

# Kindergarten Dental Assessment Pilot Program Report

## May 2017



### Background

Dental decay is the most common chronic disease of childhood – five times more common than asthma. The 2014 Smile Survey found that more than half of Sonoma County kindergarten and third grade students have decay experience and 18% have untreated tooth decay, with 4% in need of urgent treatment.<sup>1</sup> Children with poor dental health experience pain, have trouble concentrating in school, feel social stigma, and struggle to eat healthy foods. Left untreated, dental decay infects the teeth and gums, and can spread to the brain, heart and blood, occasionally resulting in death. The serious impact of this problem locally is demonstrated by the fact that almost 100 Sonoma County children under age 7 undergo dental surgery with general anesthesia each month at PDI Surgery Center to treat severe dental disease.

In 2014, the Sonoma County Department of Health Services commissioned A Portrait of Sonoma County, a report examining human development throughout Sonoma County through three dimensions: a long, healthy life, access to knowledge, and a decent standard of living. It also explored the many social and economic factors that determine individual and community health, and the uneven distribution of those factors throughout the County. Like many other health measures, dental disease is not equally spread across the community – those with limited resources carry the greatest burden. In Sonoma County, both the 2009 and the 2014 Smile Surveys demonstrated disparities between white and Latino children, and between wealthier and economically disadvantaged children, with Latino and low-income children experiencing significantly more dental decay.<sup>1</sup>

The Sonoma County Dental Health Network, a collective impact collaborative comprised of 28 agencies and 60 members, was founded in 2015 and supported by the DentaQuest Foundation. The Network published the county's first dental health strategic plan in December 2016. The goal of the 4 year plan is to achieve **75% cavity free 5 year olds by 2020**.

### Impact of Dental Disease in Sonoma County

The financial impact of dental disease is substantial and ultimately borne by the community. The Sonoma County Department of Health Services examined the economic aspects of dental health in their 2015 report, The Costs of Dental Disease Prevention and early Treatment Strategies in Sonoma County.<sup>2</sup> Using national data and the established methodologies of Griffin<sup>3</sup> and O'Connell<sup>4</sup>, along with Sonoma County's age distribution, the number of new cavity surfaces among the entire Sonoma County population is estimated to be 450,000 annually. The annual direct cost of treating these cavities is approximately \$127 million.

However, this estimate does not account for the increased cost of delayed treatment. Early treatment of a one-surface cavity costs approximately \$283, whereas dental surgeries at PDI Surgery have an average cost of \$1,400 and emergency department visits that require hospitalization have a median Medi-Cal reimbursement cost of \$5,044.<sup>5</sup> Furthermore, hospitalizations provide temporary pain relief, not the restoration treatment that will still need to be performed by a dentist.

Dental treatment requires time spent at dentist’s office, requiring employees to take time off from work, and students often must miss school to attend dental appointments. The economic report referenced earlier estimated that the cost in lost wages and time account for an economic loss of \$14.2 million dollars to restore the new cavities occurring annually in Sonoma County. The economic impact on schools is also considerable. Schools receive funding based on Average Daily Attendance (ADA) at the rate of \$34 per child per day. Using California state data that estimated the number of school days missed due to dental problems, Sonoma County’s proportionate annual loss in school funding is approximately \$384,000.

**Five Pillars of Dental Disease Prevention: Evidence Based Strategies**

Although dental disease is a major concern in the county, much of it can be prevented. The Sonoma County Department of Health Services has identified five key strategies, or Pillars of Dental Health, to improve dental health for all residents. These pillars enable the county to improve the lives of many children and adults. While each pillar provides a unique benefit in the county’s overall oral health strategy, each pillar also requires economic resources. The effects of each pillar are synergistically related, so that taken together, the results are more than the preventive effects of each pillar added to the others.

