

2019 Sonoma County

Smile Survey

An Oral Health Assessment of Sonoma County's Kindergarten and Third Grade Children



Prepared by
The Assessment and Epidemiology Unit
Health Policy, Planning and Evaluation Division
Jenny Mercado, MPH

*Healthy Communities Unit
Public Health Division
Kimberley Caldewey, PA, MPH
Andrea Pickett, MPH*

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Dental Screening Team: Claudia Lepe, RDH; Nadia Alrawi, RDH; Fernando Arriuga; Menfil Martinez

Participating Schools:

Jefferson Elementary: Principal Susan Yakich & Jennifer Craig, School Secretary II

John Reed Primary: Principal Monica Fong & Linda Ortega, Office Manager

Corona Creek Elementary: Principal Rebecca Rosales & Tami Gholson, School Secretary

Old Adobe Elementary Charter: Principal Jeff Williamson & Susan Packard, Office Secretary

La Tercera Elementary: Principal Katie Boss & Helena Sandie, Office Manager

Healdsburg Charter/HES Campus: Principal Stephanie Feith & Rosie Wagner, Secretary

Healdsburg Charter/Fitch Mountain Campus: Principal Erika McGuire & Laurel Green, School Secretary

Prestwood Elementary: Principal Jason Sutter & Regina Webb, School Office Manager

Dunbar Elementary: Principal Jillian Beall & Linda Dehzad, School Office Manager

Binkley Elementary Charter: Principal Hilary Kjaer & Tahryn Anderson, Office Manager

Village Elementary Charter: Principal Cecilia Franco-Holt & Suzana Jaynai, Office Manager

Whited Elementary Charter: Principal Beth Acosta & Lisa Rossi, Office Manager

Luther Burbank Elementary: Principal Liz Newman & Nerina Galindo, ESOM

James Monroe Elementary: Principal Katheryne Stoural

Kawana Springs Elementary: Principal Carolina Castro Ballard & Pamela Backman, Office Manager

Sheppard Elementary: Principal Jenny Young

Penngrove Elementary: Principal Amy Fadeji; Yesenia Espino, Senior School Secretary; and Jamie Kelly, School Nurse

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EXECUTIVE SUMMARY

In 2006, a coalition of community agencies and organizations set out to ensure that children in Sonoma County are healthy and ready to achieve their educational and social potential. This coalition, first called the Sonoma County Oral Health Access Coalition and later renamed the Sonoma County Dental Health Network, places oral health at the center of its activities, conducting investigations into the current status of dental health, mapping resources available to lower income and Spanish-speaking community members, and developing goals for the greatest impact. The results include the Sonoma County 2017-2020 Dental Health Strategic Plan, a comprehensive telephone survey, focus groups, school-based prevention and education programs and a dental screening survey to track progress over time. The Sonoma County Smile Survey is a basic dental health screening exam conducted at 5-year intervals in randomly sampled elementary schools for kindergarteners and third graders, since 2009. The 2019 survey provides a 10-year perspective and allows us to identify significant trends. These data forms the foundation for the county's Dental Health Network to set strategic goals, evaluate existing programs and plan for investments in resources. The health disparities noted between white and Latino/Hispanic students and between students attending higher and lower income schools is of particular interest as health, education and child development partners work together to achieve equity in health outcomes for all Sonoma County children.

Key Findings

The findings are presented here with reference to health improvement and health disparities in order to identify areas for continued efforts and improvements to reach oral health equity for Sonoma County's children.

Decay Experience

Health Improvement

- The percent of students with decay experience decreased significantly from 2009 to 2019 among third grade students, from 58 percent to 44 percent.
- From 2009 to 2019 the percent of students with decay experience decreased significantly in schools with the highest enrollment in Free and Reduced Lunch Program (50-74% and $\geq 75\%$, lower income).

Disparities

- The percent of Hispanic/Latino students with decay experience was significantly higher than for white, non-Hispanic students; however, decay experience among Hispanic/Latino students decreased significantly from 2009 to 2019.
- Despite improvement in decay experience for children attending the lowest income schools, the rate of decay was almost twice as high as for children attending higher income schools.

Untreated Decay

Need for early dental treatment

- There was no significant change in the percent of untreated decay, overall, for kindergarten or third grade students from 2009-2019.

Decreasing Disparities

- The percent of Hispanic/Latino students in need of early dental care was significantly higher than that of white, non-Hispanic students.
- The percent of Hispanic/Latino students in need of early dental care increased significantly from 2009 to 2019.

Need for urgent treatment

Health Improvement

- From 2009 to 2019 the need for urgent dental care decreased significantly for Hispanic/Latino students.
- From 2009 to 2019 there was a significant decrease in the percent of students in need of urgent care in lower income schools (50-74% FRLP and $\geq 75\%$ FRLP). In 2019 there was no difference between the need for urgent dental care between white, non-Hispanic and Hispanic/Latino students, where previously Hispanic/Latino students were 3 times more likely to need urgent care than white, non-Hispanic students.

Sealants in place

Health Improvement

- The percent of third graders with sealants was significantly higher in 2019 compared to 2009.
- The percent of third graders with sealants almost doubled for both white, non-Hispanic and Hispanic/Latino students from 2009 to 2019.

Decreasing Disparities

- In general, third graders in schools with $\geq 75\%$ of students enrolled in FRLP (lower income) were significantly more likely to have sealants than those in schools with a lower percentage enrolled in FRLP (higher income).

