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Program Evaluation: North Dakota Department of Health Seal!ND

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Program Description

The North Dakota Department of Health (NDDoH) Oral Health Program (OHP) is committed to improving the oral health of North Dakotans through prevention and education by using innovative and cost-effective approaches to promote oral health care. The OHP functions as the "backbone" organization for public oral health services in North Dakota. The OHP seeks to foster community and statewide partnerships to improve oral health and enhance access to dental care. One successful program that illustrates how the NDDoH is achieving this goal is Seal!ND.

According to the Centers for Disease Control and Prevention (CDC, 2017), in the United States, cavities are one of the most common chronic conditions in children. If left untreated, cavities can cause pain and infections that could result in eating, speaking, learning, and playing difficulties (Jackson et al. 2011). Fortunately, cavities are preventable. One way to help prevent cavities is to apply dental sealants to permanent molars (back teeth) of children. "Dental sealants are thin plastic coatings that are applied to the grooves on the chewing surfaces of the back teeth" (CDC, 2017). Studies have found that sealants reduce cavities by "81 percent for two years after they are placed on the tooth and continue to be effective for four years after placement (CDC, 2017).

Seal!ND is a school-based dental sealant program that provides preventive oral health care to low-income and underserved children in North Dakota. Schools with a high percentage of children enrolled in the free and reduced-fee school lunch program are targeted for participation in the school sealant program. Enrollment in the free and reduced-fee school lunch program provides a reliable metric for identifying schools with a higher percentage of low-income households.

The OHP provides dental screening, oral health education, dental sealants, and fluoride varnish application with retention checks in the spring prior to the end of the school year to monitor outcomes. In addition, Seal!ND identifies students with additional oral health care needs and refers them to local dental providers for treatment.

Program objectives are to increase program infrastructure and capacity, to increase the percentage of children with dental sealants, decrease the percentage of children with untreated tooth decay, and increase the percentage of children that have a dental home[1]. The North Dakota OHP Logic Model details program inputs, activities, and outcomes (Appendix A). The school-based dental sealant program seeks to ensure that all children receive highly effective preventive treatment through a proven community-based approach.

[1] A dental home is defined by the American Academy of Pediatric Dentistry as "the ongoing relationship between the dentist and the patient, inclusive of all aspects of oral health care delivered in a comprehensive, continuously accessible, coordinated, and family-centered way". For more information, visit: http://www.aapd.org/advocacy/dentalhome/.

Program Changes

Seal!ND was launched in the 2012-2013 school year. In the first year of the program, 43 schools participated. Due to the loss of funding from the Health Resources and Services Administration (HRSA) grant, Seal!ND was available in only two schools in 2013-2014. Funding was restored in 2014-15. While HRSA originally supported the program, it was known from the onset that alternate funding would eventually be required to continue to support the program. HRSA awards support new programs but HRSA does not provide long term funding for ongoing operations.

Starting in 2017-18 the program was supported by a new funding mechanism. A collaboration between the Oral Health Program (OHP) and the ND Medicaid office was instrumental in identifying a potential avenue to address sustainability for the OHP's school-based sealant program, Seal!ND. Beginning in 2016, the OHP and the ND Medicaid office began a collaboration which resulted in the approval of billing Medicaid for sealants and fluoride varnish treatments provided in school-based sealant programs starting in 2017-18. (For a complete description of the OHP partnership activities see Hodur and Gao, 2018[2]). North Dakota is one of only a few state health departments that bills Medicaid for services from a public health hygienist for the application of sealants in schools. For students that do not qualify for Medicaid, services are provided at no charge.

While work was ongoing to gain approval of Medicaid billing prior to the 2017-18 school year, the OHP was also working to encourage private practice providers to offer school-based sealant programs. Several obstacles have historically deterred private practices from providing in-school sealant programs. One of those barriers to entry is the cost of portable equipment. Another is the widely held perception that the school sealant business model is not financially viable.

To address the lack of equipment, the OHP has used multiple funding sources to purchase equipment and supplies. For example, the OHP purchased portable dental equipment to be used by private practice dentists. The use of the portable equipment is an incentive for Federally Qualified Health Centers (FQHCs) and private practice providers to partner with the OHP to provide school-based sealant programs. Medicaid billing for school-based sealant programs and efforts to encourage private practice providers to offer school-based sealants has helped to overcome perceptions related to financial feasibility. (For a complete description of the OHP partnership activities see Hodur and Gao, 2018[2]).

Private practice providers and FQHCs enter a Memorandum of Understanding (MOU) with the OHP that enables them to use the equipment. The MOU also stipulates other aspects of the program, such as data collection and reporting requirements. Private practices must collect the

[2] Hodur, Nancy M. and Gao, Xiangping. 2018. North Dakota Oral Health Program: 2017 Partnership Evaluation.

same screening data as the public health hygienist and provide those screening sheets to the OHP. Data are collected to track performance measures.

In addition to Seal!ND and private practice providers, the state's FQHCs and the Ronald McDonald Care Mobile (RMCM) also offer school-based sealant programs that bill Medicaid for services. From 2015-16 to 2017-18 some schools previously served by the OHP's school-based sealant program, Seal!ND, had school-based sealant programs provided by either private practice providers or FQHCs.

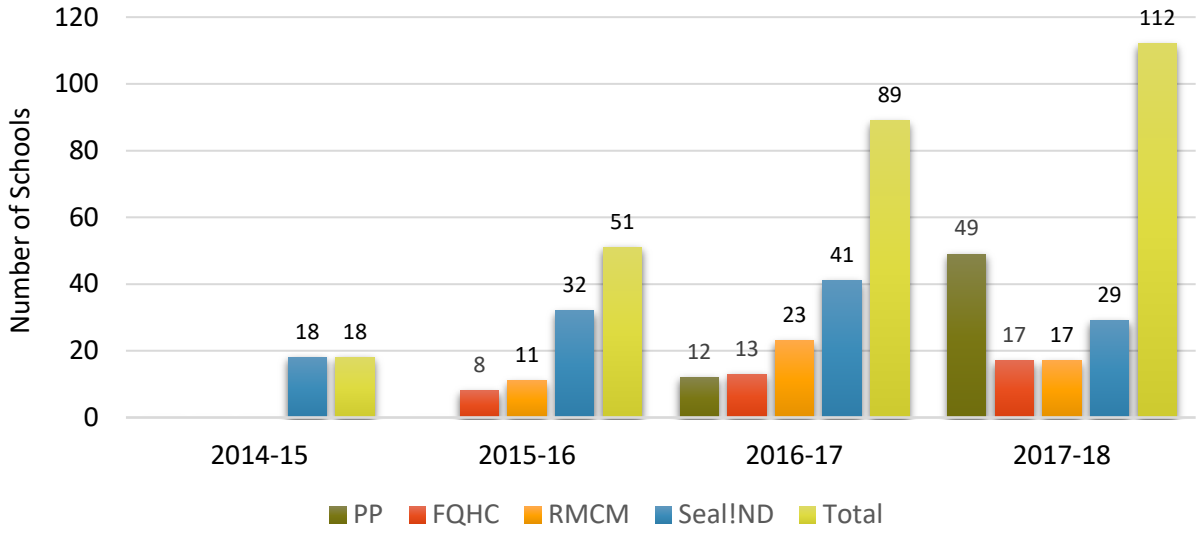
The number of schools participating in sealant services and the entities that provided the services are detailed in Table 1 and Figure 1. In 2017-18 the number of schools that participated in the OHP Seal!ND dropped to 29 schools (down from 41 in 2016-2017), which without additional context, suggests a decline in program participation. However, in 2017-18, six schools that were served by Seal!ND in 2016-17 had school-based sealant programs from a FQHC, and three previously served by Seal!ND in 2016-17 were served by private practice providers. Only three schools served by Seal!ND in 2016-17 did not have a program in 2017-18. Including FQHCs, private practice providers, and the RMCM, 112 schools had school-based sealant programs in 2017-18. Private practice providers had school-based sealant programs in 49 schools while FQHCs and RMCM each provided school-based programs in 17 schools each.

While the terms of the MOU with private practice providers stipulates that they use the same screening sheets as the Seal!ND public health hygienist, some of those screening sheets were not delivered as specified. Private practice providers' compliance was inconsistent, with some providers complying with the requirement and others that did not. Screening data also were not available for school-based sealant programs delivered by FQHCs. There are no performance measures available to describe or assess outcomes of schools served by FQHCs, private practice providers, or the RMCM. There is no formal relationship with the RMCM, although the OHP coordinates activities to avoid duplication. Accordingly, findings are only reported for the activities of the OHP public health hygienist and schools participating in Seal!ND and do not include any performance measures from private practice providers, FQHCs, or the RMCM.

Table 1. School-Based Sealant Programs, by Program Provider, 2014-15 to 2017-18

	2014-15	2015-16	2016-17	2017-18
	----------number----------			
Private Practices (PP)	0	0	12	49
Federally Qualified Health Centers (FQHC)	0	8	13	17
Ronald McDonald Care Mobile (RMCM)	0	11	23	17
Seal!ND	18	32	41	29
Total	18	51	89	112

Figure 1.
Scool-Based Sealant Programs, by Program Provider,
2014-15 to 2017-18



Free and Reduced-Fee Lunch Program

In 2017-18, Seal!ND targeted schools with 40 percent or more of students enrolled in the free or reduced-fee lunch program. In the three previous years, the program's target threshold was 45 percent. The CDC recommends school-based sealant programs identify schools with 50 percent or more of students enrolled in the free and reduced-fee lunch program for participation. However, in order to reach participation goals, the OHP lowered the metric in 2017-18. The participation threshold serves as a guideline rather than a hard and fast rule that dictates eligibility.

