



Utah oral health program Adolescent Oral Health Campaign, Evaluation report

2021-2022

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Table of contents

Report

Executive summary.....	Page 3
Program overview & methods.....	Page 4
Key findings & outcomes.....	Page 6
Oral health behavior questions.....	Page 7
Oral health knowledge questions.....	Page 13
Post-test questions measuring students' intent	Page 20
Post-test qualitative questions.....	Page 23
Discussion	Page 24
Limitations.....	Page 24
Conclusion.....	Page 25
Acknowledgments.....	Page 25

References.....	Page 26
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Appendix

Pre-test and post-test assessment tools	Page 28
References for pre-test and post-test assessment tools.....	Page 34
Educational trifold	Page 35
Comprehensive adolescent oral health campaign fact sheet	Page 36

Executive summary

During the 2021-2022 school year, the Department of Health & Human Services (DHHS), Office of Primary Care and Rural Health, Oral Health Program (OHP), continued implementation of the Adolescent Oral Health Campaign (AOHC). The AOHC is an intervention designed to educate middle school students about oral health. The vision of the AOHC is to encourage positive oral health behaviors and increase use and participation in preventive dental services. Starting in 2015, the AOHC has primarily reached middle school health classes in Salt Lake, Summit, Tooele and Weber-Morgan counties. The presentations were given by an oral health educator and/or OHP interns. This report outlines results for the 2021-2022 AOHC.

The primary goal of the intervention aligns with some of the Healthy People 2030 objectives.

- Oral Health-08 Increase the use of the oral health care system.
- Oral Health-09 Increase the proportion of low-income youth who have a preventive dental visit.
- Oral Health-02 Reduce the proportion of children and adolescents with active and untreated tooth decay.
- Tobacco Use-08 Reduce the current use of smokeless tobacco products among adolescents.

These goals also align with Utah's National Performance Measure (NPM) 13.2 to increase the "percent of children, ages 1 through 17, who had a preventive dental visit in the past year." (National performance measure distribution, n.d.) The Performance Objective for NPM 13.2 is 84.8%. Changes in preventive dental visits will not be assessed by the AOHC, but dental resources will be provided and use of services encouraged.

Increasing oral health knowledge among youth is one objective of the AOHC. Topics addressed include steps to cavity formation, how to achieve gum health, and negative effects of tobacco use. Another primary objective is to increase positive oral health behaviors and equip students with good oral health decision making skills. These behaviors and skills include, brushing two times a day, flossing daily, limiting sugary and/or acidic drinks, and visiting the dental office at least one time a year for preventive services.

To evaluate the effectiveness of the AOHC intervention, pre- and post-tests were taken by students, either electronically or in paper form, to measure comprehension of each topic. Evaluation is vital to know if students improve in understanding due to the intervention. The pre- and post-test provides a mechanism to capture participants increased oral health knowledge and demonstrates the campaigns success. (Smith & Ory, 2014).

Program overview & methods

Intervention

Based on the health belief model (HBM), the AOHC aims to improve oral health understanding as a prerequisite to change oral health behaviors. The HBM consists of six main concepts: perceived susceptibility, perceived benefits, perceived severity, perceived barriers, cues to action and self-efficacy (Xiang, et al., 2020). Each topic in the AOHC addresses the susceptibility, severity, and barriers students may perceive regarding their oral health. Benefits, cues to action and improved self-efficacy to increase positive oral health behaviors are addressed in the presentation.

A one-time oral health intervention was designed specifically for middle school and junior high students. The educational intervention consisted of a 40-to-60-minute-presentation, given by an OHP intern or OHP's oral health educator. The OHP oral health educator trains interns on the outline and oral health information to ensure consistency of presentation material. The oral health presentation consists of many topics, including cavity formation, proper brushing and flossing techniques, good nutrition choices (limiting sugary drinks and snacks), and how to properly care for braces and prevent gum disease. In addition, educational brochures containing a list of local safety net dental clinics were made available to all students, teachers, and school nurses.

Survey design

The survey instrument for 2021-2022 was adopted from previous AOHC surveys. No additional changes were made for the 2021-2022 school year.

School participation

OHP interns contacted middle school health teachers in Salt Lake, Weber-Morgan, Summit, and Tooele counties. Scheduling was determined by teacher response. The OHP focused its efforts along the Wasatch Front due to program constraints which include travel time and funding. As a result, schools were not randomly selected for the campaign. Twenty five schools were contacted and nineteen schools replied with a 76% participation rate. Two new schools were added to the campaign compared with 2020-2021.

Data collection

The students completed an anonymous online pre-test before the intervention using REDCap (Research Electronic Data Capture) a secure, web-based data capture application hosted at DHHS (Harris et al., 2009). Teachers posted the REDCap link on the students' Canvas page. Those who could not take the survey online filled out a paper version, which was later manually entered into REDCap by an OHP intern. After the educational segment, students immediately took the anonymous post-test assessment. In most classes, the pre-test, educational intervention, and post-test were completed in one class period. On some occasions, the pre-test was given by the teacher the day prior to the presentation. The assessments asked knowledge-based questions about oral health topics addressed in the educational presentation. Additionally, the survey contained demographic questions about a student's age, ZIP code, and race. Furthermore, questions about access to dental services, such as the last time the student saw a dentist or dental hygienist, were also included in the assessment.

Analysis

Average student age, distribution of student age, race, ethnicity, and responses to all survey questions were evaluated. Pre- and post-test responses to all survey questions were compared and analyzed by epidemiologists at DHHS using SAS statistical software. The effectiveness of the campaign was measured through pre- and post-test completed by students in the classroom. According to Smith & Ory (2014) "the primary purposes of evaluation in public health education and promotion are to: (1) determine the effectiveness of a given intervention and/or (2) assess and improve the quality of the intervention." (para. 2)

Intervention success was defined as an increase of 15% or greater in students marking the correct answer on the knowledge-based oral health questions between the pre- and post-test responses. This is a benchmark set by epidemiologists at DHHS as a reasonable measure of success. Complete response data from pre- and post-tests were downloaded from REDCap.



Key findings & outcomes

To avoid confusion, data presented from the 2021-2022 AOHC, will now be referred to as 2021-AOHC.

Intervention reach

During the 2020–2021 school year, the OHP oral health educator and OHP interns visited nineteen schools. As the intervention is offered per school year semester, eight of these schools were visited twice in the year because teachers requested presentations for both fall and spring semesters (different students). The AOHC was able to reach 3,723 (pre-test) and 3,541 (post-test) middle school students

Demographics

Demographics of students at participating schools are presented in Table 1. Distribution of ages and student gender were calculated based on pre-test responses. Of the 3,722 students who reported, the average student age was 13 years old. On the pre-test, 47.6% of students identified as female, 48.3% identified as male, and 4.1% identified their gender as Other.

Most students identified as White (65.2%), while the remainder of students identified as persons who are non-white: Hispanic (16.5%), Black/African American (3.1%), Asian (2.3%), American Indian/Alaska Native (1.8%), Native Hawaiian/Pacific Islander (1.8%), and “Other” (2.6%). Finally, 6.7% of students selected multiple races and were re-categorized as being two or more races.

Table 1

Demographics	Total Students N=3,723
Gender	
Female	1,758 (47.6%)
Male	1,784 (48.3%)
Other	152 (4.1%)
Missing	29 (0.8%)
Race	
American Indian/Alaska Native	65 (1.8%)
Native Hawaiian/Pacific Islander	66 (1.8%)
non-White: Hispanic/Latino	611 (16.5%)
Black/African American	113 (3.1%)
White	2,402 (65.2%)
Asian	84 (2.3%)
“Other”	96 (2.6%)
2 or more races	247 (6.7%)

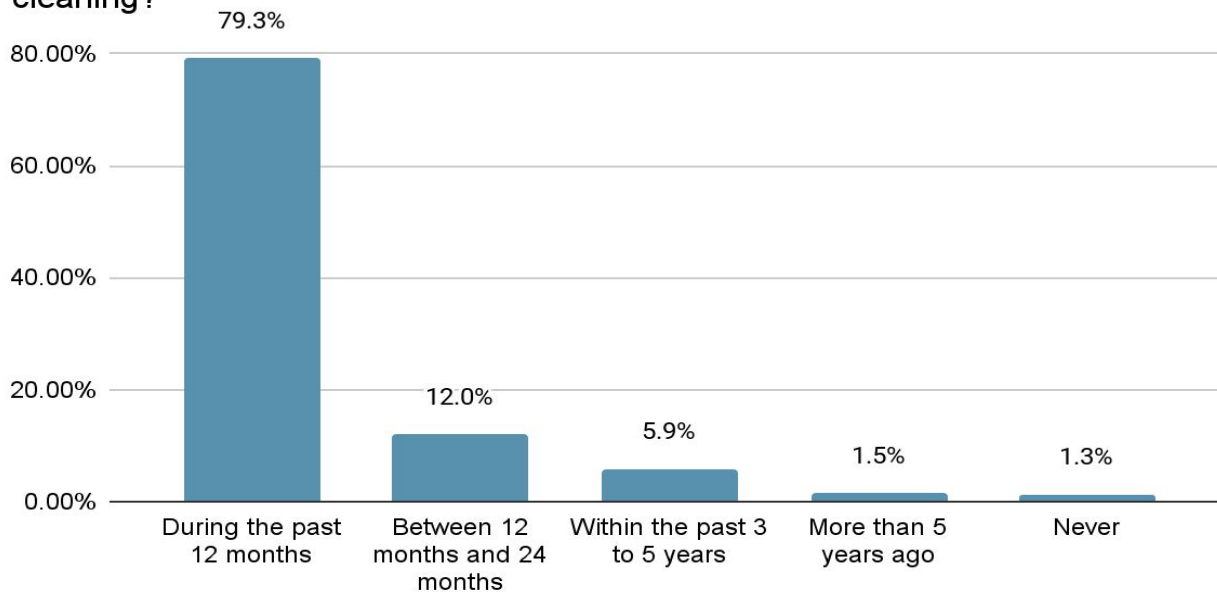
Oral health behavior questions

As noted previously, the survey included questions aimed at better understanding students' oral health knowledge and individual oral health behaviors. Only pre-test responses to oral health behavior questions are displayed below.

When was the last time you saw a dentist for a check-up, exam, teeth cleaning?

The majority (79.3%) of students in the 2021-AOHC reported having been to the dentist within the last 12 months. Twelve percent of students reported visiting a dentist within the last 12–24 months (12.0%). A small number of students reported having a dental visit within the past 3 to 5 years (5.9%), some reported seeing a dentist more than 5 years ago (1.5%), and 49 students (1.3%) indicated they had never been to the dentist (Figure 1).

Figure 1: When was the last time you saw a dentist for a check-up, exam, teeth cleaning?