Key Recommendation:

Continue efforts to address the social determinants of oral health through the Dental Health Network and other community partnerships.

Introduction

Purpose

The purpose of this survey is to provide current, local dental health data to public health planners, healthcare providers and the public. Data are a vital component in understanding and addressing the oral health issues of a community, to identify and prioritize activities to improve health for underserved populations. In 2009 the Department of Health Services coordinated the first Sonoma County Smile Survey, establishing a baseline assessment of oral health in school-aged children across Sonoma County. The survey was repeated in 2014 and again in the spring of 2019. The Basic Screening Survey is a tool for oral health surveillance for use in public health action to reduce disease and improve health.ⁱ The survey assesses kindergarten and third grade children for caries, caries experience, untreated decay, the need for early and urgent dental care, and the placement of sealants in third grade students. This oral health surveillance will inform oral health improvement efforts across the county.

Background

Dental caries, also known as cavities, remains the number one chronic disease of childhood, two to three times more common than asthma or obesity.ⁱⁱ Yet nearly all tooth decay can be prevented, and early prevention can save money for families and communities. Dental disease is one of the most common reasons for school absences, and children in pain, even when they are in the classroom, are unable to concentrate, learn, play and develop. Children with cavities in their primary teeth are three times more likely to develop cavities in their adult teeth, and losing baby teeth to decay can negatively impact the development of adult teeth. Dental disease affects overall health throughout the lifetime and is linked with other chronic diseases like diabetes and heart disease. It is also linked with risk behaviors like tobacco use and eating and drinking foods and beverages high in sugar.ⁱⁱⁱ Despite expansion of California's Medi-Cal dental program in recent years, lack of access to a dental home is a problem for many children. Oral health disparities are profound in the United States and those disparities are reflected in Sonoma County data as well. When all children are able to reach their full potential the whole community enjoys greater well-being and prosperity.

METHODS

Sample Selection and Data Collection

To update our understanding of the prevalence of tooth decay and the continued need for dental disease prevention and care among Sonoma County children, a countywide oral health screening was performed in the spring of 2019.

An electronic data file of all public elementary schools in Sonoma County was obtained from the California Department of Education. The data file, which was for the 2017-2018 school year and the most current at the time of sampling,

contained Free and Reduced Lunch Program (FRLP) ¹ and school total enrollment data by school. Grade-specific enrollment data, also from the California Department of Education, were matched to the FRLP data file. These data were used to select a systematic probability sample from public elementary schools with at least 20 children in kindergarten and third grade. The sample was stratified by the percent of students enrolled in FRLP with one out of ten schools with less than 50% of students in FRLP selected and one out of four schools with 50% or more students in the FRLP selected. Of the initial seventeen elementary schools randomly selected for inclusion, two schools declined to participate and two additional school were randomly chosen from the same FRLP stratum as replacements (Table 1). One of the two replacement schools also declined to participate. A third replacement school was selected for the sample. This school also declined participation and a replacement was not selected. The proportion of students in FRLP in the missing sampling interval is 23%. Response rates for the the participating schools ranged from 66% to 91%.

Table 1. Schools in sample by proportion in FRLP, enrollment, number screened, and response rate

School	Proportion of Students in FRLP	Total		Response Rate* Percent
		Enrolled K & 3rd Grade	Total Screened	
<i>Initial sample</i>				
Binkley Elementary	54.7	90	74	82.2
Corona Creek Elementary	13.6	142	123	86.6
Dunbar Elementary	81.2	60	46	76.7
Healdsburg Charter/Fitch	32.0	98	78	79.6
James Monroe Elementary	83.0	102	88	86.3
Jefferson Elementary	66.5	197	155	78.3
John Reed Elementary	77.5	142	124	87.3
Kawana Elementary	85.0	100	87	87.0
La Tercera Elementary	52.6	84	71	84.5
Luther Burbank Elementary	70.5	82	66	80.5
Oak Grove Elementary ¹	26.1	82	0	0.0
Old Adobe Elementary	21.8	88	69	78.4
Prestwood Elementary	41.0	126	83	65.9
Sheppard Elementary	88.0	177	161	91.0
Village Elementary	57.0	99	87	87.9
Whited Elementary	59.7	104	90	86.5
Woodland Star Charter ¹	25.4	72	0	0.0
<i>Replacement schools</i>				
Alexandar Valley Elementary ¹	23.3	33	0	0.0
Orchard View ¹	21.9	24	0	0.0
Penngrove Elementary	26.9	115	95	82.6

¹ Declined to participate

*Response rates based on 2018/2019 enrollment

In spring of the 2018-2019 school year, oral health screenings were completed at the sixteen selected schools. Children in participating schools were given a letter of explanation and a care declination form. If parents returned the care declination form, the child was excluded from screening; all other children were provided oral health screenings (passive consent). A trained dental examiner completed all screenings by visually inspecting the oral cavity using gloves, a LED headlight and disposable mouth mirrors to detect the presence or absence of specific oral conditions using the Basic Screening Survey developed by the Association of State and Territorial Dental Directors (ASTDD). Four oral health indicators were collected for each child screened:

- presence of tooth decay -*decay experience, untreated decay*

¹ Free and Reduced Lunch Program provides subsidies for free and reduced-price lunches to students based on family and income size. Eligibility is determined by an application process which parents complete and submit annually. Children from families below 130% of the poverty level (\$30,615 for a family of four) are eligible for free meals and those between 130 to 185% of the poverty level (\$30,616 to \$43,568 for a family of four) are eligible for reduced-price meals. (US Department of Health and Human Services, 2014). Eligibility for FRLP is often used as an indicator of overall socioeconomic status. Information on individual participation in the FRLP was not available; however, the percentage of children participating in the program in each school was known.

