

Seal Your Smile:

A Step Toward Combatting Oral Health Disparities in Utah



*The findings of a newly developed,
school-based sealant program*



UTAH DEPARTMENT OF
HEALTH
Office of Health Disparities

SEPTEMBER 2018

Contents

Executive Summary	2-3
Introduction	4-6
Background on SBSPs in Utah	7
The Purpose of Seal Your Smile SBSP	7
Implementation of this SBSP	8
Data Analysis Methods	9
General Outcomes	9
Summary of Findings	10
Participation across the 12 Schools	11-12
Oral Health Status	13
Complaints of Oral Pain & Unmet Dental Care	14-15
Most Recent Dental Visit	16
Dental Insurance	17-18
Reassessment Data- Participation & Additional Findings	19
Limitations	20
Recommendations	21
Conclusion	21
Acknowledgements	22
References	23

Executive Summary

SBSPs provide children with direct access to preventive dental care.

Seal Your Smile is an SBSP created in the fall of 2016 to provide dental services to 12 elementary schools in Salt Lake City School District.

Oral health is a critical component of general health and quality of life. Good oral health is widely known as a state of being free from mouth and facial pain which typically arises from infections, gum disease, tooth decay, and tooth loss, all of which limit an individual's ability to bite, chew, smile, speak, and even impacts psychosocial wellbeing.

Despite major improvements in oral health for the population as a whole, oral health disparities still exist for many children and adults who are part of communities disadvantaged in opportunities and/or resources such as racial/ethnic minorities, low-socioeconomic status individuals, and people who live in specific geographic areas. Fortunately for children, the creation of school-based sealant programs (SBSPs) provides them with direct access to preventive dental care, and links children to dental homes in the community for urgent or extensive care.

This report focuses on the results from the SBSP known as *Seal Your Smile*. The *Seal Your Smile* program offered children direct access to preventive dental care in a school setting and, for those needing urgent or extensive care, linked them to dental homes in the community. The goal was to provide an oral health assessment of all teeth and apply sealants to all teeth requiring them in an attempt to lower the incidence of caries among vulnerable elementary school-aged children who face barriers in access to dental care.

Seal Your Smile was created in the fall of 2016 by the Family Dental Plan, the Utah Department of Health's (UDOH) state dental clinic program. In 2017, the Salt Lake Education Fund, upon receipt of a Primary Care Grant from UDOH, contracted the Family Dental Plan to implement the program in 12 of Salt Lake City's elementary schools.

Week-long clinics were held in each of the twelve schools between September 2017 and December 2017, and follow-up clinics were held between March 2018 and May 2018. Through the SBSP, dental services were provided to 2,182 students.

The Utah Department of Health Office of Health Disparities collaborated with the Family Dental Plan to collect, analyze, and report on data including: student demographic information, school information, insurance information, health/dental history, and specific dental services provided on each tooth during the SBSP.

Executive Summary

Children with and without dental insurance had comparable oral health status.

Ownership of dental insurance does not necessarily guarantee access to care.

The major findings of this analysis and report include:

- Children of racial/ethnic minority groups were more likely to participate in the screening, and had a greater prevalence of untreated caries.
- Children who had an established dentist and had seen a dentist more recently required, on average, a nearly equal number of sealants as children without an established dentist.
- Both children with and without dental insurance complained of pain, as well as unmet dental needs.
- No substantial difference was observed in the average number of sealants placed on children with and without insurance.

Each of these findings demonstrates the need for school-based sealant programs in Utah, especially in areas with a disproportionately large number of families experiencing health disparities. Access to care is a major contributor to health disparities, and, as we will demonstrate later on in this report, having dental insurance does not necessarily guarantee that one will receive care. As such, children of all appropriate ages, racial/ethnic backgrounds, and socioeconomic statuses can benefit from these programs regardless of insurance status.

Introduction

What are Sealants?

The most common place for bacteria, germs, and food to settle is in the grooves of the back teeth (molars) as these are the most difficult to access by brushing or flossing¹. Bacteria that settle into the tooth consume leftover food and carbohydrates and then release acidic compounds wearing away the multiple layers of the tooth, causing tooth decay in the form of cavities (also known as caries). Untreated cavities grow in size and affect deeper layers of the tooth and can potentially lead to oral infections resulting in tooth loss.

Dental sealants are thin, plastic coatings painted onto the surfaces of the molars. Upon application, sealants flow into the deep grooves of the tooth and immediately harden, thereby providing a coating on the chewing surfaces preventing bacteria, germs, and food from settling on the tooth. Sealants protect against 80% of cavities for up to two years and 50% of cavities for up to four years². In many cases, sealants have lasted several years.

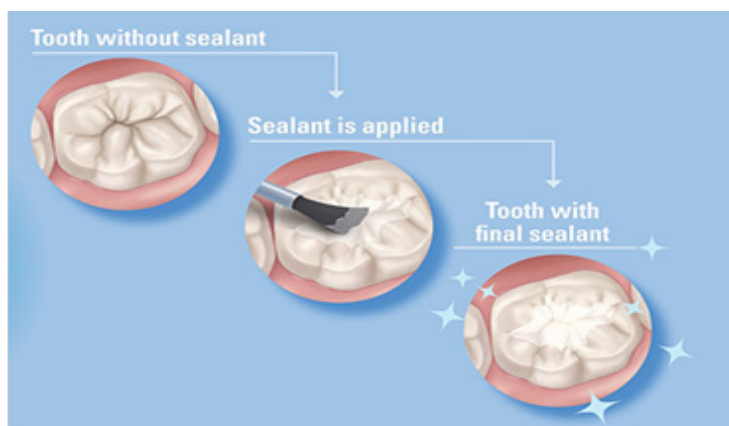


Figure 1: Contrast of a tooth with and without a sealant³.

Summary

- Sealants are thin coatings that help prevent against cavities.
- Placing sealants is quick, simple, and cost-effective.
- School-based sealant programs are a great way to provide sealants and other dental services for children.

Procedure for Applying Sealants

While sealants are a versatile preventive measure, they are only to be placed on fully erupted molars. Sealants should not be applied on a molar that contains cavities (treated or untreated), or on a tooth on which a sealant already exists.

Placing sealants is a quick, painless process. In short, it involves: 1) thoroughly cleansing the tooth to remove any unwanted microbes from the tooth enamel; 2) drying the tooth; 3) placing an acidic conditioner (etching solution) to create a stronger bond between the surface of the tooth and the following sealant; 4) application of the liquid sealant; and 5) using light or air to dry and harden the liquid sealant.

Sealants are most effective when placed after the emergence of permanent molars (first molars typically arrive around age six, and second molars typically arrive between ages 12-14)⁴.

