health data on a state level and reporting the data to the NOHSS allows Texas to compare the status of oral health within the state to others states with similar demographics and geography.

In 2011, the TxOHC began collaborating with the TDSHS and the OHP to further develop the TOHSS.<sup>42</sup> TxOHC’s main recommendation to expand the TOHSS was through the conduction of a Basic Screening Survey (BSS) in elementary schools and in Head Start Centers in Texas, as a means of providing new data sources to measure oral health in Texas.<sup>43</sup>

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### TEXAS DENTAL SEALANT PROGRAM

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The TDSHS currently operates the Texas Dental Sealant Program (TDSP) underneath the umbrella of the Oral Health Program.<sup>44</sup> This particular program targets low-income children in underserved areas, including Austin, Lubbock, and Houston.<sup>45</sup> The TDSP has a three-fold mission: first, expand the knowledge, acceptance, and application of dental sealants through collaboration with school administrators, healthcare providers, and parents; second, deliver preventive oral health services primarily through sealants; and third, encourage oral health as a critical aspect of overall health.<sup>46</sup> The TDSP plans to achieve this three-fold mission through five specific goals:

- Identify high-risk children in geographically underserved areas and provide preventive services and treatment referrals.
- Serve as a venue for the collection of oral health surveillance data.
- Develop a collaborative network of community and professional partners to increase delivery systems for the implementation of dental sealant programs.
- Facilitate, monitor, and evaluate sealant program effectiveness.
- Provide consultation, technical assistance, and guidelines for development and implementation of sealant programs.<sup>47</sup>

Dental professionals working for the state visit elementary schools to provide preventive care, such as examining children’s teeth, providing fluoride treatments and applying sealants. Children are not required to participate, but if they wish to participate, their parents must submit a signed release form authorizing the school to perform preventive services. The state funds the program, which allows them to serve all children regardless of dental health insurance.



In 2010, this program provided over 18,000 dental sealants to children.<sup>48</sup> Dental professionals placed sealants on elementary, middle school, and high school students. The program served 212 different schools and performed services that valued \$1.27 million.<sup>49</sup> However, the program could improve this statistic and the number of children served through the acquisition of additional staff and funding. Texas has more than 2.3 million children enrolled in Medicaid, each of whom has 8 molars to seal; 18,000 sealants is only a drop in the bucket.

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### HEAD START DENTAL HOME

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The Head Start Dental Home is a joint venture between the Head Start Bureau (HSB) and the AAPD that began in 2008.<sup>50</sup> The HSB and the APPD's main objective is to establish every child participating in the Head Start (HS) or Early Head Start (EHS) program within the U.S. in a local dental home. Within the state of Texas, this initiative is overseen by Dr. Paul Kennedy, Jr., who is coordinating the efforts of the Texas Academy of Pediatric Dentists, TDA, Texas Academy of General Dentistry, TDHA, Texas State Head Start Collaboration Office, Texas Head Start Grantees, and the OHP. Shortly after the initiation of the program, an assessment of the dental access of HS facilities in Texas was conducted, identifying each facility as no, low, medium, or high access needs. Currently, efforts are being made to connect high access need HS programs to local dentists that accept Medicaid.

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### PARENTS, IT'S UP TO YOU! ORAL HEALTH PROGRAM

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The primary objective of the Parent, It's Up to You! Oral Health Program is to educate and empower students to improve individual oral health hygiene.<sup>51</sup> Parent, It's Up To You! Oral Health Program provides preparatory information for expecting parents, including adult and teen parents. The curriculum consists of three lesson plans, includes information on dental care for pregnant mothers, infants, and preschoolers, and contains additional information on preventing and/or identifying tooth decay. The instruction material also includes a video in English or Spanish as well as a poster depicting tooth decay.

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### CHILDREN'S MEDICAID LOAN REPAYMENT

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The state of Texas has attempted to reduce the dentist's financial barriers associated with treating Medicaid children through loan forgiveness programs. The Children's Medicaid Loan Repayment Program offers up to \$210,000 over a four-year period to dental students from schools in Dallas, Houston, and San Antonio.<sup>52</sup> The prospective dentist must commit to accepting Medicaid children for four consecutive years, have received their dental license to practice dentistry in the state of Texas, have eligible outstanding loans (i.e. loans cannot already be paid) and have an official Medicaid number to participate in the program.<sup>53</sup> HHSC will pay a portion of the dentists' loans depending on the number of Medicaid children they see each month. Up to 300 new participants can enroll each year.<sup>54</sup> Texas adopted this loan repayment program in 2009.<sup>55</sup> However, the Health and Human Services Commission suspended this program in August 2011, because of a lack of funding allocated by the 82<sup>nd</sup> Texas Legislature.<sup>56</sup>

## ST. DAVID'S DENTAL PROGRAM

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St. David's Foundation is a non-profit organization that gives grants to smaller, community-based non-profits. One of their collaborative efforts is the St. David's Dental Program. This effort uses mobile dental trucks to provide dental care (free dental screenings, sealants, and critical care) to students at elementary schools at Austin, Del Valle, Hays, Manor, Pflugerville, and Round Rock Independent School Districts. Each "mobile clinic" has two exam rooms and digital x-ray equipment.

Campus visits are a four week process, beginning with the distribution of permission slips to students' parents. These slips only pertain to the initial dental screening that occurs the week after the slips are distributed. If the screening reveals that a patient has "visible decay and is a candidate for treatment on the mobile clinic,"<sup>57</sup> then St. David's provides an additional permission slip to parents. St. David's provides gift certificates to teachers when all diagnosed students return their permission slips, as an incentive to follow up with parents.

St. David's holds clinic on school days between 8 a.m. and 3:30 p.m. (the final hour is for emergency visits). Teachers accompany students out of class to the mobile clinics for treatment. At the end of the clinic, St. David's gives the school a record of the children treated. During these clinics, St. David's also promotes oral health education.

In 2010, the St. David's program visited 34 different schools, screened 13,525 students and sealed 14,904 teeth. Of the \$4.2 million provided in dental services, 42% of the services were restorative and 58 % of the services were preventive.<sup>58</sup>

<sup>1</sup> Social Security Administration, "Social Security Programs in the United States – Medicaid," Social Security Administration (1997): 61-68.

<sup>2</sup> Center for Medicaid and Medicare, "accessed September 21, 2011, <https://www.cms.gov/NationalCHIPPolicy/>

<sup>3</sup> Texas Health and Human Services Commission. Texas Medicaid and CHIP in Perspective. 8<sup>th</sup> edition. January 2011. Pg 1-2.

<sup>4</sup> Texas Medicaid and Health Partnership, "Welcome to Texas Medicaid and Health Partnership," accessed March 3, 2012, <http://www.tmhp.com/Pages/default.aspx>

<sup>5</sup> Texas Medicaid and Health Partnership, "Welcome to Texas Medicaid and Health Partnership," accessed March 3, 2012, <http://www.tmhp.com/Pages/default.aspx>

<sup>6</sup> Texas Medicaid and Health Partnership, "What is TMHP?," accessed March 3, 2012, [http://www.tmhp.com/Pages/TMHP/What\\_is\\_TMHP.aspx](http://www.tmhp.com/Pages/TMHP/What_is_TMHP.aspx)

<sup>7</sup> Sandra L. Decker, "Medicaid Payment Levels to Dentist and Access to Dental Care among Children and Adolescents," *Journal of the American Medical Association* (2011): 187.193

<sup>8</sup> Center for Medicare and Medicaid Services, "Fact Sheet: Medicaid/ CHIP Oral Health Services." Center for Medicare and Medicaid Services, CHIP Survey and Certification, (2010): 1-2.

<sup>9</sup> "Annual EPSDT CMS-416 Report State: Texas 2009," Center for Medicare and Medicaid Services, accessed December 15, 2011, <https://www.cms.gov/medicaidearlyperiodicscrn/downloads/2009state.pdf>.

<sup>10</sup> Texas Health and Human Services Commission, "Texas Health and Human Services Commission," accessed September 21, 2011, [http://www.hhsc.state.tx.us/chip/chip\\_dental.htm](http://www.hhsc.state.tx.us/chip/chip_dental.htm)[http://www.hhsc.state.tx.us/chip/chip\\_dental.htm](http://www.hhsc.state.tx.us/chip/chip_dental.htm)

<sup>11</sup> Susan Fishers-Owens, et al., "Giving Policy Some Teeth: Routes to Reducing Disparities in Oral Health," *Health Affairs*, (2008): 404-412.

- <sup>12</sup> Texas Department of State Health Services, “About Texas Health Steps.” Texas Health Steps. Texas Department of State Health Services. 26 Jan. 2012. <http://www.dshs.state.tx.us/thsteps/about.shtm> (accessed Sept. 12, 2011).
- <sup>13</sup> *Ibid.*
- <sup>14</sup> *Ibid.*
- <sup>15</sup> Texas Health and Human Services Commission. Texas Medicaid and CHIP in Perspective. 8<sup>th</sup> edition. January 2011. Pg 5-3.
- <sup>16</sup> Texas Department of State Health Services, “About Texas Health Steps.” Texas Health Steps. Texas Department of State Health Services. 26 Jan. 2012. <http://www.dshs.state.tx.us/thsteps/about.shtm> (accessed Sept. 12, 2011).
- <sup>17</sup> *Ibid.*
- <sup>18</sup> Texas Health and Human Services Commission. Texas Medicaid and CHIP in Perspective. 8<sup>th</sup> edition. January 2011. Pg 5-4.
- <sup>19</sup> Texas Department of State Health Services, “Oral Health Program,” accessed March 29, 2012, <http://www.dshs.state.tx.us/dental/>
- <sup>20</sup> Texas Department of State Health Services, Center for Disease Control, Department of Health and Human Services, “Oral Health in Texas,” (2008).
- <sup>21</sup> *Ibid.*
- <sup>22</sup> Texas Department of State Health Services, “Oral Health Program,” accessed March 29, 2012, <http://www.dshs.state.tx.us/dental/>
- <sup>23</sup> Texas Department of State Health Services, “Texas Services Region 8 – Oral Health Program,” Texas Department of State Health Services, accessed December 5, 2011, <http://www.dshs.state.tx.us/Layouts/ContentPage.aspx?PageID=34998&id=3369&terms=oral+health>.  
<http://www.dshs.state.tx.us/Layouts/ContentPage.aspx?PageID=34998&id=3369&terms=oral+health>
- <sup>24</sup> *Ibid.*
- <sup>25</sup> *Ibid.*
- <sup>26</sup> *Ibid.*
- <sup>27</sup> Texas Oral Health Coalition, “Who We Are,” accessed March 31, 2012, <http://www.txohc.org/index.html>
- <sup>28</sup> Texas Oral Health Coalition, “Mission and Values,” accessed March 31, 2012, <http://www.txohc.org/missionvision.html>
- <sup>29</sup> Texas Oral Health Coalition, “Texas Oral Health Coalition Framework,” Texas Oral Health Coalition (2011).
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- <sup>35</sup> Oral Health Program, “Did You Know? Oral Health Surveillance Fact Sheet,” Texas Department of State Health Services (2009).
- <sup>36</sup> *Ibid.*
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- <sup>38</sup> *Ibid.*
- <sup>39</sup> *Ibid.*
- <sup>40</sup> Altenhoff, Linda. “Questions About the Oral Health Program.” 04 Apr. 2012. Personal e-mail (30 Apr. 2012).
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- <sup>42</sup> Texas Oral Health Coalition, “State Oral Health Plan: Outline,” Texas Oral Health Coalition (2011).
- <sup>43</sup> *Ibid.*
- <sup>44</sup> Texas Department of State Health Services, “Seal a Smile, Texas Style,” Division for Family & Community Health Services, Oral Health Program (2009).
- <sup>45</sup> *Ibid.*
- <sup>46</sup> *Ibid.*
- <sup>47</sup> *Ibid.*



<sup>48</sup> *Ibid.*

<sup>49</sup> *Ibid.*

<sup>50</sup> Altenhoff, Linda. "Questions About the Oral Health Program." 04 Apr. 2012. Personal e-mail (30 Apr. 2012).