The five pillars, along with brief statements of their purposes, are:

Pillar	Rationale
1. ACCESS TO DENTAL CARE	Regular visits to a dental health professional are foundational to dental disease prevention, early diagnosis, and treatment, but is often lacking for low-wage families and others ineligible for Denti-Cal.
2. COMMUNITY HEALTH EDUCATION	Educational programs providing accurate information about dental hygiene, healthy dietary practices, and the importance of dental health to overall health reinforce positive habits and promote behavioral changes.
3. FLUORIDE VARNISH	Fluoride varnishes applied to all teeth several times yearly prevent disease, especially for those with medium- to high-risk of decay.
4. SEALANTS	Sealants applied to the chewing surfaces of permanent molars provide long-term protection for tooth surfaces most vulnerable to tooth decay
5. COMMUNITY WATER FLUORIDATION	Community water fluoridation provides protection in two ways: systematically by making teeth stronger before they have even erupted when babies drink fluoridated water, and topically by protecting the tooth surface from decay when fluoridated water is in contact with the teeth.

Currently, the county funds the School Smile Program, addressing the 4<sup>th</sup> pillar of prevention: sealants. This school-based program, currently in its 4<sup>th</sup> year is in 12 schools in Sonoma County. The CDC notes that sealants protect against 80% of cavities for 2 years and continue to protect against 50% of cavities for up to 4 years.<sup>6</sup> School-age children without sealants have almost 3 times more cavities than those with sealants. Applying sealants in school-based programs to the nearly 7 million low-income children who don’t have them in the U.S could save up to \$300 million in dental treatment costs.<sup>6</sup>

## Kindergarten Assessment Pilot Project

The Department of Health Services was awarded a Kaiser Permanente mini-grant in 2016 to conduct a kindergarten dental assessment pilot project. The purpose of this pilot is to test a school-based dental prevention strategy employing volunteer dental professionals to ensure access to care for low-income children. By screening kindergarteners through this program, more children will have their dental disease identified, be referred for treatment, and be able to establish a dental home. Fluoride varnishes are applied to children with parental consent, thus expanding the reach of a second pillar. Connection to care and established dental homes will also increase regular preventive care, including sealants, and early treatment.

The California Department of Education is a partner in statewide dental health. In 2007, legislation requiring oral health assessments for children entering public school for the first time became effective (AB1433). The ultimate goal of this program is to establish a regular source of dental care for every child. Children entering public school for the first time, in kindergarten or first grade, are to have a dental assessment by a licensed dental professional by May 31 of the first school year. The assessment can be met in many ways. It can be a complete examination and treatment plan performed by a dentist, or it can be a more basic oral health evaluation, such as a dental screening, which can be performed by dentists, as well as dental hygienists and registered dental assistants with supervision.

Although schools are allowed to use funds allocated by the California Department of Education to support implementation of the law by notifying parents and legal guardians about the health screening requirements, the assessments themselves are unfunded. Parents may obtain a waiver of this requirement if they cannot find a dental office that takes their child's insurance, cannot afford to pay for it, or the parent chooses not to have their child's oral health evaluated. Schools collect and aggregate specified data and school districts forward specified data by December 31 of each year to their County Office of Education. Despite the expansion of low-cost and Medi-Cal accepting dental services in Sonoma County, fewer than 47% of students in Santa Rosa City Schools completed the dental assessment in 2016.

Santa Rosa City Schools, Wright Elementary School District and DHS have partnered to address the low kindergarten assessment completion by committing resources to ensure that kindergarten students in the low-income schools are able to see a dental clinician at the school site, 2009 and 2014, as well as the Portrait of Sonoma County, describe the stark health inequities. This pilot project will reach neighborhoods/schools of the lowest income in these districts, with high proportion Latino students. This place-based intervention will allow the families to access care without the barriers of cost and lost work and school time. The short-term outcome is an expected increase in caries detection, fluoride varnish application and referral for needed treatment for the most underserved children. The medium-term impact is an expected increase in connecting children and their families to a dental home for preventive, as well as restorative, services. The long-term impacts are an increase in access to care, a decrease in dental decay and dental decay disparities among children, and a decrease in school absenteeism.

The pilot program employed effective strategies from two successful school-based dental services models:

1. The Sonoma County School Smile Program, a sealant program for 2<sup>nd</sup>, 3<sup>rd</sup> and 6<sup>th</sup> graders operating in 11 schools in since 2013, reaching over 6,000 students with nearly 3,000 sealants placed.
2. The San Francisco kindergarten assessment program which has provided free assessments, fluoride varnishes and referrals for 15 years in all city elementary schools. Caries have decrease steadily in low-income and Latino children.