The results of the AOHC Survey closely follow the state of Utah's Youth Risk Behavior Survey (YRBS) Question 86, "When was the last time you saw a dentist for a check-up, exam, teeth cleaning, or other dental work?" In the 2019 YRBS survey, 75.9% of students reported going to the dentist during the past 12 months. In addition, 1.9% of 9-12 grade students reported never seeing a dentist (Youth risk behavior survey, n.d.). In the 2020-AOHC survey, (81.3%) and the 2019-AOHC, (79.1%) of students reported going to the dentist within the past 12 months.

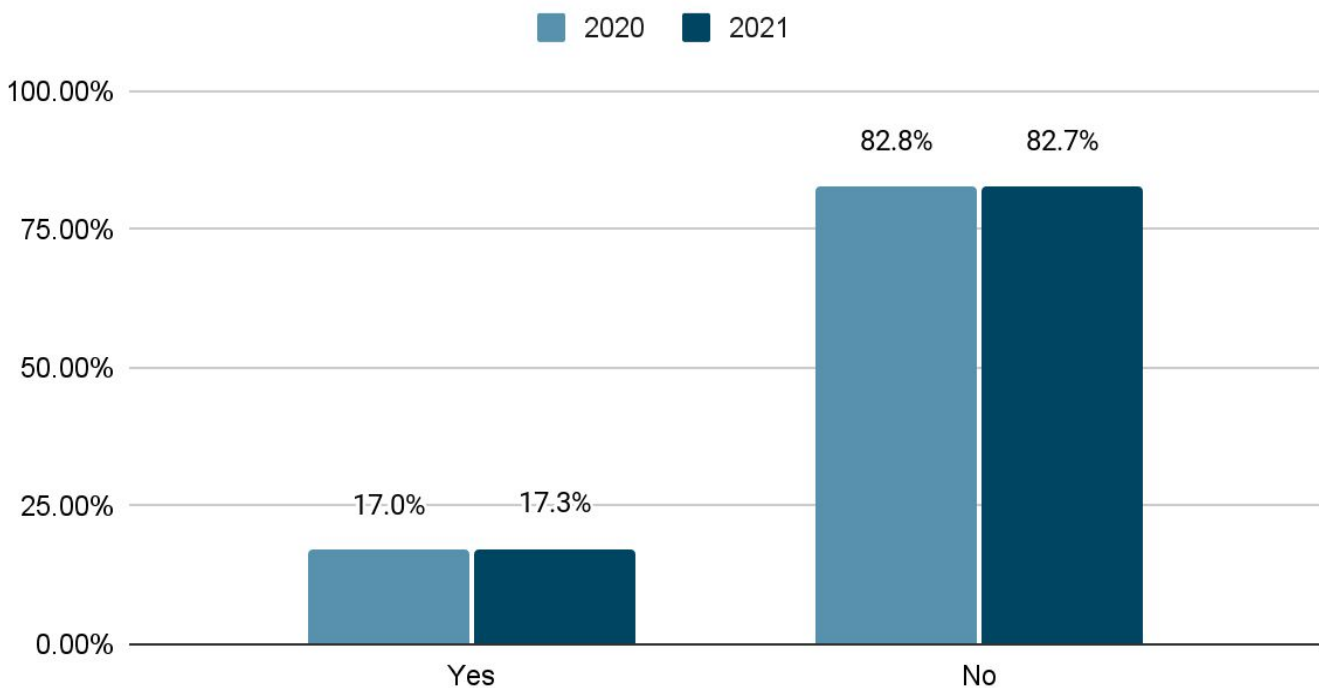
Nevertheless, care should be taken when comparing these results. The YRBS is a statewide survey primarily reaching 14 to 18 year-old students, while the AOHC focused primarily on middle school students along the Wasatch Front and primarily surveyed 12 to 14 year-old students.

During the past 12 months, was there a time when you needed dental care but could not get it at that time?

In the National Health and Nutrition Examination Survey (NHANES), there are 3 responses available to choose from: “yes”, “no”, and “don’t know”. The “don’t know” option was removed from previous surveys and not included in the 2021-AOHC survey to reduce confusion, and to stay consistent with the 2018-2019, 2019-2020, and 2020-2021 school years (NHANES, 2019).

In the 2021-AOHC, 638 students reported needing some form of dental care, but not being able to get the care they needed, making up 17.3% of the 3686 students who responded to this question. Of those who responded, the other 82.7% of students responded “No,” indicating they either did not perceive a need for dental care in the past 12 months, or they were able to access the care that they needed. These findings are very close to previous school years. In 2020-2021, 17.2% percent of students self-reported having needed care and were unable to get it, and 82.8% of the students reported they were able to get the care they needed (Figure 2).

Figure 2: During the past 12 months was there a time you needed dental care but could not get it at that time?



It is troubling that in the 2021-AOHC, 20.7% of students participating self-reported they had not been to the dentist in the past 12 months, and 17.3% reported needing dental care, but were unable to access the care they needed. It is well known that preventive dental visits are imperative for optimal oral health. There are many barriers for teenagers in accessing dental care. Scheduling conflicts for the adolescent, parents, and/or dental clinics can be a barrier to receiving care. Insurance coverage and income are also major barriers for many adolescents when it comes to accessing care.

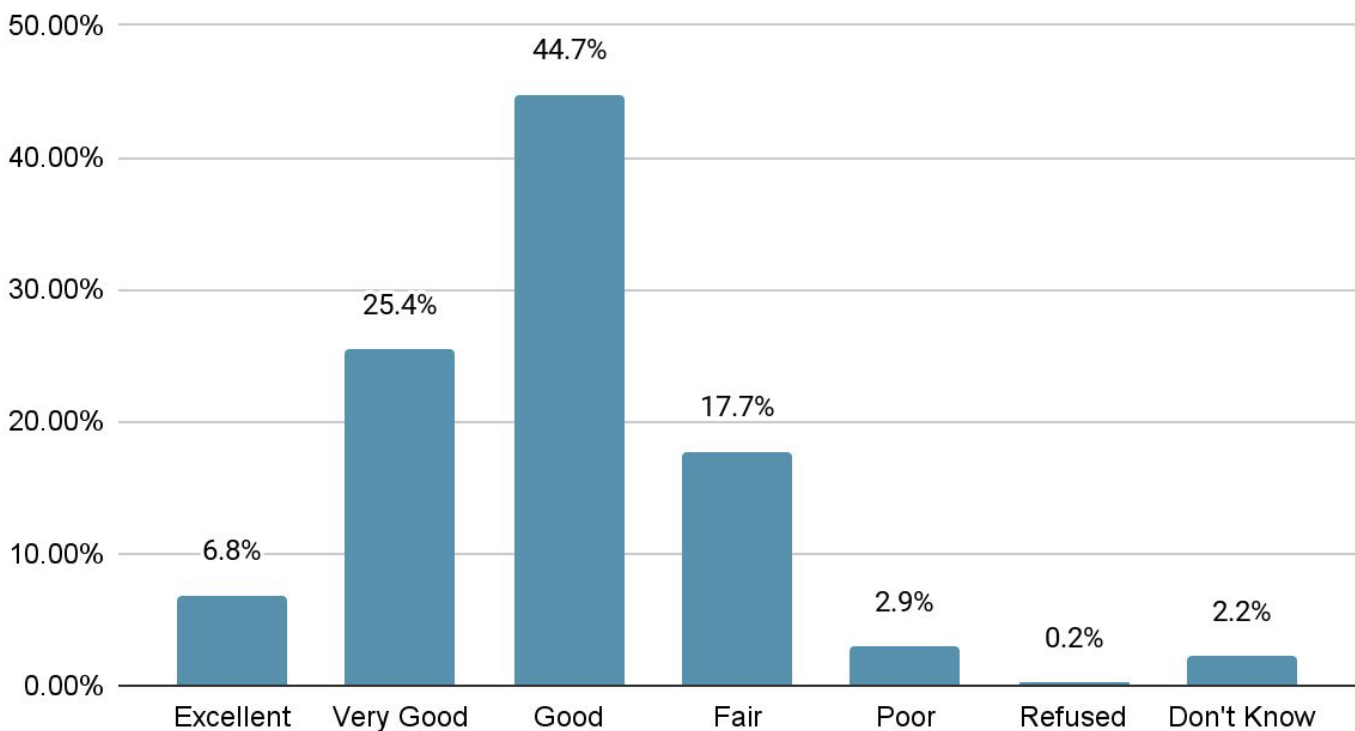
Data available on the Utah Public Health Indicator Based Information System (IBIS) displays an association between income and visiting the dentist. In the state of Utah in 2018, 47.3% of adults visited the dentist when their income was less than \$25,000 a year, whereas 82.8% of adults visited the dentist when their annual income was \$75,000 or more (IBIS, 2021). While parental income was not studied as part of this intervention, it may contribute to whether the adolescents were able to receive the care they needed.

Other barriers to accessing care include, but are not limited to, a lack of after-hours dental clinics, transportation, lack of providers, language, and other systemic constraints. The benefits of going to the dentist are addressed in the intervention, and options for low cost, safety net clinic offices were included in resources available to all students.

Overall, how would you rate the health of your teeth and gums? Would you say...

Students were asked to rate the health of their teeth and gums, allowing us to assess students' perception of their own oral health. Of the 3,708 students who responded to this question, fewer than 7% of adolescents rated their oral health as being excellent (6.8%). Most students rated their oral health as either very good (25.5%) or good (44.6%). Approximately 20% of students rated their oral health as fair (17.7%) or poor (2.9%). A small remainder of students (2.2%) who responded to this question reported they did not know how they would rate their oral health, and nine students (0.2%) refused to answer the question. The option of refusal was added in 2019, but very few students refused to answer the question (Figure 3).

Figure 3: Overall, how would you rate the health of your teeth and gums?