<sup>51</sup> Texas Department of State Health Services, "Parent, It's Up to You! Oral Health Manual for Pregnancy, Education, and Parenting (PEP) Program," accessed March 31, 2012, [http://www.dshs.state.tx.us/dental/pep\\_program.shtm](http://www.dshs.state.tx.us/dental/pep_program.shtm)

<sup>52</sup> Texas Department of State Health Services, "Texas Children's Loan Repayment Program," accessed April 2, 2012, <http://www.dshs.state.tx.us/chpr/CMLRP.shtm>

<sup>53</sup> *Ibid.*

<sup>54</sup> "State of Texas Medicaid Dental Review," Texas Health and Human Services, October 2010, accessed December 13, 2011 <http://www.hhsc.state.tx.us/contract/529120003/ProcurementLibrary/23.pdf>.

<sup>55</sup> Long, Michelle. "About Children's Medicaid Loan Repayment Program." 15 Feb. 2012. Personal e-mail (30 Apr. 2012).

<sup>56</sup> *Ibid.*

<sup>57</sup> "Program Details & FAQ." 2012. St. David's Foundation. <http://www.stdavidsfoundation.org/dental-program/program-details> (accessed April 25, 2012).

<sup>58</sup> Dental Impact Report. 2011. St. David's Foundation.

## APPENDIX 8: PREVENTIVE CARE

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Preventive dental care encompasses multiple practices and techniques, all aimed at improving children's oral health. These techniques, also known as, best dental practices vary by state, dental school, and oral health organization. Thus, this section defines the most common types of preventive care. We use academic and professional literature as well as those required by the EPSDT Medicaid program: daily oral care, dental examinations, fluoridated water, fluoride treatment, radiographs, and sealants.

### DAILY ORAL CARE

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The ADA and the Texas Dental Association (TDA) recommend several daily oral care routines to maintain healthy teeth and gums. First, adults and children, should brush their teeth twice a day and floss once a day.<sup>1</sup> In fact, one study found that children who floss daily significantly reduce the development of caries between teeth, compared with children who do not floss daily.<sup>2</sup> Second, the ADA and the TDA also recommend replacing toothbrushes every three to four months, or when brushes become frayed, to receive maximum preventive care through brushing.<sup>3</sup> Third, eating a balanced diet and restricting the number of snacks in between meals is also encouraged; this practice minimizes teeth exposure to carious-creating substances throughout the day.<sup>4</sup> Lastly, the ADA strongly endorses the consumption of fluoride drops or tablets for children who live in areas with no or minimal fluoride levels in the local water system.<sup>5</sup>

For children effective and consistent daily oral care can be a challenge. Research suggests that there is a positive correlation between a parent's daily oral health habits and a child's daily oral health habits.<sup>6</sup> If parents do not value or practice regular oral care at home, such as brushing twice daily, flossing daily, and eating a balanced diet, there is a very low likelihood that their children will value or practice regular oral care.<sup>7</sup>

### DENTAL EXAMINATIONS

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Dental examinations include teeth cleaning, performed by a dentist or a dental hygienist, as well as observation of gums and teeth to identify any potential problems, such as inflammation or dental caries.<sup>8</sup> During the dental examination, the dentist may also provide brief oral health education and dental care recommendations, evaluate the risk of potential tooth decay, or perform diagnostic procedures such as a radiograph examination.<sup>9,10</sup>

The ADA recommends that individuals visit the dentist twice a year. For children, this practice should start no later than the child's first birthday.<sup>11</sup> More specifically, the American Academy of Pediatric Dentistry (AAPD) suggests children should visit a pediatric dentist between 6 and 12 months.<sup>12</sup> The early examination and preventive dental care protects children from tooth decay in the future and helps children stay cavity-free.<sup>13</sup> Without professional examinations, children often face severe dental problems later in their life.

Dental examinations allow dental professionals to uncover and easily treat dental problems during early stages of development, before serious damage occurs.<sup>14</sup> The AAPD emphasizes that professional tooth cleaning during a dental examination will "remove plaque build-up on the

teeth,” prevent tooth decay and gum disease.<sup>15</sup> Although tooth brushing and flossing can remove plaque deposits above the gums, a professional dental cleaning is the only way to remove plaque below the gum line, when it is most treatable and before it turns into tartar.<sup>16,17</sup> Therefore, regular dental examinations not only help to prevent tooth decay, but also prevent gum disease from becoming more serious.

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## FLUORIDATED WATER

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Fluoride is one of the most widely used mechanisms to prevent tooth decay. The Center for Disease Control (CDC) classifies fluoridation of drinking water as one of the top ten great public health achievements.<sup>18</sup>

During the 1930s and 40s, several epidemiological studies found an inverse relationship between fluorine and dental caries. These studies involved fluorine found in rocks and soil, which had natural contact with the water used for consumption by those communities. In 1944, research put this hypothesis to the test in a larger setting. The city of Newburgh, New York, agreed to increase the fluorine content by adding sodium fluoride to the public drinking water supply. The results from this study indicated a 30 % decrease in caries experienced in the city of Newburgh as compared with Kingston, New York, where the water remained fluorine-free.<sup>19</sup> Today, most professional organizations, such as the AAPD and the American Dental Hygienists Association (ADHA),<sup>20</sup> consider water fluoridation to be one of the most effective, safe, and inexpensive mechanisms to prevent tooth decay.<sup>21</sup> In fact, the CDC conducted an analysis of the cost-effectiveness of using fluoridated water to prevent tooth decay and they found that for every \$1 spent on water fluoridation, \$38 was saved in restorative dental services.<sup>22</sup>

The U.S. Department of Health and Human Services recommends and affirms the safety of fluoridated water in the range of 0.7 – 1.2 milligrams per Liter (mg/L) or parts per million (ppm) based on ambient air temperature of geographic areas.<sup>23 24</sup> The Environmental Protection Agreement (EPA) sets the Maximum Contaminant Level for fluoride at 4 ppm. In addition, the EPA has set a non-enforceable secondary maximum standard for fluoride at 2.0 ppm.<sup>25</sup> This secondary standard seeks to regulate the contaminants in drinking water that may cause aesthetic or cosmetic effects such as skin or tooth discoloration.

Usually, state or local municipalities make the autonomous decision whether or not to fluoridate the water supply. Whenever fluoride exposure is less than 0.6 ppm, local officials should consider fluoride therapy. The ADA, AAPD, and AAP jointly recommend first to evaluate the water supply fluoride levels and filtration systems, and then systemically administer fluoride supplements (i.e. fluoride tablets) according to the following schedule:

**TABLE 18: DIETARY FLUORIDE SUPPLEMENTATION SCHEDULE**

Age	Less than 0.3 ppm	F 0.3 – 0.6 ppm	More than F 0.6 ppm
Birth – 6 months	0	0	0
6 months – 3 years	0.25 mg	0	0
3 years – 6 years	0.50 mg	0.25 mg	0
6 years –16 years	1.00 mg	0.50 mg	0

**Source:** American Academy of Pediatric Dentistry, “Reference Manual 2000-2001: Guidelines for Fluoride Therapy,” American Academy of Pediatric Dentistry, (2000): 45; American Academy of Pediatric Dentistry, “Guidelines for Fluoride Therapy,” American Academy of Pediatric Dentistry, (2008): 153-156.

Currently, 75 to 100 % of Texas water is fluoridated,<sup>26</sup> making Texas one of two states (along with North Dakota), west of the Mississippi River that has achieved the *Healthy People 2010* target.<sup>27</sup> Furthermore, as of 2006, 79.6% of public water systems in the state of Texas contained the optimum level of fluoride of that group, 16.9% of which received fluoride supplements.<sup>28</sup> However, 20.4% of Texas public water systems have not reached the ideal level of fluoride nor have the corresponding county programs provided fluoride supplements, leaving about 5 million of the 24 million Texans served by public water systems without access to fluoridated water.<sup>29</sup>

**Healthy People 2010**

Healthy People 2010 is a national initiative to promote good health and prevent disease.

Although fluoridating water costs state and local governments financial resources, water fluoridation also provides benefits as well. During their most recent water fluoridation study, the state of Texas concluded that they had saved \$24 per child, per year in Medicaid expenditures because of the number of cavities prevented by drinking fluoridated water.<sup>30</sup> The following tables show the results from the treatment and control groups and incremental treatment cost savings per Texas Health Steps (THSteps) dental client.<sup>31</sup>

**TABLE 19: COUNTY COMPARISON CHARACTERISTICS**

<b>County Comparison Characteristics</b>	<b>Bexar County</b>	<b>Tarrant County</b>
<b>Fluoridation Status</b>	Not Fluoridated	Fluoridated
<b>County Population</b>	1,403,275	1,223,416
<b>County Population using optimal water fluoridation</b>	51,000	1,170,000
<b>% County Population using optimal water fluoridation</b>	4%	96%
<b>CWA Fluoride Level</b>	0.24	0.89
<b>THS Medicaid Eligible</b>	136,807	79,995
<b>THS Dental Clients – Dental</b>	59,537	26,469
<b># Medicaid Dental Providers</b>	445	102
<b>THS Dental Cost-Treatment Services</b>	\$8,106,823	\$3,093,434
<b>THS Dental Cost-Treatment Services Per Client</b>	\$136	\$117

**Source:** “Water Fluoridation Costs in Texas: Texas Health Steps (EPSDT-Medicaid). [www.dshs.state.tx.us/dental/pdf/fluoridation.pdf](http://www.dshs.state.tx.us/dental/pdf/fluoridation.pdf) (accessed April 26, 2012).

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### TOPICAL FLOURIDE TREATMENTS

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In addition to adding fluoride to water, dental care professionals also apply fluoride topically. These treatments include fluoride gels and varnishes, which vary by the strength of the sodium fluoride and the length of time the treatment remains on the tooth surface.<sup>32</sup> The AAPD recommends that children with a high risk of developing caries should receive a professional fluoride treatment every three to six months.<sup>33</sup> For those children with moderate risk, the AAPD recommends a less frequent schedule treatment, but at least every six months. The AAPD acknowledges that many children with high risk may not have regular access to a dentist, and thus, trained non-dental healthcare professionals could effectively apply fluoride varnish to decrease the frequency of early childhood caries.<sup>34</sup>

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### RADIOGRAPH EXAMS

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Radiographs are a conventional practice in preventive care in states across the country. Centers for Medicare and Medicaid Services (CMS) and the AAPD argue that radiographs are valuable

tools in preventive oral health care.<sup>35,36</sup> An ASTDD study on state regulations and dental practices found that “radiographs (x-rays) are a widely accepted component of a complete dental examination.”<sup>37</sup>

Radiograph exams commonly identify caries during early stages of development. According to the ADA chart, new patients should receive a comprehensive radiograph exam, regardless of age.<sup>38</sup> By decreasing the amount of time between radiograph exams in higher risk patients, dentists can identify caries much earlier. For all patients that dentists identify to be high risk for developing caries, the ADA states that radiograph exams are necessary every 6-12 months.<sup>39</sup> However if patients have a low risk of caries, dentists do not need to use radiographs in exams as often. In fact, if patients have seen a dentist and have no increased risk factors for caries, the ADA recommends radiograph exams every 12-24 months.<sup>40</sup>

To provide the best care, without endangering patients, dentists should follow the recommendations of the ADA when assessing the need for radiograph exams for children and adolescents. The ADA created a schedule for dentists to use in determining which patients should or should not receive radiographs in a given dental visit; however, each dentist should recommend radiographs for diagnostic purposes on an individual basis. Both the AAPD and CMS endorse the guidelines established by the ADA regarding prescribing dental radiographs.<sup>41, 42</sup> Furthermore, the AAPD specifically states that infants, children, and adolescents should receive radiograph screenings, but pediatric dentists should be careful not to expose patients to radiation unnecessarily.<sup>43</sup>

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## SEALANTS

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The final form of preventive treatment that this report will consider is the application of dental sealants. Many dental and health organizations (including the ASTDD, the CDC, CMS, TSHHS, and the AAPD) recommend sealants as a preventive care. Dental sealants are clear protective coatings placed on molars to prevent caries and to protect deep cracks and grooves on chewing surfaces. Sealants act as a shield for vulnerable areas where normal brushing and flossing cannot reach. To apply sealants, the dental professional places the sealant gel on a cleaned tooth and then shines an ultraviolet light that dries the coating.<sup>44</sup> After application, the patient can immediately begin eating food.