## Materials & Methods

Six elementary schools in the city of Santa Rosa were identified as low-income schools based on the percentage of children enrolled in the Federal Free and Reduced Price Meal program. Brook Hill Elementary, Luther Burbank Elementary, and Steele Lane Elementary were the three schools selected from Santa Rosa City Schools District. JX Wilson Elementary, RL Stevens Elementary, and Wright Charter School were selected from the Wright Elementary School District. Schools provided basic student data, class schedules, and maps for our planning purposes. Parent contact information was also provided on an as needed basis to confirm allergies and consent wishes when forms were not completely filled out. DHS staff clearly communicated the screening schedules with school staff and made sure that a minimum amount of class time was disrupted during these events. Parental consent forms were circulated via student backpack at least two weeks prior to the scheduled assessment date. Assessments were conducted for all children unless parents opted out of the program. Fluoride varnish was applied with explicit parent consent, after screening for allergies. Incomplete consent forms prompted an additional phone call from school staff or DHS to gather the missing information.

Assessment results were recorded using a software program developed by Oral Health Solutions Inc. Volunteer assistants used iPads, entering data to a modified screening form from the 2014 Smile Survey. The data from these iPads were then uploaded to a secure database where Oral Health Solution staff compiled the data and sent it back to DHS staff in an excel format. The data was then able to be cleaned and aggregated to assess results.

The dental services were provided by volunteer dental professionals. These volunteers were recruited through partnerships with the Redwood Empire Dental Society and the Redwood Dental Hygiene Society. All volunteer dental professionals were provided with oral health screening protocols prior to ensure standardization of disease ranking. The classifications were basic: any history of dental decay, presence of current untreated cavities, and presence of severe disease such as infection, swelling or pain.

The program “is an excellent support for the health of our Kindergarten students.”