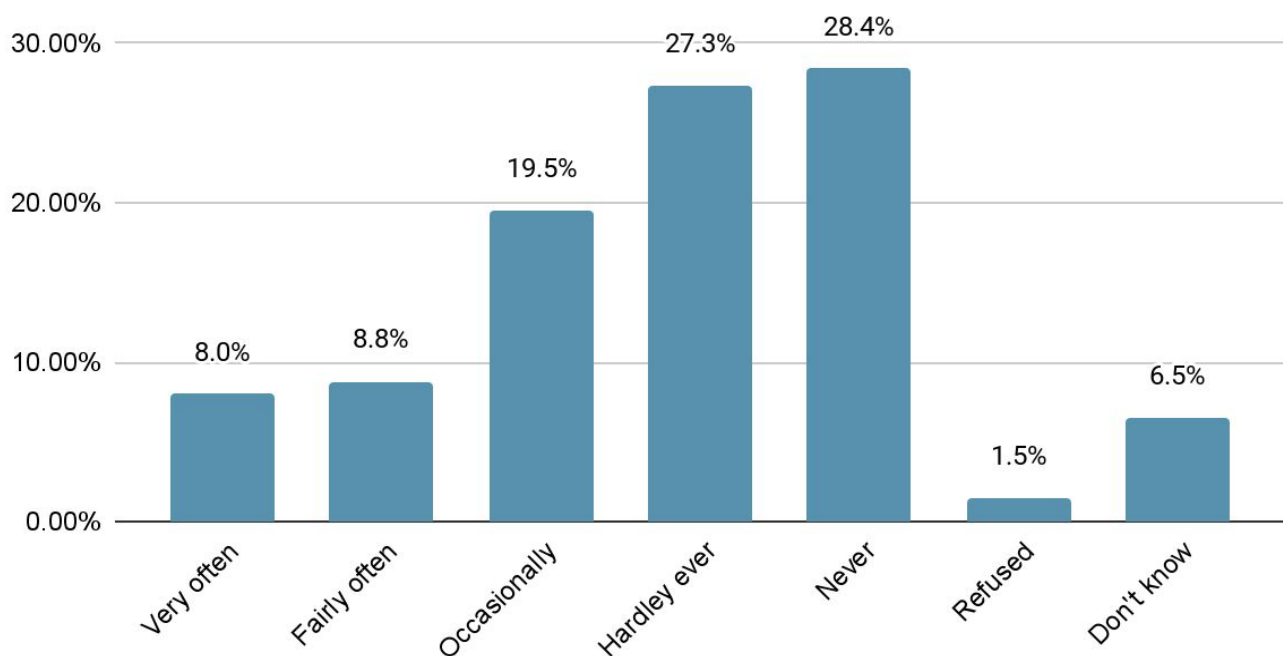
Dental problems are shown to impact self-esteem, school performance, and school attendance. Research has shown associations between dental issues and shyness, feelings of worthlessness and reduced friendliness; adolescents aged 15-17 displayed the highest levels (Guarnizo-Herreno & Wehby, 2012).

How often during the last year have you been self-conscious or embarrassed because of your teeth or mouth? Would you say...

Physical health and mental health are closely connected, and perception of self affects mental health significantly. Utah has seen an increase in youth depression and suicide. Data from Utah's 2021 YRBS indicated that 39.6% of 9th grade students felt sad or hopeless daily and consistently enough that they stopped doing usual activities for 12 months (IBIS, 2021a). This is an increase from the 2019 data which indicated that 33.4% of 9th grade students felt sad or hopeless daily (IBIS 2019a). The OHP intends to collect data to see if the appearance of teeth, mouth, gums, and smile affect the way youth feel about themselves and determine whether this could be a possible trigger of feelings of depression and negative self-image.

For the 2021-AOHC, 3,697 students responded to the question, "How often during the last year have you been self-conscious or embarrassed because of your teeth or mouth?" The largest percentage (28.4%) reported they never feel that way, which appears to be a positive outcome. However, 8.0% of participants *very often* feel self-conscious about the appearance of their teeth or mouth, and just about the same amount reported feeling this way *fairly often* (8.8%). This may not necessarily correlate to the high rates of suicide or depression in Utah, but these are important measures to note overall when considering issues that affect adolescents (Figure 4).

Figure 4: How often during the last year have you been self-conscious or embarrassed because of your teeth or mouth?

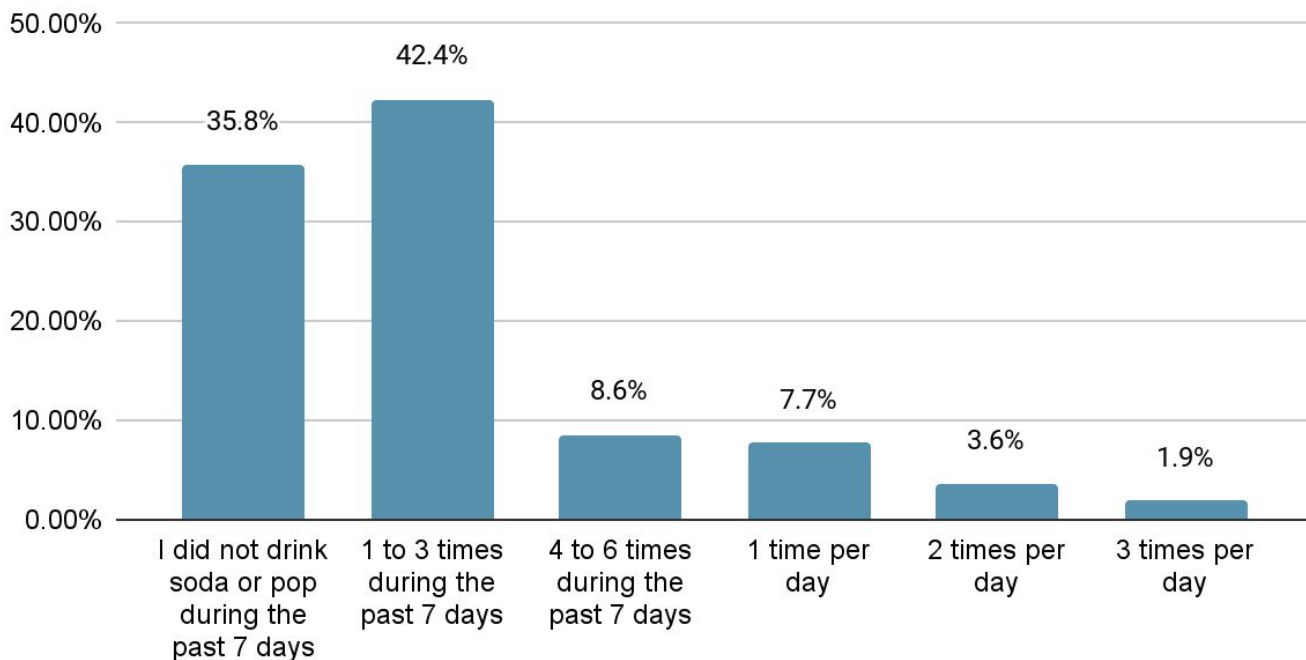


During the past 7 days, how many times did you drink a can, bottle, or glass of soda pop, such as Coke, Pepsi, or Sprite (not including diet soda or diet pop)?

On the pre-test assessment, fewer than half of the 3,701 students reported consuming 1 to 3 sodas over the course of the previous week (42.4%), and about one-third of students reported not consuming any soda during the previous week (35.8%). 13.2% of the students reported consuming soda on a daily basis, while 8.6% consume soda 4 to 6 times a week (Figure 5).

In the YRBS 2021 survey, 55 students (11.7%) reported drinking a can, bottle, or glass of soda pop in the past seven days. However, the results of the 2021-AOHC Survey have a much larger percentage of students who self-reported frequent soda consumption compared with the state of Utah's YRBS. In the 2021-AOHC, 51% of students reported drinking soda 1-6 times in the past 7 days (IBIS, 2021b). Nonetheless, caution should be taken when comparing these results. The YRBS is a statewide survey primarily reaching 14 to 18 year-old students and the adolescent oral health campaign focused primarily on 12 to 14 year-old middle school students along the Wasatch Front.

Figure 5: During the past 7 days, how many times did you drink a can, bottle or glass or soda or pop, such as Coke, Pepsi, or Sprite?



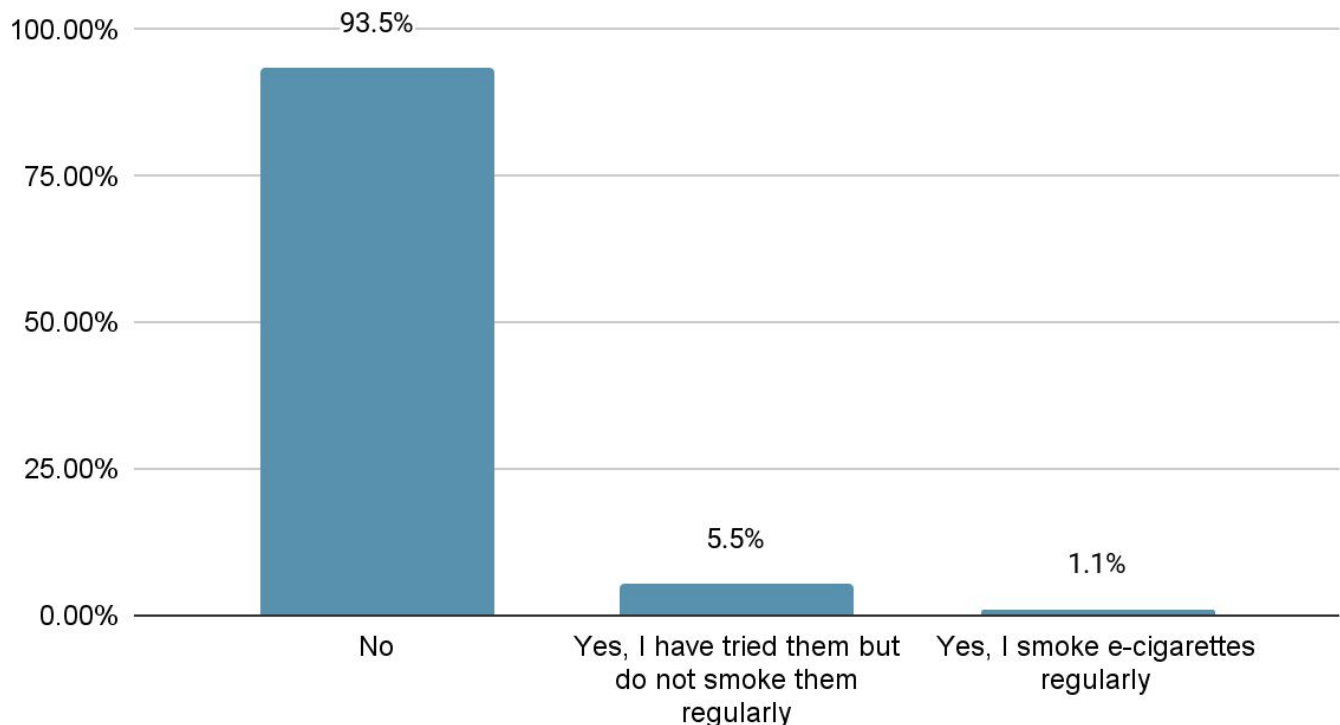
Soda is a highly acidic and sugary drink that is notably damaging to tooth structure and can lead to tooth decay. Every time we eat food or have a drink that contains sugar, the bacteria (primarily *streptococcus mutans*) in our mouth eats the sucrose in our diet and releases acid. The human mouth becomes acidic for 20-40 minutes each time it's exposed to food or drinks. During this time, the pH of the mouth often drops to a level where the tooth starts to demineralize or decay. The more frequently these acid attacks occur, the higher the risk of dental decay (Loesche, 1996).