Health care organizations recommend sealants because of their effectiveness. Children develop their first set of molars around eight years old and their second set of molars around the age of twelve. Since children develop most caries on their molars, sealants are preventive measures that can reduce caries for children. One study found that sealants reduced caries by 87% after 12 months in children.<sup>45</sup> Third-quarters of sealants were still intact and protecting children’s teeth after two years, according to a survey of dentists completed by the ADA.<sup>46</sup> Sealants are generally effective for five years, but some can last much longer. Due to their long lifetime and effectiveness in preventing future caries, sealants are a very popular treatment for children.

Despite the efficacy of sealants preventing caries, less than half of the children receive them. The National Health and Nutritional Examination Survey (NHENES) in 2004 found that only 32% of all eight-year-olds had received a sealant. *Healthy People 2010*, a national program attempting to raise awareness and identify issues that affect the health of Americans, set a goal for 50% of

children in the United States to receive sealants. Some researchers suggest that all high-risk children should receive sealants, while others suggest that all children should receive sealants.<sup>47</sup>

Dentists caution that the application of a sealant over an already decaying tooth could trap the caries underneath, causing accelerated decay. Evidence, however, is inconclusive on this topic. For example, CMS acknowledged that with regular checkups “sealants can be applied to teeth with evidence of decay to arrest the progress of decay.”<sup>48</sup> Aleksejuniene et al (2004) demonstrates that a properly placed sealant will stop the tooth from decaying further.<sup>49</sup> The ADA, however, favors a more cautious approach and recommends placing sealants on high-risk children only after performing a thorough examination to determine if there is decay on the tooth.<sup>50, 51, 52</sup>

The ASTDD recommends the application of sealants for all at-risk children, determined by eligibility for the free and reduced school lunch program. In one of the ASTDD’s most recent policy reports, they, along with the ADA and the AAPD agreed that the best preventive care policy is to seal the teeth of the whole population.<sup>53</sup> These organizations came to this conclusion because the risks associated with sealing teeth were minor, as long as patients continued to visit their dental home to assess the sealants as well as their overall oral health.

The CDC and CMS both recommend that dental professionals apply sealants as quickly as possible to all first and second molars.<sup>54</sup> They state that x-rays are not necessary for sealant placement and an oral assessment is sufficient. The CDC also recommends placing sealants on children even when the likelihood of a follow-up appointment is uncertain.<sup>55</sup> CMS states that a dental home is the most adequate method to provide sealants for children.<sup>56</sup> They recommend the placement of sealants as soon as possible after the tooth breaks through the gums. In some instances, children will need restorative treatment to dental caries that are already present, prior to the placement of sealants.<sup>57</sup>

<sup>1</sup> American Dental Association, “Oral Health Topics: Cleaning Your Teeth and Gums,” <http://www.ada.org/2624.aspx>, (Accessed November 30, 2011).

<sup>2</sup> G.Z. Wright, D.W. Banting, and W.H. Feasby, “Effect of Interdental Flossing on the Incidence of Proximal Caries in Children,” *Journal of Dental Research* 56 (1977): 574-578.

<sup>3</sup> American Dental Association, “Oral Health Topics: Cleaning Your Teeth and Gums,” <http://www.ada.org/2624.aspx>, (Accessed November 30, 2011).

<sup>4</sup> *Ibid.*

<sup>5</sup> R. Gary Rozier, et. Al. “Evidence-Based Clinical Recommendations on the Prescription of Dietary Fluoride Supplements for Caries Prevention: A report of the ADA council on Scientific Affairs.” *Journal of the American Dental Association* 141 (2010): 1480-89.

<sup>6</sup> M. L. Mattila et. Al. “Caries in Five-year-old Children and Associations with Family-related Factors,” *Journal of Dental Research* 79 (2000): 875-81.

<sup>7</sup> *Ibid.*

<sup>8</sup> “Definition: Dental Exam,” Mayo Clinic, accessed Jan 27, 2012, <http://www.mayoclinic.com/health/dental-exam/MY01097>.

<sup>9</sup> “Dental exam for children,” Mayo Clinic, accessed Nov 22, 2011, <http://www.mayoclinic.com/health/dental-exam-for-children/MY01098>

<sup>10</sup> “Definition: Dental Exam,” Mayo Clinic, accessed Jan 27, 2012, <http://www.mayoclinic.com/health/dental-exam/MY01097>.

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- 20 Water fluoridation is the adjustment of fluoride levels to optimum quantities.
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- <sup>36</sup> Centers for Medicare and Medicaid Services, Guide to Children’s Dental Care in Medicaid, 2004, 5  
<http://www.aapd.org/policycenter/periodicity/pdf/DentalGuide.pdf>.
- <sup>37</sup> Association of State and Territorial Dental Directors 2008, 2.
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- <sup>40</sup> *Ibid.*
- <sup>41</sup> American Academy of Pediatric Dentistry, Guideline on Prescribing Dental Radiographs for Infants, Children, Adolescents, and Persons with Special Health Care Needs, 2009, 290  
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- <sup>46</sup> Jean Beauchamp et al. “Evidence-based clinical recommendations for the use of pit-and-fissure sealants.” *Journal of the American Dental Association* 139 (March 2008).
- <sup>47</sup> Griffin, S. O., P. M. Griffing, B. F. Gooch, and L.K. Barker. “Comparing the Costs of Three Sealant Delivery Strategies,” *Journal of Dental Research* 81 (9).
- <sup>48</sup> Department of Health and Human Services. “Guide to Children’s Dental Care in Medicaid”2004. pg. 2.
- <sup>49</sup> Jolanta Aleksejuniene, et al. “Best Practices for Dental Sealants in Community Service-Learning,” *Journal of Dental Association* 74 (9).
- <sup>50</sup> Jean Beauchamp et al. “Evidence-based clinical recommendations for the use of pit-and-fissure sealants.” *Journal of the American Dental Association* 139 (March 2008).
- <sup>51</sup> Jean Beauchamp et al. “Evidence-based clinical recommendations for the use of pit-and-fissure sealants,” *Journal of the American Dental Association* 139 (March 2008). S. O. Griffin, et al. “Exploring four-handed delivery and retention of resin-based sealants,” *Journal of the American Dental Association* 139 (March 2008).
- <sup>52</sup> There is research regarding the types of chemicals to use as the sealant. However, this paper will not address the technical details of types of sealants, but rather refer to general sealant placement.
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## APPENDIX 9: COST-BENEFIT ANALYSIS OF CARE METHODS

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The three most common forms of preventive care are sealants, fluoride treatments, and fluoridated water. There are costs and benefits associated with each treatment. The capstone team performed a cost-benefit analysis on fluoride varnish and sealants, and summarized research by the CDC on fluoridated water. The team calculated the cost of restorative and preventive treatment using two different numbers: the ADA 75<sup>th</sup> percentile from the *2011 Survey of Dental Fees*, and the 2012 Medicaid reimbursement rates in Texas. The ADA survey shows the market rate according to dentists, and is a measure of the cost to society. Medicaid reimbursement rates will show the cost and benefit the state currently faces.

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### SUMMARY OF FINDINGS

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Although sealants and fluoride do prevent future cavities from forming, there is a cost associated with each treatment. After performing the CBA, the capstone team found that sealants or fluoride treatments were cost-effective when observing only the treatment costs. With specific probabilities of developing a cavity after 10 years, and a 1% discount rate, the capstone team found the net benefit of placing sealants was \$10.32 when using the ADA 75<sup>th</sup> percentile found in their 2011 Survey of Dental Fees. The result for fluoride was -\$9.84. The research team also performed the analysis using travel time and distance that parents may be forced to bear taking their child to a dentist office.

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### METHODOLOGY

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Effectiveness of oral treatments has been a widely researched topic. From 1971 to 2001, there were 1,465 peer-reviewed articles on sealants alone.<sup>1</sup> However, very few studies have conducted CBA and cost effectiveness studies of oral treatments and the results do not appear to be consistent. For example, some studies found that sealants are cost-effective in preventing decayed, missing, or filled permanent tooth surface (DMFS).<sup>2,3,4</sup> Net savings of having DMFS avoided ranged between \$10.83 and \$55.10 in 2012 dollars.<sup>5</sup> Other studies show that sealants are not cost-effective<sup>6,7</sup> or only if there is evidence of previous or present caries experience.<sup>8</sup> Finally, one study reported that its own findings were inconclusive.<sup>9</sup> To avoid potential biases in our report, we conduct a comprehensive sensitivity analysis and have selected the most reliable indicators as suggested by the most modern literature on the subject.

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### MEASURE OF COSTS

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The capstone team used the following formula to estimate the costs of a given treatment:

$$TC = TF + OC$$

Total cost (TC) equals the treatment fee (TF) and the opportunity costs (OC) to the patient and their parent. The opportunity cost is the cost to the parent for leaving his/her job to take a child to the dentist and the cost of the child for leaving school. The time spent to conduct the dental procedure plus the patient and parent travel costs are included in the opportunity costs. Table 20 summarizes these assumptions.

**TABLE 20: COST ASSUMPTIONS OF PREVENTIVE CARE AT MARKET REIMBURSEMENT RATES**

Parameter	Sealant	Fluoride Varnish
<b>Cost of one time application of treatment<sup>10</sup></b>	<b>\$400.00</b>	<b>\$35.00</b>
Opportunity Cost:		
Miles to Dentist (roundtrip) <sup>11</sup>	20.4 miles	20.4 miles
Mileage Rate <sup>12</sup>	\$0.55	\$0.55
<b>Mileage Cost (Distance*Rate)</b>	<b>\$11.22</b>	<b>\$11.22</b>
Travel Time (minutes) <sup>13</sup>	44	44
Visit Time <sup>14</sup>	40	2
Total Time (minutes)	84	46
Student Time Rate (per hour) <sup>15</sup>	\$6.72	\$6.72
Parent Time Rate (per hour) <sup>16</sup>	\$10.00	\$10.00
Total Rate	\$16.72	\$16.72
<b>Cost of Time</b> ( $\frac{\text{Total Rate}}{60} \times \text{Total Time}$ )	<b>\$23.41</b>	<b>\$12.82</b>
<b>Total Cost of Preventive Care</b>	<b>\$434.63</b>	<b>\$59.04</b>
<b>Total Cost of Preventive Care per Tooth</b>	<b>\$54.33</b>	<b>\$7.38</b>

Based on our calculation, it would cost \$54.33 to seal one tooth and \$7.38 to provide fluoride varnish at the market rate. However, this estimate is far from complete. Children in rural areas must travel much further than the national average to receive dental care. This fact is evidenced by the lack of dentists 47 counties in Texas. Therefore, it is likely that our calculation underestimates the total cost.

#### MEASURE OF BENEFITS

Calculating the benefits is more complex than calculating the costs. First, we estimate the averted future costs of restorative treatment cost (expected cost of single-surface amalgam plus time costs) – that is, the treatment effectiveness probability ( $P_{\text{Cavity}_P}$ ) multiplied by all expected cost of restoration. These benefits are then discounted to the present value using a conservative interest rate of 1% in a time frame of five and ten years. The research team used 1% because of the low interest rates in the U.S. today. After computing the present value, we compare these savings with the effects of no preventive care ( $P_{\text{Cavity}_{NP}}$ ).

**TABLE 21: COST OF FILLING ONE TOOTH AT MARKET REIMBURSEMENT RATE**

Parameter	Cost
<b>Cost of one filling<sup>17</sup></b>	<b>\$133.00</b>
Opportunity Cost:	
Miles to Dentist <sup>18</sup>	22.4 miles
Mileage Rate <sup>19</sup>	\$0.55
<b>Mileage Cost (Distance*Rate)</b>	<b>\$11.22</b>
Travel Time (minutes) <sup>20</sup>	44
Visit Time <sup>21</sup>	20
Total Time (minutes)	64
Student Time Rate (per hour) <sup>22</sup>	\$6.72
Parent Time Rate (per hour) <sup>23</sup>	\$10.00
Total Rate	\$16.72
<b>Cost of Time</b>	<b>\$ 17.83</b>
<b>Total Cost of Restorative Care</b>	<b>\$ 162.05</b>

The Medicaid Reimbursement Rates are calculated follow the same format as Tables 21 and 22. The results for a sealant, fluoride varnish, and restorative care are displayed in Table 23.