- presence of treated tooth decay - *cavity, restoration, extraction of a molar*
- presence of dental sealants - *at least one sealant on a permanent molar*
- need for dental care – *early dental care, urgent dental care needed or no dental care.*

Screeners also collected data on sex, race and ethnicity, and child age from school rosters. Race and ethnicity was indicated using a standard form which included the following categories: White, Black/African American, Hispanic/Latino(a), Asian, American Indian/Alaska Native, multi-racial, unknown/missing and a field for other values.

Using criteria outlined in the ASTDD Basic Screening Survey manual, screeners completed each assessment and entered data directly using a tablet and data entry software.

Data Analysis

Data from all sites were aggregated into a single file. Data were cleaned and analyzed using SAS 9.4 (Cary, NC). The complex sample survey design was incorporated into the analysis. All percentages were computed as weighted averages. All estimates reflect the weighted average for each grade over the entire county. The Rao, Scott likelihood ratio chi-square test was used to test for statistical association between oral health outcomes and demographic variables. Logistic regression was used to test for linear trends. For all statistical testing, a p-value less than 0.05 was considered statistically significant.

RESULTS

Demographics

Table 2 describes the demographic characteristics of children screened in the sampled schools. About half of the students in the sampled schools were kindergartners, and females and males were equally represented (49% and 51%, respectively).

White and Hispanic/Latino children represent 94% of the 1,497 students screened. Due to the relatively small sample size of other racial/ethnic groups, analysis by race/ethnicity was limited to white, non-Hispanic and Hispanic/Latino students.

It is important to acknowledge that, although this survey was unable to capture the oral health status of other non-white or non-Hispanic students, such as Native Americans, disparities in these other populations may be large, requiring targeted resources to address. Health disparities research shows that an inability to measure these disparities can increase poor health outcomes because the impact of interventions on these populations is not being evaluated.

Table 2. Demographic characteristics of participating students

	Kindergarten	3rd Grade	Total
Number Screened	751	746	1497
<i>Race/Ethnicity</i>			
White	45.0%	43.4%	44.2%
Hispanic/Latino	48.1%	50.9%	49.5%
African American/Black	2.9%	2.7%	2.8%
Asian	3.9%	2.1%	3.0%
Pacific Islander	0.0%	0.0%	0.0%
American Indian	0.0%	0.1%	0.1%
Multi-racial	0.0%	0.5%	0.3%
Unknown	0.1%	0.1%	0.1%
<i>Gender</i>			
Female	48.7%	47.1%	47.9%
Male	51.3%	52.9%	52.1%

Decay Experience

Decay experience is defined as the presence of either untreated or treated tooth decay (cavity) or a permanent molar tooth that is missing because it was extracted as a result of decay. About 41% of kindergarten and third grade students had decay experience in 2019, significantly less than in 2009 (52%). Detailed data on students with decay experience are displayed in Table 3. Highlights of these data are described below.

By Grade Level

Approximately 41% of kindergarteners and 44% of third graders had decay experience in 2019 (Figure 1). From 2009 to 2019, there was a significant decrease in the percent of third graders with decay experience. In 2009, during the first administration of the survey, a significantly higher percent of third graders had decay experience than kindergarten students; however, in 2019 the percent of students with decay experience by grade level was similar.

By Race/Ethnicity

The percent of students with decay experience varied for white, non-Hispanic and Hispanic/Latino students. In 2019 about 58% of Hispanic/Latino students (6 in 10 students, Figure 2) had decay experience, significantly higher than the percent of white, non-Hispanic students with decay experience (31%, or 3 in 10 students). From 2009 to 2019 the percent of students with decay experience decreased significantly (12% decrease) for Hispanic/Latino students while no change occurred among white, non-Hispanic students, resulting in a reduction in the disparity for this health indicator.

By Percent of Children in Free and Reduced Lunch Program (FRLP)

Students in schools with a higher proportion of students enrolled in the FRLP (indicating lower income) were significantly more likely to have decay experience than those in schools with lower percentage enrolled in the FRLP (higher income). Students in schools with the highest proportion of participants in the FRLP were almost two times as likely to have decay experience as students in schools with the lowest proportion of FRLP participation (57% for >=75% in FRLP compared to 32% for 0-25% in FRLP). From 2009 to 2019 the

Table 3. Percent of students with decay experience by grade, race/ethnicity, enrollment in FRLP and assessment year