The wording of the question “not including diet sodas or diet pop” was adopted from the YRBS-2017. Diet sodas do not have the same sugar content as regular sodas, but they have a very low pH and can be very acidic. Although diet sodas were not included in the survey question, the risks of drinking both diet and non-diet sodas were covered in the presentation.

Have you ever smoked an electronic cigarette or vaped?

In the 2021-AOHC, 93.5% of students surveyed reported having never smoked an electronic cigarette or vaped. A small percentage (5.5%) reported trying or experimenting with electronic devices, and even fewer (1.1%) use these products regularly. This is a slight increase from the previous year (Figure 6).

Figure 6: Have you ever smoked an electronic cigarette or vaped?



The OHP recognizes the increasing popularity of electronic cigarette use among teens and young adults in Utah. Electronic cigarettes are less expensive compared to other tobacco products and come in many flavors (Blaha, 2021). In 2021, 9.7% of Utah high school students reported they had used e-cigarettes or vape products in the past 30 days (Utah YRBS).

According to the Vape Product Experimentation and Use Fact Sheet found in Utah's Indicator-Based Information System (IBIS), "In 2013, 2015, and 2017 Utah students were more likely to report use of electronic cigarettes or vape products than any other tobacco or nicotine products." 2021 data show that 12.4% of students in grade 8 have experimented with vaping products and 5.6% of 8th graders have used vaping products in the last 30 days (IBIS, 2021). A study conducted in 2018 followed a large group of adolescents over a year-long study and gathered self-reported data of dental health issues related to their vaping and smoking habits. Approximately 22% of the participants reported dental problems in the past year, and 7% reported past use of both tobacco and electronic cigarettes (Akinkugbe, 2018). We continue to emphasize that e-cigarettes are not safe and are highly addictive.

Due to the astonishing rise in popularity of vaping products, the OHP addresses the consequences of vaping and other tobacco products on the teeth, gums, and mucosal tissues in this campaign. Individuals who use e-cigarettes are at an increased risk of cavities, dry mouth, receding gums, bone loss, broken teeth, and burns from malfunctioning e-cigarettes (ADA, n.d.a; Manchir, 2018; FEMA, 2017; DHHS, 2020).

Oral health knowledge questions

Topics covered in the educational intervention included steps to cavity formation, gum disease, nutrition (with an emphasis on avoiding soda consumption), and how to care for braces and that cavities are a communicable disease. Questions geared toward assessing students' understanding of specific topics were asked in both the pre- and post-tests. A comparison of pre- and post-test responses for each of these questions is presented below. As stated in the intervention section of this report, the OHP considers the intervention a success if there is a 15% increase in students marking the correct answer between the completed pre- and post-tests. Table 2 shows all questions asked and the number and frequency of responses given for each answer.

Table 2 survey question responses

Survey question responses (correct answer choice in bold)		
	Pre-Test	Post-Test
Survey Question	N (%)	N (%)
<i>Is it common for healthy gums to bleed when brushing/flossing?</i>		
No, bleeding gums is not normal	2,006 (54.0)	3,165 (89.5)
Yes, when you have a cold	60 (1.6)	19 (0.5)
Yes, sometimes	1,489 (40.1)	281 (7.9)
Yes, all the time	157 (4.2)	72 (2.0)
Missing*	11 (0.3)	4 (0.1)
<i>Can toothpaste clear up pimples?</i>		
Yes	743 (20.1)	192 (5.5)
No	2,955 (79.9)	3,328 (94.6)
Missing*	25 (0.7)	21 (0.6)
<i>Which of the following chronic diseases is most common among children/teens?</i>		
Asthma	527 (14.2)	73 (2.1)
Cavities	2,543 (68.6)	3,353 (94.9)
Hay fever	293 (7.9)	59 (1.7)
Obesity	342 (9.2)	49 (1.4)
Missing*	18 (0.5)	7 (0.2)

<i>All of the following statements are true about cavities except for one. Mark the statement that is false.</i>		
Cavities can spread from person to person	2,689 (72.6)	322 (9.1)
Cavities can get worse over time if not treated	255 (6.9)	167 (4.7)
Everyone gets cavities	569 (15.4)	2,801 (79.5)
Cavities are preventable	191 (5.2)	235 (6.7)
Missing*	19 (0.5)	16 (0.5)
<i>How often is it recommended that you brush your teeth?</i>		
Once a day	79 (2.1)	41 (1.2)
Twice a day	2,828 (76.3)	3,254 (92.3)
After every meal	762 (20.6)	212 (6.0)
Not sure/Don't know	37 (1.0)	20 (0.6)
Missing*	17 (0.5)	14 (0.4)
Note. * Missing not calculated into percentages		

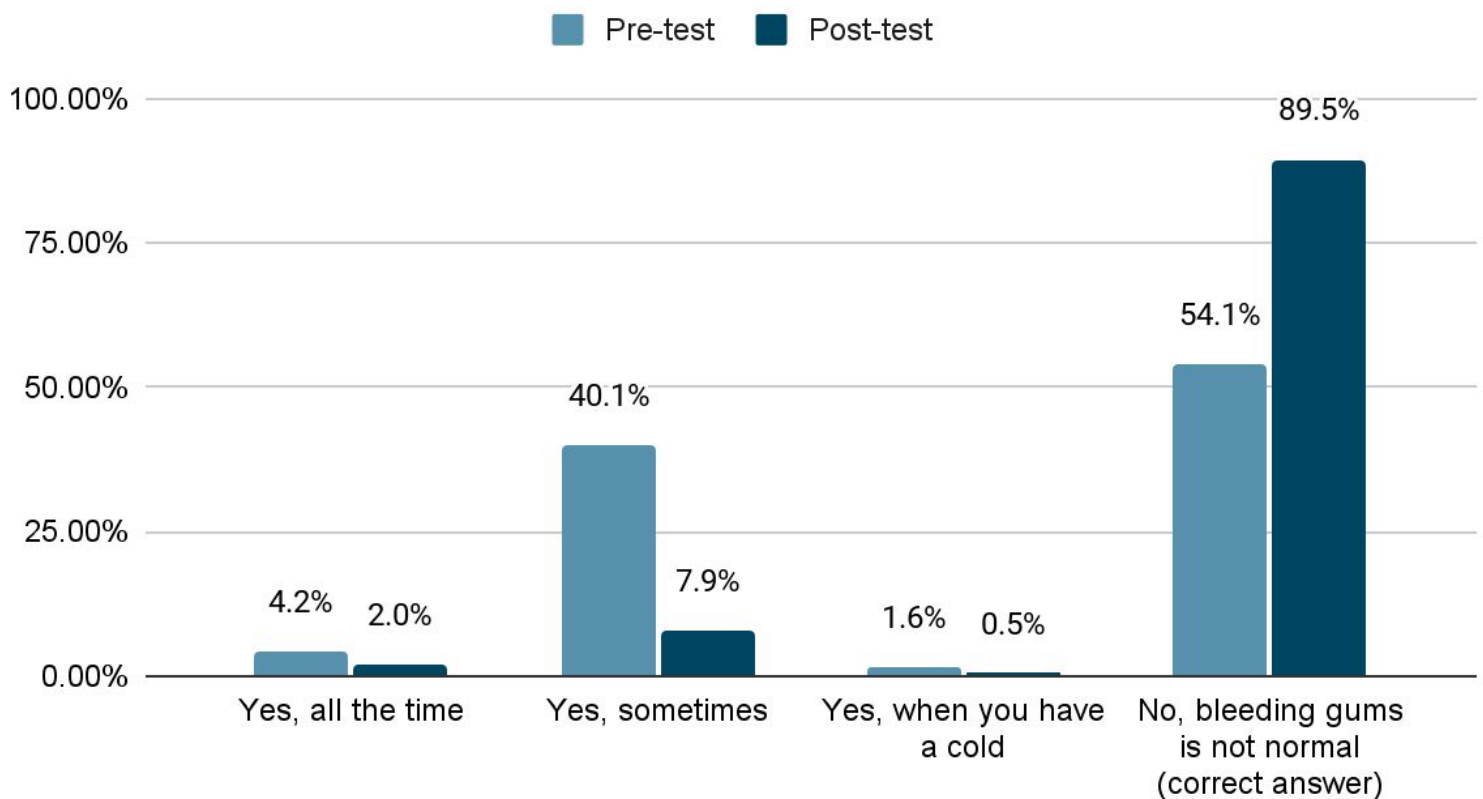
Is it common for healthy gums to bleed with brushing/flossing?

When asked if it is healthy for gums to bleed with brushing/flossing, the correct response is, "No, bleeding gums is not normal." A little more than half of the students selected the correct response during the pre-test (54%), compared with 89.5% who selected this response during the post-test. It is important for students to know bleeding gums is not normal. The absolute percentage change between correct answers from the pre- to post-test was 35.5%, representing a success in the intervention of greater than 15% (Figure 7).

According to the American Dental Association (ADA), “In some cases, bleeding gums can be a sign of gingivitis, the early stages of periodontal disease. If your gums bleed easily or bleed when you brush, talk to your dentist about your oral health. Gingivitis is preventable.” (ADA, n.d.b) It is important for adolescents to know the signs and symptoms of gum disease.

“Hormonal changes related to puberty can put teens at greater risk for getting periodontal disease. During puberty, an increased level of hormones, such as progesterone and possibly estrogen, cause increased blood circulation to the gums. This may cause an increase in gum sensitivity and lead to a greater reaction to any irritation, including food particles and plaque.” (AAP, 2021)