**TABLE 22: COST ASSUMPTIONS USING CURRENT MEDICAID REIMBURSEMENT RATES**

	Sealant	Fluoride Varnish	Restorative Care
<b>Cost of One Treatment</b>	\$28.82	\$15.00	\$65.72
<b>Total Cost</b>	\$53.69	\$39.04	\$94.77

**TABLE 23: EFFECTIVENESS OF PREVENTIVE TREATMENTS**

Probability	Treatment Type			
	Sealants		Fluoride Varnish	
	5	10	5 years	10 years
<b>Probability of a cavity with preventive care</b>	15.0%	26.6%	35.7%	55.8%
<b>Probability of a cavity without preventive care</b>	65.6%	76.7%	65.6%	76.7%

**Source:** Bravo, M., et. al. 2005. “Sealant and Fluoride Varnish in Caries: A Randomized Trial.” Journal of Dental Research (84).

One caveat of this calculation is the impossibility to estimate certain intangible benefits. For example, discomfort and pain resulting from tooth decay is major issue that can be avoided but cannot be easily estimated.

The previous calculations will be shown for sealants and fluoride varnish. The Center for Disease Control and Prevention completed a cost-benefit analysis for community fluoridation, and the findings are described below.

The formula below will be used to complete our analysis:

$$Net\ Benefit_t = \left( \frac{[(P\ Cavity_{NP}) * Cost\ of\ restoration_{t+N-1}]}{(1 + R)^N} - \frac{[(P\ Cavity_P) * Cost\ of\ restoration_{t+N-1}]}{(1 + R)^N} \right) - Cost\ of\ preventive\ treatment_t$$

P Cavity<sub>NP</sub> = Probability of cavity occurring without preventive care.

Cost of Restoration = Fee for filling a tooth.

P Cavity<sub>P</sub> = Probability of cavity occurring with the use of preventive care.

To calculate the net benefit of preventive care, we will take the probability that a child will develop a cavity in the future without preventive care and subtract from that the probability of a cavity developing with preventive care. We will then subtract from the difference the cost of preventive treatment. This will provide us a net benefit or cost. The calculations will be performed for different time periods and discount rates to measure the sensitivity of our calculations.

## SEALANTS

**TABLE 24: NET BENEFIT TO SOCIETY OF SEALANT USING MARKET RATE**

Discount Rate	R = 1%		R = 2%		R = 3%	
	5 years	10	5 years	10 years	5 years	10 years
Cost without Sealant	\$98.06	\$124.30	\$93.35	\$101.97	\$88.91	\$92.49
Cost with Sealant	\$23.13	\$39.02	\$22.02	\$35.36	\$20.97	\$32.08
<b>Difference</b>	<b>\$74.94</b>	<b>\$85.27</b>	<b>\$71.33</b>	<b>\$66.60</b>	<b>\$67.94</b>	<b>\$60.41</b>
Sealant Application	\$54.33	\$54.33	\$54.33	\$54.33	\$54.33	\$54.33
<b>Net Benefit</b>	<b>\$20.61</b>	<b>\$30.94</b>	<b>\$17.01</b>	<b>\$12.28</b>	<b>\$13.61</b>	<b>\$6.08</b>

The calculations performed in Table 24 are found using the reimbursement rate from ADA, the cost of time and travel to the parent and child, and discounting the cost to the present. The net benefit for sealants is positive with all plausible discount rates. We calculated the benefit over time, using different discount rates to measure sensitivity. Sealants are effective at preventing cavities from developing. However, when considering the time that students and parents lose while visiting the dentists, it becomes more effective to restore a tooth later. We did discover that when only the dental treatment cost is used, the net benefit is positive for all time periods and discount rate.

We assumed that the filling used would be an amalgam filling on one side of the tooth. We purposely used the lowest restorative cost we could find. The amalgam filling on one side only

effectively fill a tooth only when the cavity is very small and caught early. As the cavity worsens, the cost to repair the cavity increases as well. Again, we are not able to quantify the pain and suffering a child feels while waiting for a tooth to be filled or during the filling itself. The pain felt is real, but we are unable to quantify it.

## SEALANT ANALYSIS

The previous calculations assumed the entire social cost with seeking treatment. We can make two separate charts now. One that uses current Medicaid reimbursement numbers, and the other that uses the ADA 75<sup>th</sup> percentile. Dentists will prefer the 75<sup>th</sup> percentile, because it is a better indicator of market cost.

**TABLE 25: NET BENEFIT OF SEALANTS – COST TO STATE USING MARKET COST**

Discount Rate	1%		2%		3%	
	5	10	5	10	5	10
Years						
Cost without Sealants	\$80.48	\$92.35	\$76.61	\$83.68	\$72.97	\$75.91
Cost with Sealants	\$18.98	\$32.03	\$18.07	\$29.02	\$17.21	\$26.32
<b>Difference</b>	<b>\$61.50</b>	<b>\$60.32</b>	<b>\$58.54</b>	<b>\$54.66</b>	<b>\$55.76</b>	<b>\$49.58</b>
Preventive Treatment	\$50.00	\$50.00	\$50.00	\$50.00	\$50.00	\$50.00
<b>Net Benefit</b>	<b>\$11.50</b>	<b>\$10.32</b>	<b>\$8.54</b>	<b>\$4.66</b>	<b>\$5.76</b>	<b>-\$0.42</b>

As shown above, with a 1% discount rate, and over a 10 year period of time the net benefit of sealants is \$10.32 per tooth. If the state used the ADA 75<sup>th</sup> percentile as a basis for reimbursements, the net benefit of sealants for all children on Medicaid would be \$2,580,000.<sup>24</sup> Even assuming a 2% discount rate, the net benefit would be at least \$4.66 per tooth, per child. The net benefit of sealants using the current Medicaid reimbursement rates is also positive when using a 1% discount rate over 10 years (\$0.99).

**TABLE 26: NET BENEFIT OF SEALANTS – COST TO STATE USING CURRENT MEDICAID REIMBURSEMENT RATES**

Discount Rate	1%		2%		3%	
	5	10	5	10	5	10
Years						
Cost without Sealants	\$39.77	\$45.63	\$37.86	\$41.35	\$36.06	\$37.51
Cost with Sealants	\$9.38	\$15.83	\$8.93	\$14.34	\$8.50	\$17.48
<b>Difference</b>	<b>\$30.39</b>	<b>\$29.81</b>	<b>\$28.93</b>	<b>\$27.01</b>	<b>\$27.55</b>	<b>\$20.03</b>
Preventive Treatment	\$28.82	\$28.82	\$28.82	\$28.82	\$28.82	\$28.82
<b>Net Benefit</b>	<b>\$1.57</b>	<b>\$0.99</b>	<b>\$0.11</b>	<b>-\$1.81</b>	<b>-\$1.27</b>	<b>-\$8.79</b>

Texas needs to encourage dentists who accept Medicaid to place sealants on the teeth of children. The state can save money using sealants because of the cost-effectiveness of sealants using these conservative estimates. We assumed that all children who needed restorative care would use a 1-side amalgam filling. As more expensive restorative care is used, the net benefit will only increase.

## FLUORIDE VARNISH

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We measured fluoride to have a negative net benefit (net cost). If parents and students have to travel to the dentist office to receive preventive care, it is more cost-effective to fill cavities instead of prevent them. The fluoride varnish benefit is more negative than the benefit of the sealant. Each tooth is billed separately when receiving a sealant; however, the fluoride treatment is given to the entire mouth. Children need to receive fluoride varnish every 6 months for fluoride to be effective, increasing the opportunity costs that they and their parents face.

**TABLE 27: NET BENEFIT TO SOCIETY OF FLUORIDE VARNISH USING MARKET RATE**

Discount Rate	R = 1%	
	5 years	10 years
Cost without Fluoride	\$98.06	\$112.52
Cost with Fluoride	\$55.05	\$81.86
<b>Difference</b>	<b>\$43.02</b>	<b>\$30.66</b>
Fluoride Application	\$86.40	\$154.60
<b>Net Benefit</b>	<b>-\$43.38</b>	<b>-\$123.94</b>

## FLUORIDE VARNISH ANALYSIS

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The initial net benefits for the application of fluoride varnish is negative. When we analyzed the results for sealants without considering the opportunity cost, the net benefit increased, and showed overwhelmingly that the state could save money by providing sealants to children to prevent cavities from forming. The same analysis will be for fluoride varnish using the ADA 75<sup>th</sup> percentile and the current Medicaid reimbursement rates.

**TABLE 28: NET BENEFIT OF FLUORIDE - COST TO STATE USING MARKET RATE**

Discount Rate	1%	
Years	5	10
Cost without Fluoride	\$80.48	\$92.35
Cost with Fluoride	\$45.18	\$67.18
<b>Difference</b>	<b>\$35.31</b>	<b>\$25.16</b>
Preventive Treatment	\$51.22	\$91.62
<b>Net Benefit</b>	<b>-\$15.91</b>	<b>-\$66.46</b>

Only look at the cost to the state using the market rate, we find that over 10 years and with a 1% discount rate, the net benefit is negative. It is more cost-effective to restore cavities after forming than to provide fluoride varnish. There is a large difference between 5 and 10 years across all discount rates. This is because of the large rise in cavities observed after 5 years. Table 23 showed the effective rates of fluoride treatment. After 5 years, 35.7% of children who used fluoride had cavities, but after 10 years, the percentage increased to 55.8%

**TABLE 29: NET BENEFIT OF FLUORIDE - COST TO STATE USING MEDICAID REIMBURSEMENT**

Discount Rate	1%	
Years	5	10
Cost without Fluoride	\$39.77	\$45.63
Cost with Fluoride	\$22.32	\$33.20
<b>Difference</b>	<b>\$17.45</b>	<b>\$12.43</b>
Preventive Treatment	\$21.95	\$39.27
<b>Net Benefit</b>	<b>-\$4.50</b>	<b>-\$26.84</b>

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## COMMUNITY FLUORIDE

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In 2001, the Texas Department of Health completed a study on the cost of public dental care compared to community fluoride. They measured the fluoride levels in each county, counted the population, and asked for dentists to submit claims paid.<sup>25</sup> They estimated that the average cost of dental care for a child declined by 24 dollars when the child received fluoride through public water. The optimal public water fluoride levels was found to be .8 parts per million (ppm).



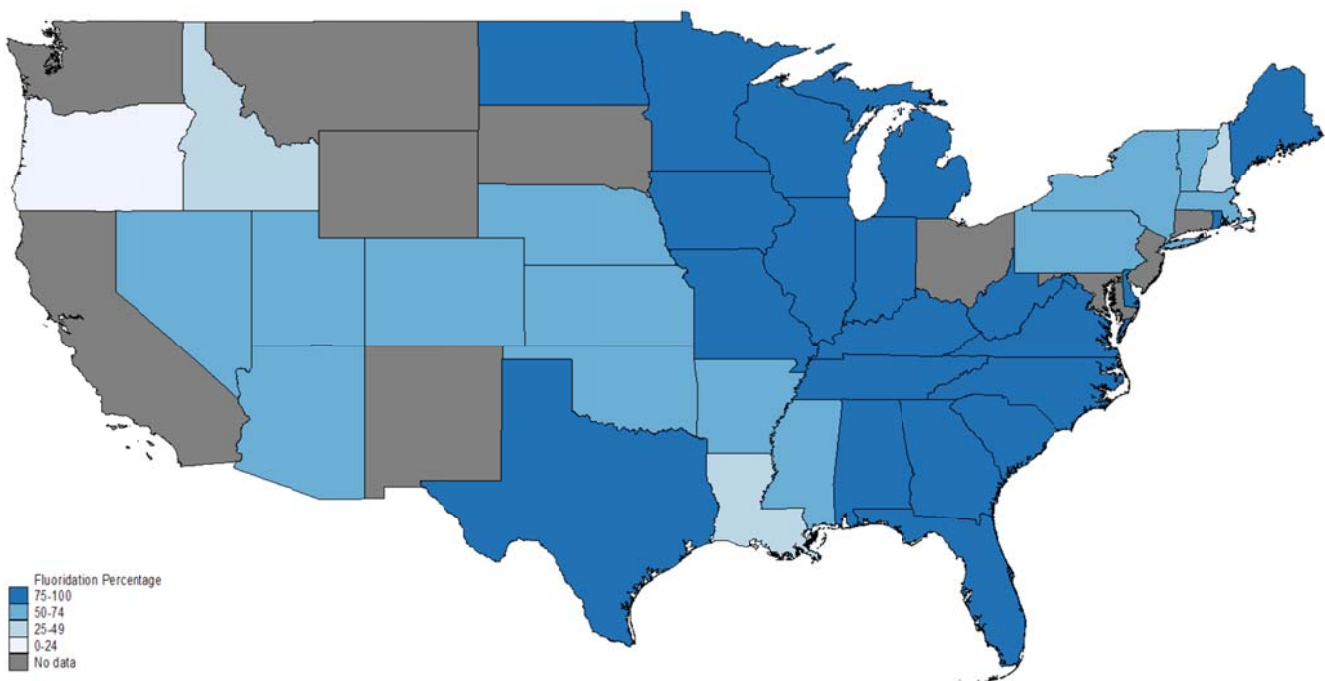
$$\text{County Wt. Av. (CWA) Fluoride Level (ppm F)} = \frac{\sum(\text{median fluoride level} \times \text{pop. served})_{\text{systems in the country}}}{\sum \text{populations served}}$$

The state wanted to find how much it cost per person in each county to provide fluoridation. They also calculated the start-up and maintenance costs for the county, and per person costs in the county. As fluoride levels rose, the cost savings per child increased.