Student participation in the free or reduced-fee lunch program provides a reliable metric for identifying schools with a higher percentage of low-income households. Children from low-income households are typically at higher risk for tooth decay (cavities) and may lack access to dental care (CDC, 2017). Seal!ND works closely with the North Dakota Department of Public Instruction (DPI) to identify schools with 40 percent or more of students enrolled in the free and reduced-fee lunch program. Schools represent an opportunity channel for reaching underserved and vulnerable children with public health messaging, education, and direct services to advance oral health. Table 2 details the number of schools in North Dakota by the percentage of student enrolled in the free and reduced-fee lunch program. In 2017-18, there were 141 schools with 40 percent or more of students enrolled in the free and reduced-fee lunch program (Table 2).

Table 2. North Dakota Schools, by Percentage of Students Enrolled in the Free and Reduced-Fee Lunch Program				
Percentage of Students Enrolled in the Free and Reduced-Fee Lunch Program	2014-2015	2015-2016	2016-2017	2017-2018
	----------number----------			
0-9 percent	31	34	24	29
10-19 percent	61	58	62	63
20-29 percent	106	106	96	99
30-39 percent	85	82	79	81
40-49 Percent	47	49	57	52
50 percent or more	61	81	86	89
Total Schools Participating in FRL Program	391	411[1]	412[1]	413
Total Schools in North Dakota	475	480	481	483

[1]Does not sum to total as some schools did not report free and reduced-fee enrollment rates due to privacy concerns. School that do not report are generally specialized facilities with small enrollments, such as residential juvenile treatment centers. All students at those facilities are eligible for the free and reduced-fee lunch program.
Data Source: https://www.nd.gov/dpi/data/directory/
https://www.nd.gov/dpi/SchoolStaff/ChildNutritionFoodDistribution/SchoolDistrictData/

In 2017-18, most of the schools served by Seal!ND, RMCM, and FQHCs had 40 percent or more of students enrolled in the free and reduced-fee lunch program. Some schools served by Seal!ND, RMCM, and FQHCs did fall below the 40 percent or greater enrollment threshold. Enrollment rates at participating schools vary from year to year based on changes in enrollment, the economy, or any number of external factors. While those rates may vary from year to year, based on available capacity Seal!ND strives to continue providing school-based services to schools that have previously met the participation criteria. Of the 29 schools served by the OHP school-based sealant program, Seal!ND, 23 schools had 40 percent or more of students enrolled in the free and reduced-fee lunch program (Table 3). Similarly, 15 of 17 and 14 of 17 schools served by FQHCs and the RMCM, respectively, had 40 percent of more of students enrolled in the free and reduced-fee lunch program. Fewer schools, 9 of 49, served by private practice providers met the 40 percent threshold. Most of the schools served by private practice providers fell between 20 to 40 percent of students enrolled in the free and reduced-fee lunch program. Private practice providers are not limited under the terms of the MOU to offering school-based sealant programs to schools with 40 percent of more of students enrolled in the free and reduced-fee lunch program. Schools served by Seal!ND and FQHCs had 53 and 55 percent, respectively, of students enrolled in the free and reduce-fee lunch program. On average, schools served by RMCM had 62 percent of students enrolled in the free and reduced-fee lunch program while schools served by private practice providers had 29 percent of students enrolled in the free and reduced-fee lunch program (Table 3).

Table 3. Percent of Students Enrolled in Free and Reduced-Fee Lunch Program, by School-Based Sealant Provider, 2017-18				
Percent of Student Enrolled in the Free and Reduce Lunch Program	Private Practice Providers	FQHCs	RMCM	Seal!ND
0-9 Percent	5	0	0	0
10-19 Percent	6	0	0	0
20-29 Percent	16	1	0	2
30-39 Percent	13	1	3	4
40-49 Percent	5	5	4	10
50 Percent or More	4	10	10	13
Mean Percentage[1]	28.7%	54.8%	62.2%	53.0%
	(N=49)	(N=17)	(N=17)	(N=29)

[1]The mean percentage represents the average FRL rate of the participating schools.
Data Source: https://www.nd.gov/dpi/data/directory/
https://www.nd.gov/dpi/SchoolStaff/ChildNutritionFoodDistribution/SchoolDistrictData/

Evaluation Methodology

The OHP program contracts with the North Dakota State University (NDSU) Center for Social Research (CSR) for program evaluation. The evaluation of Seal!ND focused on two key indicators; the number of averted cavities and feedback from administrators in participating schools from a self-administered on-line questionnaire.

Evaluation Methodology Averted Cavities

To quantify the benefits of the school sealant program, the CSR used a methodology developed by the CDC to calculate the number of averted cavities attributable to school-based dental sealant programs like Seal!ND (Griffin et al. 2014). Public health hygienists collect data on the number of students screened, number of teeth sealed, and number of teeth with cavities, as well as relevant demographic data such as age and grade level of children that participate in the program. The number of cavities prevented was calculated using the weighted average attack rate (annual risk for tooth decay in the absence of school sealants) and the sealant retention rate (the percentage of sealants that stayed intact for 12 months). The weighted average one-year attack rate was 5.31 percent in 2017-18, calculated using methods as described in Griffin et al. 2014 (Table 4). The attack rate is defined at the annual probability of developing a cavity in a sound first molar not treated with a sealant. The one-year sealant retention rate of 89 percent was based on secondary data as reported in Griffin et al. 2014.

Table 4. Average Annual Attack Rate, Seal!ND, 2014-15 to 2017-18				
	2014-15	**2015-16**	**2016-17**	**2017-18**
Attack rate	12.57	5.99	10.16	5.31

Evaluation Methodology Participating Schools Survey

To further gauge program effectiveness, key stakeholders from participating school districts were surveyed to assess the program's efficiency and to provide useful feedback to assess program strengths and opportunities for improvement. The CSR designed the questionnaire with input from the OHP. Beginning with the 2014-15 school year, the self-administered survey was distributed annually to school administrators, support personnel, and others at participating schools that worked with the program and the public health hygienists that provided screenings and applied sealants. The survey was designed to evaluate program effectiveness and how OHP staff interacted and collaborated with participating schools. Data collected from the survey of program contacts at participating schools were analyzed using standard widely accepted descriptive statistics to address key evaluation questions related to the school's experience with the sealant program and the public health hygienist that provided services.

For study period 2017-18, the North Dakota Oral Health Prevention Coordinator sent invitations to 30 individuals at 29 participating schools (one school had both elementary and intermediate sections that coordinated Seal!ND activities) requesting they complete a brief questionnaire. Four subsequent reminders were sent and ultimately 17 individuals completed the survey for a 56.7 percent response rate. Response rates were higher in previous years with 94.4 percent in 2014-15, 95.0 percent in 2015-16, and 73.8 percent in 2016-17.

Respondents were asked their level of agreement with a number of statements. The questionnaire used a five-point Likert scale where one is "strongly disagree" and five is "strongly agree" to gauge the participating school's experience with the dental sealant program. The same five-point Likert scale was used to calculate a weighted average score of all respondents to further gauge respondents' level of agreement with various statements. The questionnaire also included four open-ended questions that solicited additional feedback about the program, suggestions for program improvement, and how to increase program participation. The same questionnaire was used for each program year to gauge and track stakeholder perceptions over time. Findings for all four program years are reported for all questions except the open-ended questions. Responses for the open-ended questions are only reported for the 2017-18 school year.

Findings

Estimates of adverted cavities and Seal!ND participating school survey results are reported in the following sections.

Annual Measures and Cavities Averted

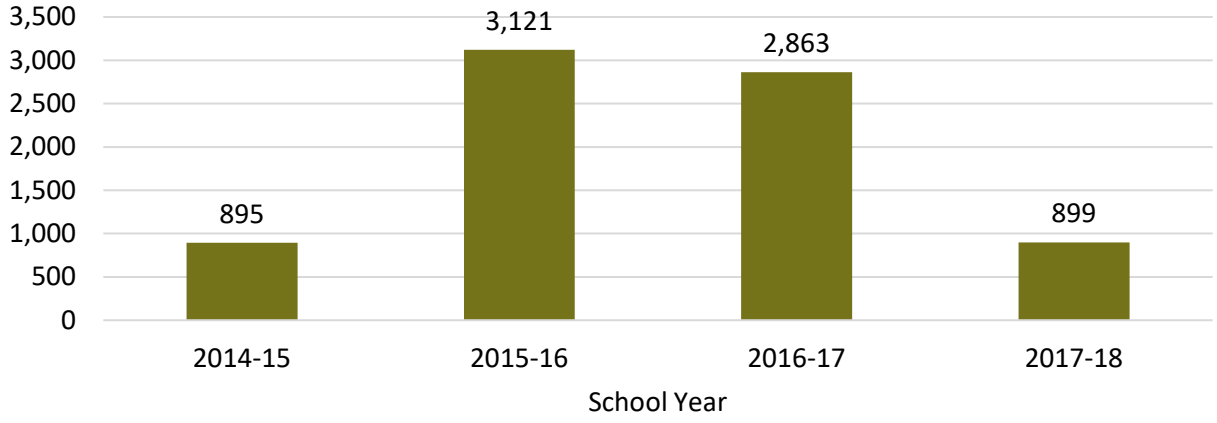
The number of students screened and the number of cavities averted are reported in the following sections.

Student Demographics

Seal!ND has expanded considerably since the 2014-15 school year, the first year of the evaluation period and the first year of the program after funding was restored. In 2014-15, 18 schools participated. The number of participating schools increased to 40 in 2015-16 and 41 in 2016-2017. In 2017-18, 29 schools had a school-based sealant program administered by Seal!ND. The results presented below will focus specifically on the students served by the Seal!ND program.

In 2014-15, 895 children were screened through the Seal!ND program. After increasing to 3,121 in 2015-16 and 2,863 in 2016-17, 899 children were screened using the Seal!ND program in 2017-18 (Figure 2). It is important to note performance metrics are limited to only those schools served by Seal!ND.