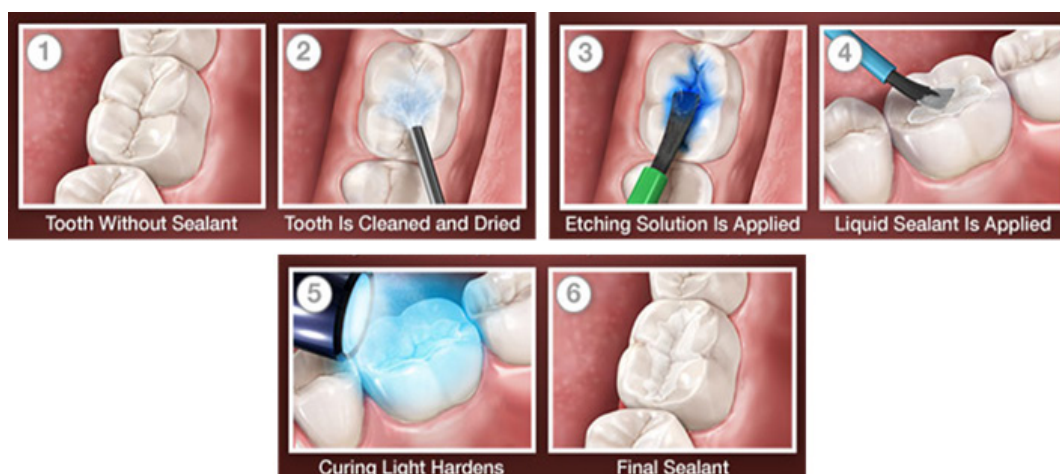


Figure 2: Application of a sealant⁵.

Oral Health Disparities

Although considerable progress has been made overall in oral health, many groups still experience a “severe and disproportionate burden” of oral health disease⁴. These health disparities vary by race and ethnicity, socioeconomic status, age, gender, and geography^{1,4,5}. Oral health disparities are often a manifestation of underlying disparities in access to care and are influenced by social, economic, and environmental determinants. For example, underserved populations may face the added barriers of low health literacy levels and limited familiarity with clinical guidelines and local health systems.

In the U.S., children between ages six and 11 without sealants were found to have nearly three times as many first molar cavities than children with sealants⁶. While the overall number of children with sealants has increased, low-income children are 20% less likely to have sealants than higher-income children⁷. This disparity is largely due to a higher prevalence of uninsured individuals in the low-income population⁸, limited access to health care due to socioeconomic status⁹, health insurance policies that do not cover general dental services, and language barriers. As a result, about 7 million low-income children in the U.S. need sealants¹⁰.

Importance of SBSPs in Addressing Oral Health Disparities

Promoted as a best practice by the Centers for Disease Control and Prevention (CDC), SBSPs offer children direct access to preventive dental care and link children to dental homes in the community for urgent or extensive care. School-based programs are conducted completely in the school setting. Dental health professionals such as dentists or dental hygienists provide services in a fixed clinical facility within the school setting, in a mobile dental van parked on school property, or by utilizing portable equipment¹¹. Dental sealant programs generally target vulnerable populations who are less likely to receive dental care.



Economic Benefits of SBSPs

Substantial economic benefits have been observed with the use of SBSPs. For example, if a child receives sealants he/she will be much less likely to develop cavities, thereby reducing more expensive restorative procedures. Between 2003 and 2008, a 60% increase in the delivery of school-based sealants in states with CDC funding for SBSPs, saved an estimated total of \$1 million in Medicaid dental expenditures¹². Furthermore, a 2017 Economic Review reported that SBSPs become cost-saving after two years and save \$11.70 per sealed tooth over four years¹³. Finally, the CDC estimates by providing sealants to all 7 million low-income children in need, more than 3 million cavities can be prevented, saving up to \$300 million in subsequent dental treatment costs¹⁴.

Background on SBSPs in Utah

In Utah, *Sealants for Smiles* (different from *Seal Your Smile*) was the most established and extended school-based dental sealant program. The program provided age-specific oral health education, oral health assessments, topical fluoride application, and placement of dental sealants to children in elementary schools along the Wasatch Front¹⁵.

Within its first year, *Sealants for Smiles* increased dental services provided to low-income children by more than 300%. During the 2008-2009 school year, *Sealants for Smiles* placed a total of 16,975 dental sealants¹⁶. *Sealants for Smiles* operated between July 2007 and May 2016, when the last clinic was held.

The Purpose of Seal Your Smile SBSP

In fall 2016, in response to the need expressed by school districts, the Family Dental Plan, the UDOH's state dental clinic program, created the *Seal Your Smile* SBSP. In 2017, the Salt Lake Education Fund applied for and received, a Primary Care Grant from UDOH to start *Seal Your Smile* in elementary schools in the Salt Lake City School District (SLCSD). The SLCSD then contracted with the Family Dental Plan to provide the dental services, marking the implementation of the *Seal Your Smile* SBSP.

The target audience for *Seal Your Smile* was the young, underserved population of the western portion of Salt Lake City. All schools participating the *Seal Your Smile* SBSP have more than 50% of students dependent on free and reduced lunch. A substantial portion of that population depends on public medical insurance (such as Medicaid or CHIP), but lack a primary medical/dental provider.

As a pilot program, the goals of this SBSP were to demonstrate the critical nature of dental services, improve oral health outcomes, and reinstate SBSPs in Utah. On a more fundamental level, the goal of this SBSP was to reduce the gap between the number of low-income and high-income children receiving sealants by reaching out to schools in low-income neighborhoods.

The UDOH Office of Health Disparities collaborated with the Family Dental Plan to collect and analyze data throughout this SBSP. The Office of Health Disparities provided technical assistance in creating a single, comprehensive database containing all pertinent demographic and clinical data for each student screened. Since 2016, the Utah Office of Health Disparities has been working in targeted neighborhoods to address the problem of inadequate access to oral health services among racial/ethnic minorities and other underserved populations.

Implementation of Seal Your Smile SBSP

Twelve elementary schools in the SLCSO (Jackson, Franklin, Newman, North Star, Backman, Parkview, Rose Park, Riley, Mountain View, Escalante, Meadowlark, and Edison) were chosen to participate in the *Seal Your Smile* SBSP based on more than 50% of the students receiving free and reduced lunch. Over 5,500 permission slips were given to teachers to distribute to students across all grade levels (Pre-K-6). The permission slips were provided in both English and Spanish and provided background information on sealants, the benefits of receiving sealants, and details on how the clinic in the school would be organized. Permission slips requested the following:

- The student's demographic information (gender, city and zip code, race and ethnicity, and language)
- School information (school district, grade, and teacher)
- The student's insurance information
- Health/dental history (whether the child had been to a dentist, when the child was last seen by a dentist, whether the child has an established dentist)

Only students who returned the permission slip with a parent's or guardian's signature were allowed to participate in the SBSP.

Between September and December 2017, a week-long clinic was held at each of the 12 schools. A designated clinic coordinator and as many as four dental hygienists were present at each clinic. Each child was seen by a licensed dental hygienist and received one or more of the following preventive services: an oral health assessment, sealants (if appropriate), and fluoride varnish treatments. All procedures followed the American Dental Association and CDC's recommendations for school-based dental sealant programs. In extremely rare cases, a child who was seen in the clinic did not undergo screening. Reassessment clinics were held in each school between March and May 2018 to determine the impact of the SBSP on the oral health of each student.