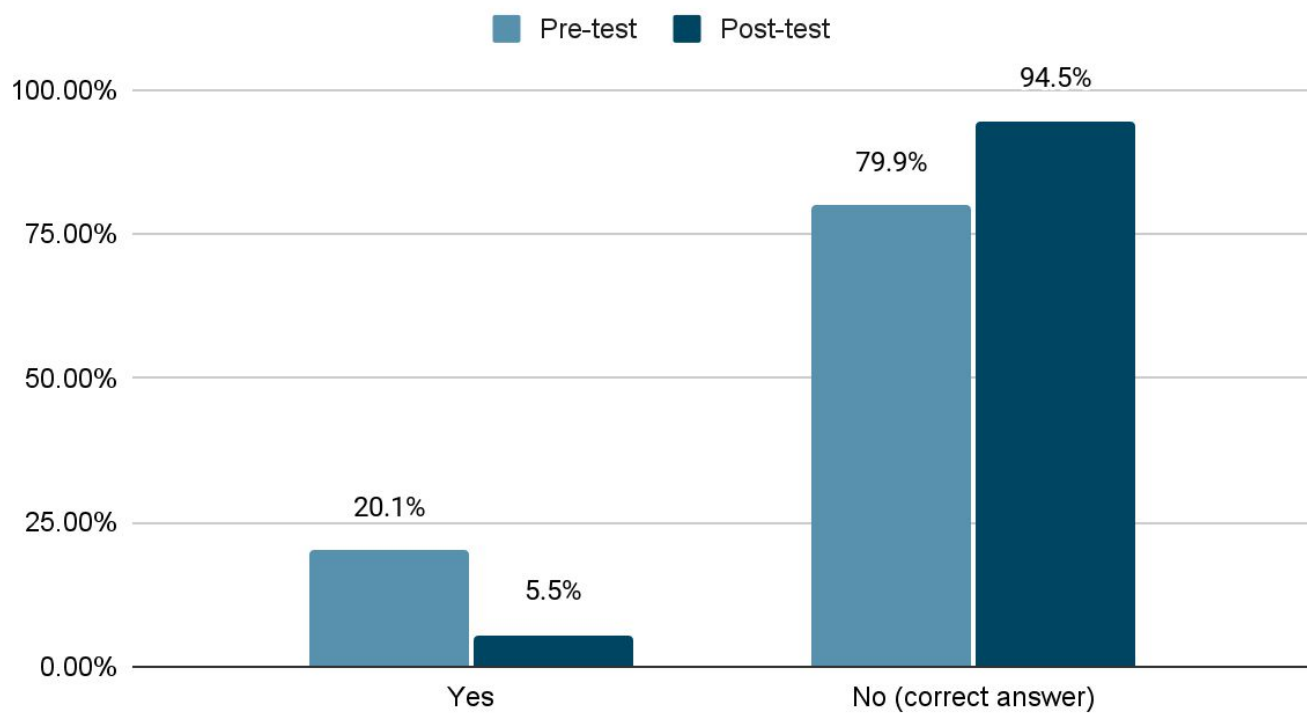
Figure: 7 Is it common for healthy gums to bleed when brushing/flossing?



Can toothpaste clear up pimples?

There is no scientific evidence that toothpaste will help with pimples. More than three quarters of students selected the correct answer in the pre-test (79.9%), and nearly all students selected the correct response on the post-test (94.6%). The absolute percentage change between correct answers from the pre- to post-test was 14.7%, very close to reaching the goal but represents a lack of success in the intervention (Figure 8). This information will need to be made clearer in the presentation to achieve at least a 15% improvement in pre- and post-test knowledge.

Figure 8: Can toothpaste clear up pimples?



The question of whether toothpaste can clear up pimples was used to spark a conversation that products should only be used as directed. There are many false claims and dental fads on social media and other illegitimate sources youth look to for advice. It is recommended that if students have questions about oral health products or homemade dental products to talk to their dentist or dental hygienist or contact the Utah Department of Health and Human Services, Office of Primary Care and Rural Health, Oral Health Program.

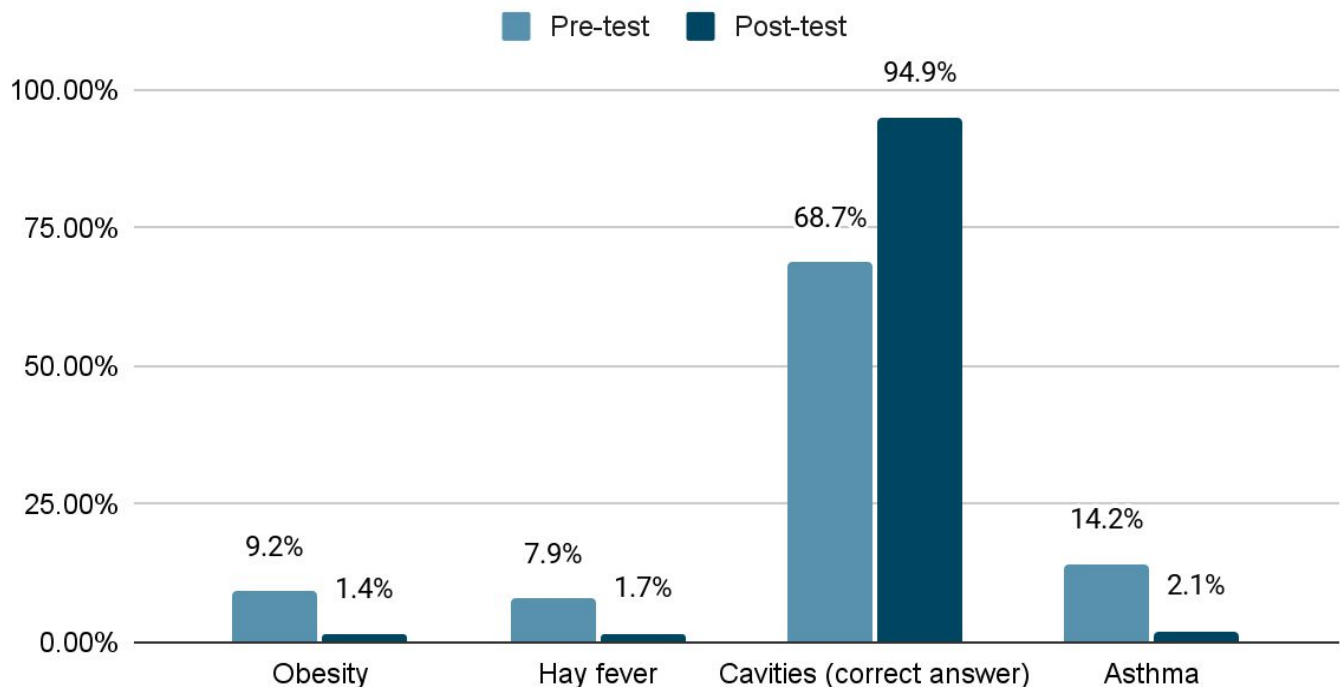
Which of the following diseases is most common among children/teens?

Tooth decay is the most common chronic disease among children and teens. In fact, the Surgeon General on Oral Health: The Silent Epidemic stated, “Although largely preventable, dental caries and periodontal disease are the 2 biggest threats to oral health and are among the most common chronic diseases in the United States. Dental caries is the most common chronic disease in children: it is about 5 times more common than asthma and 7 times as common as hay fever.” (Benjamin, 2010)

The National Center of Health Statistics reported, “Among adolescents aged 12–19, 58% had experienced dental caries in permanent teeth in 2011–2012.” (Dye et al, 2015) Tooth decay is largely preventable. This educational intervention works to help students understand they can prevent tooth decay. The question was used to determine whether students understood the significant effect that poor oral health has on both populations and individuals.

More than half of the students selected the correct response on the pre-test (68.6%). Nearly all the students selected the correct response on the post-test (94.9%). This resulted in a 26.3% increase in students marking the correct answer from the pre-test to the post-test assessment and is considered a success (Figure 9).

Figure 9: Which one of the following chronic diseases is most common among children / teens?

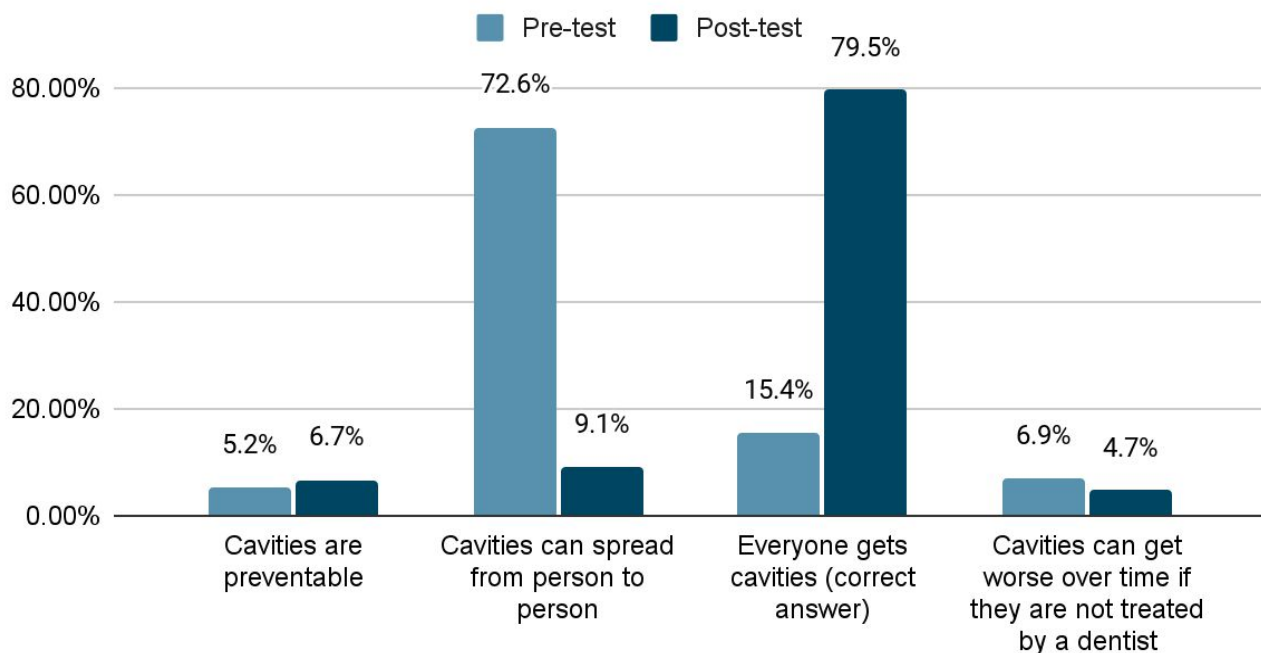


All of the following statements are true about cavities except for one. Mark the statement that is false.

“Everyone gets cavities” is the false statement students should have selected out of several other statements. Cavities are largely preventable; not everyone gets cavities. Individual choices and behaviors largely influence the risk of dental decay. Most students incorrectly chose, “Cavities can spread from person-to-person” as being false on the pre-test when in fact, cavities are transmissible. In the publication, *Pediatric Dentistry 2006*, it states, “Dental caries is an infectious and transmissible disease.” (Berkowitz, 2006)

On the pre-test, 15.4% of students selected the correct answer. On the post-test, 79.5% of students marked the correct answer. This resulted in a 64.1% increase in students choosing the correct answer on the post -test. This is considered successful (Figure 10).

Figure: 10 All of the following statements are true about cavities except for one. Mark the statement that is false.