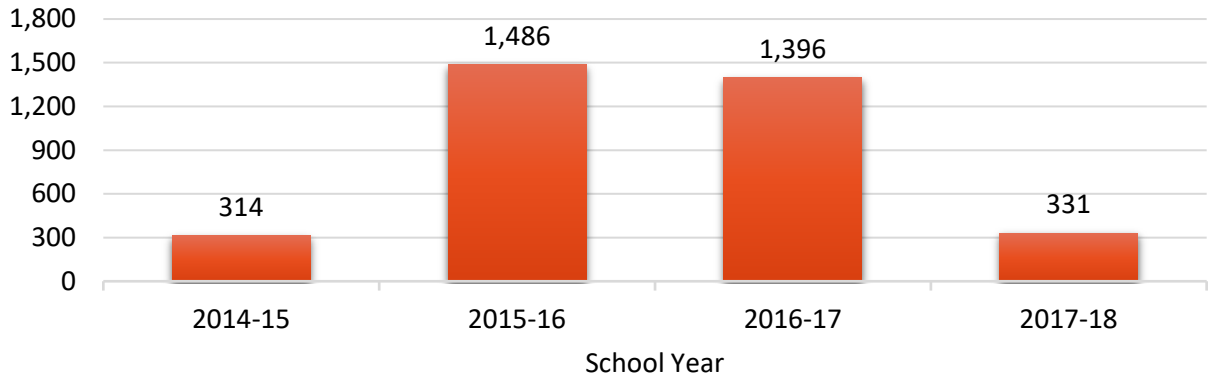
Figure 2.
Number of Students Screened, Seal!ND, by School Year



Trends were similar for the number of children who received sealants as the number of students screened. With the substantial increase in the number of participating schools in 2015-16, the number of students that received sealants increased from 314 in 2014-15 to 1,486 in 2015-16. In 2016-17, 1,396 students received sealants. In 2017-18, 331 students received sealants through the Seal!ND program. Again, the decline in the number of students receiving

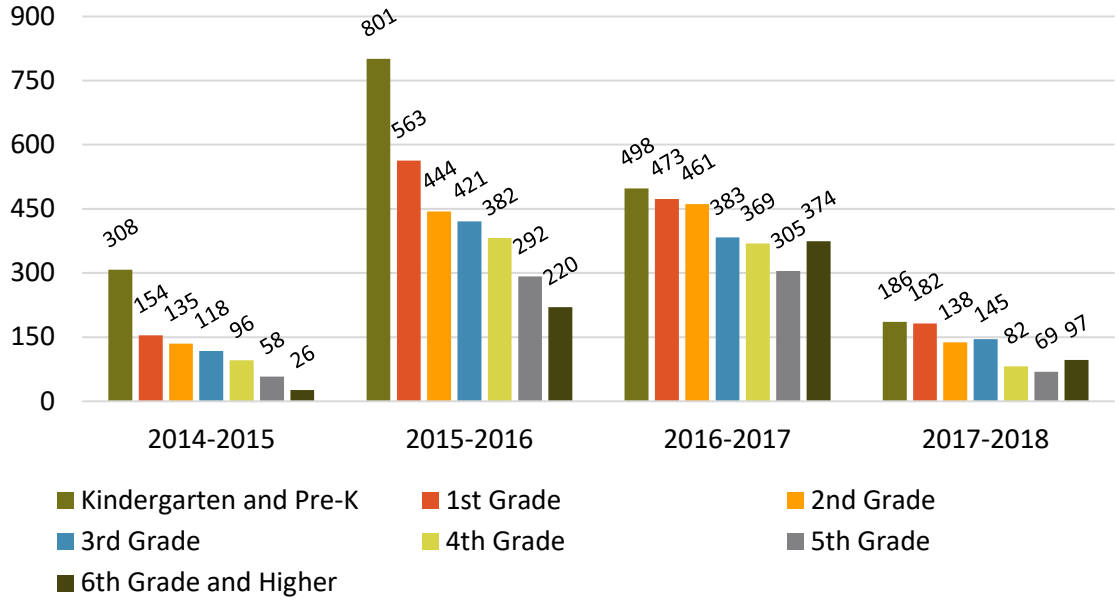
sealants in 2017-18 is reflective of the the number of schools participating in the Seal!ND program (Figure 3, Table 5).

Figure 3.
Number of Students that Received Sealants, Seal!ND, by School Year



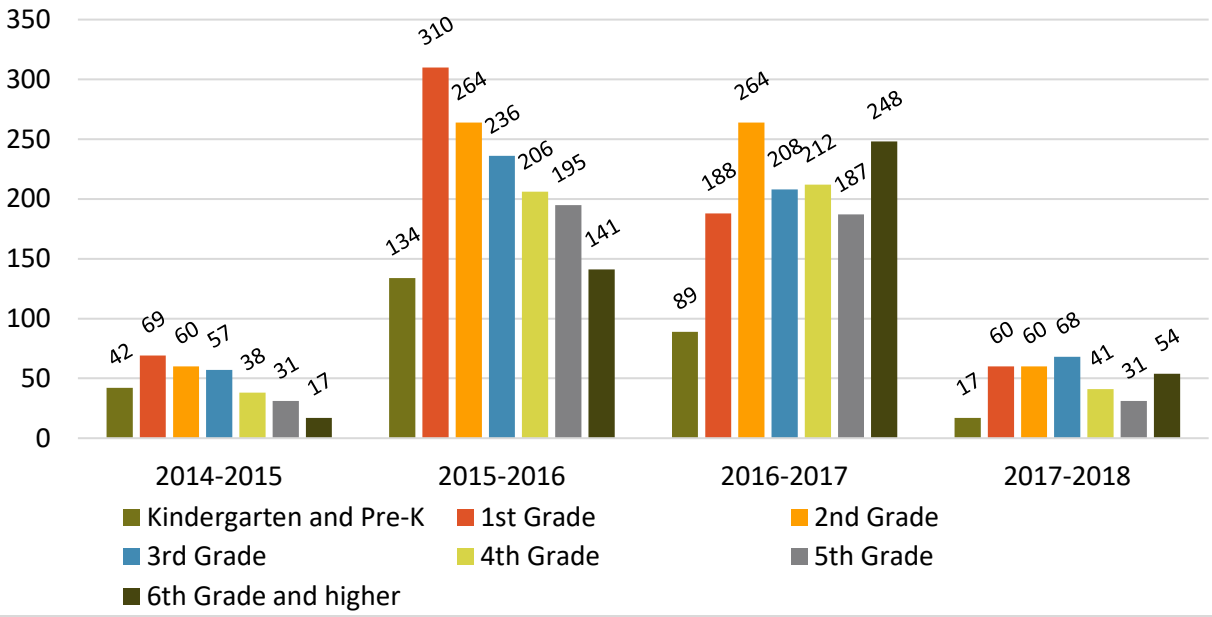
For each program year, more Kindergarten and Pre-Kindergarten (Pre-K) students were screened than any other grade. In 2014-15, 308 Kindergarden and Pre-K students were screened (Figure 4). The number of students screened in other grades ranged from 26 to 154. Trends were similar in 2015-16 when more Kindergartners and Pre-K students were screened than students in other grades. Screenings per grade were more uniform in 2016-17 ranging from 498 Kindergarten and Pre-K students screened to 305 students in 5th grade as well as 374 students in 6th grade or higher. First grade students were the second most frequently screened through all the four years. Similar to previous years, students that were screened were more frequently in Pre-K, 1st, 2nd, and 3rd grades (186, 182, 138, and 145 students screened, respectively). Screenings of 4th, 5th, and 6th grade or higher ranged from 69 to 97 students. Declining program participation in higher grades is consistent with CDC best practices. CDC best practice guidelines report program participation typically drops in higher grades (CDC, 2017).

Figure 4.
Number of Students Screened, Seal!ND, by Grade,
by School Year



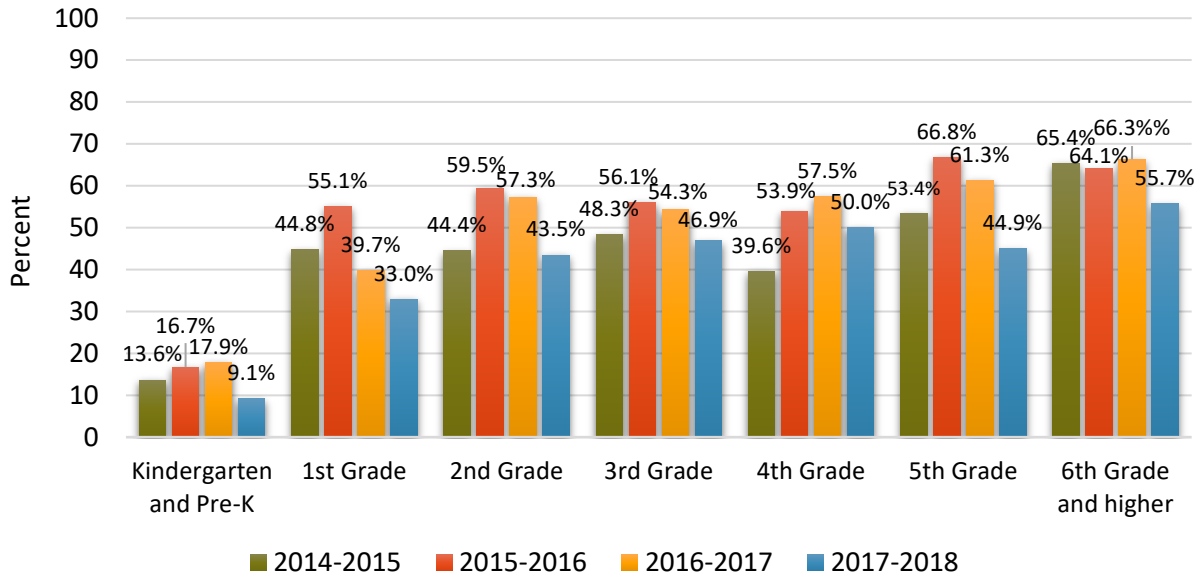
While Kindergarten and Pre-K students were most frequently screened, sealants were most frequently applied to students in 1st and 2nd grade in program year one, two, and three (Figure 5, Table 5). In 2017-18, the number of students screened and that received sealants was more consistent among Pre-K, 1st, 2nd, and 3rd graders. Generally, as students progressed to higher grades, the number of students that have sealants applied declined. This is consistent with best practices for school sealant programs. The application of sealants is most effective if applied soon after first molars emerge, when children are 6 to 7 years old (Macek et al. 2003), which is generally when children are in 1st or 2nd grade.