During the clinics, the dental hygienists filled out a form for each student documenting the following:

- Screening (complaints of pain, untreated and treated caries, presence of molars, presence of sealants, and recommended sealants)
- Dental services provided on each tooth (sealants placed, and/or fluoride varnish applied)
- Whether the child had an unmet dental need(s), and if so, the urgency of the need

All of the data collected on the forms was entered and stored electronically in REDCap, a secure web application for building and managing online surveys and databases¹⁷. Each student was identified and stored in the REDCap database by their school ID number.

Data Analysis Methods

Data from the completed forms were consolidated into a single spreadsheet. Data were stratified and analyzed based on the variables of interest. For example, in the analysis pertaining to the graph labeled “Untreated Cavities by Race/Ethnicity,” the data was first stratified based on the race/ethnicity reported on the form. Within each strata, the data was further sorted based on presence of untreated caries, which allowed for an easier calculation of the percentage of children in each racial/ethnic group presenting with untreated cavities.

In any analysis for which an average number of sealants is reported, only children who received a sealant were included. Those who were reported to have received zero sealants were excluded for the following reasons: 1) they had no need for sealants since their molars were un-erupted, 2) they already had sealants placed, or 3) they had caries (treated or untreated) in their molars.

For the analyses performed in “Most Recent Dental Visit” (p. 16-17), and “Dental Insurance” (p. 18-19), unpaired t-tests were performed to assess statistical significance. An unpaired t-test was chosen over the paired t-test because the different groups were compared as different subjects. A p-value of less than 0.05 was considered statistically significant.

Overall Outcomes

In total, 2,182 children participated in the *Seal Your Smile* SBSP. Participation was defined by submission of a form with an affirmative response and a screening performed. This number comprised 39.4% students enrolled at the beginning of the school year in all 12 schools (5,534).

- 2,182 screenings were performed
- A total of 4,235 sealants were placed on teeth in 1,442 children who qualified
- 2,158 children received fluoride varnish treatment

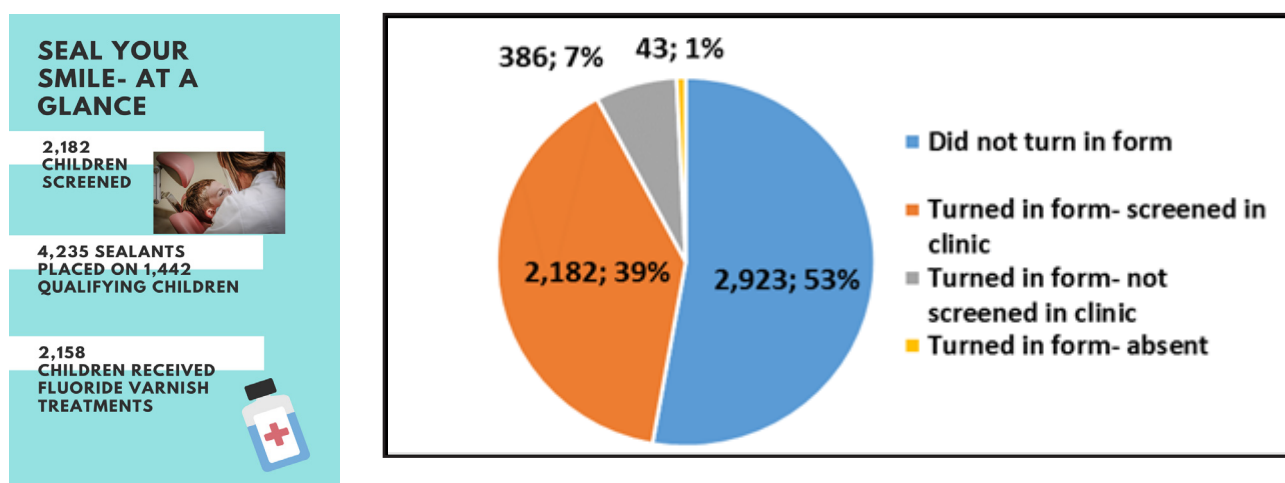


Figure 3 (above left): Impact of the *Seal Your Smile* SBSP.

Figure 4 (above right): Participation across the 12 elementary schools in *Seal Your Smile*.

Summary of Findings

- Participation in the screening was dominated by racial/ethnic minority groups.
- Children from racial/ethnic minority groups experienced a greater prevalence of untreated caries when compared with White children
- Asian, Black/African American, Hispanic/Latino, and Native Hawaiian/Pacific Islander children had a greater average number of untreated caries when compared with White children.
- Children belonging to all minority groups, with the exception of American Indians/Alaskan Natives, were less likely to have an established dentist.
- Nearly half of the children with a complaint of pain were insured (Children's Health Insurance Program [CHIP], Medicaid, or Other [Private Insurance]).
- Children with dental insurance comprised an unexpectedly high proportion of the total number of children with unmet dental needs.
- Nevertheless, as the urgency of unmet dental needs increases, the gap between children with and without dental insurance lessens. In other words, simply having dental insurance may not be adequate in terms of achieving a good oral health status.
 - This finding suggests that children living in these areas may be experiencing a limited access to dental care regardless of whether they have dental insurance.
- There was no substantial difference in the average number of sealants placed even when students were grouped according to whether they had an established dentist or not. Of the students initially screened in the clinic, 11% had never been to a dentist. Of those who had been to a dentist, 61% had seen a dentist in the last year, 22% had seen a dentist during the past one to three years, and 7% had seen a dentist more than three years ago.
- No substantial differences were observed in the average number of sealants placed between children who had never been to the dentist, children who had seen a dentist in the last year, children who had seen a dentist within the past one to three years, and children who had seen a dentist more than three years ago.
 - These findings suggest that even children who have visited a dentist can benefit from SBSPs.
- Of the 2,182 students seen in the clinic, 28.5% had no dental insurance, 35.3% had public insurance (5.4% had Children's Health Insurance Program, 29.9% had Medicaid), 17.1% reported 'Other' insurance, and 19.1% were unreported.
- No substantial differences were observed in the average number of sealants placed between children who had no dental insurance, children who had public insurance, and children who had private ('Other') insurance.