Texas estimated that the cost of installing a fluoride system averaged \$1.20 per person, and the maintenance costs would average to \$0.35 per person. Texas' study was very similar to a study completed by the CDC. The CDC completed a study in 2005 and found that for every dollar invested in community fluoride, dental bills would be reduced by \$38.00.<sup>26</sup>

Last year, the city of College Station decided to stop adding fluoride to drinking water. By not fluoridating water, the city is expecting to save \$41,480.<sup>27</sup> The city estimated its population to be 96,666, which means that it cost the city \$0.43 per person to fluoridate the water. The water naturally contains approximately half of the recommended fluoridation level. With the economic downturn and forced budget cuts, and because fluoridation is not legally required, the city cut the program. The city does not receive the benefit for fluoridating water because they do not pay dental fees or Medicaid reimbursements.

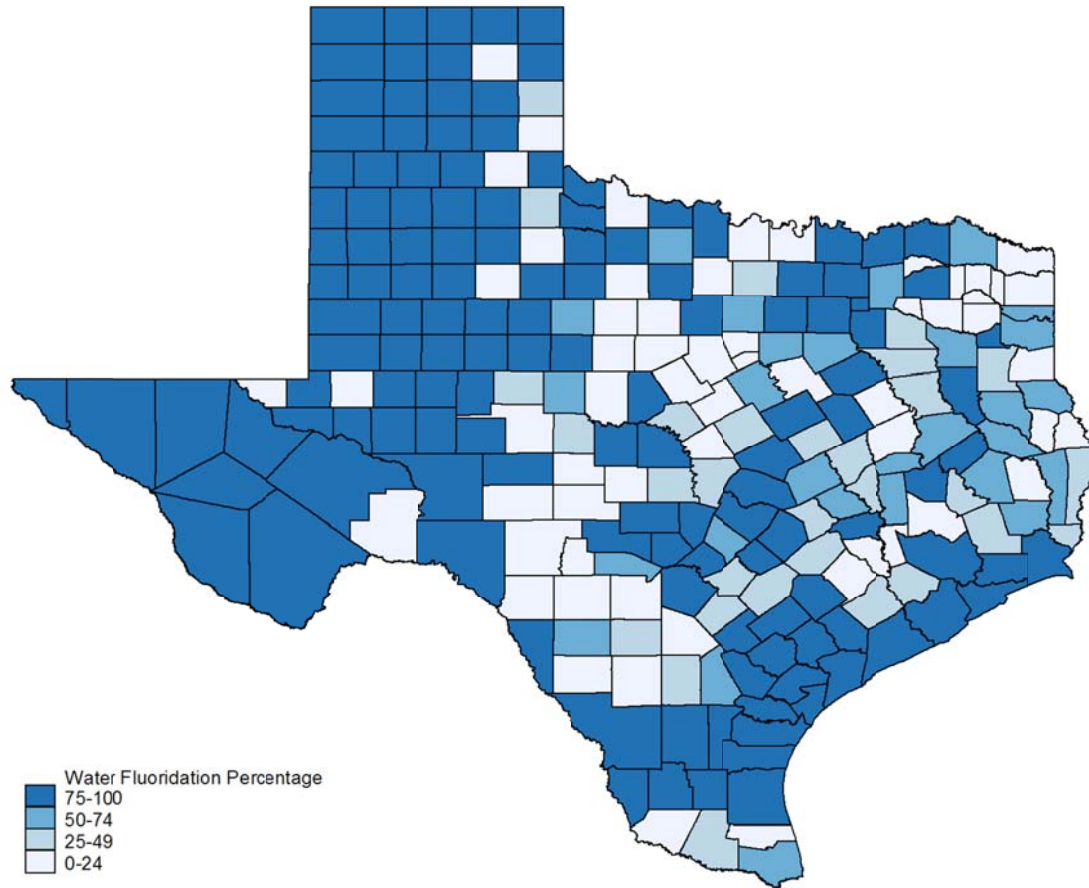
**FIGURE 30: PERCENTAGE OF FLUORIDATED WATER IN THE UNITED STATES**



**Source:** Centers for Disease Control and Prevention, Water Fluoridation 2006.

The CDC estimates that at least 75% of Texas has community fluoride water, and it ranks as one of the top states in the nation. Much of the water in Texas is naturally fluoridated, but this only shows if water is fluoridated. It does not show at what levels the water is fluoridated or what areas might not have fluoridated water.

**FIGURE 31: PERCENTAGE OF FLUORIDATED WATER IN TEXAS**



**Source:** Centers for Disease Control and Prevention, Water Fluoridation 2006.

Again, Texas is mostly fluoridated, but there are counties in Texas that have no water fluoridation when the water reaches the tap. Also, this map was drawn in 2006, and many cities faced large budget cuts since then and, like College Station, have cut out fluoridating the water.

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## CONCLUSIONS

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If we only consider the cost to the state for Medicaid reimbursements, then it is cost-effective to provide preventive dental care at the dentist office. When the opportunity costs are included, it becomes more costly to provide restorative rather than preventive care. Also, preventive care is not foolproof. The ADA recommends reapplying fluoride varnish every 6 months and having sealants checked frequently to verify no cracks develop.<sup>28</sup> As long as the sealant remains intact, it will prevent cavities from forming. The state legislature can save money now and in the future by implementing preventive care. Sealants are more cost-effective than fluoride varnish as our study has shown. They are also more effective at preventing cavities. Sealants require a one-time visit to the dentist, while fluoride varnish requires semiannual visits for reapplication.

Fluoridated water is also very cost-effective. For every dollar spent, the state could save 38 dollars on future dental care. There is a separation of costs and benefits for cities and the state.

Cities are the parties responsible to pay for and fluoridate water, and in economic downturn, many cities are removing fluoride. The state has an incentive for the water to be fluoridated. One way to align the goals of the state with that of the city would be to offer grants to cities to fluoridate the water.

During the previous calculations, we used a one-surface amalgam to approximate the cost of restorative care. Not every tooth, will be filled on only one-surface, so we calculated the cost of a two-surface amalgam, and placing a crown on the teeth. We used a 1% discount rate, over a period of 10 years. Fluoride continues to have a negative benefit, though the amount decreased.

**TABLE 30: COST OF FILLING A TWO-SURFACE AMALGAM USING MARKET RATE**

	Sealant Benefit		Fluoride Benefit	
	All Costs	State Costs	All Costs	State Costs
Cost without Preventive Care	\$187.32	\$122.90	\$187.32	\$122.90
Cost with Preventive Care	\$64.97	\$42.62	\$136.28	\$89.41
<b>Difference</b>	<b>\$122.36</b>	<b>\$80.28</b>	<b>\$51.04</b>	<b>\$33.49</b>
Preventive Treatment	\$65.72	\$50.00	\$154.6	\$91.62
<b>Net Benefit</b>	<b>\$56.64</b>	<b>\$30.28</b>	<b>-\$103.56</b>	<b>-\$58.13</b>

**TABLE 31: COST OF RESTORATIVE CARE WITH A CROWN USING MARKET RATE**

	Sealant Benefit		Fluoride Benefit	
	with time	without time	with time	without time
Cost without Preventive Care	\$676.34	\$656.17	\$676.34	\$656.17
Cost with Preventive Care	\$234.56	\$227.56	\$492.04	\$477.37
<b>Difference</b>	<b>\$441.78</b>	<b>\$428.60</b>	<b>\$184.30</b>	<b>\$178.80</b>
Preventive Treatment	\$33.15	\$50.00	\$154.6	\$91.62
<b>Net Benefit</b>	<b>\$408.63</b>	<b>\$378.60</b>	<b>\$29.70</b>	<b>\$87.18</b>

As the price of restorative care increases, it become more cost-effective to perform preventive care on patients than wait 10 years to fix cavities. If restorative care took place after 5 years, the net benefit would be even larger. With expensive restorative care, the difference between benefits when including time becomes smaller. One calculation not included in the cost-benefit is the additional time that a child will spend at the dentist office as a tooth is restored with a crown.

Many studies examining the cost-effectiveness of sealants divide children based on risk of developing cavities in the future. For high-risk children, one study concluded that the cost of restorative care for patients with sealants was \$55.50, while the cost without sealants was \$71.50.<sup>29</sup> They recommended sealing all permanent molars for high-risk children. A separate

study examined the benefit of sealing only high-risk, sealing all children’s teeth, or not placing any sealants. They determined that sealing no teeth was the most costly and the least effective.<sup>30</sup>

## RECOMMENDATIONS

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We recommend that the state work with local communities to fluoridate the water. If the state would provide a grant to cities, they would have additional incentives to fluoridate the water, which could save the state money over time by lowering Medicaid spending.

The state should also focus dental policy on sealants. As proven above, they are most cost-effective than fluoride varnish, and will save the state money. As children receive sealants to protect their teeth, they are less likely to have a cavity, will feel less pain, and will not miss as much school dealing with oral health.

- <sup>1</sup> Simonsen, Richard J. 2002. “Pit and fissure sealant: review of the literature.” *Pediatric Dentistry*. 24:5 393-414. <http://www.aapd.org/upload/articles/simonsen5-02.pdf>.
- <sup>2</sup> Leake JL, Martinello BP. A four year evaluation of a fissure sealant in a public health setting. *Dent J*. 1976;42(8):409-15
- <sup>3</sup> Weintraub JA, Stearns SC, Burt BA, Beltran E, Eklund SA. A retrospective analysis of the cost-effectiveness of dental sealants in a children's health center. *Soc Sci Med* 1993;36(11):1483-93
- <sup>4</sup> Simonsen RJ. Retention and effectiveness of a single application of white sealant after 10 years. *J Am Dent Assoc* 1987;115(1):31-6.
- <sup>5</sup> Morgan MV, Crowley SJ, Wright C. Economic evaluation of a pit and fissure dental sealant and fluoride mouthrinsing program in two nonfluoridated regions of Victoria, Australia. *J Public Health Dent*. 1998;58(1):19-27
- <sup>6</sup> Bhuridej P. Treatment Outcomes of Sealants on First Permanent Molars: Natural History, Survivorship, and Cost-Utility Analysis [The University of Iowa; 2003.
- <sup>7</sup> Weintraub JA, Stearns SC, Rozier RG, Huang CC. Treatment outcomes and costs of dental sealants among children enrolled in Medicaid. *Am J Public Health* 2001;91(11):1877-81.
- <sup>8</sup> Leverett DH, Handelman SL, Brenner CM, et al. Use of sealants in the prevention and early treatment of carious lesions: cost analysis. *J Am Dent Assoc*. 1983;106(1):39-42
- <sup>9</sup> Burt BA. Tentative analysis of the efficiency of fissure sealant in a public program in London. *Community Dent Oral Epidemiol* 1977;5(2):73-7.
- <sup>10</sup> 2011 ADA Survey of Fees from the West South Central Region (Texas, Oklahoma, Louisiana, and Arkansas).
- <sup>11</sup> “Mode of Travel and Actual Distance Traveled for Medical or Dental Care.” South Carolina Rural Health Research Center. [http://rhr.sph.sc.edu/report/SCRHRC\\_ModeofTravel\\_Exec\\_Sum.pdf](http://rhr.sph.sc.edu/report/SCRHRC_ModeofTravel_Exec_Sum.pdf).
- <sup>12</sup> Federal Mileage Reimbursement Rate
- <sup>13</sup> “Mode of Travel and Actual Distance Traveled for Medical or Dental Care.” South Carolina Rural Health Research Center. [http://rhr.sph.sc.edu/report/SCRHRC\\_ModeofTravel\\_Exec\\_Sum.pdf](http://rhr.sph.sc.edu/report/SCRHRC_ModeofTravel_Exec_Sum.pdf).
- <sup>14</sup> American Dental Hygienists’ Association, "Dental Sealants," (2001), [http://www.adha.org/downloads/sup\\_sealant.pdf](http://www.adha.org/downloads/sup_sealant.pdf) (accessed May 1, 2012). “Fluoride Varnish – Frequently Asked Questions,” New York State Department of Health. [http://www.health.ny.gov/prevention/dental/fluoride\\_varnish\\_faq.htm](http://www.health.ny.gov/prevention/dental/fluoride_varnish_faq.htm) (accessed May 1, 2012).