Figure 5.
Number of Students with Sealants Applied, Seal!ND,
by Grade, by School Year



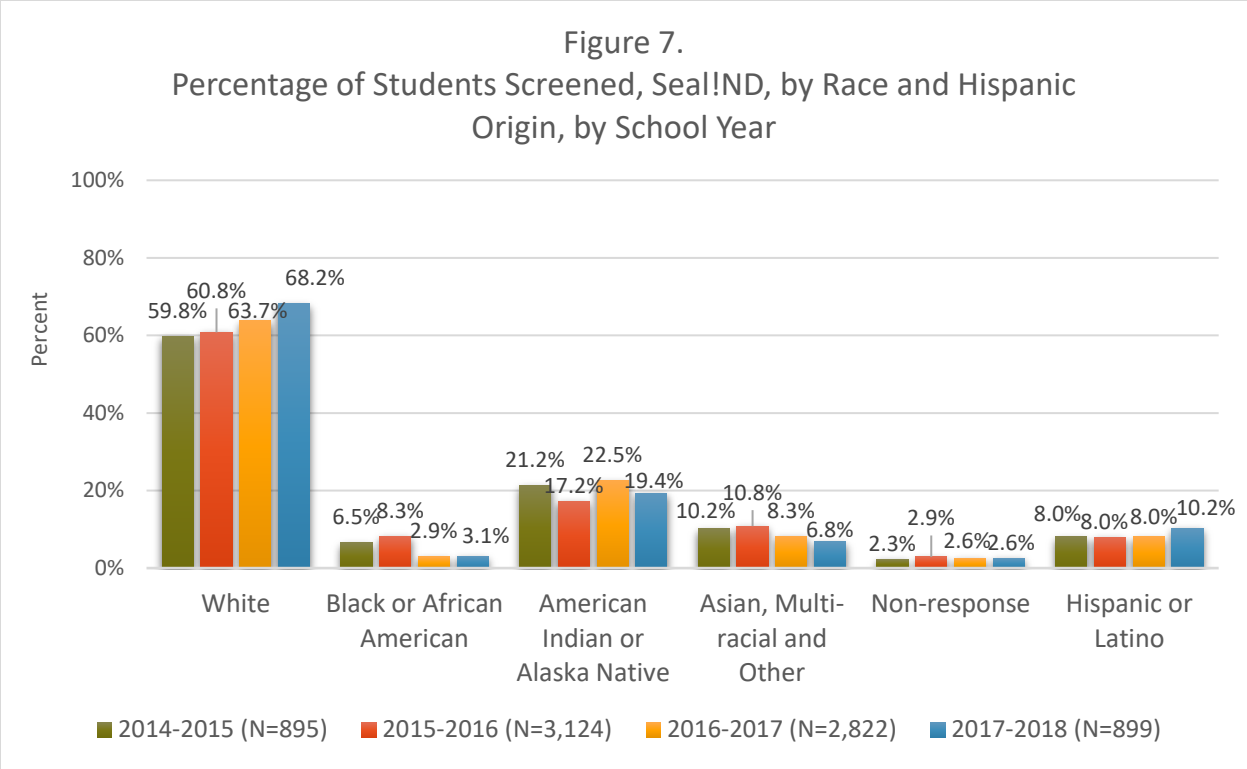
The percentage of students who receive sealants offers some perspective on overall student participation in the program and to what degree the program is reaching the target audience, including low-income and underserved populations. The percentage of children in participating schools in grades one through five with sealants applied ranged from 40 to 53 percent of all students in each corresponding grade in 2014-15 (Figure 6, Table 5). In the two subsequent years, the percentage of children with sealants applied in grades one through five ranged from 40 to 67 percent. In 2017-18 33 to 50 percent of student in grades one through five received sealants. Fewer students in Kindergarten and Pre-K received sealants in all four program years, ranging from 9 to 18 percent. Fewer children with applied sealants in Kindergarten and Pre-K is likely a function of the fact that for many in Kindergarten and Pre-K, first molars have not yet errupted.

Figure 6
Percentage of Students with Sealants Applied, Seal!ND, by Grade, by School Year



Program Target Audience

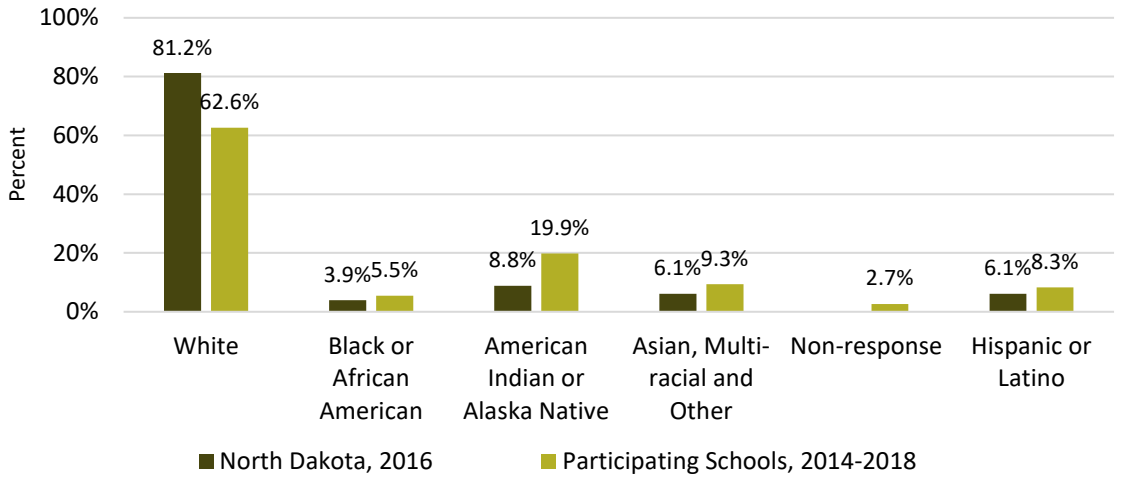
One of the goals of the school-based sealant program is to reach children that are high-risk based on socio-economic status, which frequently includes racial minorities. While a majority of students who participated in the school sealant program were white, the program served a greater percentage of minority students than the overall child population distribution of the state. Over the four-year study period, an average of 63 percent of the children screened were white, 20 percent were American Indian, and 5 percent were Black or African American. Additionally, 9 percent of students were Hispanic or Latino (of any race) (Figure 7).



Note: The categories in Figure 6 are not mutually exclusive as racial categories are inclusive of Hispanic origin. In addition, the Hispanic origin category reflects students of any race.

Overall the state's child population is less racially diverse than the students that participated in the school sealant program. Over the course of the four-year program period, participating minorty students are represented at levels exceeding the overall statewide racial distribution of children. Twenty percent of program participants were American Indian, while 9 percent of children statewide are American Indian (Figure 8). Minority students in other racial and ethnic groups were represented at higher rates than the child population statewide. The program also served slightly higher percentages of Black or African American students and Hispanic, Latino, Asian, and multi-racial students than the statewide population. This would suggest the program is effectively targeting racial minorities who are more frequently low income and whose oral health care needs are often underserved.

Figure 8.
Population by Race and Hispanic Origin for Children in North Dakota, 2016, and Participating Schools, SEAL!ND, 2014-2018



Note: The categories in Figure 8 are not mutually exclusive as racial categories are inclusive of Hispanic origin. In addition, the Hispanic origin category reflects students of any race.

Molars Sealed and Cavities Averted

Consistent with the increase in the number of schools directly served through the Seal!ND program, the number of first molars sealed increased from 939 in 2014-15 to 4,390 in 2015-16. The number of first molars sealed dropped slightly to 3,799 in 2016-17. The large jump in the number of first molars sealed in 2015-16 was a function of the substantial increase in the number of schools and students that participated in the program. With fewer schools participating in the program in 2017-2018, the number of first molars sealed dropped to 887 (Figure 9, Table 5).