	2009	95% Confidence Interval (CI)	2014	95% CI	2019	95% CI
<i>Total</i>	51.7	49.2-54.2	50.5	45.2-55.9	42.6	38.4-46.7 ^
<i>Grade</i>						
Kindergarten	46.1*	42.7-49.5	45.8*	39.2-52.5	41.4	36.2-46.6
3rd Grade	58.4	54.8-62.2	55.5	50.3-60.7	43.8	38.1-49.4 ^
<i>Race/ethnicity</i>						
White, non-Hispanic	32.2*	28.0-36.5	34.2*	30.9-37.4	31.3*	26.7-35.9
Hispanic/Latino	65.1	61.9-68.4	63.7	59.1-68.2	57.8	53.7-61.8 ^
<i>Proportion of children in FRLP</i>						
0-25%	30.6*	24.1-37.2	32.8*	30.7-34.8	31.7*	25.2-38.2
25-49%	39.1	32.8-45.4	39.5	33.9-45.1	33.9	25.8-42.1
50-74%	54.4	54.4-49.9	54.5	45.4-63.6	46.8	40.9-52.7 ^
>=75%	67.3	63.9-71.1	68.1	63.4-72.9	57.2	50.7-63.4 ^

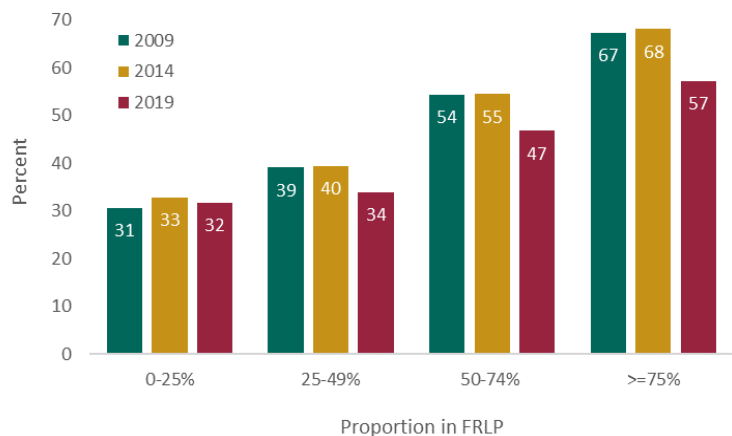
*Chi-square test for independence significant p<.05,

^Test for linear trend (by year) significant p<.05

Figure 2. Ratio of students with decay experience by race/ethnicity, 2019



Figure 3. Percent of students with decay experience by proportion enrolled in FRLP and assessment year



percent of students with decay experienced decreased significantly in schools with 50-74% and $\geq 75\%$ enrolled in FRLP but remained constant (no statistical change) in schools with less FRLP participation (Figure 3).

Untreated Decay

Untreated decay is tooth decay that has not received appropriate care, either in the form of a dental filling or a restoration such as a crown. In 2019, about one out of five kindergarten and third grade students (16%) had untreated decay. The percent of students with untreated decay did not change significantly for either grade from 2009 to 2019. Detailed data on students with untreated decay is presented in Table 4 and significant findings are highlighted below.

Table 4. Percent of students with untreated decay by grade, race/ethnicity, enrollment in FRLP and assessment year

		2009	95% CI	2014	95% CI	2019	95% CI
<i>Total</i>		16.2	14.3-18.1	17.6	13.8-21.3	15.5	11.7-19.4
<i>Grade</i>	Kindergarten	15.5	13.0-18.0	19.5	14.6-24.5	15.9	10.3-21.6
	3rd Grade	16.8	13.9-19.6	15.5	12.5-18.5	15.1	11.6-18.7
<i>Race/ethnicity</i>	White, non-Hispanic	10.9*	8.1-13.7	11.0*	7.5-14.5	11.4*	6.6-19.3
	Hispanic/Latino	19.7	16.9-22.5	21.5	16.8-26.3	21.3	17.4-25.1
<i>Proportion of children in FRLP</i>	0-25%	9.3*	5.1-13.5	10.5*	4.5-16.5	11.9	5.8-17.9
	25-49%	14.2	9.7-18.7	11.4	8.6-14.2	11.4	2.3-20.4
	50-74%	16.5	13.1-19.9	22.3	12.6-32.1	16.7	11.4-21.9
	>=75%	20.9	17.5-24.2	22.8	16.5-29.1	22.5	16.9-28.1

*Chi-square test for independence significant $p < .05$,

^Test for linear trend (by year) significant $p < .05$

By Grade Level

In 2019 the percent of students with untreated dental decay was similar for kindergarten and third graders (16% and 15%, respectively). While untreated decay appears to be trending downward among third grade students, the rate was not significantly different in 2019 compared to 2009. The percent of kindergarteners with untreated decay did not change significantly from 2009 to 2019 (Figure 4).

By Race/Ethnicity

In 2019 the percent of students with untreated dental decay was significantly higher for Hispanic/Latino students than for white, non-Hispanic students (21% compared to 11%). There was no significant change in the percent of Hispanic/Latino or white, non-Hispanic students with untreated decay from 2009 to 2019 (Figure 5).

By Percent of Children in FRLP

In 2019 there was no significant difference in the percent of students with untreated dental decay by percent enrolled in FRLP. From 2009 to 2019 there was no significant change in the percent of students with untreated decay by percent enrolled in FRLP.