School Principal

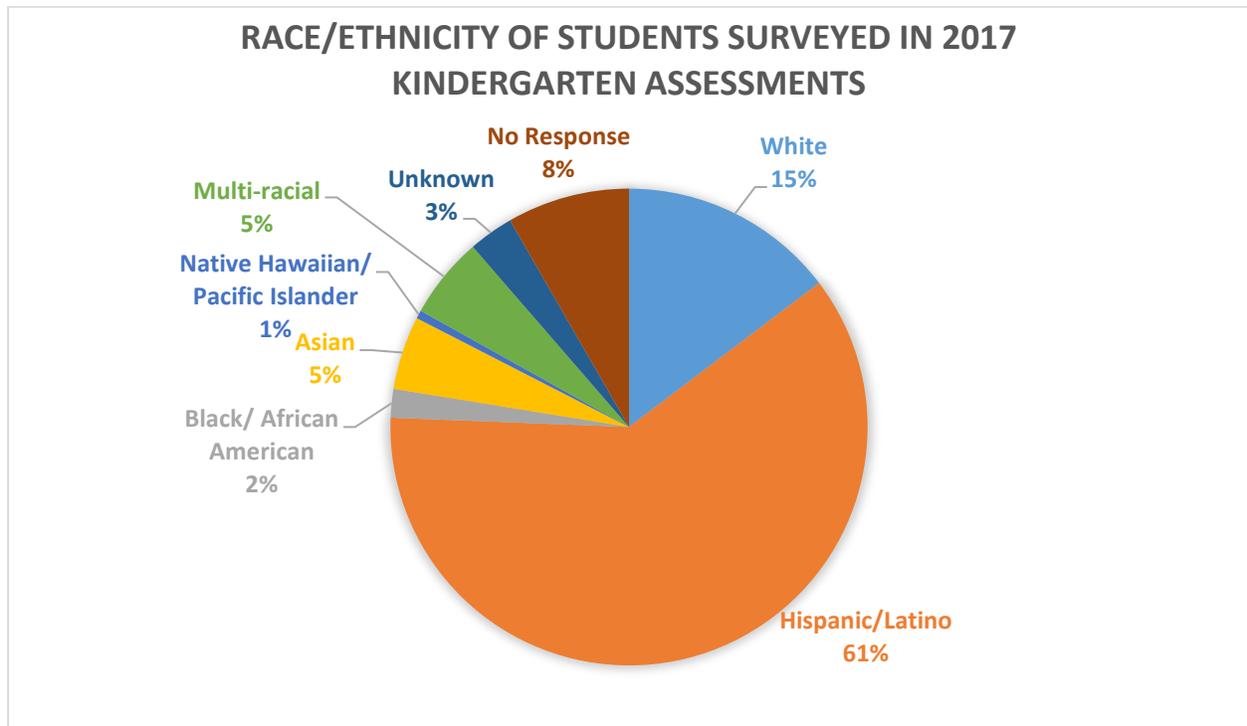
## Results

In the spring of 2017, 361 kindergarten and transitional kindergarten students were screened for the Kindergarten Dental Assessment Pilot Program. Table 1 shows the demographics of the students screened from 6 schools compared to the demographics of the 2014 Smile Survey. White and Hispanic/Latino students comprised 75.6% of those screened.

**Table 1. Demographic Characteristics of Participating Children compared to 2014 Smile Survey**

	2017 Kindergarten Assessments	2014 Smile Survey
Number Screened	361	810
<i>Race/Ethnicity</i>		
White	14.7%	32.2%
Hispanic/Latino	60.9%	54.4%
African American/Black	1.9%	2.3%
Asian	5.0%	2.1%
Pacific Islander	0.6%	0.9%
American Indian	0.0%	0.4%
Multi-racial	5.5%	5.1%
Unknown	11.4%	2.6%

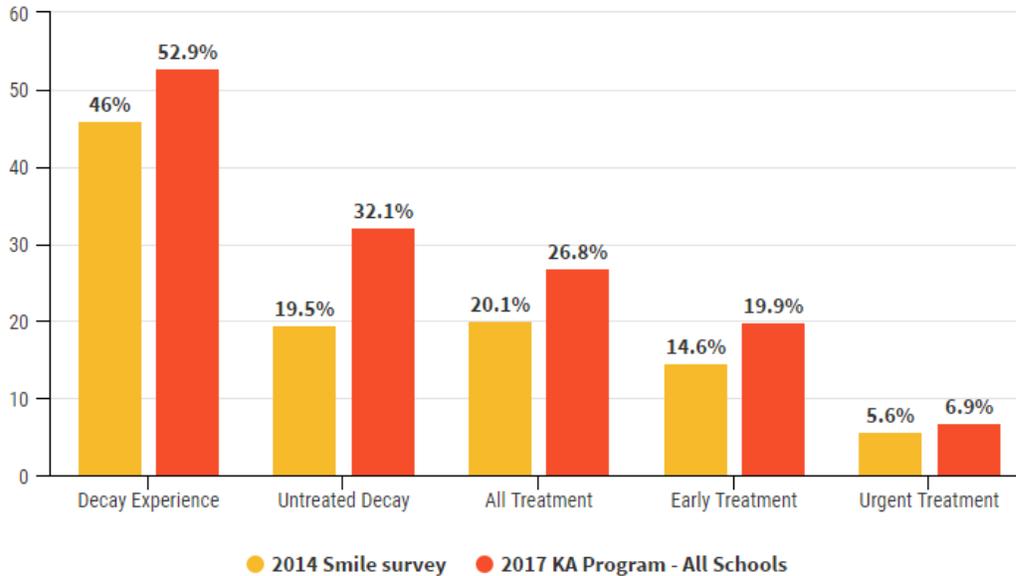
**Figure 1. Race/Ethnicity of Students Surveyed in the 2017 Kindergarten Assessments**



## Decay Experience

Almost 53% of kindergarteners screened had decay experience (Figure 2 and Table 2). Of students displaying decay experience, Hispanic/Latino students had far higher rates of decay experience compared to White, non-Hispanic students (35.7% compared to 14.7%).

**Figure 2. Results of 2017 Kindergarten Assessment compared to 2014 Smile Survey**



**Table 2. Percent of Kindergarten Students with Decay Experience**

School	Students Screened	Decay Experience	No Decay Experience
Brook Hill	62	53.2%	46.8%
Luther Burbank	51	41.2%	58.8%
Steele Lane	59	52.5%	47.5%
JX Wilson	70	56.0%	44.0%
RL Stevens	78	44.9%	55.1%
Wright Charter	41	78.0%	22.0%
<b>Total</b>	<b>361</b>	<b>52.9%</b>	<b>47.1%</b>

## Untreated Decay

Just over 33% of students had untreated decay present at the time of screening, while almost 67% did not have untreated decay present (Table 3). Of those with untreated decay present, 61% were Hispanic/Latino, while 13.8% were White. This shows that Hispanic/Latino students were significantly more likely to have untreated decay at these 6 schools.