Figure 9.
Number of First Molars Sealed, Seal!ND, by School Year

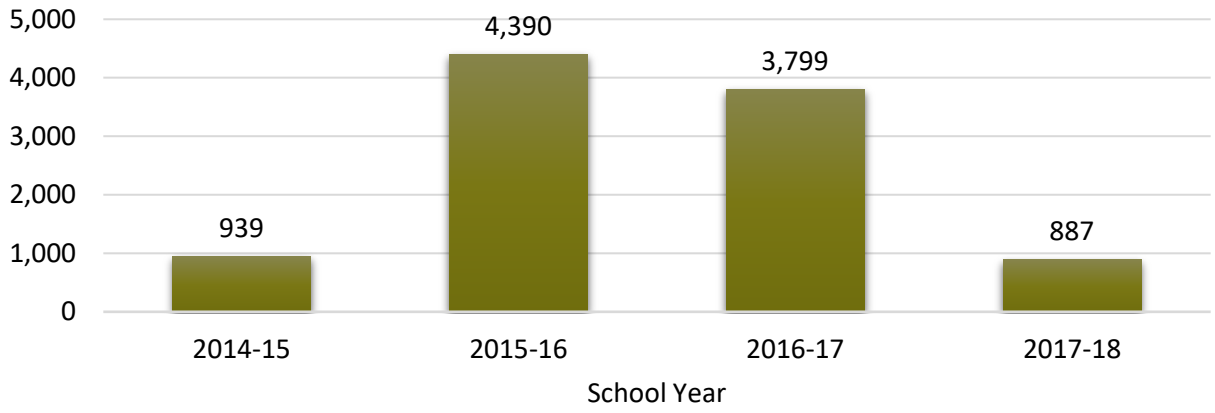


Table 5. Summary of Services Delivered, SEAL!ND, by School Year				
	School Year			
Item	2014-15	2015-16	2016-17	2017-18
Number of participating schools	18	40	41	29
Number of students screened	895	3,121	2,863	899
Number of students that received sealants	314	1,486	1,396	331
Percentage of students screened with sealants applied	35.0%	47.6%	48.8%	36.8%
Number of 1st molars sealed	939	4,390	3,799	887
Number of 1st molars, 2nd molars, and other teeth sealed	1,257	6,452	6,122	1399
Total number of students with sealants	531	2,118	1,997	582
Percentage of students with sealants	59.2%	67.8%	69.8%	64.7%

Seal!ND dental screenings also identify students with untreated cavities and refers them to local providers for treatment and dental care. In 2014-15, 262 students, approximately 30 percent of the students screened, had untreated cavities (Table 6). In 2015-16 and 2016-17, the number of students identified as having untreated cavities increased to 707 and 805, respectively. While the absolute number of students referred for treatment increased, the percentage of students screened and referred for care declined to 23 percent in 2015-2016 but bounced back to around 29 percent in 2016-2017. In 2017-2018, 168 students, 19 percent of student screened, had untreated decay.

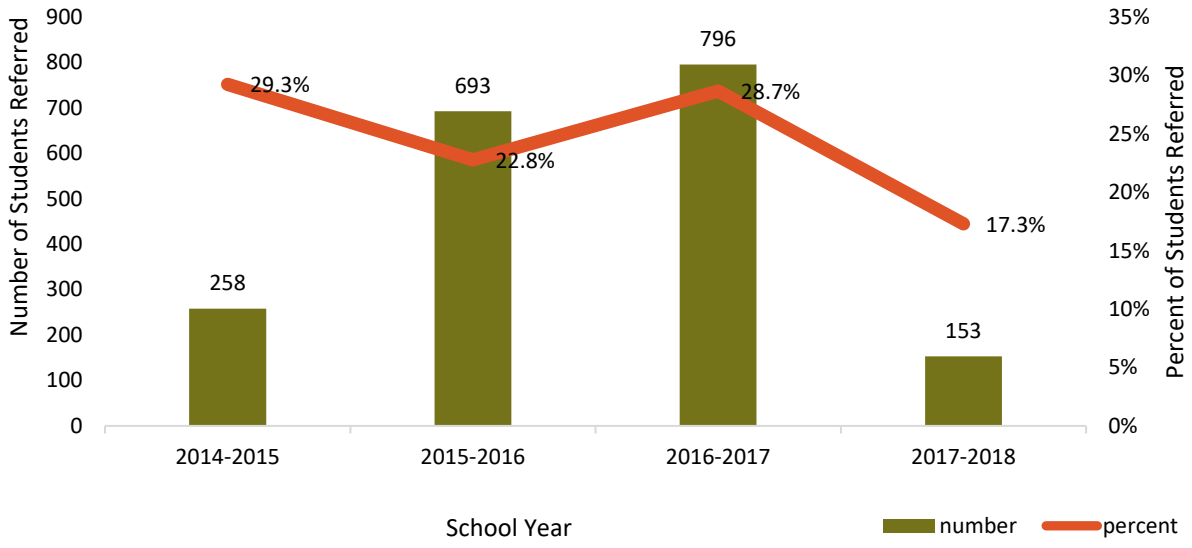
Most of the untreated decay detected during the four-year program period was classified as early dental care. However, 261 children, or 14 percent of children with a referral required urgent care over the course of the four-year study period. In 2017-2018, the percentage of students with urgent care needs was three times greater than in 2014-15 (6% in 2017-18 compared to 2% in 2014-15). The number and percentage of students that required urgent care were similar in 2015-16 and 2016-17, 93 and 103 students, respectively, approximately 3 percent of students screened. Urgent care was defined as “pain, infection, large decay, abscess, or drainage” (Table 6).

Approximately one in four students screened since the program began in 2014-15 were identified as having untreated cavities, and 1,900 children were referred for treatment over the course of the four-year study period (Table 6, Figure 10). About half of the children screened had either treated or untreated decay. The number of students with untreated decay and treated decay does not equal the total number of students with either treated or untreated decay as some students with treated decay may also have newly detected untreated decay as a result of the school screening.

Table 6. Summary of Children Screened with Treated and Untreated Decay, and Referred for Treatment, SEAL!ND, by School Year								
	2014-15		2015-16		2016-17		2017-2018	
	%	n	%	n	%	n	%	n
Students with treated or untreated decay	55.2	486	52.0	1,582	57.5	1,593	51.5	455
Students with treated decay	37.9	334	38.4	1,167	42.3	1,174	39.4	348
Students with untreated decay	29.8	262	23.2	707	29.0	805	19.0	168
Students referred for dental care	29.2	258	22.7	693	28.6	796	17.3	153
Students referred for immediate treatment (Urgent care)	1.5	13	3.1	93	3.7	103	5.9	52
Students referred for early dental care (Restorative care)	27.8	245	19.7	600	25.0	693	11.4	101
Number of students screened	882		3,043		2,775		884	

About 30 percent of students screened were referred to dental providers for treatment in 2014-15 and 2016-17 (Table 6, Figure 10). Twenty-three percent of students screened were referred for treatment in 2015-16. While the number of students referred for care increased substantially in 2015-16 and 2016-17 as a result of the increase in the number of schools and students participating in the program, the percentage of children screened and referred was relatively consistent, varying by six percentage points. In 2017-2018, with fewer participating schools, the number of students referred for care also dropped. The percentage of students referred for treatment dropped to 17 percent in 2017-18 compared to rates of referral of 23 to 29 percent in the three previous years.

Figure 10.
Number and Percentage of Students Screened That Were Referred for Dental Care, Seal!ND, by School Year



It was estimated that the school-based dental sealant program sponsored by OHP prevented decay in 423 permanent molars in 2014-15. The number of molars with prevented decay increased to 1,235 in 2015-16 and 1,524 in 2016-17. In 2017-18 it was estimated the program prevented 228 permanent molars from decay (Table 7).

Stated in another way, in 2016-17 for every 2.5 molars that received sealant, one cavity was prevented. The ratio of cavities prevented in 2014-15 was similar to cavities prevented in 2016-17, 2.2 sealed molars per adverted cavity. The ratio of cavities prevented to molars sealed was slightly higher in 2015-16 and 2017-2018 when the ratios were 3.6 and 3.9 molars sealed, respectively (Table 7).

The average cost to fill a typical cavity was based on North Dakota Medicaid reimbursement rates. As of July 1, 2016, the reimbursement rate was $77.50 (North Dakota Department of Human Services, 2017). Total avoided cost from cavity prevention as a result of the application of sealants was $32,783 in 2014-15 (Table 7). Avoided costs increased in the subsequent years to $95,713 in 2015-16 and $118,110 in 2016-17. The avoided costs decreased to $17,670 in 2017-18 (Table 7). Total averted costs over the four-year study period were $264,275 (Table 7).

Table 7. Summary of Prevented Decay and Avoided Costs, Seal!ND, by School Year				
	School Year			
Item	2014-15	2015-16	2016-17	2017-18
Prevented decay in permanent molars	423	1,235	1,524	228
Ratio of Number of molars sealed per cavities prevented	2.2	3.6	2.5	3.9
Avoided cost from cavity prevention per avoided caries	$77.50	$77.50	$77.50	$77.50
Total avoided costs	$32,782.50	$95,712.50	$118,110.00	$17,670.00

SEAL!ND Participating School Survey

Findings from the participating school survey are detailed in the following sections. As detailed in the methods section, survey respondents were school administrators who coordinated and administered program activities for the participating schools. Responses to open-ended questions can be found in Appendix B.

Dental Sealant Program

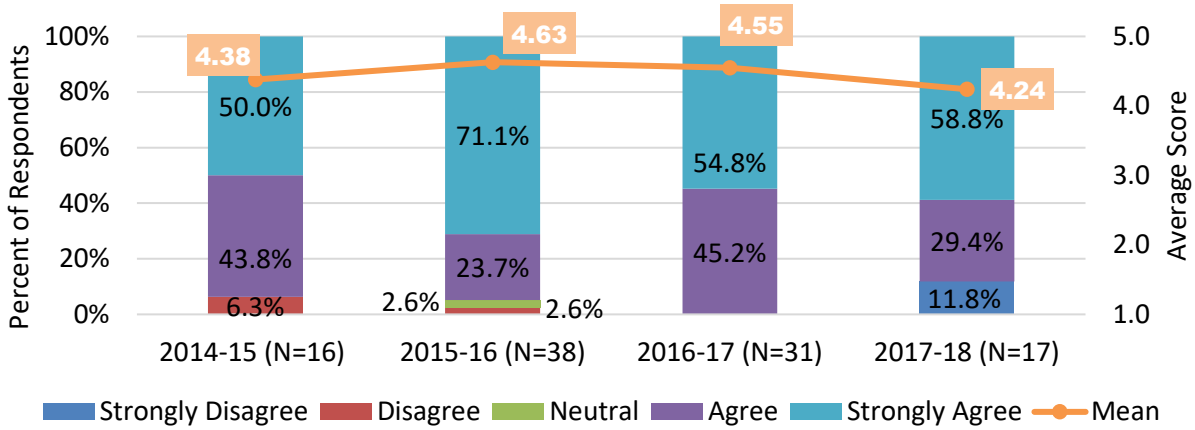
The survey respondents' level of agreement on statements related to the school's experience with the dental sealant program are detailed in the following sections. Results for the most recent study period and the previous three years are reported. Questions are as they appeared on the survey instrument.