- <sup>15</sup> Average school district expenditure per pupil hour assuming a seven hour school day.
- <sup>16</sup> Hourly wage implied by the maximum annual earnings of a Medicaid eligible household with one-working adult and one child assuming the adult works 40 hours a week 52 weeks a year.
- <sup>17</sup> 2011 ADA Survey of Fees
- <sup>18</sup> “Mode of Travel and Actual Distance Traveled for Medical or Dental Care.” South Carolina Rural Health Research Center. [http://rhr.sph.sc.edu/report/SCRHRC\\_ModeofTravel\\_Exec\\_Sum.pdf](http://rhr.sph.sc.edu/report/SCRHRC_ModeofTravel_Exec_Sum.pdf). Average travel time is 44 minutes. Rural Patients, on average, travel further.
- <sup>19</sup> Federal Mileage Reimbursement Rate
- <sup>20</sup> “Mode of Travel and Actual Distance Traveled for Medical or Dental Care.” South Carolina Rural Health Research Center. [http://rhr.sph.sc.edu/report/SCRHRC\\_ModeofTravel\\_Exec\\_Sum.pdf](http://rhr.sph.sc.edu/report/SCRHRC_ModeofTravel_Exec_Sum.pdf). Average travel time is 44 minutes. Rural Patients, on average, travel further.
- <sup>21</sup> Time based on observation
- <sup>22</sup> Hourly rate based off total amount a public school receives for having a child in class when attendance is taken.
- <sup>23</sup> Average salary
- <sup>24</sup> 2.5 million children are currently enrolled in Medicaid. 2.5 million \* \$10.32 = \$25,800,000.
- <sup>25</sup> Water Fluoridation Costs in Texas: Texas Health Steps (EPSDT-Medicaid). 2011.
- <sup>26</sup> U.S. Department of Health and Human Services, Assistant Secretary for Planning and Evaluation, “Overview of the Uninsured in the United States: An Analysis of the 2005 Current Population Survey” (2005), <http://aspe.hhs.gov/health/Reports/05/uninsuredcps/ib.pdf> (accessed April 5, 2012).
- <sup>27</sup> City of College Station. Approved Annual Budget 2011-2012. Pg 134.
- <sup>28</sup> ADA Council on Scientific Affairs. May 2006. “Professionally Applied Topical Fluoride: Executive Summary of Evidence-Based Clinical Recommendations.” [http://www.ada.org/sections/scienceAndResearch/pdfs/report\\_fluoride\\_exec.pdf](http://www.ada.org/sections/scienceAndResearch/pdfs/report_fluoride_exec.pdf), “Oral Health Topics.” <http://www.ada.org/3026.aspx>.
- <sup>29</sup> Dasanayake AP, Li Y, Kirk K, Bronstein J, Childers NK. Restorative cost-savings related to dental sealants in Alabama Medicaid children. *Pediatric Dent.* 2003 Nov-Dec;25(6):572-6.
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## APPENDIX 10: ORAL CARE DELIVERY METHODS

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In addition to the variations in types of dental care, there are also variations in the way care is delivered. The dental home and mobile dental units are two of the most recent ways dental professionals and non-profit organizations are exploring alternative methods of delivery. Though all delivery methods have pros and cons, one point is always consistent: optimal settings to receive dental care is not determined through the evaluation of the method by itself, instead it must be ascertained through an evaluation of how well it meets the needs of the patients it is designed to serve.

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### THE DENTAL HOME

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The state of Texas introduced the dental home concept through the implementation of the First Dental Home project. This project attempts to ease the dental care barriers identified by the Frew Advisory Committee. The project began in 2008 and targeted children six months to 35 months of age as the primary receivers of dental home treatment.<sup>1</sup> The dental home provided oral examinations, preventive care, education, and topical fluoride for Medicaid children.<sup>2,3</sup> Due to the success of the First Dental Home project, TDA recommended expanding the dental home incrementally among additional age groups.

The ongoing relationship between the dentist and the patient, inclusive of all aspects of oral health care delivered in a comprehensive, continuously accessible, coordinated, and family-centered way. Establishment of a dental home begins no later than 12 months of age and includes referral to dental specialists when appropriate.<sup>4</sup> These aspects, as well as the additional characteristics of compassion and cultural competence, were taken directly from the concept of the medical home, defined in 1992 by the American Academy of Pediatrics (AAP).<sup>5</sup> Please see Table 32 for a full description of each of the seven characteristics of the dental home, as well as a brief overview of some of the benefits derived from this oral health structure.

The creation of the dental home, like the medical home, came from the reaction to overwhelming empirical evidence demonstrating the benefits of an oral health care structure that encourages a long-term relationship with a single oral health professional.<sup>6</sup> The dental home structure mimics the medical home structure so that benefits derived from the medical home are also applicable with the dental home.<sup>7</sup> Furthermore, children who have an established dental home have a higher probability to receive preventive oral health care, which can limit the amount of restorative oral health care needed later on.<sup>8</sup>

This higher probability of preventive care may, in part, come from the high mandates placed on dental homes. According to the AAP, the dental home is required to provide “an accurate risk assessment for dental diseases and conditions; an individualized preventive dental health program based on the risk assessment; anticipatory guidance about growth and development issues (i.e. teething, digit or pacifier habits, and feeding practices); a plan for emergency dental trauma; information about proper care of the child’s teeth and gingival tissues and information regarding proper nutrition and dietary practices; comprehensive dental care in accordance with accepted guidelines and periodicity schedules for pediatric dental health; referrals to other dental

specialists, such as endodontists, oral surgeons, orthodontists, and periodontists, when care cannot be provided directly within the dental home.”<sup>9</sup>

Oral health care providers created the concept of the dental home to treat children considered at high-risk for dental caries. The AAP defines high-risk children as:

- children with additional health care requirements;
- children of parents with high number of caries;
- children with caries, plaque, or teeth staining; infants who feed through the night (i.e. bottle or breast-fed);
- children who are late birth-order;
- children with low socioeconomic status.

According to the AAP, children that fit into one or more of these categories should be established in a dental home between six months of age and six months after the first tooth emerges.<sup>10</sup> Recent legislation expanded the dental home structure to include all children eligible for Medicaid.

Texas dental homes have several methods to become more culturally appropriate and aware in their practice as they are serving patients from diverse cultural backgrounds. For example, the state of Vermont organized several focus groups in order to gather relevant information to promote oral health awareness and education for the Smile Vermont oral health program.<sup>11</sup> The state of Texas could use a similar approach to assist Texas dental homes by also gathering specific information in order to communicate and promote oral health awareness and education in a culturally appropriate way.<sup>12</sup> In the Oregon’s First Tooth program, as another example, the state of Oregon offered culturally appropriate training to dental professionals as well as provided culturally appropriate handouts to better serve cultural diverse patients.<sup>13</sup>

**TABLE 32: IDEAL CHARACTERISTICS AND PRACTICAL ADVANTAGES OF A DENTAL HOME**

Characteristics	Description	Practical Advantages
<b>Accessible</b>	<ul style="list-style-type: none"> <li>Care Provided in the child’s community</li> <li>All insurance accepted and changes in coverage accommodated</li> </ul>	<ul style="list-style-type: none"> <li>Source of care is close to home and accessible to family</li> <li>Minimal hassle encountered with payment</li> <li>Office ready for treatment in emergency situations</li> <li>Office is nonbiased in dealing with children with special needs, or CSHCN</li> <li>Dentists knows community needs and resources (fluoride in water)</li> </ul>
<b>Family Centered</b>	<ul style="list-style-type: none"> <li>Recognition of the centeredness of the family</li> <li>Unbiased complete information is shared on an ongoing basis</li> </ul>	<ul style="list-style-type: none"> <li>Low parent/ child anxiety improves care</li> <li>Care protocols are comfortable to family (behavior management)</li> <li>Appropriate role of parents in home care is established</li> </ul>
<b>Continuous</b>	<ul style="list-style-type: none"> <li>Same primary care providers from infancy through adolescence</li> <li>Assistance provided with transitions (for example, to school)</li> </ul>	<ul style="list-style-type: none"> <li>Appropriate recall intervals are based on child’s needs</li> <li>Continuity of care is better owing to recall system vs. episodic care</li> <li>Coordination of complex dental treatment is possible (traumatic injury)</li> <li>Liaison with medical providers for CSHCN is improved (congenital heart disease)</li> </ul>
<b>Comprehensive</b>	<ul style="list-style-type: none"> <li>Health care available 24 hours a day, seven days a week</li> <li>Preventive , primary, tertiary care provided</li> </ul>	<ul style="list-style-type: none"> <li>Emergency access is ensured</li> <li>Care manager and primary care dentist are in same place</li> </ul>
<b>Coordinated</b>	<ul style="list-style-type: none"> <li>Families linked to support, education and community services</li> <li>Information centralized</li> </ul>	<ul style="list-style-type: none"> <li>Records centralized</li> <li>School, workshop, therapy linkages established and known (cleft palate care)</li> </ul>
<b>Compassionate</b>	<ul style="list-style-type: none"> <li>Expressed and demonstrated concern for child and family</li> </ul>	<ul style="list-style-type: none"> <li>Dentist-child relationship is established</li> <li>Family relationship is established</li> <li>Children less anxious owing to familiarity</li> </ul>
<b>Culturally Competent</b>	<ul style="list-style-type: none"> <li>Cultural background recognized, valued, and respected</li> </ul>	<ul style="list-style-type: none"> <li>Mechanism is established for communication for ongoing care</li> <li>Specialized resources are known and proven if needed</li> <li>Staff may speak other languages and know dental terminology</li> </ul>

**Source:** Arthur J. Nowak and Paul S. Casamassimo, “The Dental Home: A Primary Care Oral Health Concept,” Journal of the American Dental Association 133(2002): 93-98.