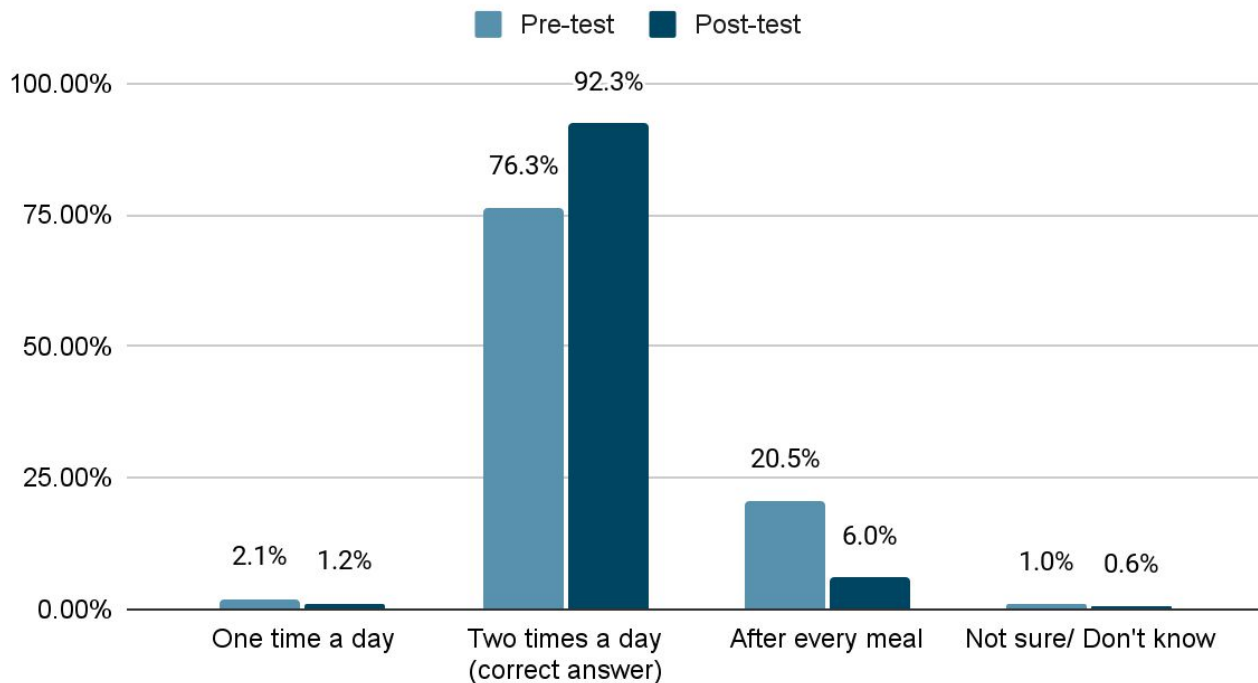


How often is it recommended that you brush your teeth?

Daily oral hygiene affects the body's overall health. The American Dental Association (ADA) recommends brushing twice a day. 2021-AOHC pre-test results indicate most of the students (76.3%) were already aware that brushing twice a day is recommended. Roughly one fifth of students indicated on the pre-test that brushing after every meal was preferred (20.6%). Although the ADA recommends this frequency for certain cases, such as individuals who wear orthodontic appliances, the recommendation for most individuals is to brush teeth twice a day for two minutes (ADA, n.d.c).

The post-test demonstrated a clear shift in students' knowledge, with a majority of students (92.3%) marking the correct answer that brushing twice a day is recommended (Figure 12). This resulted in a 16% increase in students marking the correct answer from the pre-test to the post-test assessment and is considered a success.

Figure 11: How often is it recommended that you brush your teeth?



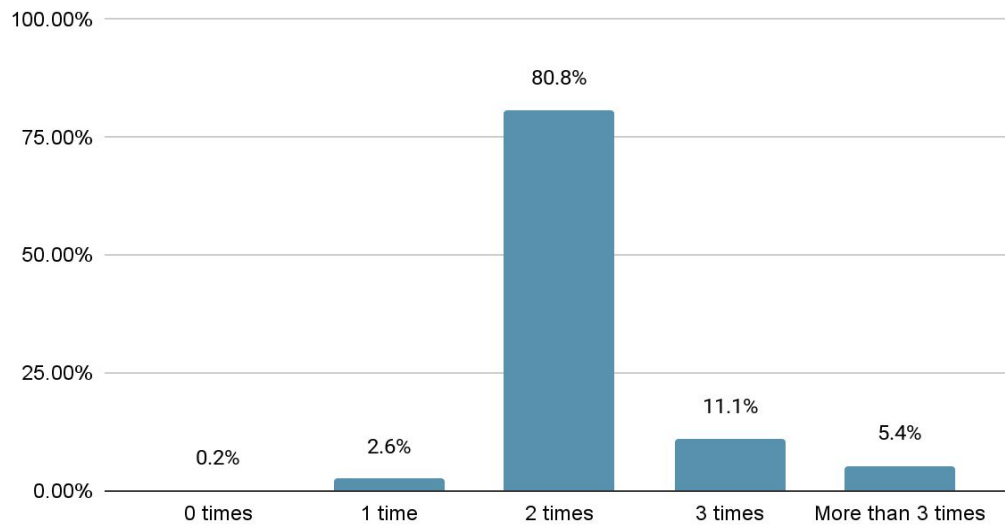
Post-test questions measuring students intent

The following questions were added for the first time to the 2019-AOHC instrumentation tool to measure students' intentions. One of the goals of this educational intervention is to increase positive oral health behaviors of youth. We asked students what their intent was to follow through with good oral health behavior discussed during this intervention, such as brushing, flossing, and reducing soda consumption. With the hopes of increasing the adoption and maintenance of positive oral health behaviors, this intervention uses the Health Belief Model to address perceived barriers to good oral hygiene habits by providing solutions to those barriers. These intent questions provide the OHP with another set of measurements to determine the success of this intervention (La Morte, 2019).

How many times a day do you plan to brush your teeth in the future?

This question asks the students about their intent to brush their teeth in the future, which is an essential behavior for good oral health (Figure 12).

Figure 12: How many times a day do you plan to brush your teeth in the future?

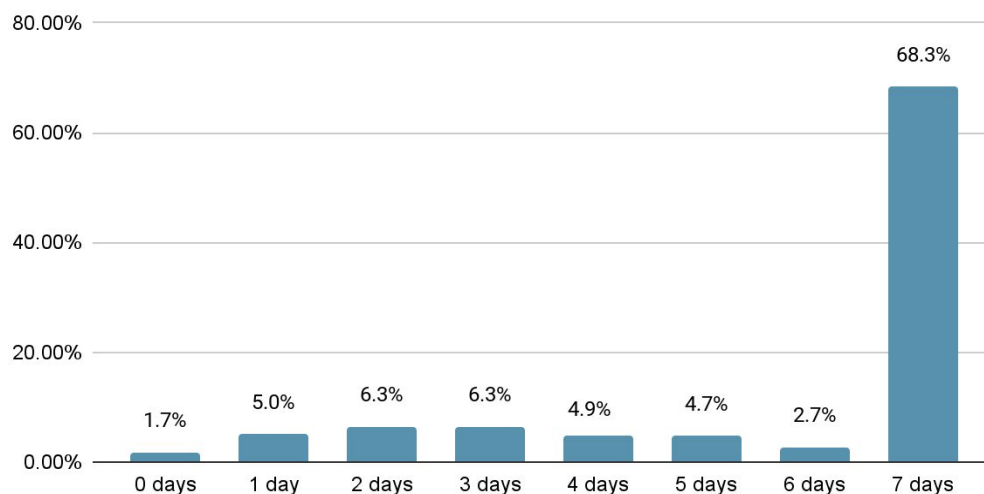


Of the 3,525 students who responded to this question, a large majority (80.8%) recalled the education portion of the intervention and planned on following the guideline of brushing twice a day. A few, (11.1%) plan to do even more and brush 3 times per day. There was a small group (2.6%) that, for whatever reason, still did not feel that they can, or want to brush their teeth for the recommended time every day. Three students (0.2%) responded they will not brush their teeth at all each day.

In the future, how many times a week do you plan to floss between your teeth?

More than half of students (68.3%) reported they will floss their teeth every day, with 30% of students planning to floss between 1 and 6 times during the week. However, 1.7% said they will not floss their teeth during the week. These 2 questions demonstrate that most students learned the importance of brushing twice a day and flossing daily (Figure 13).

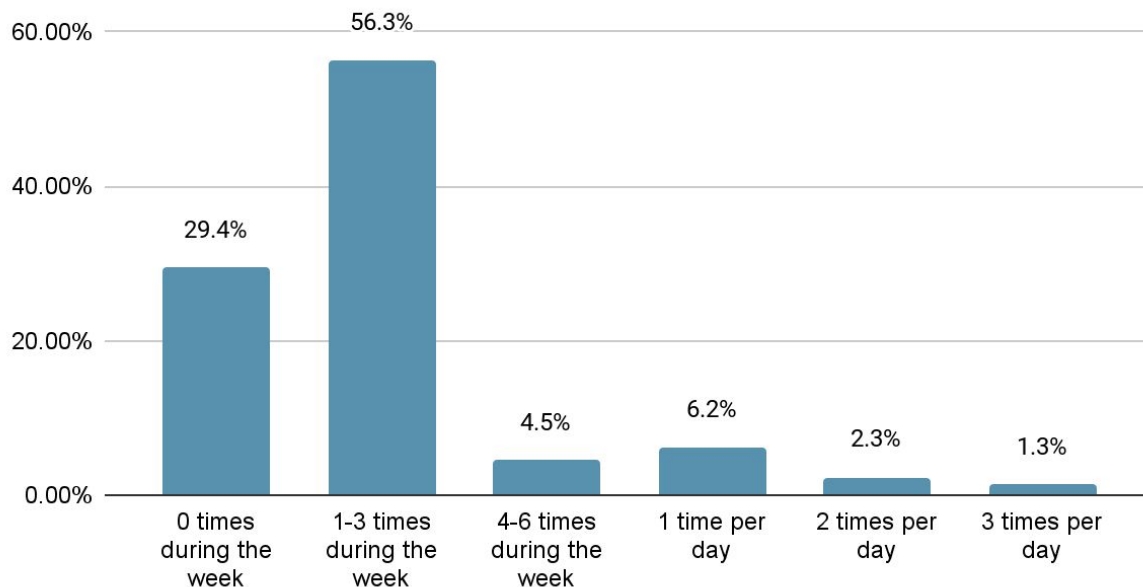
Figure 13: In the future, how many times a week do you plan to floss between your teeth?



In the future, how many times a week do you plan to drink a can, bottle, or glass of soda or pop, such as Coke, Pepsi, or Sprite? (Do not count diet soda or diet pop.)

Consumption of sugary foods and drinks increases the risk of tooth decay. This question specifically asks about regular soda and states that diet soda is not included since there is no actual sugar content in diet soda, and sugar is the main point of discussion for the question and the lesson. However, it should be noted that diet sodas are still carbonated and contain acid which is damaging to the teeth. The two most common answers were a plan to drink no soda at all (29.4%) or to drink soda a moderate 1-3 times during the week (56.3%). Most students learned the harm of sugary beverages and reported their plan to reduce or eliminate it from their diets (Figure 14).