1. **We were well informed about the dental sealant program offered at our school (Q 1.A).**

In 2017-18, similar to the previous three years, the majority of respondents (88%) indicated that they agreed or strongly agreed that they were well informed about the dental sealant program. 2017-18 was the first year any respondents indicated they were not well informed about the dental sealant program. While 11.8 percent of respondents strongly disagreed with the statement, that percentage only represents two respondents. In 2016-2017, all survey participants agreed or strongly agreed with the statement. Previous years' responses were similar, with nearly unanimous agreement that respondents were well informed about the dental sealant program. In 2014-15 and 2015-16, one respondent disagreed with the statement. The average scores were relatively consistent ranging from 4.24 in 2017-18 to 4.63 in 2015-16. Responses indicate a high-level of agreement that respondents were well-informed about the dental sealant program (Table 8, Figure 11).

Table 8. Respondent's Level of Agreement, "We were well informed about the dental sealant program offered at our school.", Seal!ND, Participating School Survey, by School Year								
	2014-15 (N=16)		2015-16 (N=38)		2016-17 (N=31)		2017-18 (N=17)	
	%	*n*	%	*n*	%	*n*	%	*n*
Strongly Disagree	0.0	0	0.0	0	0.0	0	11.8	2
Disagree	6.3	1	2.6	1	0.0	0	0	0
Neutral	0.0	0	2.6	1	0.0	0	0	0
Agree	43.8	7	23.7	9	45.2	14	29.4	5
Strongly Agree	50.0	8	71.1	27	54.8	17	58.8	10
Mean (Std. Dev.)	4.38 (0.81)		4.63 (0.67)		4.55 (0.51)		4.24 (1.30)	

Figure 11.
Respondent's Level of Agreement, "We were well informed about the dental sealant program offered at our school", Seal!ND, Participating School Survey, by School Year



2. We had sufficient information to promote the dental sealant program (Q1.B).

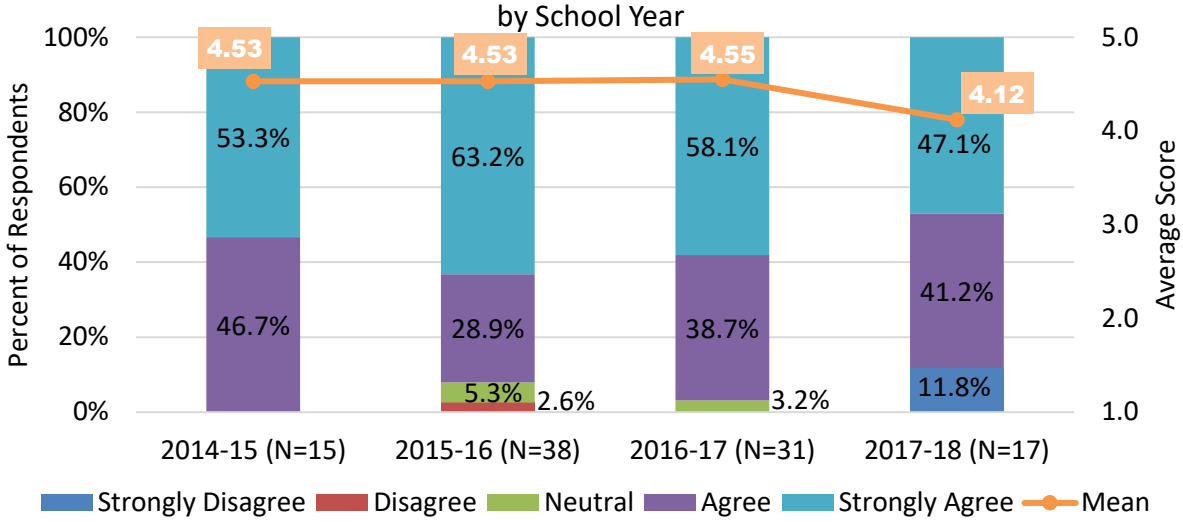
The majority of respondents (88%) agreed or strongly agreed they had sufficient information to promote the dental sealant program in 2017-18. Two respondents (11.8%) strongly disagreed that they had sufficient information to promote the dental sealant program in 2017-18. In 2016-17, all but one respondent agreed or strongly agreed they had sufficient information to promote the dental sealant program. In 2015-16, 92.1 percent of respondents agreed with the statement, while only one respondent disagreed (and two were neutral (5.3%). In 2014-15, all respondents agreed or strongly agreed they had sufficient information to promote the dental sealant program. Average scores were around 4.53 for the first three program years, indicating

high levels of agreement among survey respondents that they had sufficient information to promote the school sealant program. The average score dropped slightly to 4.12 in 2017-18, however, a score above 4.00 indicates high levels of agreement among survey respondents (Table 9, Figure 12).

Table 9. Respondent's Level of Agreement, "We had sufficient information to promote the dental sealant program.", Seal!ND, Participating School Survey, by School Year

	2014-15 (*N*=15)		2015-16 (*N*=38)		2016-17 (*N*=31)		2017-18 (*N*=17)	
	%	*n*	%	*n*	%	*n*	%	*n*
Strongly Disagree	0.0	0	0.0	0	0.0	0	11.8	2
Disagree	0.0	0	2.6	1	0.0	0	0	0
Neutral	0.0	0	5.3	2	3.2	1	0	0
Agree	46.7	7	28.9	11	38.7	12	41.2	7
Strongly Agree	53.3	8	63.2	24	58.1	18	47.1	8
Mean (Std. Dev.)	4.53 (0.52)		4.53 (0.73)		4.55 (0.57)		4.12 (1.27)	

Figure 12.
Respondent's Level of Agreement, "We had sufficient information to promote the dental sealant program.", Seal!ND,Participating School Survey, by School Year



3. We understood our roles and responsibilities in delivering the dental sealant program (Q1.C).

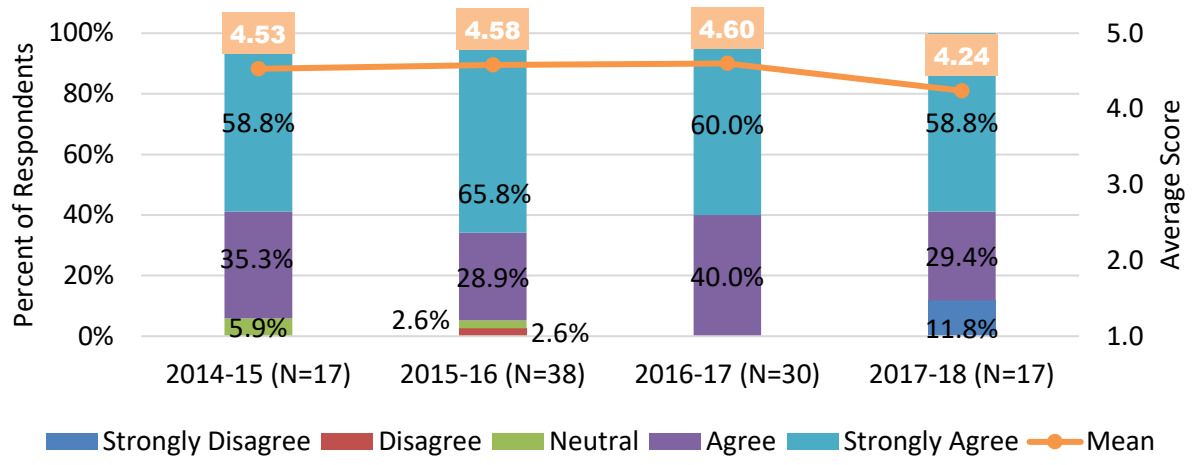
The level of agreement was consistent across program years. Over the course of the four-year study period, on average, 94 percent of respondents either agreed or strongly agreed that they understood their roles and responsibilities in delivering the dental sealant program. However,

like the previous two questions, in 2017-18, two respondents or 11.8 percent strongly disagreed that they understood their roles and responsibilities delivering the dental sealant program. For 2016-17, all respondents agreed or strongly agreed that they understood their roles and responsibilities. In 2015-16, one respondent disagreed and one was neutral. Average scores ranged from 4.24 in 2017-18 to 4.60 in 2016-17 indicating a high level of agreement among respondents that they understood their roles and responsibilities in the delivery of the dental sealant program (Table 10, Figure 13).