**Table 3. Percent of Kindergarteners with Untreated Decay**

School	Untreated Decay	No Untreated Decay
Brook Hill	30.6%	69.4%
Luther Burbank	19.6%	80.4%
Steele Lane	20.3%	79.7%
JX Wilson	34.0%	66.0%
RL Stevens	35.0%	65.0%
Wright Charter	59.0%	41.0%

Need for Dental Treatment

More than 1 in 4 students (27%) was in need of early or urgent dental treatment (Table 4). When Hispanic/Latino and White students were compared, Hispanic/Latino students were more than 4 times more likely to need dental treatment than White students (22.6% compared to 4.7%). In total, 25 students were referred for urgent treatment, defined as decay class III. Decay class II was defined as having cavities present, but without symptoms like pain, infection, or swelling present. Decay class III is considered an urgent case, with large cavities present and possible signs of pain, infection, or swelling.

**Table 4. Number of Kindergarteners in Need of Dental Treatment, Class II\* and III\***

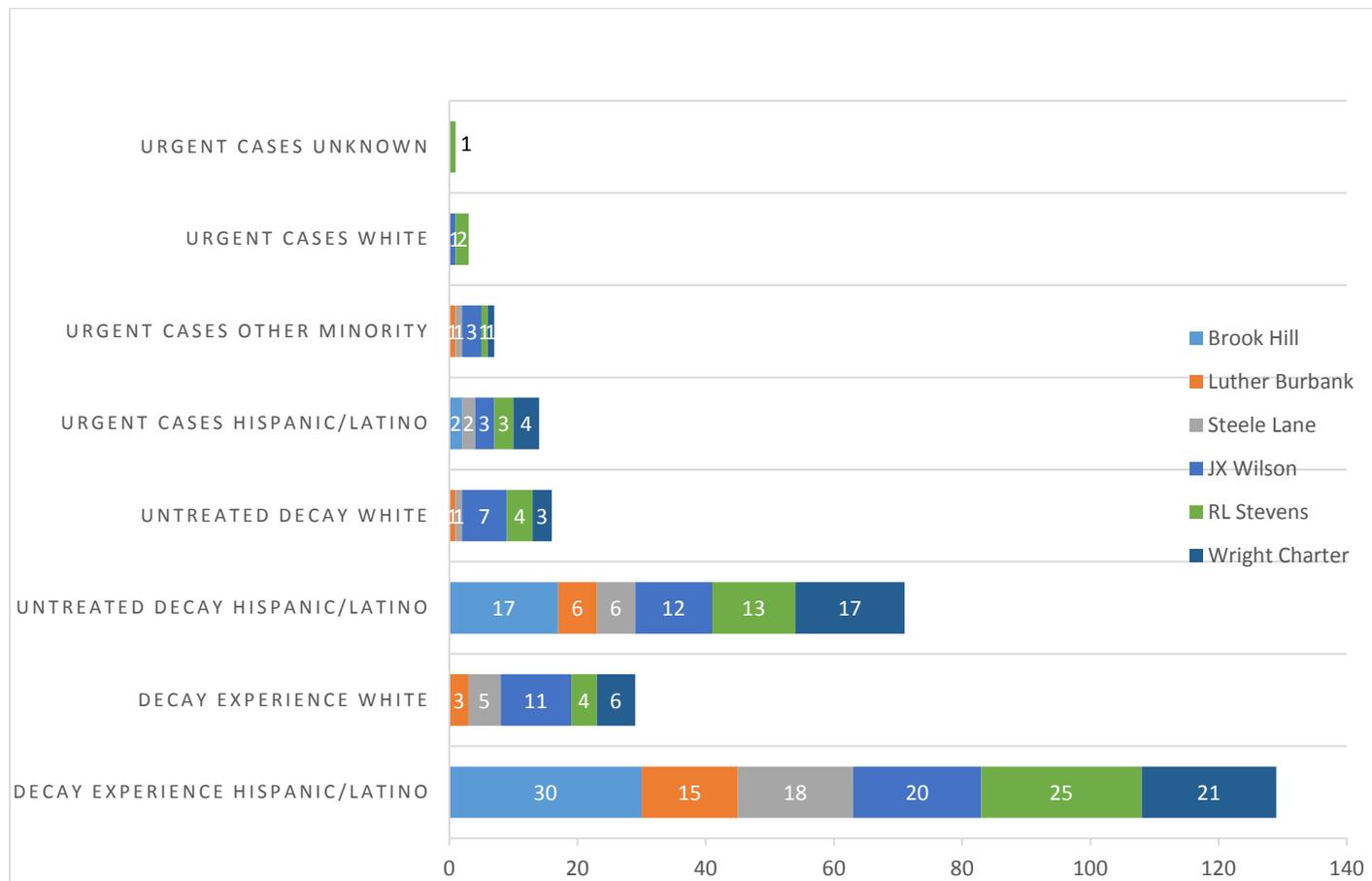
School	Decay Class II	Decay Class III	All Decay Referred
Brook Hill	16%	3%	19%
Luther Burbank	22%	2%	24%
Steele Lane	15%	5%	20%
JX Wilson	11%	10%	21%
RL Stevens	26%	9%	35%
Wright Charter	34%	12%	46%
Total	19.9%	6.9%	26.8%