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## PROS

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- Dental home providers are eligible for Medicaid reimbursements
- Thorough examination of teeth and risk assessment.
- Ability to interact with and educate patients
- Develop lasting relationships
- Develop individualized treatment schedule

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## CONS

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- Lack of available dentists in rural areas
- Parents must be present for Medicaid reimbursement
- Children must visit same dentists
- Parent and child must travel to office

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## THE I-SMILE DENTAL HOME EXAMPLE

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The state of Iowa started the I-Smile Dental Home initiative in 2007. By 2008, the I-Smile dental home project had an annual budget of approximately \$2.2 million dollars, which provided 34,320 fluoride varnish applications, 43,490 oral screenings, and the care coordination of 41,354 patients.<sup>14</sup> Of that annual budget \$500,000 goes towards administrative expenses, such as employee benefits, travel expenses, information services, and salaries for four full-time employees.<sup>15</sup> The remaining \$1.7 million dollars goes towards the salaries of 24 regional coordinators, contracted to work a minimum of 20 hours per week supervising patient referrals, directing patient care, and communicate with families, community organizations and dental care professionals.<sup>16</sup> Lastly, the I-Smile program also employs an additional one full-time employee and one half-time employee who promote oral health awareness, oversee the oral health surveillance system, as well as provide administrative oversight to the regional contractors.<sup>17</sup> Grants given directly from the Iowa's Health Resources and Services Administration Targeted Oral Health Service System fund these employee's salaries, which is not included in the I-Smile annual budget.<sup>18</sup>

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## MOBILE DENTISTRY FACILITIES

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Mobile dental facilities are an innovative practice that allows dental care to be taken to the patient, rather than the patient going to a dental office. According to the Texas Administrative Code, a mobile dental facility is “any self-contained facility in which dentistry will be practiced which may be moved, towed, or transported from one location to another.”<sup>19</sup> While there has not been a full assessment on mobile dentistry, it is recommended by the Academy of General Dentistry as a means to increase access to care.<sup>20</sup> These units increase access for children by delivering care in school based settings and to rural areas that lack dental professionals. A mobile dentistry unit must contend with the issues associated with the truck and dental equipment

maintenance and complications surrounding the delivery of dental care in a mobile setting, especially when delivered to children in a school setting.

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### CONSIDERATIONS FOR PRACTITIONERS:

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The capital needed to run a mobile dental facility includes a truck, van, or trailer and the dental equipment to perform care. A mobile facility can be either

- a self-contained motorized van driven by clinic staff or a hired driver to different locations; or
- a trailer that is hauled or towed by a truck to a location.

Programs use a combination of vehicles depending on the population they serve and geographic considerations. Dental equipment that must also be installed in the vehicle. Typical equipment includes patient chairs, dental units and hand pieces, x-ray units, lights, and computers.<sup>21</sup> Once the van and equipment are procured, the program must ensure that the unit meets certain requirements including: maintaining a steady temperature at all times to ensure the stability of the liquid and chemical dental supplies and to prevent equipment damage, regular equipment maintenance, van insurance, and storage.<sup>22</sup> Additional considerations include generators on board, telephone and computer systems, and wheel chair lifts.

Mobile dental programs face several issues such as community relations, state laws, staffing and procedures, and financial stability. Dental units must work with the community, schools, parents, dental societies, local dentists and health departments to assess needs, develop programs, and build cooperative relationships. Building community relationships is especially important for providing care to children, and establishing a long-term program. Additionally, states have detailed laws dictating dental care to include licensure, certification processes, Medicaid reimbursement, and parental consent for dental work on children. Staffing of mobile units depends on the service offered, but frequently includes dentists, dental hygienists, and/or dental assistants all of which are regulated by state laws. The services offered vary by program but can be either preventive or restorative and commonly include: oral examination, dental cleaning, restorative, education, radiograph, screening, topical fluoride, and sealants.<sup>23</sup> Finally, it is important for programs to regularly assess needs, perform case management, evaluate progress, and set up a tracking system for children.<sup>24</sup>

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### SCHOOL BASED CONSIDERATIONS FOR PRACTITIONERS

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Mobile dental facilities are commonly used in school-based settings and in rural areas. There are additional considerations for practitioners when treating children in a school setting. If the mobile unit does not have its own generator then a special electrical hookup must be available at each school. Additionally, there are liabilities associated with school visits including

- It is the responsibility of the school to see that the permission forms are given to the parent or legal guardian, completed correctly, and returned to the school in a timely manner before the dental team arrives to conduct the screenings.

- The dental team is responsible for completing the results of dental screening forms, but the school is responsible for getting these results to the parent or legal guardian.<sup>25</sup>

One significant issue impacting mobile care units is Texas state law requiring parents to be present during a dental exam for the dental professional to be reimbursed through Medicaid, unless the services are given in approved school health clinics, Head Start programs, or child-care facilities.<sup>26</sup>

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#### PROS

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- Improved access to dental care
- Serve multiple populations in broad geographic areas<sup>27</sup>
- Serves rural populations without dental populations
- Serves low-income school children<sup>28</sup>
- High visibility of program, potential funders able to advertise and such<sup>29</sup>
- On-site lab and x-ray possible<sup>30</sup>
- Saves parents travel time to take child to dentists
- Reduces commuting time in rural areas

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#### CONS

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- Mobile dental facilities are not operating with the intent of building a relationship with patients like the dental home program
- Initial cost/operating costs
- Increased coordination required
- Community misperceptions and potential for misuse for emergency care or replacing all dental care
- Challenges finding providers
- Space limited for staff, supplies, and records
- Security, storage, and maintenance of vehicle/trailer
- Regulatory and legal compliance (Americans with Disabilities Act, fire, etc.)  
Waste disposal (particularly hazardous materials)  
Increased risk for liability<sup>31</sup>

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#### CURRENT PROGRAM EXAMPLE: ST. DAVID’S DENTAL PROGRAM.

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St. David’s hospital in Austin, Texas, developed a mobile-based dental program that provides “free dental care to low-income children in schools without relying on reimbursements or government funding” by collaborating with community partners in Central Texas.<sup>32</sup> The goal of the program “is to eliminate the barriers of economics, language, and transportation for the disadvantaged to access dental care.<sup>33</sup>” The mobile units provide preventive and restorative dental treatments as well as dental health education for parents and students at the schools they serve<sup>34</sup>. According to an analysis of the program, its success was related to sustained funding, well-compensated clinicians, policies that maximize consent form return rates, and the

development of strong relationships with school district and individual school staff<sup>35</sup>. The program developed a process to provide services:

1. Four weeks before: Parents decide whether their child can participate
2. Three weeks before: Dentist and assistant perform dental screening and hand out consent forms for children requiring treatment
3. Two weeks before: consent forms collected
4. Clinic performed, all documentation of patients given to school, teachers with 100% consent forms returned receive gift certificates

Since its beginning in 1998, St. David's Dental Program has screened over 130,000 children and treated over 38,000. Of those children 80% were in elementary school and 88% were Hispanic children.<sup>36</sup> Jackson et. al. found that in 2005 the program provided \$2.1 million worth of services at a cost of \$1.2 million.<sup>37</sup>

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## SCHOOL BASED DENTAL PROGRAMS

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School based dental programs operate entirely within a school setting. School based dental programs operate similarly to school based health centers (SBHC) which targeted “uninsured, underinsured, low-income, and minority children whose access to care is otherwise limited.”<sup>38</sup> Instead of kids leaving school to visit the dentist, the dentist visits the child. There are two separate types of school-based programs that are conducted in the school setting. The first is teams using portable dentist equipment. This allows dental professionals to travel with their own equipment to several schools. Their practice is not based out of one school. They set up their equipment in the school nurses office or gym and perform dental procedures during the day. The second school-based program is a health clinic located in the school. These clinics are self-contained in the school setting. Dental professionals may only be on-site for a few hours during the day, but the clinic contains all of the dental equipment they will need.<sup>39</sup> One study found that school based dental programs, are perhaps the most convenient care location for both children and parents because they eliminate the need for transportation, parent time off, and missed school.<sup>40</sup> Different strategies exist in a school based program including screening services where a professional will examine children's teeth and provide recommendations for future treatment; preventive care that can be applied quickly; or delivery for all dental procedures that a typical child may need.<sup>41</sup>

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## CONSIDERATIONS FOR PRACTITIONERS

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Children with access to school dental program are more likely to have seen a dentist in the past year than other similarly economic disadvantaged children without a school based dental program.<sup>42</sup> School based programs generally target schools with a large population of low-income children. This provides a large base of children who were less likely to visit a dentist. The school might provide an ideal setting to locate high-numbers of children who are eligible for Medicaid, but unable to seek treatment. School based programs that this capstone observed and

researched focused on schools with a high population of low-income children, as measured by participation in free and reduced school lunch.<sup>43</sup>

Dental equipment is a major concern for a school based clinic. Equipment can either be portable or stationary. Depending on the population of a school, portable equipment may not be the most economical; because that limits the number of children a dentist can serve. Dental professionals and research question the effectiveness of care in a school setting. They worry that the correct equipment may not be available, that dental professionals will not properly educate children, and that tooth assessments will not be performed properly.<sup>44</sup>

Schools are frequently used to promote health care. Children are currently screened for vision and hearing. In a survey of health professionals conducted in 2011, researchers found that “there were disparate views as to what those services should be. Some felt strongly that screening and perhaps some limited prevention services were the most appropriate services while others supported a full continuum of care, including classroom education, screenings and clinics providing comprehensive care in a dental operatory at school.”<sup>45</sup> There is a wide variety of views on school based services, as well as methods to implement.<sup>46</sup>

Many of the articles that observe school-based clinics focus on sealants as an effective strategy to reducing caries. Especially in schools with a high percentage of kids receiving free and reduced school lunch.

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#### PROS

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- The CDC found that school programs are important to reach low-income children.<sup>47</sup>
- School-based programs reduce education time lost by visiting a dentist
- Can target underserved populations.<sup>48</sup>
- Parent’s do not loose work hours
- Providers can receive Medicaid if given at school based health clinic.<sup>49 50</sup>
- Equipment may be portable to visit multiple schools.<sup>51</sup>
- Parent’s do not loose work hours
- Providers can receive Medicaid if given at school based health clinic.<sup>52 53</sup>
- Equipment may be portable to visit multiple schools.<sup>54</sup>

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#### CONS

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- Sealants need to be observed carefully after placement to verify they were sealed correctly.<sup>55</sup>
- Children receive treatment without receiving a thorough risk-assessment.<sup>56</sup>
- Start-up costs may be high.<sup>57</sup>
- School clinics may be difficult to sustain financially.<sup>58</sup>

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EXAMPLE OF CURRENT PROGRAM:  
NEW MEXICO SCHOOL-BASED DENTAL SEALANT PROGRAM

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The goal of the New Mexico School-Based Dental Sealant Program<sup>59</sup> is to reduce tooth decay in children by providing preventive services in eligible schools. The program provides services to over 125 schools that with at least 50% of children who participate in free and reduced school lunch.<sup>60</sup> In rural areas, all children are eligible for services; but in urban areas, services are provided to only children enrolled in grades 1-3.

The program is administered through a mix of state staff and private dental providers. Hygienists, Assistants, Case Managers and dentists all participate through the state staff. They are formed into three teams with a dentist, dental hygienist and assistant. They travel to schools using portable equipment. When the state staff are unable to reach schools, they contract with private offices. This program is supported through grants from the state.

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COMPARISON OF DELIVERY METHODS

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Preventive care can be given at any of the locations shown above. Matching up the most cost-effective location with the most cost-effective treatment will increase access that children have to preventive care. For example, rural areas can benefit from mobile dental vans or portable dental equipment because it decreases the travel time for treatment and allows dental professionals to go where the patients live. For urban children, a combination of care locations could make it easier for parents to get children to dental professionals. When analyzing the differences between rural and urban areas in Texas, it is important to remember that delivery methods can mitigate barriers to dental care.

**TABLE 33: COMPARISON OF DELIVERY METHODS**

	<b>Advantages</b>	<b>Disadvantages</b>
<b>Dental Home</b>	<ul style="list-style-type: none"> <li>• Ability to interact with and educate patients</li> <li>• Develop lasting relationships</li> <li>• Medicaid Reimbursement</li> <li>• Cultural background is recognized, valued, and respected</li> <li>• Develop individualized treatment schedule</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of available dentists in rural areas</li> <li>• Parents must be present for Medicaid reimbursement</li> <li>• Children must visit same dentist</li> <li>• Parent and child must travel to office</li> </ul>
<b>Mobile Dental Units</b>	<ul style="list-style-type: none"> <li>• Care is delivered at locations near patients</li> <li>• High visibility</li> <li>• Reduces parent time involvement</li> <li>• Serve multiple populations</li> </ul>	<ul style="list-style-type: none"> <li>• Counter intuitive to Dental Home</li> <li>• High initial costs</li> <li>• Large operating costs to travel between locations</li> <li>• Challenge finding providers</li> <li>• Limited space for staff, supplies, and records</li> <li>• Community misperceptions</li> </ul>
<b>School-Based Clinics</b>	<ul style="list-style-type: none"> <li>• Reduce lost school time and parent travel time</li> <li>• Target underserved populations</li> <li>• May be eligible for Medicaid reimbursements</li> <li>• Equipment can be portable</li> <li>• Care given at stable location</li> </ul>	<ul style="list-style-type: none"> <li>• High start-up costs</li> <li>• Difficult to sustain financially</li> <li>• Treatment given without thorough risk-assessment</li> <li>• If equipment is stationary, dental unit cannot expand coverage</li> </ul>

<sup>1</sup> “Health and Human Services Commission. "Health and Human Services System Strategic Plan 2011–15," *Health and Human Services Commission*. [http://www.hhs.state.tx.us/StrategicPlans/SP11-15/Strategic\\_Plan.pdf](http://www.hhs.state.tx.us/StrategicPlans/SP11-15/Strategic_Plan.pdf) (accessed March 2, 2012.).