Figure 4. Percent of students with untreated dental decay by grade level and assessment year

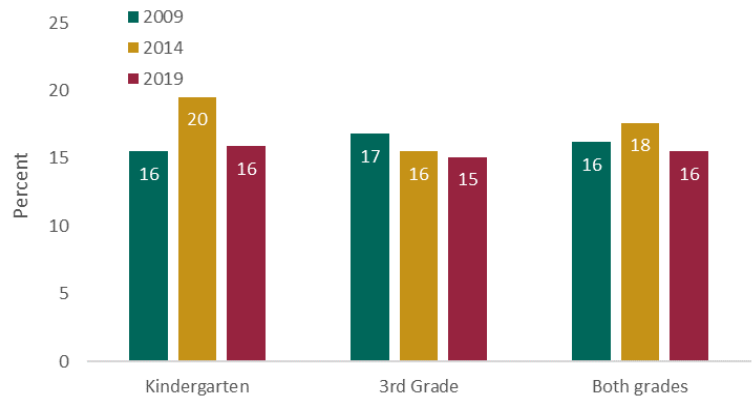
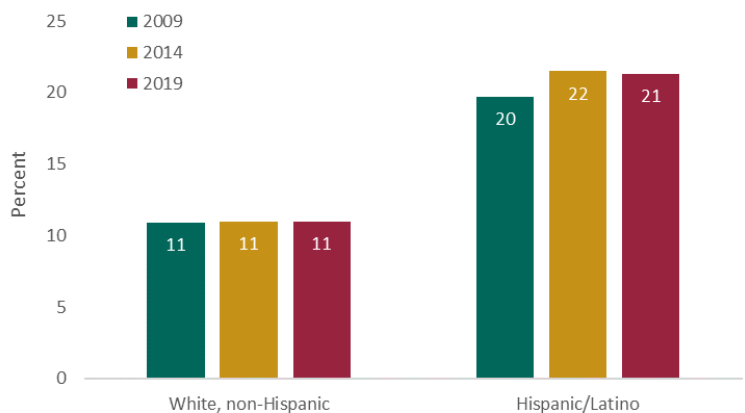


Figure 5. Percent of students with untreated dental decay by race/ethnicity and assessment year



Need for Dental Care

Need for dental care refers to the level of care urgency determined by his/her oral health status, as defined by the Association of State and Territorial Dental Directors' (ASTDD) Basic Screening Manual. **Early care** is needed when the child has untreated decay but has no pain or infection. The ASTDD recommends that dental care should be provided within the next several weeks. A child with a broken or missing filling but no other untreated decay would be classified as needing early dental care. **Urgent care** is needed when the child has pain, infection, or swelling (abscess). The ASTDD recommends that dental care should be provided within 24 to 48 hours. Tables 5-7 provide a detailed description of students in need of dental care by urgency and significant findings described below.

Any Dental Care

In 2019 about 15% of kindergarten and third graders had any need for dental care (early or urgent). The percent of students with any need for dental care remained similar from 2009 to 2019.

Early Dental Care

Almost 15% of students were in need of early care in 2019. The percent of students in need of early care increased significantly from 2009 to 2019 (from 11% to 15%).

Urgent Dental Care

In 2019, less than 1% of kindergarten and third grade students were in need of urgent dental care, significantly less than the 4% of students in need of urgent care in both 2009 and 2014.

Table 5. Percent of students with any need for dental care by grade, race/ethnicity, enrollment in FRLP and assessment year

		2009	95% CI	2014	95% CI	2019	95% CI
<i>Total</i>		15.9	14.0-17.7	18.0	14.2-21.8	15.4	11.7-19.1
<i>Grade</i>	Kindergarten	14.9	12.5-17.4	20.1	15.1-25.2	15.9	10.3-21.6
	3rd Grade	16.6	13.7-19.4	15.8	12.6-18.9	14.8	11.2-18.4
<i>Race/ethnicity</i>	White, non-Hispanic	10.8*	7.9-13.7	11.2*	7.6-14.8	11.2*	6.6-15.7
	Hispanic/Latino	19.0	16.3-21.7	21.9	17.3-26.6	21.3	17.4-25.1
<i>Proportion of children in FRPL</i>	0-25%*	10.1	5.6-14.5	10.0*	4.6-15.4	11.9	5.8-17.9
	25-49%	14.5	10.0-19.0	12.6	7.6-17.6	10.9	2.6-19.3
	50-74%	15.4	12.0-18.7	23.1	13.7-32.5	16.7	11.4-21.9
	>=75%	20.2	16.8-23.5	23.1	17.2-29.1	22.5	16.9-28.1

*Chi-square test for independence significant p<.05,

^Test for linear trend (by year) significant p<.05

Table 6. Percent of students with early need for dental care by grade, race/ethnicity, enrollment in FRLP and assessment year

		2009	95% CI	2014	95% CI	2019	95% CI
<i>Total</i>		11.4	9.8-13.1	13.6	10.7-16.5	14.5	10.9-18.1 ^
<i>Grade</i>	Kindergarten	10.1	8.1-12.1	14.6	11.6-18.0	15.7	10.1-16.6 ^
	3rd Grade	12.5	10.0-15.1	12.6	9.5-15.6	13.3	10.0-16.6
<i>Race/ethnicity</i>	White, non-Hispanic	9.2*	6.7-11.4	8.7*	5.4-12.0	10.2*	5.9-14.5
	Hispanic/Latino	12.9	11.1-14.4	15.8	12.8-18.1	20.5	16.6-24.3 ^
<i>Proportion of children in FRPL</i>	0-25%	8.9*	7.2-10.7	8.3	2.7-13.9	11.2	6.3-16.1
	25-49%	11.4	6.1-16.7	9.3	5.4-13.2	10.5	2.1-18.9
	50-74%	11.0	9.8-12.3	16.7	9.8-23.6	15.2	10.3-20.1 ^
	>=75%	13.2	12.1-14.5	17.7	13.6-21.9	21.4	15.8-26.9 ^