\*Decay Class II = early dental care needed    \*Decay Class III = Urgent/Serious Dental Problems

Decay Experience and Untreated Decay Cases by Ethnicity

Hispanic/Latino students exhibited a higher rates of decay experience and untreated decay when compared to white students. Out of all students screened who had decay experience (52.9%), 37% of those were Hispanic/Latino and only 8% were White students. Hispanic/Latino students are 4.5 times more likely to have experience decay by Kindergarten, when compared to their White student counterparts. Out of all students screened who had untreated decay (32.1%), 21% of those were Hispanic/Latino and only 4% were White. Hispanic/Latino students are over 5 times more likely to have untreated decay by Kindergarten, when compared to their White student counterparts.

**Figure 3. Number of Cases of Decay Experience, Untreated Decay, and Urgent Cases by Ethnicity**



Fluoride Varnish and Consent Rates

Fluoride varnish was applied to 142 total students or 39.3% of those screened. This is due to consent forms returned at each school, as fluoride varnish can only be applied with parental consent. The overall consent rate for all schools combined was 47.5% with 214 consent forms returned out of 451 total students.

## Student Knowledge Measured

Students were surveyed on screening days and asked simple questions about if they had visited a dentist before, what they thought about the dentist if they had visited one, and did they brush their teeth this morning. Most students indicated that they had seen a dentist, while a few students could not remember, or did not know. Of the students who had seen a dentist, most liked going either because they received a prize or because the visit was “fun”. Only a handful of students indicated that the dentist was “scary” and that they did not like to go. Many students couldn’t remember if they had brushed their teeth prior to coming into school that morning. Answers widely from students on brushing with some answering that they had brushed, a couple indicated that they knew how many times a day they should brush, and some students looked perplexed and refused to answer. Students were extremely receptive to conversations with the dental professional performing the screening and really listened intently when the professional told them to brush and have mom and dad help twice a day. Many students who had been screened could be heard chatting with fellow students about what the dental professional had said. The hope is that those conversations continued at home, and made a lasting positive impression on students.

## Evaluation

Schools have a wide variety of staff involved in helping to make a program like this successful. In order to evaluate this pilot program, surveys were distributed in paper form, online, and used during one-on-one interviews with teachers, principals, parents, and even dental professionals who volunteered during the program. These surveys and interviews were collected after screenings had been completed at schools.

Twenty-four teachers were surveyed with 62.5% responding by paper form or with an online entry. Three dental professional volunteers completed an online survey. A one-on-one interview was completed with five school principals in person, while four parents were interviewed over the phone and asked key programmatic questions. The results in Table 5 show most surveyed felt that oral health was important, that this pilot was valuable to students, and that the program components were clear. Teachers, principals, and dental providers also highly reported the ease with which they could accommodate or participate in the pilot program.

“Students in dire need of dental care are getting it.”