Program Participation: Forms Submitted & Screenings Performed

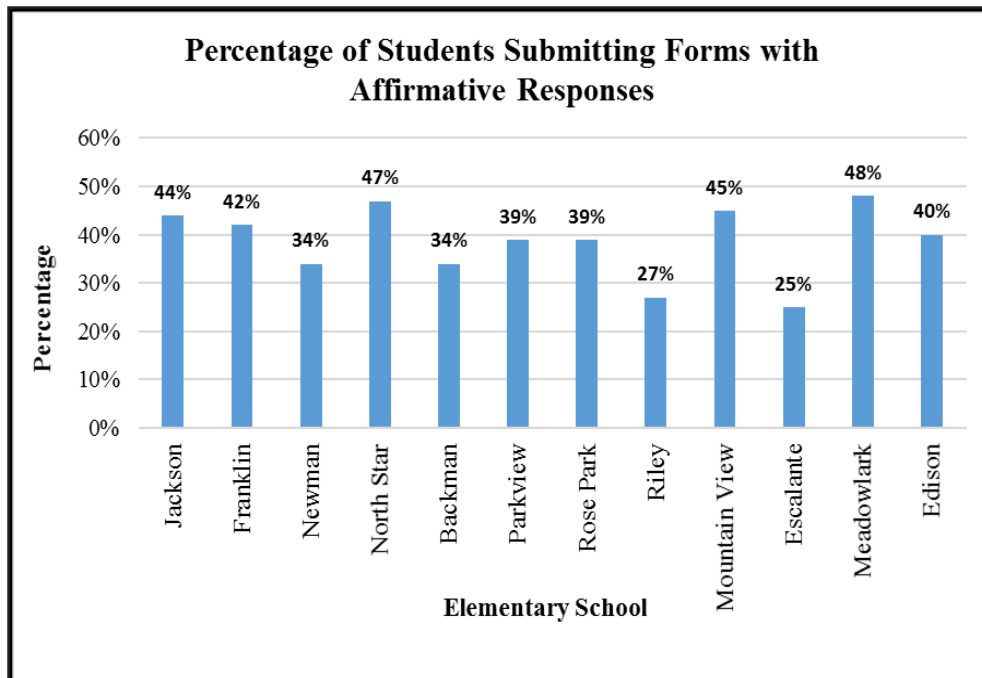


Figure 5 (Left):
Percentage of forms
submitted with af-
firmative responses
in *Seal Your Smile*
by school.

Participation varied across all schools, ranging from 25%-50%. While students and parents/guardians of all schools saw a benefit of the SBSP clinic, some schools had a noticeably higher degree of participation.

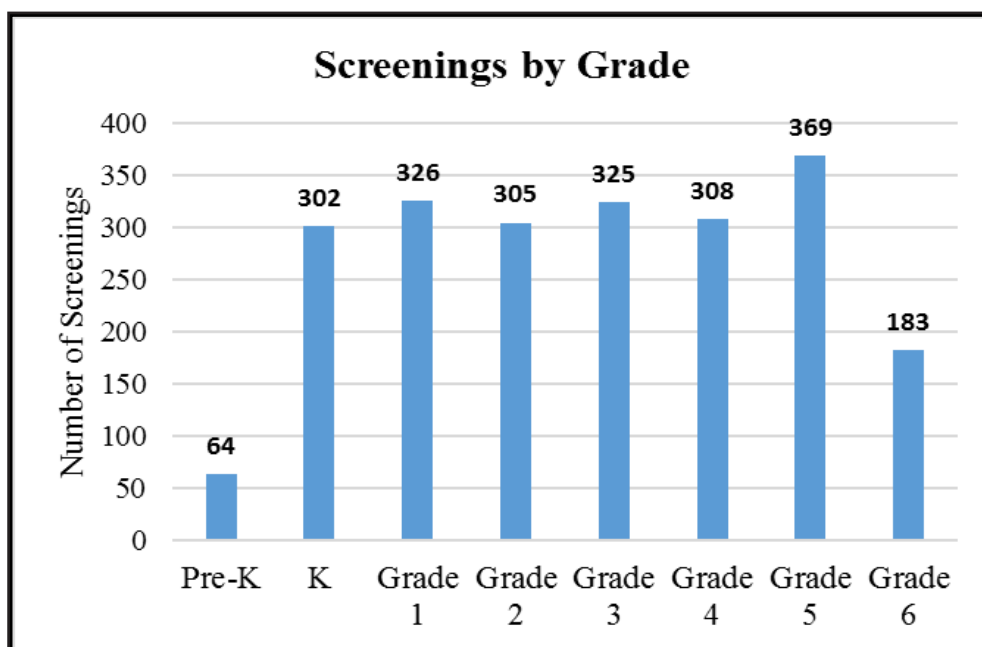


Figure 6 (Left):
Students screened in
Seal Your Smile by
grade.

Of the 2,184 children with affirmative responses on the permission forms, 2,182 were screened in the clinic. The number of children screened was nearly uniform across grade levels K-5. Since the first and second molars generally erupt at six years and 11 years respectively, this uniform participation indicates that children between the ages of 6 and 11 are likely to benefit most from school-based sealant programs.

Race/Ethnicity	Percentage of Children (N/Total)
American Indian/Alaskan Native	1.28% (28/2,182)
Asian	5.04% (110/2,182)
Black/African American	5.63% (123/2,182)
Hispanic/Latino	55.8% (1,218/2,182)
Native Hawaiian/Pacific Islander	7.06% (154/2,182)
Other/Two or More Races	5.96% (130/2,182)
White	9.58% (209/2,182)

Participation in Seal Your Smile was dominated by students of racial and ethnic minority groups.

Oral Health Status:

Untreated and Treated Cavities

Cumulatively, 1,215 untreated cavities were observed in 809 children, and 2,065 treated cavities were noted in 1,072 children among those who were screened.

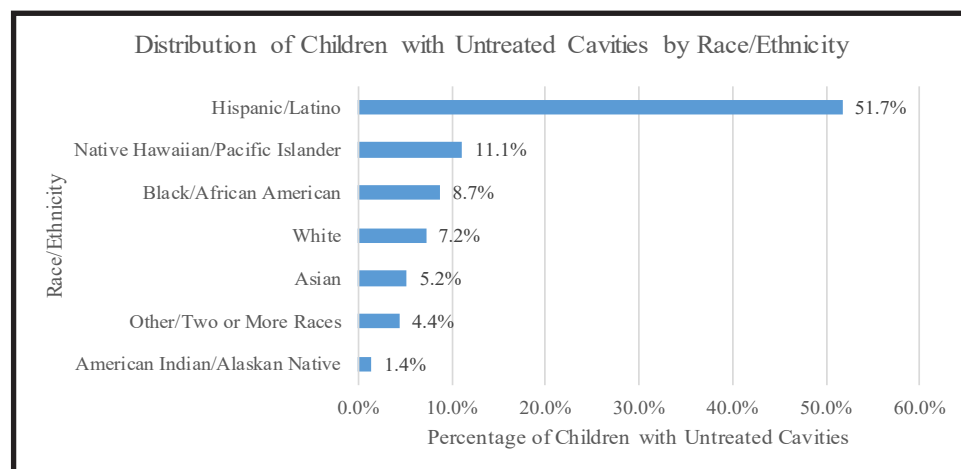


Figure 7 (Left): Distribution of untreated cavities across race/ethnicity. Of the children who had untreated cavities, more than 80% belonged to minority race/ethnic groups.