*Chi-square test for independence significant p<.05,

^Test for linear trend (by year) significant p<.05

Table 7. Percent of students with urgent need for dental care by grade, race/ethnicity, enrollment in FRLP and assessment year

		2009	95% CI	2014	95% CI	2019	95% CI
<i>Total</i>		4.4	3.4-5.5	4.4	3.2-5.6	0.9	0.4-1.3 ^
<i>Grade</i>	Kindergarten	4.9	3.3-6.4	5.6	3.2-7.9	0.3*	0-0.5 ^
	3rd Grade	4.0	2.6-4.0	3.2	2.4-4.1	1.5	0.7-2.4 ^
<i>Race/ethnicity</i>	White, non-Hispanic	1.6*	0.3-2.8	2.5*	1.1-3.9	0.9	0.1-1.7
	Hispanic/Latino	6.1	4.4-7.7	6.2	4.3-8.2	0.8	0.3-1.4 ^
<i>Proportion of children in FRPL</i>	0-25%	1.2*	0-2.9	1.7*	1.5-1.9	0.7	0-1.8
	25-49%	3.1	0.8-5.4	3.3	2.2-4.4	0.4	0-1.1 ^
	50-74%	4.4	2.5-6.2	6.4	3.6-9.2	1.5	0.7-2.3 ^
	>=75%	7.0	4.8-9.1	5.4	3.3-7.4	1.1	0.2-2.0 ^

*Chi-square test for independence significant p<.05,

^Test for linear trend (by year) significant p<.05

By Grade Level

Any Dental Care

In 2019 the percent of kindergarten and third grade students in need of any dental care was similar (16% and 15%, respectively). The percent of students in need of any dental care did not change significantly from 2009 to 2019 for kindergarten or third graders.

Early Dental Care

Rates of students in need of early dental care were similar by grade level. In 2019 about 16% of kindergarteners and 13% of third grade students were in need of early dental care. From 2009 to 2019, the percent of kindergarteners in need of early care increased significantly but did not change significantly for third graders.

Urgent Dental Care

The percent of students in need of urgent care varied by grade level with less than 1% of kindergarteners and about 2% of third graders needing urgent care in 2019. From 2009 to 2019 there was a significant decrease in the percent of students needing urgent care for both kindergarteners and third graders.

By Race/Ethnicity

Any Dental Care

In 2019 Hispanic/Latino students were nearly twice as likely to need any dental care compared to white, non-Hispanic students (21% vs. 11%). There was no change from 2009 to 2019 in the need for any dental care for Hispanic/Latino and white, non-Hispanic students.

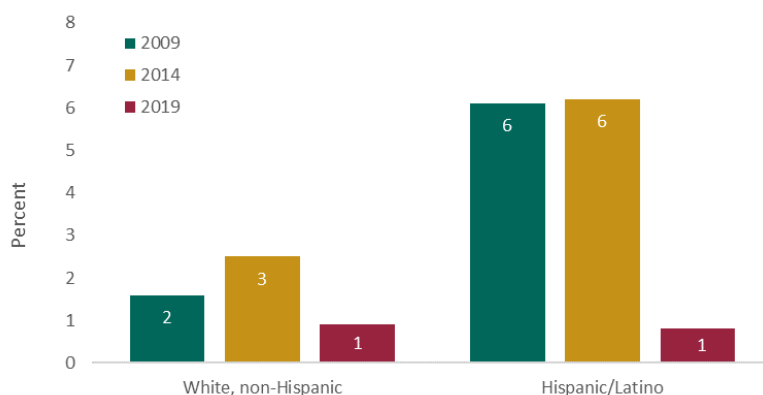
Early Dental Care

The percent of Hispanic/Latino students in need of early dental care (21%) was more than twice the rate of white, non-Hispanic students (10%) in 2019. From 2009 to 2019 the percent of Hispanic/Latino students in need of early dental care increased significantly from 13% to 21%. There was no significant change in the percent of students in need of early care for white, non-Hispanic students over the time period.

Urgent Dental Care

In 2019 there was no significant difference in the percent in need of urgent dental care for Hispanic/Latino compared to white, non-Hispanic students (Figure 6). In contrast, the percent of Hispanic/Latinos students in need of urgent care in 2009 was three time higher than white, non-Hispanic students (Figure 6). Need for urgent care decreased significantly from 2009 to 2019 for Hispanic/Latino students (6% compared to 1%) but did not change significantly for white, non-Hispanic students.

Figure 6. Percent of students in need of urgent dental care by race/ethnicity and assessment year



By Percent of Children in FRLP

Any Dental Care

In 2019 the percent of children in need of any dental care did not vary significantly by the percent enrolled in FRLP. There were no changes in the percent of children in need of any dental care by percent enrolled in FRLP from 2009 to 2019.