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<sup>4</sup> American Academy of Pediatric Dentistry, “Definition of Dental Home.” *Reference Manual* 33, no. 6 (2010): 1-1.

<sup>5</sup> Arthur J. Nowak and Paul S. Casamassimo, “The Dental Home: A Primary Care Oral Health Concept,” *Journal of the American Dental Association* 133(2002): 93-98.

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- <sup>15</sup> *Ibid.*
- <sup>16</sup> *Ibid.*
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- <sup>18</sup> *Ibid.*
- <sup>19</sup> Texas Administrative Code: Title 22, Part 5, Chapter 108, Subchapter D.  
[http://info.sos.state.tx.us/pls/pub/readtac\\$ext.TacPage?sl=R&app=9&p\\_dir=&p\\_rloc=&p\\_tloc=&p\\_ploc=&pg=1&p\\_tac=&ti=22&pt=5&ch=108&rl=41](http://info.sos.state.tx.us/pls/pub/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=22&pt=5&ch=108&rl=41)
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## APPENDIX 11: DELIVERY METHODS COST BENEFIT ANALYSIS

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This appendix analyzed the costs of three different delivery methods for dental care for children. The capstone team performed the costs analysis by using startup, equipment, staffing, and annual operating costs. The first method analyzed is a fixed location, for example a typical dental office or dental home located in a fixed office building. This delivery method assumed the use of four different practice sizes: a three, six, nine, and twelve chair practice. It was important to estimate the costs for a fixed dental office for multiple sizes so the analysis was realistic and encompassed various clinic costs, equipment costs, and number of patients served. The second delivery method analyzed was a mobile clinic. For example, a mobile dental van that serves patients on board by dental professionals. This option included only a two chair model, because mobile dental facilities often do not have the space for more chairs. Finally, costs were analyzed for portable dental equipment, which involves equipment is unloaded in a standing building to deliver dental care to patients and packed up after patients have been served.

The capstone team performed the cost analysis by using numbers calculated by the National Maternal and Child Oral Health Resources Center. Startup costs for any delivery method include construction, large equipment, and small supplies and equipment; the costs were additionally adjusted for inflation to 2010 costs. Staffing costs were calculated using Texas dentists, hygienists, assistant, and clerical salaries for 2011.<sup>1</sup> Annual operating costs include utilities, rent or mortgage payments, dental supplies, and other office supplies. After calculating these costs for each type of delivery option, the two mobile delivery options had less expensive start up and annual costs, although they can serve fewer patients.

Figure 36 displays the total startup costs, annual operating costs, and then cost-per-patient treated and visited. The red rows were calculated using a low estimate of patient numbers and the blue rows below were calculated using a high estimate of patients served in clinics. It is important to note that the patients served estimates for the mobile unit are low when compared to other mobile vans currently operating in Texas. For example, in 2004-2005 the St. David's Dental Program screened over 37,000 children with four dental vans, with an average of 9,000 patients served in the year. Additionally, they were able to treat 4,609 children which would be close to 1,150 patients treated per van. The numbers used in the chart below were between 500 and 800 patients treated annually. If the cost per patient were analyzed with numbers like the St. David's program, the cost per patient treated and visited would decrease. Based on their program budget of \$1,200,000, the cost per patient screened was \$32.10 and cost per patient treated was \$260.<sup>2</sup>

**TABLE 34: DELIVERY METHOD COSTS**

<b>Size</b>	<b>Dental Office</b>			<b>Mobile</b>	<b>Portable</b>
	<b>3-chair (1800 sq ft)</b>	<b>6-chair (2925 sq ft)</b>	<b>12-chair (3970 sq ft)</b>	<b>2-chair</b>	<b>2-chair</b>
Patients Treated/Year	1000-1800	1801-3600	5401-7200	500-800	500-800
Visits/Year (DDS+DH)	3000-3400	6400-6600	12800-32000	1400-2000	1200-1800
Total Start-Up Costs	\$624,452.0 0	\$1,016,217.0 0	\$1,549,538.0 0	\$453,330.0 0	\$47,301.00
Total Annual Operating Costs	\$390,853.0 0	\$651,825.00	\$1,014,738.0 0	\$321,330.0 0	\$321,326.0 0
Cost per patient visited	\$114.96	\$101.85	\$79.28	\$229.52	\$267.77
Cost per patient treated	\$390.85	\$361.92	\$187.88	\$642.66	\$642.65
Cost per patient visited	\$114.96	\$98.76	\$31.71	\$160.67	\$178.51
Cost per patient treated	\$217.14	\$181.06	\$140.94	\$401.66	\$401.66

**Source:** Safety Net Dental Clinic Manual, “Chapter 2. Facility Design and Construction,” Dental Clinical Manual, [http://www.dentalclinicmanual.com/chapt2/1\\_1.html](http://www.dentalclinicmanual.com/chapt2/1_1.html), accessed April 28, 2012

## BENEFITS AND DRAWBACKS OF DELIVERY METHODS

Calculating the costs for each delivery method was relatively straightforward; calculating general benefits that however, is much more difficult. There are no differences in the quality of dental care that can be derived from having a fixed clinic, mobile van, or portable equipment. The benefit of having any type of delivery location for dental care is simply, people have a place to go to receive care. The benefits therefore, are access benefits for the patients for each type of delivery method.

Fixed clinics are the traditional delivery method for dental care. The benefits of receiving care in fixed facilities are that patients have continuity of care, more space to optimize patient staff ratios, and can be community based<sup>3</sup>. The problem with traditional fixed clinics is that patients are limited by geography, high startup costs, and transportation and time costs to patients may be higher.<sup>4</sup>

Mobile dental vans and trucks are self-contained vehicles that deliver care by arriving in a location, and serving patients on-board the van. Mobile facilities have the benefit of mobility and can serve a multitude of populations including minorities and rural patients. The cons of mobile vans are that they have high startup costs, require extensive coordination, have several maintenance issues, and lack continuity of care for patients.

Finally, portable equipment that can be transported and unloaded in different locations like school or office buildings have the benefit of reaching various locations like schools, rural areas, assisted living facilities, low startup costs, transportability, and highly custom and versatile equipment. The problem with portable equipment for delivering dental care is that the dental professionals must find setup space and time costs for setup can be high and result in fewer dental procedures performed, increased staff responsibilities, and discontinuity of care<sup>5</sup>.

While each method of delivery has drawbacks, they can each be customized for the characteristics of patients served, the goals of each clinic, and the costs for the dental professionals to deliver care. For example, a mobile van may be the best option for a clinic that wants to work with underserved school children in urban or rural areas because the van can drive to multiple schools and provide care to children who cannot get to a fixed facility. Similarly, portable equipment has less expensive startup costs and could serve rural patients separated by long distances cheaper than a van because transportation costs are less. Finally, a fixed facility provides the best continuous care. Those patients who can provide transportation to the office will be served with consistent care.

Each method can be paired with different types of care for different patient populations. Based on staffing ratios and equipment, mobile vans have proven effective methods to deliver preventive care like dental exams, cleanings, and sealants. Portable equipment varies based on what equipment is used by professionals and also tends to provide preventive care to patients. Fixed facilities have the benefit of providing comprehensive care, including preventive and restorative.

**TABLE 35: COST TO DELIVERY METHODS CHART**

	Dental Office			Mobile	Portable
Size	3-chair (1800 sq ft)	6-chair (2925 sq ft)	12-chair (3970 sq ft)	2-chair	2-chair
Patients Treated/Year	1000-1800	1801-3600	5401-7200	500-800	500-800
Visits/Year (DDS+DH)	3000-3400	6400-6600	12800-32000	1400-2000	1200-1800
<b>Start-up Costs</b>					
Construction (\$215/sq ft)	\$387,000	\$628,875	\$853,550	\$405,198	N/A
Large Equipment	\$185,234	\$287,193	\$501,025	\$21,813	\$20,982
Supplies, Instruments and Small Equipment	\$52,218	\$100,149	\$194,963	\$26,319	\$26,319
<b>Total</b>	<b>\$624,452</b>	<b>\$1,016,217</b>	<b>\$1,549,538</b>	<b>\$453,330</b>	<b>\$47,301</b>
<b>Staffing Costs</b>					
Salary	1	2	4	1	1
Avg. Dentist Salary \$171,330	\$171,330	\$342,660	\$458,769	\$106,037	\$106,037
Avg. Dental Assistants Salary \$31,500	\$63,000	\$126,000	\$252,000	\$63,000	\$63,000
Avg. Dental Hygienists \$65,436 - \$67,190	\$67,190	\$67,190	\$134,380	\$134,380	\$134,380
Avg. Receptionist Salary 25,070	25,070	\$25,070	\$25,070	N/A	N/A
<b>Total</b>	<b>\$326,590</b>	<b>\$560,920</b>	<b>\$870,219</b>	<b>\$303,417</b>	<b>\$303,417</b>
<b>Annual Operating Costs</b>					
Utilities Average \$9,467 to \$12,924	\$9,467	\$10,619	\$12,924	\$0 to \$4,000	N/A
Rent or Mortgage Payment Average \$31,212	\$29,238	\$30,408	\$34,083	N/A	N/A
Dental Supplies \$7,649/operatory	\$22,947	\$45,892	\$91,786	\$15,298	\$15,298
Other (charts, office supplies, etc.) \$2,611 to \$5,762	\$2,611	\$3,986	\$5,726	\$2,611	\$2,611
<b>Total Start-Up Costs</b>	<b>\$624,452</b>	<b>\$1,016,217</b>	<b>\$1,549,538</b>	<b>\$453,330</b>	<b>\$47,301</b>
<b>Total Annual Operating Costs</b>	<b>\$390,853</b>	<b>\$651,825</b>	<b>\$1,014,738</b>	<b>\$321,330</b>	<b>\$321,326</b>
<b>Cost per patient visited</b>	<b>\$114.96</b>	<b>\$101.85</b>	<b>\$79.28</b>	<b>\$229.52</b>	<b>\$267.77</b>
<b>Cost per patient treated</b>	<b>\$390.85</b>	<b>\$361.92</b>	<b>\$187.88</b>	<b>\$642.66</b>	<b>\$642.65</b>
<b>Cost per patient visited</b>	<b>\$114.96</b>	<b>\$98.76</b>	<b>\$31.71</b>	<b>\$160.67</b>	<b>\$178.51</b>
<b>Cost per patient treated</b>	<b>\$217.14</b>	<b>\$181.06</b>	<b>\$140.94</b>	<b>\$401.66</b>	<b>\$401.66</b>

- <sup>1</sup> “Occupational Employment and Wages, May 2011: Dentists, General” Bureau of Labor Statistics. [www.bls.gov/oes/current/oes291021.htm](http://www.bls.gov/oes/current/oes291021.htm) (accessed May 1, 2012).  
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- <sup>3</sup> Hill, Dr. Larry. “Dental Clinic Comparison Chart: Capacity and Costs for Fixed Clinics, Mobile Clinics and Clinics Using Portable Equipment.” *Mobile-Portable Dental Manual*. Net Dental Clinic Manual Advisory Committee. 2007. <http://www.mobile-portabledentalmanual.com/chapt1/sect...> (accessed Apr. 28, 2012)
- <sup>4</sup> *Ibid.*
- <sup>5</sup> *Ibid.*