Race/Ethnicity	Average # of Untreated Cavities
Asian	3.27
Native Hawaiian/Pacific Islander	2.87
Hispanic/Latino	2.51
Black/African American	2.39
Other/Two or More Races	2.16
White	2.06
American Indian/Alaskan Native	1.25

Prevalence and average number of untreated caries was far greater in children belonging to most minority races/ethnicities when compared with White children. The average number of untreated caries was highest in Asian and Native Hawaiian/Pacific Islander children, each with nearly one-and-a-half times as many untreated caries as children who identified as White.

Race/Ethnicity	Percent with Dentist
American Indian/Alaskan Native	50.0%
Asian	23.6%
Black/African American	14.6%
Hispanic/Latino	39.1%
Native Hawaiian/Pacific Islander	36.8%
Other/Two or More Races	48.5%
White	49.3%

Additionally, the percentage of children with an established dentist was far less in children belonging to most minority races/ethnicities when compared with White children, except for American Indian/Alaskan Native children. The percent with an established dentist was lowest in Black/African American and Asian children, followed by Native Hawaiian/Pacific Islander, and Hispanic/Latino children.

Complaints of Oral Pain & Unmet Dental Care

Of the 2,182 children screened, 320 (14.7%) had a complaint of pain in one or more teeth. Surprisingly, nearly half of these children had some type of insurance (Children's Health Insurance Program [CHIP], Medicaid, or Other [Private Insurance]).

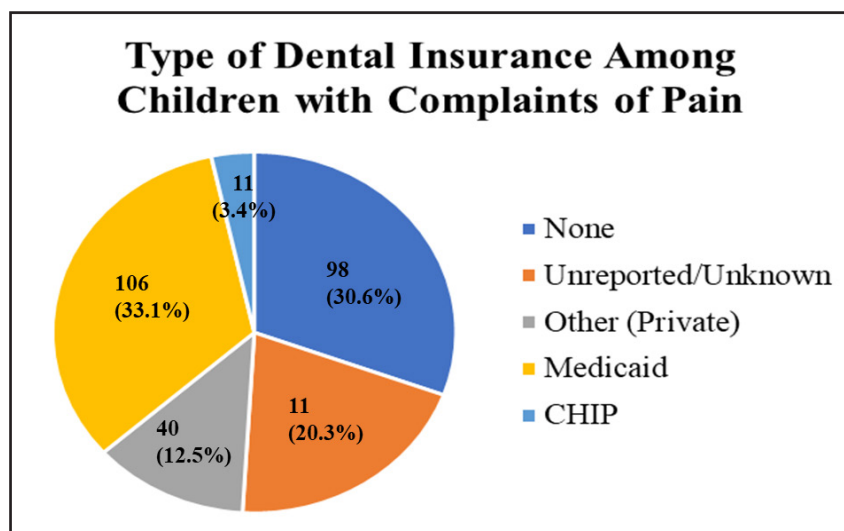


Figure 8 (Left): 320 children with complaints of pain grouped by type of dental insurance.

At the end of the screening, hygienists noted if the child had remaining unmet dental needs and the urgency of care needed (Early- not urgent, Moderate- semi-urgent, or Urgent). In total, there were 799 children with unmet dental needs. Once again, children with a dental insurance plan made up an unexpectedly high proportion of the total number of children with unmet dental needs (46.9%), while children without dental insurance comprised 33.1%. For each urgency of unmet dental need, the number of children and their respective type of insurance is as follows:

Early (non-urgent): 387 Children		
CHIP	18	(4.65%)
Medicaid	117	(30.2%)
Other (Private)	58	(15.0%)
No Dental Insurance	120	(31.0%)
Unreported/Unknown	74	(19.1%)

Urgent Care: 105 Children		
CHIP	4	(3.81%)
Medicaid	29	(27.6%)
Other (Private)	6	(5.71%)
No Dental Insurance	40	(38.1%)
Unreported/Unknown	26	(24.8%)

Moderate (semi-urgent): 307 Children		
CHIP	14	(4.56%)
Medicaid	80	(26.1%)
Other (Private)	49	(16.0%)
No Dental Insurance	104	(33.9%)
Unreported/Unknown	60	(19.5%)

No Unmet Needs: 1,374 Children		
CHIP	82	(5.97%)
Medicaid	424	(30.9%)
Other (Private)	259	(18.9%)
No Dental Insurance	355	(25.8%)
Unreported/Unknown	254	(18.5%)

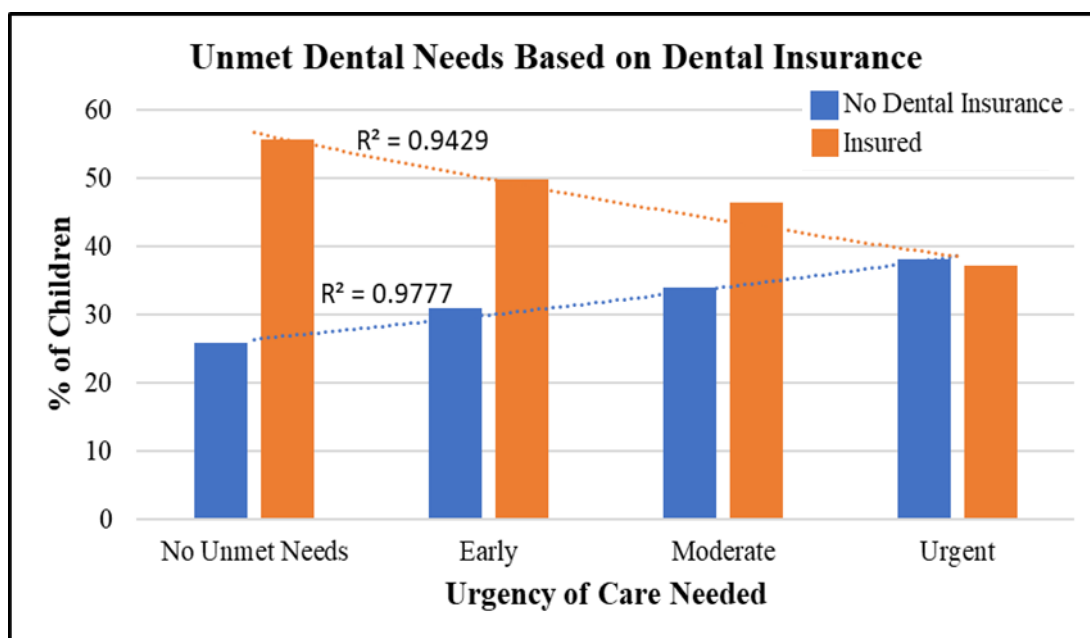


Figure 9 (Left): Trends in urgency of care needed in children with and without dental insurance. In both cases the line of best fit is almost perfectly linear, as indicated by the R^2 values.

When comparing the percentages of children with different urgencies of unmet dental needs, a positive, direct relationship for those without any type of dental insurance is observed; while a negative, direct relationship for those with dental insurance is observed. Thus, as the dental care needed becomes more urgent, the percent of children who are uninsured also increases. For example, 25.8% of children with no unmet needs are uninsured, while 38.1% of children with urgent dental needs are uninsured.