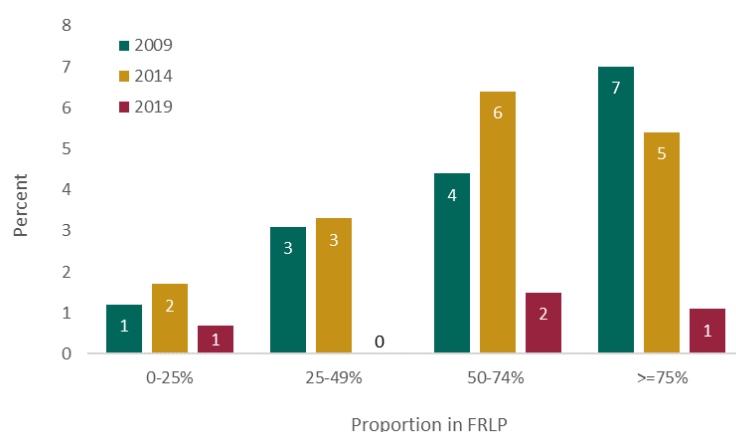
Early Dental Care

The percent of children in need of early dental care did not vary significantly by the proportion enrolled in FRLP in 2019. From 2009 to 2019 the percent of students in need of early care increased significantly schools with 50-74% and $\geq 75\%$ FRLP participation. There were no changes in the percent of children in need of early dental care in schools with 0-25% or 25-49% students in FRLP.

Urgent Dental Care

In 2019 there was no significant difference in the need of urgent dental care by proportion of students enrolled in FRLP. In contrast, the percent of students in need of urgent dental care in 2009 was significantly higher for schools with $\geq 75\%$ of students in FRLP (lower income) compared to those with 0-25% of students in FRLP (7% compared to 1%). From 2009 to 2019 there was a significant decrease in the percent of students in need of urgent care for schools with 25-49%, 50-74%, and $\geq 75\%$ of students in FRLP (Figure 7).

Figure 7. Percent of students in need of urgent dental care by proportion enrolled in FRLP and assessment year



Sealants

Dental sealants are thin, plastic coatings applied to the chewing surface of the back of the teeth. Sealants are applied on a child's first molars during first and second grade and second molars during sixth or seventh grade and are recommended by the American Dental Association (ADA), the Centers for Disease Control and Prevention (CDC), and many other national health agencies. According to the CDC, sealants protect against 80% of cavities for 2 years and continue to protect against 50% of cavities for up to 4 years.^{iv} In 2019 almost 31% of third grade students had sealants, significantly higher than in 2009 (17%). Detailed data on sealants is displayed in Table 8 and significant findings are described below.

Table 8. Percent of third graders with sealants by race/ethnicity, enrollment in FRLP and assessment year

		2009	95% CI	2014	95% CI	2019	95% CI
<i>Total</i>		16.8	13.9-19.7	43.8	36.5-51.0	30.9	23.6-38.2
<i>Race/ethnicity</i>	White, non-Hispanic	15.6	10.5-20.8	36.9*	26.1-47.9	29.9	20.9-39.0
	Hispanic/Latino	16.8	13.0-20.6	53.1	43.9-62.2	33.7	23.8-43.5
<i>Proportion of children in FRPL</i>	0-25%	13.6	7.1-20.0	32.9*	29.6-36.3	23.2*	19.3-27.1
	25-49%	17.6	8.3-26.6	48.9	34.4-63.4	31.3	13.7-48.9
	50-74%	19.6	14.2-25.1	41.5	32.9-50.1	23.7	15.3-32.1
	$\geq 75\%$	16.2	11.8-20.6	50.7	38.2-63.1	42.2	34.0-50.4

*Chi-square test for independence significant $p < .05$,

^Test for linear trend (by year) significant $p < .05$

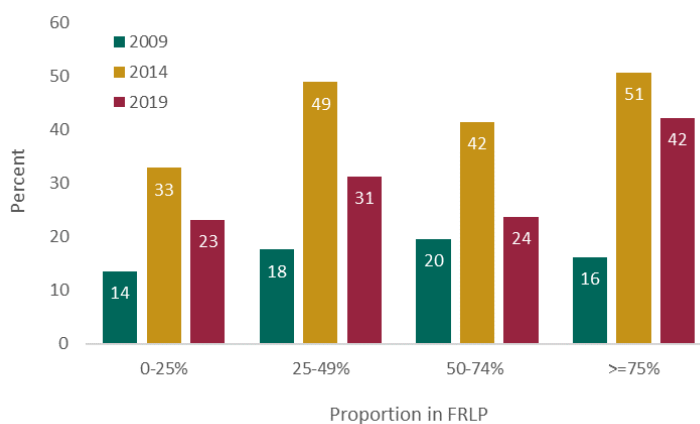
By Race/Ethnicity

The percent of students with sealants was similar for white, non-Hispanic and Hispanic/Latino third graders (30% compared to 34%) in 2019. The percent of third graders with sealants doubled for both white, non-Hispanic and Hispanic/Latino students from 2009 to 2019 (from 16% to 30% and 17% to 34%, respectively).

By Percent of Children in FRLP

In general, third graders in schools with $\geq 75\%$ of students enrolled in the FRLP (lower income) were significantly more likely to have sealants than those in schools with a lower proportion enrolled in the FRLP (higher income). From 2009 to 2014 the percent of third graders with sealants increased significantly in all levels of enrollment in FRLP (Figure 8). These rates decreased significantly from 2014 to 2019; however, the percent of third graders with sealants was still higher in 2019 than 2009.

Figure 8. Percent of 3rd grade students with sealants by proportion enrolled in FRLP and assessment year



DISCUSSION AND IMPLICATIONS

Limitations

The findings in this report are subject to several limitations. First, one school selected as a replacement declined to participate and was not replaced. This resulted a smaller sample size in the 0-25% FRLP stratum and a slight overrepresentation of lower income schools in the sample. Second, the possibility of selective participation, meaning not all parents permitted their children to participate, may have caused bias. Third, these screenings were conducted without the help of diagnostic x-rays and results will likely differ from those observed by office clinicians. Finally, the cross-sectional study design does not allow the identification of whether dental sealant placement occurred before or after the occurrence of decay experience.