Table 10. Respondent's Level of Agreement, We understood our roles and responsibilities in delivering the dental sealant program.", Seal!ND, Participating School Survey, by School Year

	2014-15 (N=17)		2015-16 (*N*=38)		2016-17 (*N*=30)		2017-18 (*N*=17)	
	%	*n*	%	*n*	%	*n*	%	*n*
Strongly Disagree	0.0	0	0.0	0	0.0	0	11.8	2
Disagree	0.0	0	2.6	1	0.0	0	0	0
Neutral	5.9	1	2.6	1	0.0	0	0	0
Agree	35.3	6	28.9	11	40.0	12	29.4	5
Strongly Agree	58.8	10	65.8	25	60.0	18	58.8	10
Mean (Std. Dev.)	4.53 (0.62)		4.58 (0.68)		4.60 (0.50)		4.24 (1.30)	

Figure 13.
Respondent's Level of Agreement, We understood our roles and responsibilities in delivering the dental sealant program.", Seal!ND, Participating School Survey, by School Year



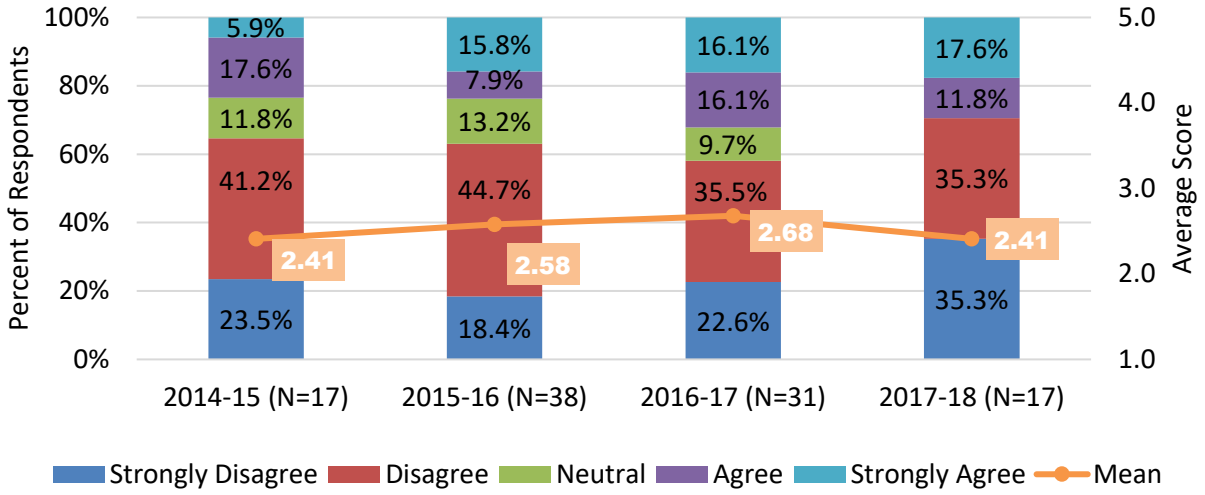
4. **Performing our school's roles and responsibilities in the dental sealant program took a great deal of staff time and effort (Q1.D).**

The majority of respondents indicate the school's role and responsibilities did not take a great deal of staff time and effort. Approximately 70 percent of respondents in 2017-18 either disagreed or strongly disagreed that the dental sealant program took a great deal of staff time and effort while about 30 percent of respondents either agreed or strongly agreed. In 2014-15 and 2015-16, roughly 64 percent of respondents either disagreed or strongly disagreed. In 2016-2017, 58 percent of respondents disagreed or strongly disagreed with the statement and 32 percent either agreed or strongly agreed. In the first two years of the program, 24 percent of respondents agreed or strongly agreed that the program took a great deal of staff time and effort. In 2016-17, 10 respondents, 32 percent, agreed or strongly agreed the dental sealant program took a great deal of staff time and effort. Among the 10 respondents who agreed or strongly agreed that the program took a great deal of staff time and effort, six were from schools that were new to the program that year and three respondents were from schools that joined the previous year (data not shown). In 2017-18, five individuals or 29 percent, indicated the programs took a great deal of staff time and effort. This would suggest that as participants became more familiar with the program, the amount of time and effort required to perform the school's roles and responsibilites in the dental sealant program became less over time (Table 11 and Figure 14).

Table 11. Respondent's Level of Agreement, "Performing our school's roles and responsibilities in the dental sealant program took a great deal of staff time and effort.", Seal!ND, Participating School Survey, by School Year

	2014-15 (*N*=17)		2015-16 (*N*=38)		2016-17 (*N*=31)		2017-18 (*N*=17)	
	%	*n*	%	*n*	%	*n*	%	*n*
Strongly Disagree	23.5	4	18.4	7	22.6	7	35.3	6
Disagree	41.2	7	44.7	17	35.5	11	35.3	6
Neutral	11.8	2	13.2	5	9.7	3	0	0
Agree	17.6	3	7.9	3	16.1	5	11.8	2
Strongly Agree	5.9	1	15.8	6	16.1	5	17.6	3
Mean (Std. Dev.)	2.41 (1.23)		2.58 (1.33)		2.68 (1.42)		2.41 1.54	

Figure 14.
Respondent's Level of Agreement, "Performing our school's roles and responsibilities in the dental sealant program took a great deal of staff time and effort.", Seal!ND, Participating School Survey, by School Year

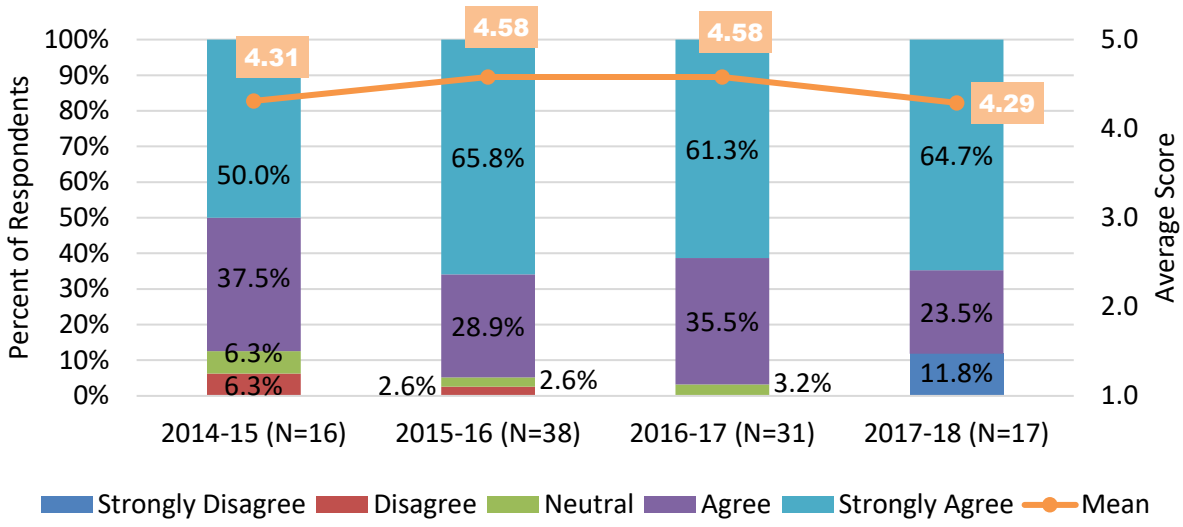


5. We had sufficient communication with the public health hygienist to coordinate the delivery of services (Q1.E).

In 2017-18, 88 percent of respondents indicated they agreed or strongly agreed there was sufficient communication with the public hygienist to coordinate the delivery of services, while two respondents strongly disagreed. In 2016-17, nearly 100 percent of respondents indicated there was sufficient communication. One respondent was neutral. Results were similar in 2015-16 and 2014-15, where one respondent disagreed or was neutral that there was sufficient communication with the public health hygienist. Average scores ranged from 4.29 to 4.58 suggesting that respondents largely agreed that they had sufficient communication with the public health hygienist to coordinate the delivery of services (Table 12 and Figure 15).

Table 12. Respondent's Level of Agreement, "We had sufficient communication with the public health hygienist to coordinate the delivery of services.", Seal!ND, Participating School Survey, by School Year								
	2014-15 (*N*=16)		2015-16 (*N*=38)		2016-17 (*N*=31)		2017-18 (*N*=17)	
	%	*n*	%	*n*	%	*n*	%	*n*
Strongly Disagree	0.0	0	0.0	0	0.0	0	11.8	2
Disagree	6.3	1	2.6	1	0.0	0	0	0
Neutral	6.3	1	2.6	1	3.2	1	0	0
Agree	37.5	6	28.9	11	35.5	11	23.5	4
Strongly Agree	50.0	8	65.8	25	61.3	19	64.7	11
Mean (Std. Dev.)	4.31 (0.87)		4.58 (0.68)		4.58 (0.56)		4.29 (1.31)	

Figure 15.
Respondent's Level of Agreement, "We had sufficient communication with the public health hygienist to coordinate the delivery of services.", Seal!ND, Participating School Survey, by School Year



6. We had sufficient communication with the ND Oral Health Program regarding the operation of the dental sealant program (Q1.F).

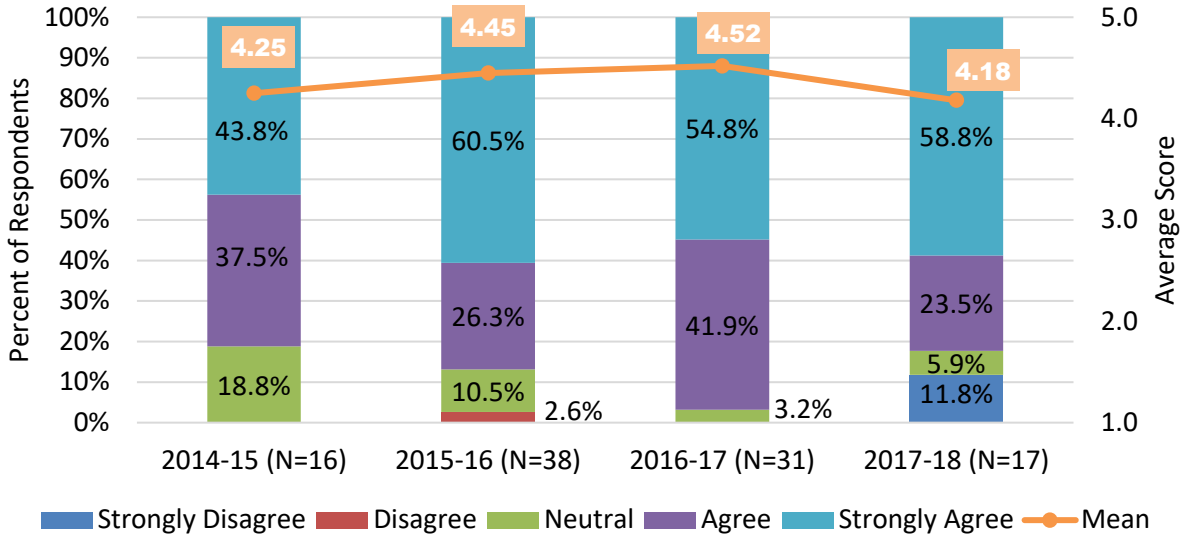
In 2017-18, 82 percent of respondents either agreed or strongly agreed that there was sufficient communication with the ND Oral Health Program regarding the operation of the dental sealant program. One respondent was neutral (6%) and two respondents strongly disagreed (12%). In 2016-2017, a large majority of respondents either agreed (42%) or strongly agreed (55%) that there was sufficient communication regarding the operation of the dental

sealant program. One respondent was neutral. Only one respondent in 2015-16 disagreed with the statement that they had sufficient communication with the OHP regarding the dental sealant program. Average scores ranged from 4.18 in 2017-18 to 4.52 in 2016-17 which indicates most respondents agreed they had sufficient communication with the OHP (Table 13 and Figure 16).