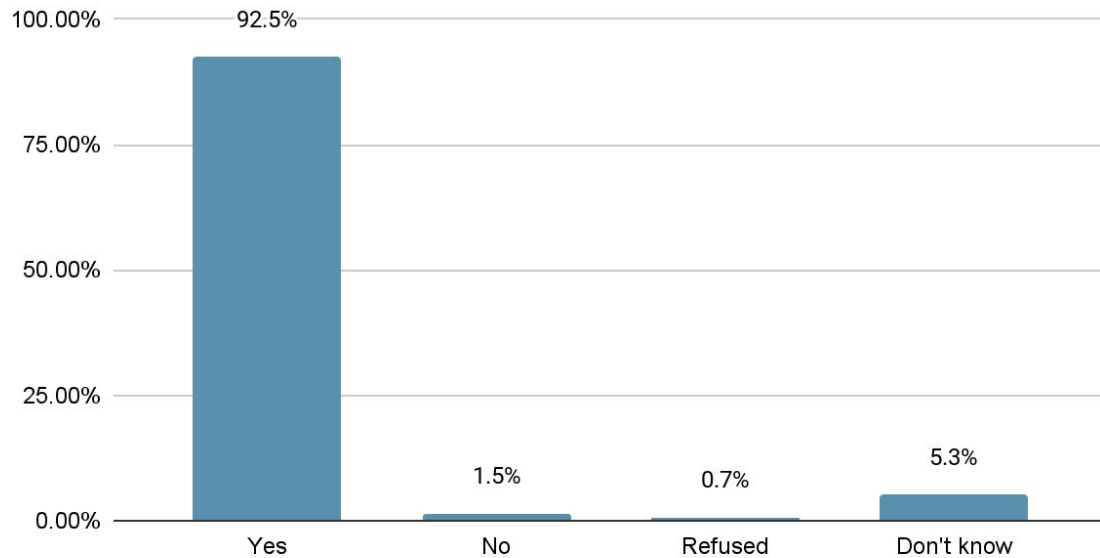
Figure 14: In the future, how many times a week do you plan to drink a can, bottle, or glass of soda or pop, such as Coke, Pepsi, or Sprite?



In the future, do you plan to see a dentist for a check-up exam and teeth-cleaning?

This question is in line with Utah's NPM-13B and asked the students about their intent of accessing dental services in the next year after having this intervention and having low-cost dental resources made available. The majority of students (92.5%) stated that they planned to be able to see a dentist, and it is very fortunate that they are confident that they will be able to do so. The next largest group (5.1%) reported that they did not know whether they would be able to plan to see a dentist. This is important to note because there were a significant number of youths, cited above in this report, who said that they needed dental care but were not able to receive it (Figure 15).

Figure 15: In the future, do you plan to see a dentist for a check-up, exam, and teeth-cleaning?



Post-qualitative questions

To acquire knowledge about students' opinions regarding the oral health presentation and adjust future presentations accordingly, two post-test questions ask about the information included in the oral health presentations that is most and least helpful (Figures 16 and 17). Most students noted all the information was helpful.

Figure 16: Which topics were the most useful to you during the oral health presentation?

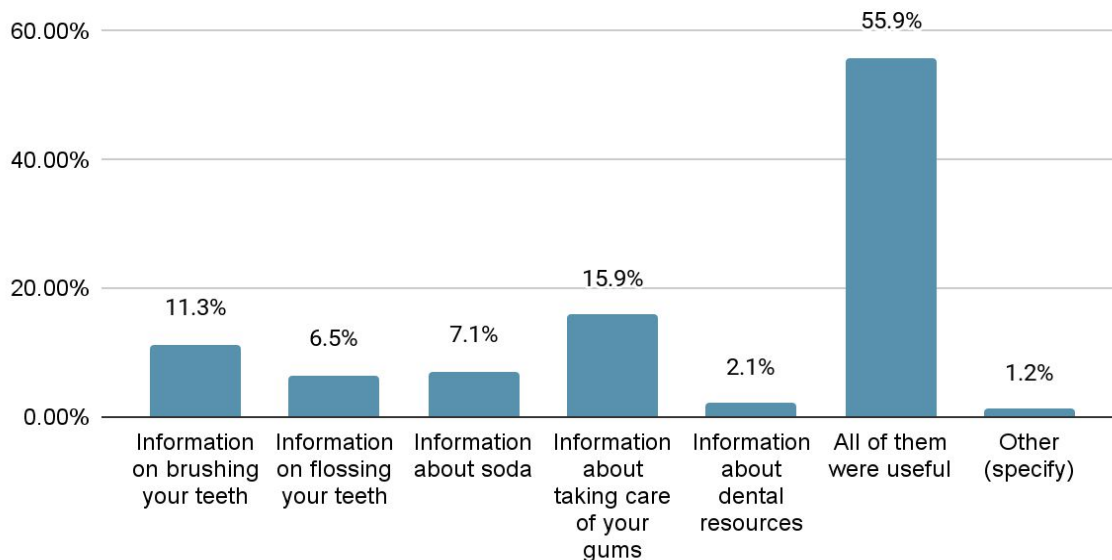
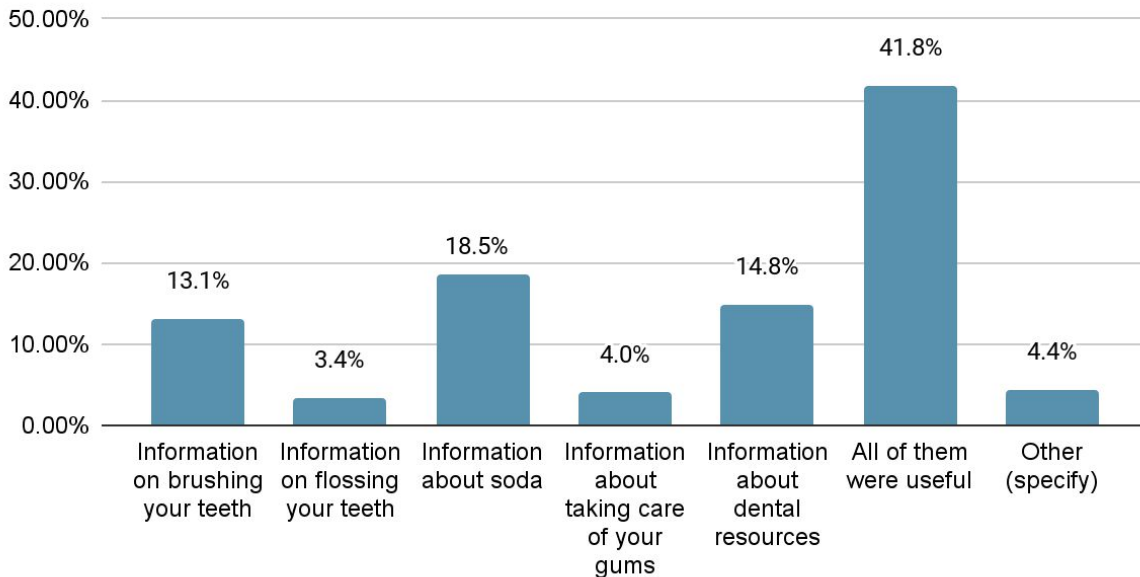


Figure 17: What topics were the least useful to you during the oral health presentation?



Discussion

As stated previously, the vision of the AOHC is to encourage positive oral health behaviors and increase utilization and participation in preventive dental services. Of the Oral Health Knowledge questions, only one failed to reach the 15% improvement benchmark. However, this question also had a high pre-test percentage. This may show even though some questions are thoroughly explained to students, there may still be an internal bias that blocks internalization and understanding. However, critical information such as the implications of bleeding gums saw a large increase in knowledge.

Post-test questions to evaluate a student’s intent to implement behaviors were positive. Large percentages of the youth showed a desire to brush and floss their teeth, visit a dentist, and lower sugary drink consumption.

These findings will continue to be used to educate and modify information presented in subsequent campaigns. In addition, as funding and staffing permits, further research could be done to evaluate whether the knowledge gains persist over time. Also, do these knowledge gains translate into positive behavior changes? The addition of more in depth research is exciting, but currently not feasible.

Limitations

Assessing the full impact of the campaign is difficult due to several limitations. The first limitation relates to school selection. The program’s oral health educator and OHP interns contacted specific schools and school districts based on their geographical location. If the school’s health teacher agreed to the presentation, OHP presented at that school. As a result, schools were not randomly selected to participate in the intervention, and the students who received the intervention program may not be representative of all Utah’s adolescents. There was also a discrepancy between the number of completed pre-tests and post-tests that were returned to the oral health educator. While 3,723 pre-tests were completed by students, only 3,541 completed post-tests were returned. Many of the uncompleted post-tests were from one specific school that failed to follow-up by taking the test.

Pre-tests and post-tests are not linked due to classroom restraints. As a result, the findings of this educational intervention are the averages of all the pre-tests and all the post-tests. Therefore, we are unable to see if a student marks a correct answer on a pre-test and then marks a false answer on a post-test. We also cannot account for questions being left blank on a pre-test and then completed by a student on the post-test. In the 2021-AOHC, the pre-test and post-test were available online and most students participated in the online format. This reduces the probability of answers being left blank, and almost eliminates potential data entry errors by OHP interns entering data into REDCap from paper surveys.

It should also be noted that bias due to self-reporting is always present. Therefore, it is possible the results of health behavior questions, such as questions about soda consumption or last dental visit, are not entirely accurate. Additionally, since the surveys were self-reported, some students returned incomplete pre-tests and post-tests.

Other limitations include post-test assessment only accounts for short-term knowledge gains; there is no link to long-term knowledge gains, short-term behavioral outcomes, or long-term behavior changes. Future research may include a second post-test taken several weeks after the intervention. Currently, resources are limited and the feasibility of this is low.

Conclusions

The Adolescent Oral Health Campaign is an effective way to assess and increase adolescents' knowledge of oral health topics. Offering this intervention on a yearly basis will allow OHP to track trends in changes in knowledge on oral health topics among Utah adolescents. Translating knowledge into positive health behaviors is a goal of the AOHC. Using the HBM to help students acquire a desire to achieve oral health and an understanding that implementing behaviors (such as brushing and flossing) can prevent gum disease and cavities, can accomplish that goal.

Acknowledgments

This report is the result of collaboration between the Office of Primary Care and Rural Health, Oral Health Program and the Data Resource Program within the Bureau of Maternal and Child Health at the Department of Health and Human Services. We would like to thank school administrators, teachers, and students for their participation in the Adolescent Oral Health Campaign. In addition, we would like to thank the oral health program educator, Lauren Neufeld for designing this intervention and offering the presentation to participating schools. A special thank you to OHP interns Sharla Howes, Megan Larsen and Tami Whitelock for presenting at participating schools.