Nevertheless, as the urgency of unmet dental needs increases, the gap between children with and without dental insurance lessens. In other words, simply having dental insurance may not be adequate in terms of achieving a good oral health status. Instead, children living in these areas may be experiencing a limited access to dental care regardless of whether they have dental insurance or not.

Most Recent Dental Visit

Data was collected on each student's most recent dental visit ("Never," "In the Last Year," "1-3 Years," and "More than 3 Years"). While it would seem valid to assume that children who have had more recent dental visits would be much less likely to need sealants from a SBSP, no substantial difference was observed. In particular, the difference between the numbers of sealants placed was negligible between children who had seen the dentist one to three years ago and those who had seen the dentist more than three years ago. A marginally smaller difference was noticed when any of the groups were compared to children who had never seen a dentist.

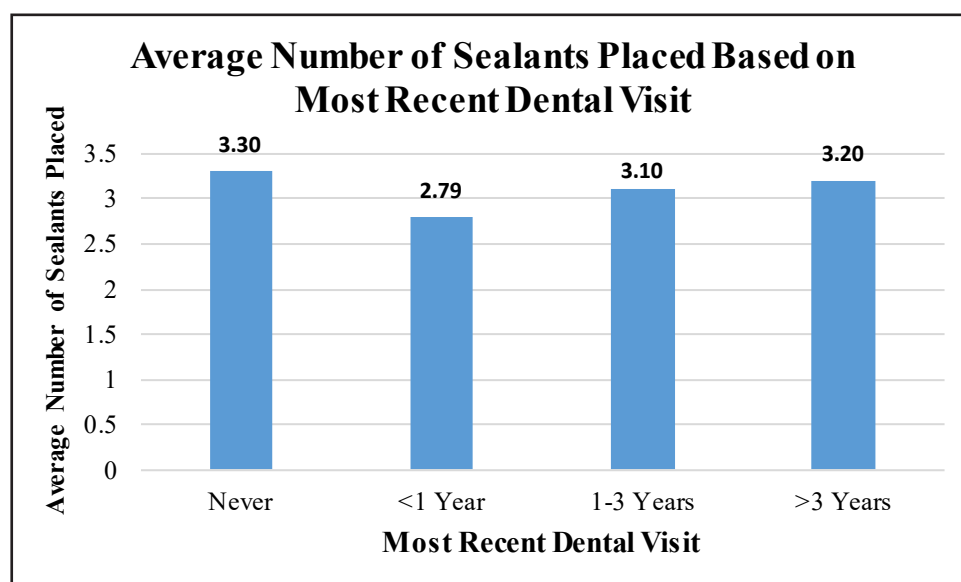


Figure 10 (Left): Average number of sealants placed in children grouped by most recent dental visit. Only children who received a sealant(s) were included in the calculation of the average.

The statistical significance between the number of sealants received by children who "never" visited the dentist and those with more recent dental visits (<1 year, 1-3 years, and >3 years) was assessed among students who participated in the SBSP:

Dental Visit Groups Being Compared	P-Value
Never vs. < 1 Year	<0.0001
Never vs. 1-3 Years	0.1404
Never vs. More than 3 Years	0.5817

- There is a statistically significant difference ONLY between the number of sealants placed in students who never had been to the dentist (M=3.30) and the number of sealants placed in students who had been to the dentist within the last year (M=2.79).
- There was NOT a statistically significance difference between the number of sealants placed in students who never had been to the dentist (M=3.30) and the number of sealants placed in students who had been to the dentist one to three years ago (M=3.10) and more than three years ago (M=3.20).

This finding suggests that children who have visited a dentist more than one year ago (between one and three years, or more than three years) can benefit from SBSPs.

Dental Insurance

Data was collected on the child's type of dental insurance (Children's Health Insurance Program [CHIP], Medicaid, Other [Private Insurance], and No Dental Insurance). While it would seem logical to assume that children who have a dental insurance plan would be less likely to participate in a SBSP, children with no dental insurance constituted only 28.5% (622) of the total number screened.

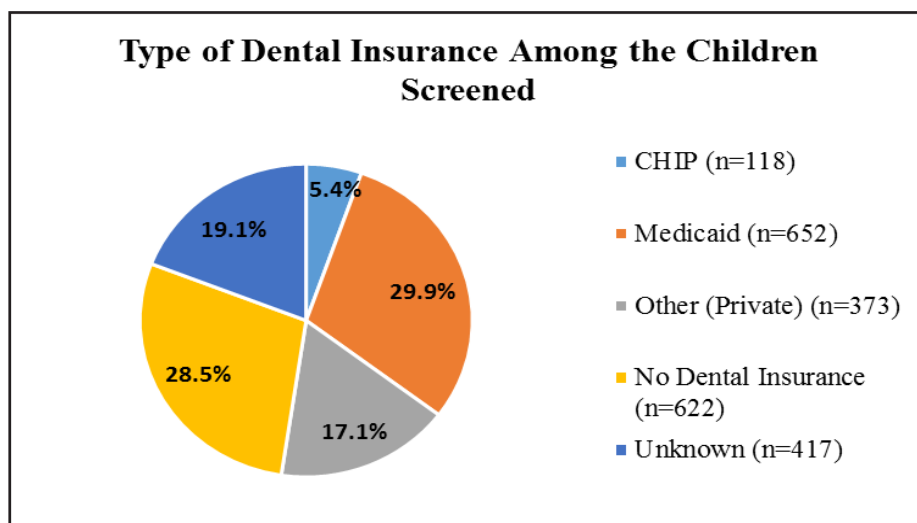


Figure 11 (Left):
Type of dental insurance among the children screen in the *Seal Your Smile* SBSP.

Additionally, it seems logical to assume that children with dental insurance would receive much fewer sealants than those without dental insurance. However, this was not found to be the case. Children with and without insurance plans received nearly equal amounts of sealants. Dental insurance constituted only 28.5% (622) of the total number screened.

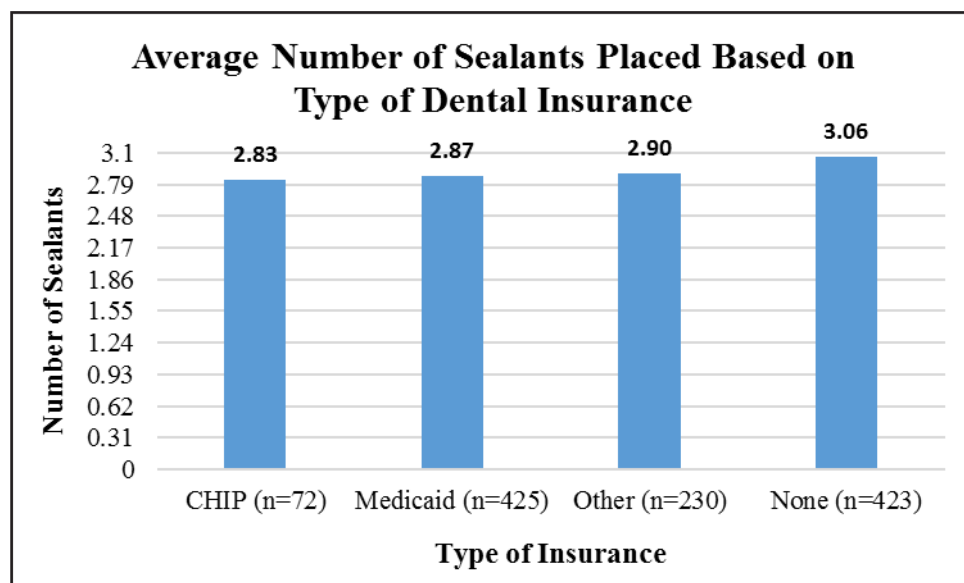


Figure 12 (Left):
Mean number of sealants placed, by type of dental insurance.