Discussion

The 2019 survey findings, in isolation, depict a community experiencing a high prevalence of dental disease in school-aged children. However, in the course of the ten years from the first survey to the most recent survey, significant improvements have been realized, including a reduction in disparities in the need for urgent dental treatment and in the placement of dental sealants. While these trends are encouraging, the goal of achieving 75% cavity free 5-year-olds by 2020 remains elusive. Disparities between children attending higher income schools and those attending schools with a greater proportion of the students enrolled in FRLP continue. The dental health gap between Latino/Hispanic and white children has decreased over time, yet persists, resulting in a two-fold increase in disease for Latino/Hispanic students. Children whose families have limited resources are significantly less likely to visit a dentist and more likely to have untreated dental needs than those in higher incomes.^v The cost of dental care remains a significant barrier to care. For many families, taking time off work to attend a dental appointment is an economic hardship, yet evening and weekend services are very limited in Sonoma County.^{vi} A recent telephone survey of 600 Sonoma County residents revealed that

for Latinos, cost of care, fear of the dentist, not having the time to go and difficulty finding a dentist are all barriers to care.^{vii} Transportation assistance, flexible evening and weekend services, linguistic and cultural competency among care staff, services located on bus-line and in neighborhoods and the use of community health workers to encourage and coordinate care are all solutions to access barriers that related to the economic and social conditions that influence differences in health status. These conditions are broadly described as the social determinants of health.^{viii}

In the ten year period from 2009-2019, investments totaling tens of millions of dollars in infrastructure and programming have resulted in numerous efforts to improve the oral health of children in Sonoma County such as: the construction of community dental clinics throughout the county; prevention services offered at WIC sites, preschools and elementary schools; treatment services via mobile clinics offered in several locations; annual Give Kids A Smile events; the introduction of community dental health workers and standardized cavity risk assessments in community dental clinics and a perinatal and infant oral health pilot project involving multiple local partners.

Preventive services in particular have skyrocketed in recent years, thanks to the Dental Transformation Initiative, a 4-year pilot project grant awarded by the California Department of Health Care Services. The number of risk assessments (basic questions and exam to determine oral health status) for low income children seen in community dental clinics increased from 1,773 in 2017 to nearly 8,000 in 2018. The ratio of prevention to treatment services nearly tripled from 5:1 in 2017 to 13:1 in the first half of 2019. These interventions, taken together, have undoubtedly contributed to some of the oral health improvements captured in this survey, and will continue to demonstrate their effectiveness in the next few years, as more children receive prevention services to stop decay before it starts. When we focus efforts to address the social determinants of oral health, we will decrease disparity and move in the direction of well-being for all in Sonoma County.

Recommendations

- Promote oral health literacy, with messages that increase awareness of oral health as a key component to general health. Important messages include: dental disease is a preventable chronic illness, baby teeth matter, dental care during pregnancy is both safe and essential, and fluoride in toothpaste, water and varnish applications are effective.
- Continue efforts to address the social determinants of oral health through the Dental Health Network and other community partnerships.
- Integrate oral health in the primary care setting, for all ages and including pregnant women.
- Increase school-based and school-linked oral health prevention services.
- Improve referral to dental care homes, ensuring that children complete the initial dental visit.
- Continue to focus on family-friendly dental services, linguistically and culturally appropriate to the community.
- Monitor dental disease through the kindergarten oral health assessment school requirement, AB 1433.

REFERENCES

ⁱ THE BASIC SCREENING SURVEY: A TOOL FOR ORAL HEALTH-ASTDD. Retrieved from <https://www.astdd.org/docs/bss-surveillance-not-research-july-2017.pdf>.

ⁱⁱ Pregnancy and Early Childhood. Retrieved from <https://www.cdhp.org/state-of-dental-health/pregnancy-early-childhood>.

ⁱⁱⁱ Centers for Disease Control and Prevention, Oral Health Basics. Retrieved from: <https://www.cdc.gov/oralhealth/basics/index.html>.

^{iv} The Centers for Disease Control and Prevention, Oral Health, Dental Sealant FAQs. Retrieved from : https://www.cdc.gov/oralhealth/dental_sealant_program/sealants-FAQ.htm

^v Osborn, R, Squites D, Doty MM, Sarnak DO, Schneider EC. In a new survey of even countries, US. Adults still struggle with access to and affordability of health care. Health Aff (Millwood) 2016;35(12):2327-2336.

^{vi} Fleming E, Afful J. Prevalence of total and untreated dental caries among youth:United States, 2015-16. NCHS Data Brief, no 307. Hyattsville, MD: National Center for Health Statistics.

^{vii} Sonoma County Dental: Findings from A Survey of 600 Sonoma County Residents. Lake Research Partners 2016.

^{viii} Secretary's Advisory Committee on Health Promotion and Disease Prevention Objectives for 2020. Healthy People 2020: An Opportunity to Address the Societal Determinants of Health in the United States. July 26, 2010. Available from: <http://www.healthypeople.gov/2010/hp2020/advisory/SocietalDeterminantsHealth.htm>