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Pre-test and Post-test Assessment Tools

Pre - Test

Age:

Gender: Male/ Female/ Other

Home Zip Code:

1. Is it common for healthy gums to bleed when brushing/flossing? (select one)

- A) Yes, all the time
- B) Yes, sometimes
- C) Yes, when you have a cold
- D) No, bleeding gums is not normal

2. Can toothpaste clear up pimples? (select one)

Yes No

3. Which one of the following chronic diseases is most common among children/teens? (select one)

- A) Obesity
- B) Hay Fever
- C) Cavities
- D) Asthma

4. All of the following statements are true about cavities except for one. Mark the statement that is false. (select one)

- A) Cavities are preventable
- B) Cavities can spread from person to person
- C) Everyone gets cavities
- D) Cavities can get worse over time if they are not treated by a dentist

5. How often is it recommended that you brush your teeth? (select one)

- A) One time a day
- B) Two times a day
- C) After every meal
- D) Not Sure / Don't Know

6. Overall, how would you rate the health of your teeth and gums? Would you say...

- A) Excellent
- B) Very Good
- C) Good
- D) Fair
- E) Poor
- F) Refused
- G) Don't Know

7. When was the last time you saw a dentist for a check-up, exam, teeth cleaning? (select one)

- A) During the past 12 months
- B) Between 12 months and 24 months ago
- C) Within the past 3 to 5 years
- D) More than 5 years ago
- E) Never

8. During the past 12 months, was there a time when you needed dental care but could not get it at that time?

Yes No

9. During the past 7 days, how many times did you drink a can, bottle, or glass of soda or pop, such as Coke, Pepsi, or Sprite? (Do not include diet soda or diet pop.) (select one)

- A) I did not drink soda or pop during the past 7 days
- B) 1 to 3 times during the past 7 days
- C) 4 to 6 times during the past 7 days
- D) 1 time per day
- E) 2 times per day
- F) 3 times per day

10. Have you ever smoked an electronic cigarette or vaped?

- A) No
- B) Yes, I have tried them but do not smoke them regularly
- C) Yes, I smoke e-cigarettes regularly

11. How often during the last year have you been self-conscious or embarrassed because of your teeth or mouth? Would you say...

- A) Very often
- B) Fairly often
- C) Occasionally
- D) Hardly ever
- E) Never?
- F) Refused
- G) Don't Know

12. What is your Race? (select one)

- A) American Indian or Alaska Native
- B) Asian
- C) Black or African American
- D) Native Hawaiian or Other Pacific Islander
- E) White
- F) Two or more races
- G) Hispanic/Latino
- H) Other _____

Post-Test

Age:

Gender: Male/ Female/ Other

Home Zip Code:

1. Is it common for healthy gums to bleed when brushing/flossing? (select one)

- A) Yes, all the time
- B) Yes, sometimes
- C) Yes, when you have a cold
- D) No, bleeding gums is not normal

2. Can toothpaste clear up pimples? (select one)

Yes No

3. Which one of the following chronic diseases is **most** common among children/teens? (select one)

- A) Obesity
- B) Hay Fever
- C) Cavities
- D) Asthma

4. All of the following statements are true about cavities except for one. Mark the statement that is **false**. (select one)

- A) Cavities are preventable
- B) Cavities can spread from person to person
- C) Everyone gets cavities
- D) Cavities can get worse over time if they are not treated by a dentist

5. How often is it recommended that you brush your teeth? (select one)

- A) One time a day
- B) Two times a day
- C) After every meal
- D) Not Sure / Don't Know

6. How many times a day do you plan to brush your teeth in the future?

- A) 0 times
- B) 1 time
- C) 2 times
- D) 3 times
- E) More than 3 times

7. In the future, how many times a week do you plan to floss between your teeth?

- A) 0 days
- B) 1 day
- C) 2 days
- D) 3 days
- E) 4 days
- F) 5 days
- G) 6 days
- H) 7 days

8. In the future, how many times a week do you plan to drink a can, bottle, or glass of soda or pop, such as Coke, Pepsi, or Sprite? (Do not count diet soda or diet pop.)

- A) 0 times during the week
- B) 1 -3 times during the week
- C) 4 - 6 times during the week
- D) 1 time per day
- E) 2 times per day
- F) 3 times per day

9. In the future, do you plan to see a dentist for a check-up exam, and teeth- cleaning?

- A) Yes
- B) No
- C) Refuse
- D) Don't Know

10. What is your Race? (select one)

- A) American Indian or Alaska Native
- B) Asian
- C) Black or African American
- D) Native Hawaiian or Other Pacific Islander
- E) White
- F) Two or more races
- G) Hispanic/Latino
- H) Other _____

11. What topics were the MOST useful to you during the oral health presentation? (select one)

- A) Information on brushing your teeth
- B) Information on flossing your teeth
- C) Information about soda
- D) Information about taking care of your gums
- E) Information about dental resources
- F) All of them were useful
- G) Other (specify) _____

12. What topics were the LEAST useful to you during the oral health presentation? (select one)

- A) Information on brushing your teeth
- B) Information on flossing your teeth
- C) Information about soda
- D) Information about taking care of your gums
- E) Information about dental resources
- F) All of them were useful
- G) Other (specify) _____

References for pre-test and post-test assessment tools

Question 3. *Which of the following chronic diseases is most common among children/teens?*

“Tooth decay is one of the most common diseases of childhood—5 times as common as asthma, and 7 times as common as hay fever”

Centers for Disease Control and Prevention [CDC]. (2009). The power of prevention: Chronic disease...the public health challenge of the 21st century.

<https://stacks.cdc.gov/view/cdc/5509>

Question 6. *Overall, how would you rate the health of your teeth and gums?*

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https://wwwn.cdc.gov/nchs/data/nhanes/2017-2018/questionnaires/OHQ_I.pdf

Question 7. *When was the last time you saw a dentist for a check-up, exam, teeth cleaning?*

Centers for Disease Control and Prevention [CDC]. (2019). *2019 state and local youth risk behavior survey.*

https://www.cdc.gov/healthyyouth/data/yrbs/pdf/2019/2019_YRBS-Standard-HS-Questionnaire.pdf

Question 8. *During the past 12 months, was there a time when you needed dental care but could not get it at that time?*

National Health and Nutrition Examination Survey [NHANES]. (2019). Oral Health Questions.

https://wwwn.cdc.gov/nchs/data/nhanes/2017-2018/questionnaires/OHQ_I.pdf

Question 9. *During the past 7 days, how many times did you drink a can, bottle, or glass of soda or pop, such as Coke, Pepsi, or Sprite? (Do not include diet soda or diet pop.)*

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Questions 11 & 12. *What is your race? What is your ethnicity?*

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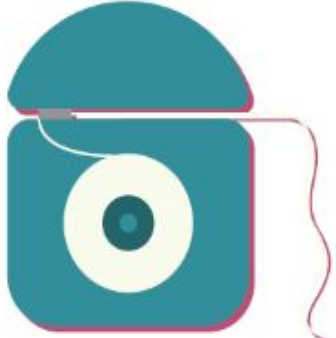


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Educational Tri-Folds/Infogram

The Tri-fold local resource portion is specific to each county. Currently we have created trifolds for Davis, Salt Lake, Summit, Tooele, Utah, and Weber-Morgan counties. These trifolds are also available in Spanish for the following counties: Davis, Salt Lake, Utah and Weber-Morgan. All county resources are available in Spanish upon request.

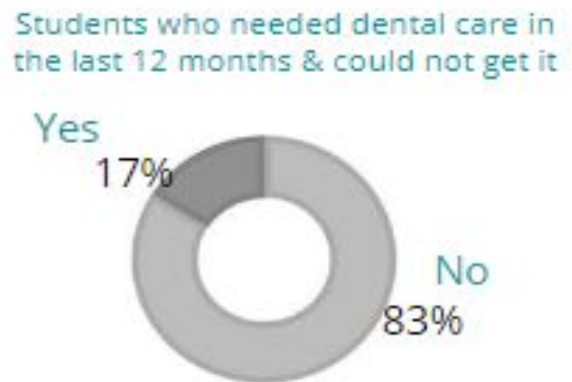
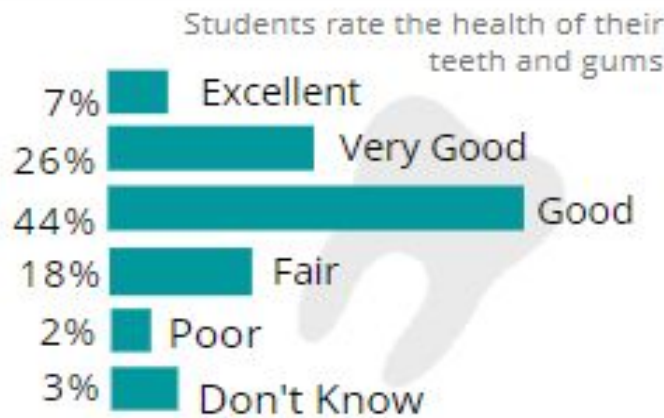
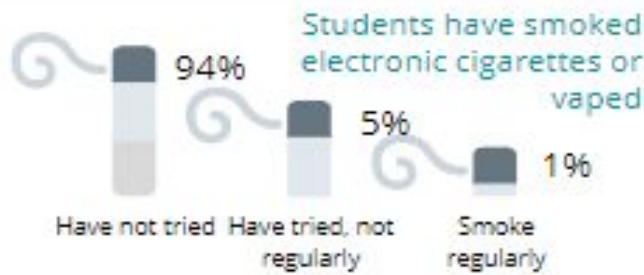
<p>The Take Away 120</p> <p>What does 120 mean to you?</p> <ul style="list-style-type: none"> 1 - Floss once a day 2 - Brush twice a day 0 - Equals no cavities  <p>The mouth is connected to the body! It is important to keep your mouth healthy in order to help keep your whole body healthy.</p>	<p>Dental Resources In Salt Lake City</p> <p><u>Fortis Dental Hygiene School</u> 3949 South 700 East, Suite #200 Salt Lake City, UT 84107 801-713-4200 Services: Preventive Call for an appointment</p> <p><u>Roseman School of Dentistry</u> 10894 South River Front Parkway South Jordan, UT 84095 801-878-1200 Services: Preventive and Restorative</p> 	<p><u>Salt Lake Community College Dental Hygiene Clinic</u> 3491 West Wights Fort Rd. West Jordan, UT 84088 801-957-6001 Services: Preventive</p> <p><u>University of Utah School of Dentistry</u> Multiple Locations including Salt Lake City 801-587-6453 Call for an appointment Services: Preventive and Restorative</p> 
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ADOLESCENT ORAL HEALTH CAMPAIGN 2021 2022

A one-time intervention encouraging positive adolescent oral health behaviors

Educational Topics:

- Proper brushing & flossing
- Gum disease
- Braces Care
- Cavities
- Nutrition



Students' survey responses before and after educational intervention

Can toothpaste clear up pimples?



36% of students were self-conscious or embarrassed of their teeth or mouth very often, fairly often or occasionally in the last year

Data displayed are results of surveys from Adolescent Oral Health Campaign 2021 - 2022 educational intervention