*School Principal*

Table 5. Evaluation Results

<i>Respondents</i>	<i>How Important is oral health?</i>	<i>How valuable is the program?</i>	<i>How easy was it for you/your school to participate?</i>	<i>How clear were the program goals?</i>
Teachers	93% - Extremely Important	93% - Extremely Valuable	74% - Extremely Easy to Easy	74% - Extremely Clear to Clear
Principals	100% - Extremely Important	100% - Extremely Valuable	80% - Easy	80% - Extremely Clear
Providers	100% - Extremely Important	100% - Extremely Valuable	100% - Extremely Easy to Easy	100% - Extremely Clear
Parents	100% - Extremely Important	100% - Extremely Valuable	--not asked--	75% - Extremely Clear

All groups surveyed were also asked to share recommendations for improving the program. The lists below highlight those recommendations.

Recommendations for Improvements:

Teachers and Principals – how to improve consent returns

- Provide incentive to students and/or teachers
- Provide a classroom poster to track students who have returned their consent form
- Make returning the parent consent form a homework assignment
- Provide a short informational session on the program to parents at back to school night and/or to teachers and school staff

Parents – how to better communicate

- Use the school backpack mail to send home information
- Use the school’s phone call system to alert parents about the program and screenings

Providers – how to improve program

- Plan to serve more schools and provide more opportunities to volunteer
- Change the schedule to incorporate more classrooms seen on a single screening day
- Provide disposable mirrors to make it easier to assess students

Teachers, principals, and parents also provided answers to a survey or interview question asking them to describe the positive impact this pilot program has had on students. Below are some quotes taken directly from those answers:

- One teacher loved that the students received a chance to have their teeth checked, while another teacher shared that parents acted on the notes sent home instructing students to see a dentist

- One principal noted that the pilot program had a positive impact stating “students in dire need of dental care are getting it.” While another principal stated of the program: “it is an excellent support for the health of our Kindergarten students.”
- One parent stated that “the program was helpful and made it easier for my son to get into a dentist.”

## Discussion

The Kindergarten Dental Assessment Pilot Program has shown that dental disease is prevalent within those screened (see Figure 1). More than half (52.9%) of students have decay experience and one-third (33%) have untreated decay. These rates have increased, in some cases significantly, from when the 2014 Smile Survey was completed. This screening shows that students are not getting into care soon enough to receive preventative treatments.

Hispanic/Latino students are disproportionately impacted by dental disease. Hispanic/Latino students are 4.5 times more likely to have experience decay, and are over 5 times more likely to have untreated decay by Kindergarten, when compared to their White student counterparts. While the schools participating in the pilot program did have a higher rate of Hispanic/Latino students in each classroom compared to White students, the overall need for early interventions was clearly on display. Hispanic/Latino students need to be prioritized as patients as early as possible and a better effort needs to be made to address barriers that keep them from accessing care early and often.

As part of this assessment the 25 students identified as needing urgent treatment were referred and follow up phone calls confirmed they were treated. This is a critical support step that has not been done for students who bring in dental screening forms to satisfy the AB1433 mandate. Follow up phone calls of urgent cases of need, which were mostly comprised of Hispanic/Latino students, is made difficult because of language barriers with parents only speaking Spanish, difficulty contacting parents at home, and families in unstable housing situations. This pilot program tried to address issues getting urgent cases into care by working directly with parent engagement specialists at each school as well as closely with a district school nurse and two area clinics. These key staff were critical to the success of getting all urgent need students seen by a dentist as a result of this screening. By tracking and prioritizing the students in need this pilot has been successful in getting all identified students into treatment.

Another consideration beyond assessing is the application of fluoride varnish. Fluoride varnish is an important intervention for students. According to the CDC, professional application of fluoride varnish prevents one third of decay in primary teeth and almost half of decay in permanent teeth.<sup>7</sup> This pilot project was an effective way to prevent decay in underserved students whose parents provide consent. While this program’s consent returns fell in best practice standards, better consent rates would increase fluoride varnish application. By collecting surveys to assess the best path to reach out to parents, the pilot program team will seek to educate parents about the benefits of fluoride varnish through multiple pathways in the future. These could include but are not limited to: back to school events, parent group meetings, automated-calls from the schools, better or more frequent flyer distribution, and signage around classrooms.