The statistical significance between the number of sealants received by children with no dental insurance and those with dental insurance (CHIP, Medicaid, or 'Other') was assessed among students who participated in the SBSP:

Insurance Groups Being Compared	P-Value
No Dental Insurance vs. CHIP	0.2029
No Dental Insurance vs. 'Other' Insurance	0.1513
No Dental Insurance vs. Medicaid	0.0413

- There is a statistically significant difference ONLY between the number of sealants placed in students with no dental insurance (M= 3.06) and the number of sealants placed in students with Medicaid (M= 2.87).
- There was NOT a statistically significance difference between the number of sealants placed in students without dental insurance (M=3.06) and the number of sealants placed in students with CHIP (M=2.83) and 'Other' (M=2.90).

A statistically significant difference in average number of sealants placed was noted between children who did not have dental insurance and those who had Medicaid, indicating that ownership of Medicaid may be tied to a lower average number of sealants. Additionally, these findings suggest that children with or without insurance can benefit from SBSPs.

Reassessment Data:

Participation and Additional Findings

In total, 1,817 students were screened in the reassessment clinics taking place in the spring of 2018. This number comprised 83.3% of the 2,182 students initially screened.

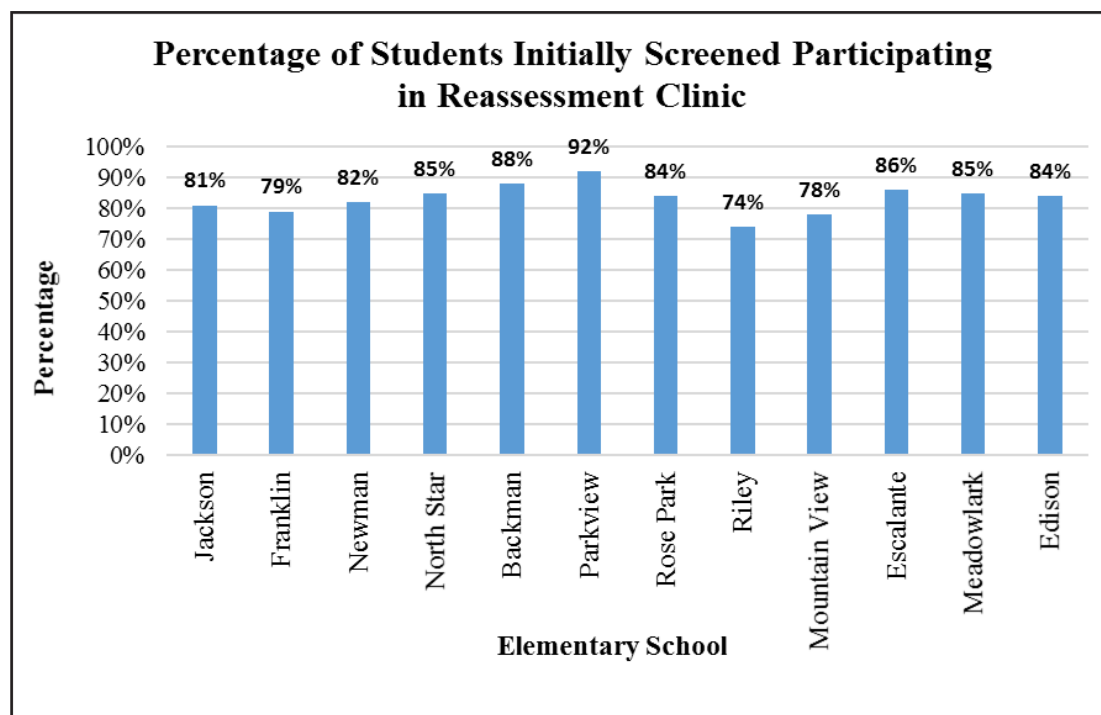


Figure 13 (Above): Percentage of students who were screened in the fall 2017 clinics that participated in the *Seal Your Smile* reassessment clinic held in spring 2018. Generally, participation rates were high in the reassessment clinic with the exception of Backman and Parkview elementary schools.

Additional Findings:

- Of the children who had untreated cavities identified in the initial screening (809 children), 661 were screened in the reassessment clinic. Of those screened in the reassessment, 424 (64%) still had untreated cavities.
- Of the children with complaints of pain in the initial screening (320 children), 271 were screened in the reassessment clinic. Of those screened in the reassessment clinic, 33 (12%) were still experiencing pain.

Limitations

- Student enrollment in the 12 schools participating in the SBSP likely shifted between the time of permission form distribution and the clinic, which may have introduced a small margin of error in the data analysis.
- Participation in the SBSP varied greatly across the 12 schools, creating an over-representation by students of certain schools over others. This may create some bias in the results if, for example, students with a certain type of insurance or socioeconomic status are more likely to attend a particular school.
- Forms were given to children rather than being mailed, emailed, or given directly to the child's parents/guardians. This could have resulted in lost forms that may have never reached the parents/guardians.
- Because forms were provided only in English and Spanish, some parents/guardians of students may not have understood the content of the form. This may have been the case for at least 10%-15% of the student body belong to non-white and non-Hispanic ethnicities in many of the schools¹⁸. As such, a substantial portion of the student body may have been excluded from the program.
- Despite the forms providing a basic introduction or explanation of what sealants are, parents may still not have been aware of the benefits of sealants. Thus, it is possible that parents/guardians may not have had an adequate health literacy to understand what services the screening would provide and/or the benefits of a sealant. As such, a number of parents may have ignored the form.
- When the responses on the completed forms were reviewed, there was always a group of children for whom no answer was reported (in the analyses above, this cohort of children is designated "Unreported/Unknown"). In many cases, especially "Dental Insurance Information" and "Race/Ethnicity", this unreported/unknown cohort amounted to nearly 20% of the children screened.
 - The large number of "unreported/unknown" could have resulted because parents might have not understood what was being asked on the form, or known how to fill out a particular section(s) of the form.
 - Although unlikely that such occurrences skewed the results to a large degree, more complete information may contribute to more statistically significant conclusions.
- Finally, all information provided in the permission form was self-reported, so parents/guardians may have felt obligated to answer in a way that portrayed them in a better light. Thus, the accuracy of the information reported on the permission forms may have been somewhat compromised.
- During the clinics, x-rays of teeth were not taken, as this practice is not recommended in SBSPs by the American Dental Association for safety concerns. It is entirely possible that the number of untreated cavities is under-reported.