## Assessment Report Cards

A Report Card was created to show outcomes for schools (see Figure 3 and 4 below.) School level “Report Cards” as well as District Level “Report Cards” help visually capture the decay rates, fluoride varnish applications, and students screened during the pilot program. The bottom of each report card also charts the school(s) results compare to the 2014 Smile Survey data. School principals and District Superintendents were furnished with both hard and digital copies to display or keep on file.

**Figure 3. & 4. Examples of Assessment Report Card**



## Recommendations

### 1. Increase dental screenings and referrals for kindergarteners

Kindergarten screening, completed by the end of the first year in school, is a state requirement. Identifying decay early, providing preventive fluoride varnishes and connecting children and their families to dental homes will decrease dental disease. School based screening has been shown to benefit lower income communities, decreasing lost work time for parents and cost for dental care. Schools benefit from fewer student absences for dental care. Developing a sustainable countywide kindergarten screening program, to focus on provision of care for lower income students, will require commitment from multiple stakeholders and is integral to efforts to improve kindergarten readiness.

### 2. Increase reporting of dental assessments by Sonoma County schools to the State Database.

The reporting process now is cumbersome and confusing, with few school districts reporting data. This could be because some districts are not collecting, but the more likely reason is that school staff do not know or have the capability to report the data. According to the Wright School District Nurse, reporting was difficult for her because she has very little direction on how to report and to where to report data collected. The current technical assistance for districts comes from school nurses who have been in

districts for a while. While a database is available through the California Dental Association (CDA), schools need to prioritize collecting and reporting of data. The CDA offers technical assistance that should be made available to all district and school level nurses. Also, having dental assessments were performed on-site during the beginning of the school year could lead to students' data being compiled and uploaded quickly.

### **3. Consider expanding school based programs.**

School based dental programs are an effective strategy to reach underserved children. School based sealant programs are in numerous schools throughout Sonoma County. The School Smile Program operates in 12 schools and would be a great way to implement Kindergarten Assessments while parents are already engaged around the idea of school based dental care. Schools with Kindergarten dental assessments should also expand into more preventative services like dental sealants. School-age children without sealants have almost 3 times more cavities than those with sealants.<sup>6</sup> By bringing dental programs to the school site, children learn about the importance of dental health, interact with dental professionals in a familiar environment and benefit from teacher and peer support. The economic return on investment for schools and parents is substantial as well. According to the Children's Dental Health Project Sealant Report, the average cost of applying a sealant is less than one-third the cost of filling a cavity.<sup>8</sup>

#### References

1. County of Sonoma Dept. of Health Services. (2013). *Sonoma County Smile Survey: An Oral Health Assessment of Sonoma County's Kindergarten and Third Grade Children*.
2. County of Sonoma Dept. of Health Services (2015). *The Costs of Dental Disease Prevention and Early Treatment Strategies in Sonoma County*.
3. Griffin SO et al. (2001). [An economic evaluation of community water fluoridation](#). *Journal of Public Health Dentistry*, 61 (2), 78-86.
4. O'Connell JM et al. (2005). [Costs and savings associated with community water fluoridation programs in Colorado](#). *Preventing Chronic Disease*, 2, 1-13.
5. California HealthCare Foundation. (2009). *Emergency Department Visits for Preventable Dental Conditions in California*. Retrieved April 2015 from California Healthcare Foundation: <http://www.chcf.org/~media/MEDIA%20LIBRARY%20Files/PDF/E/PDF%20EDUseDentalConditions.pdf>.
6. Centers for Disease Control and Prevention. (2016). [School Dental-Sealant Programs Could Prevent Most Cavities, Lower Treatment Costs in Vulnerable Children](#). *Press Release*
7. Centers for Disease Control and Prevention. (2014). [Use of Dental Care and Effective Preventive Services in Preventing Tooth Decay Among U.S. Children and Adolescents — Medical Expenditure Panel Survey, United States, 2003–2009 and National Health and Nutrition Examination Survey, United States, 2005–2010](#). *Morbidity and Mortality Weekly Report (MMWR)*, 63(02);54-60
8. Children's Dental Health Project. (2014). [Dental Sealants: Proven to Prevent Tooth Decay](#). Website.