Recommendations

- Based on the findings, it is recommended that SBSPs continue to expand in their scope, thereby providing essential dental care to more children in need.
- Although it may be tempting to assume that possession of insurance guarantees better health, it is advised to avoid this assumption since access to care continues to be a barrier for those with and without insurance. SBSPs should be held in an open manner so even children who have insurance, who might not be accessing care, can participate.
- SBSPs should collaborate with communities to create initiatives, support programs, and educational materials that can lead to increased participation.
 - Create user-friendly and culturally/linguistically appropriate educational materials and/or informative presentations during regular community meetings to increase oral health literacy and ensure that parents and the community in general, are aware of the benefits of sealants and SBSPs.
 - In addition to discussing the health benefits of sealants, also discuss the economic benefits when educating parents or community members. Sealants have a huge potential to help children avoid more expensive and invasive oral treatments down the road and are a highly recommended preventive measure.

Conclusion

Seal Your Smile, a pilot SBSP, sheds new light on the extent of oral health disparities found in Utah's communities. Findings indicate that children with insurance experience a similar oral health status (including number of untreated caries, complaints of oral health, and urgency of unmet dental needs) as children without insurance, suggesting that a lack of access to dental care is prevalent. Each of these findings indicate that, while altering health and dental insurance policies in hopes of increasing access to care may not be a foreseeable outcome, school-based sealant programs demonstrate a very practical and economically beneficial solution.

In providing free dental services ranging from routine screenings or fluoride varnish treatments to sealant placements, *Seal Your Smile* has improved the oral health of more than 2,000 children. By expanding the scope of SBSPs, the goal of reducing the gap between the number of children of high socioeconomic status receiving dental care and those of low socioeconomic status receiving dental care will become a more tangible target. Furthermore, by increasing the number of children receiving dental care, millions of dollars will be saved by reducing the need for more invasive dental care.

Acknowledgements

Authors of Report, and Data Analysis

- Nityam Rathi, Summer Intern, Utah Department of Health (UDOH), Office of Health Disparities (OHD)
- Brittney Okada, MPH, CHES, Utah Department of Health (UDOH), Office of Health Disparities (OHD)
- Dulce Díez, MPH, MCHES, Utah Department of Health (UDOH), Office of Health Disparities (OHD)

Design and Coordination of the *Seal Your Smile* SBSP

- Sharon Taylor, Utah Department of Health (UDOH), Family Dental Plan (FDP)
- Juli Miller, Utah Department of Health (UDOH), Family Dental Plan (FDP)
Executive Director, Moab Free Health Clinic

Additional Support

- Matt Huntington, Utah Department of Health (UDOH), Office of Health Disparities (OHD)
- Charla Haley, Utah Department of Health (UDOH), Office of Public Information and Marketing (OPIM)

Funding Sources

- Program Implementation: Primary Care Grants 2017-18, Utah Department of Health
- Data Analysis and Reporting: State Partnership Grant to Improve Minority Health (STTMP151108), Office of Minority Health, U.S. Department of Health and Human Services, 2015-2020
- Family Dental Plan provided necessary dental equipment, dental hygienists, and dentists for each of the clinics

References

1. Oong, Ella M., et al. "The effect of dental sealants on bacteria levels in caries lesions: a review of the evidence." *The Journal of the American Dental Association* 139.3 (2008): 271-278.
2. Community Preventive Services Task Force. Preventing Dental Caries: School-based Dental Sealant Delivery Programs. Atlanta, GA: US Department of Health and Human Services, Community Preventive Services Task Force; 2016. <https://www.thecommunityguide.org/findings/dental-caries-cavities-school-based-dental-sealant-delivery-programs>.
3. "Dental Sealant Program." *Minnesota Department of Health*, Minnesota Department of Health, <http://www.health.state.mn.us/divs/healthimprovement/programs-initiatives/in-schools/dentalsealant.html>.
4. Wright, John T., et al. "Evidence-based clinical practice guideline for the use of pit-and-fissure sealants: a report of the American Dental Association and the American Academy of Pediatric Dentistry." *The Journal of the American Dental Association* 147.8 (2016): 672-682.
5. "Dental Sealants." Dental-Sealants, Dental Works, <https://dentalworks.com/Dental-Sealants>.
6. "Oral Health." *Centers for Disease Control and Prevention*, Centers for Disease Control and Prevention, 16 Mar. 2018, www.cdc.gov/oralhealth/dental_sealant_program/index.htm.
7. "CDC Vital Signs—Dental Sealants Prevent Cavities." <https://tools.cdc.gov/>, Centers for Disease Control & Prevention, 18 Oct. 2016, www.cdc.gov/vitalsigns.
8. Baker, D. W., Sudano, J. J., Albert, J. M., Borawski, E. A., & Dor, A. "Lack of health insurance and decline in overall health in late middle age." *New England Journal of Medicine*, vol. 345, no. 15, 2001, pp. 1106-1112.
9. Willson, Andrea E. "Fundamental causes' of health disparities: a comparative analysis of Canada and the United States." *International Sociology* 24.1 (2009): 93-113.
10. "Vital Signs." Centers for Disease Control and Prevention, Centers for Disease Control and Prevention, 18 Oct. 2016, www.cdc.gov/vitalsigns/dental-sealants/index.html.
11. "Best Practice Approaches for State and Community Oral Health Programs." <https://www.astdd.org>, Association of State & Territorial Dental Directors, Nov. 2017, www.astdd.org/docs/sealant-bpar-update-11-2017-final.pdf.
12. United States, Congress, "Annual Performance Plan and Report." *Annual Performance Plan and Report*, U.S. Department of Health and Human Services, 2015, pp. 38–39.
13. Griffin, Susan O., et al. "Evaluation of School-Based Dental Sealant Programs: An Updated Community Guide Systematic Economic Review." *American Journal of Preventive Medicine*, vol. 52, no. 3, 2017, pp. 407–415.
14. Griffin, Susan O., et al. "Vital Signs: Dental Sealant Use and Untreated Tooth Decay Among U.S. School-Aged Children." *MMWR. Morbidity and Mortality Weekly Report*, vol. 65, no. 41, 2016, pp. 1141–1145.
15. "About Us." Sealants for Smiles, <http://www.sealantsforsmiles.org/>.
16. "Sealants for Smiles Fact Sheet." <https://health.utah.gov>, Sealants for Smiles, 25 Aug. 2009.
17. Harris, Paul A., et al. "Research Electronic Data Capture (REDCap)—A Metadata-Driven Methodology and Workflow Process for Providing Translational Research Informatics Support." *Journal of Biomedical Informatics*, vol. 42, no. 2, 2009, pp. 377–381.
18. "K-12 School Quality Information and Parenting Resources." *Parenting*, GreatSchools, www.greatschools.org/.