Table 13. Respondent's Level of Agreement, "We had sufficient communication with the ND Oral Health Program regarding the operation of the dental sealant program.", Seal!ND, Participating School Survey, By School Year

	2014-15 (*N*=16)		2015-16 (*N*=38)		2016-17 (*N*=31)		2017-18 (*N*=17)	
	%	*n*	%	*n*	%	*n*	%	*n*
Strongly Disagree	0.0	0	0.0	0	0.0	0	11.8	2
Disagree	0.0	0	2.6	1	0.0	0	0	0
Neutral	18.8	3	10.5	4	3.2	1	5.9	1
Agree	37.5	6	26.3	10	41.9	13	23.5	4
Strongly Agree	43.8	7	60.5	23	54.8	17	58.8	10
Mean (Std. Dev.)	4.25 (0.77)		4.45 (0.80)		4.52 (0.57)		4.18 (1.33)	

Figure 16.
Respondent's Level of Agreement, "We had sufficient communication with the ND Oral Health Program regarding the operation of the dental sealant program.", Seal!ND, Participating School Survey, By School Year



Perceptions of Service Provided by the Public Health Hygienist

Respondents were asked about their level of agreement on several statements related to the service provided by the public health dental hygienist. Results for the most recent study period and the previous three years are reported. Questions are as they appeared on the survey instrument.

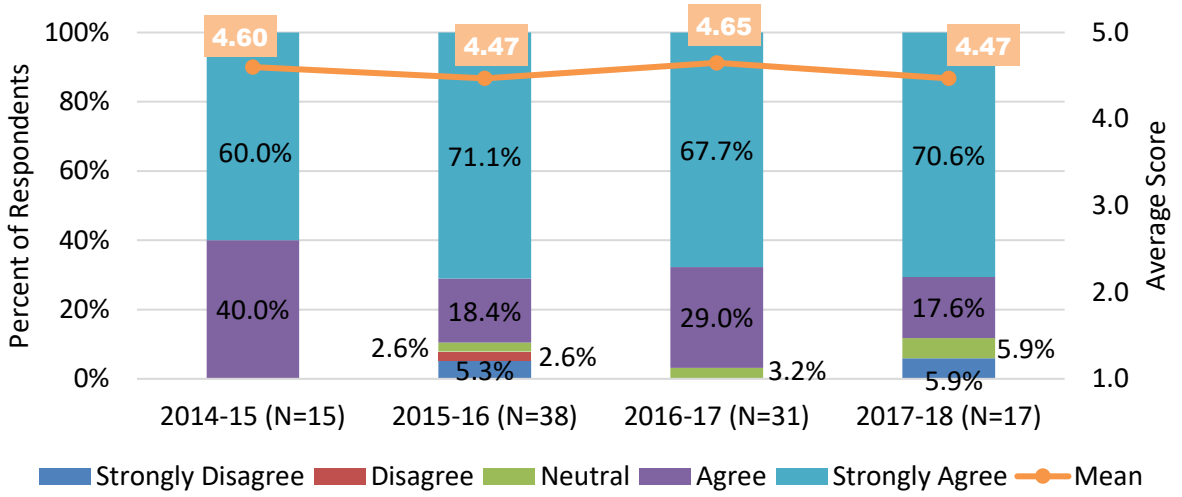
1. **The public health hygienist who provided services at our school was easy to get in touch with (Q3.A).**

Nearly all respondents either agreed or strongly agreed with the statement that the public health hygienist who provided services was easy to contact. Eighty-eight to 100 percent of respondents either agreed or strongly agreed with the statement. In 2017-18, 88.2 percent either agreed or strongly agreed with the statement, one respondent (6%) strongly disagreed, and one respondent was neutral. Even with the few respondents who disagreed with the statement, average scores were high, ranging from 4.47 in 2015-16 and 2017-18 to 4.65 in 2016-17, indicating overall satisfaction with school personnel's ability to contact the public health hygienist who provided services at the respondent's school (Table 14, Figure 17).

Table 14. Respondent's Level of Agreement, "The public health hygienist who provided services at our school was easy to get in touch with.", Seal!ND, Participating School Survey, by School Year

	2014-15 (*N*=15)		2015-16 (*N*=38)		2016-17 (*N*=31)		2017-18 (*N*=17)	
	%	*n*	%	*n*	%	*n*	%	*n*
Strongly Disagree	0.0	0	5.3	2	0.0	0	5.9	1
Disagree	0.0	0	2.6	1	0.0	0	0.0	0
Neutral	0.0	0	2.6	1	3.2	1	5.9	1
Agree	40.0	6	18.4	7	29.0	9	17.6	3
Strongly Agree	60.0	9	71.1	27	67.7	21	70.6	12
Mean (Std. Dev.)	4.60 (0.51)		4.47 (1.06)		4.65 (0.55)		4.47 (1.07)	

Figure 17.
Respondent's Level of Agreement, "The public health hygienist who provided services at our school was easy to get in touch with.", Seal!ND, Participating School Survey, by School Year

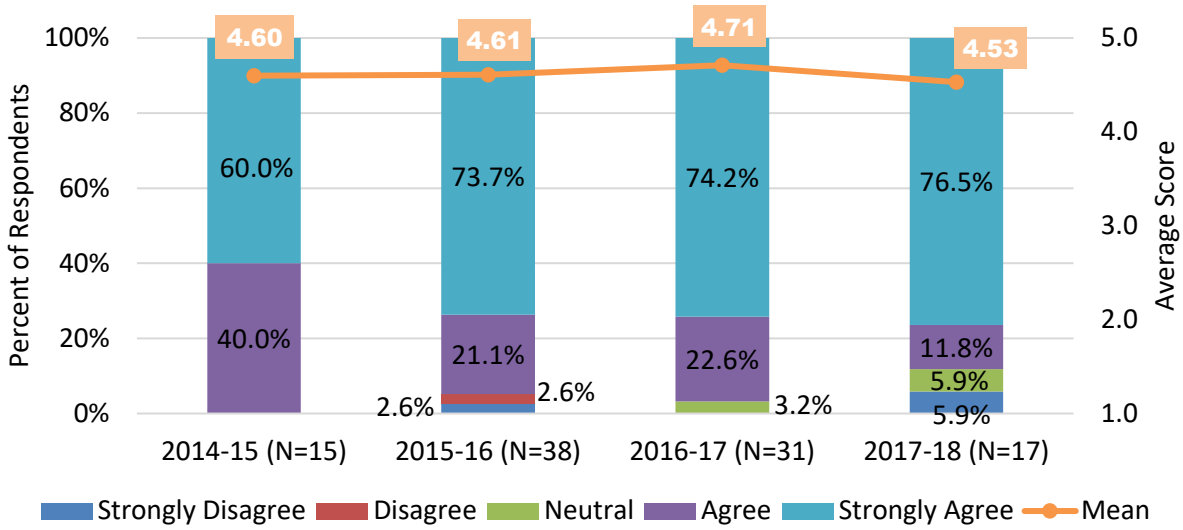


2. The public health hygienist who provided services at our school was easy to communicate with (Q3.B).

Nearly all repsondents either agreed or strongly agreed with the statement that the public health hygienist that provided services was easy to communicate with. Eighty-eight to 100 percent of respondents either agreed or strongly agreed with the statement in each of the four one-year study periods. In 2017-18, 5.9 percent of respondents strongly disagreed with the statement. Even with the few respondents who disagreed with the statement, average scores were high, ranging from 4.53 to 4.71, indicating overall satisfaction with respondent's ability to communicate with the public health hygienist who provided service at the respondent's school (Table 15, Figure 18).

Table 15. Respondent's Level of Agreement, "The public health hygienist who provided services at our school was easy to communicate with.", Seal!ND, Participating School Survey, by School Year								
	2014-15 (*N*=15)		2015-16 (*N*=38)		2016-17 (*N*=31)		2017-18 (*N*=17)	
	%	*n*	%	*n*	%	*n*	%	*n*
Strongly Disagree	0.0	0	2.6	1	0.0	0	5.9	1
Disagree	0.0	0	2.6	1	0.0	0	0.0	0
Neutral	0.0	0	0.0	0	3.2	1	5.9	1
Agree	40.0	6	21.1	8	22.6	7	11.8	2
Strongly Agree	60.0	9	73.7	28	74.2	23	76.5	13
Mean (Std. Dev.)	4.60 (0.51)		4.61 (0.86)		4.71 (0.53)		4.53 (1.07)	

Figure 18.
Respondent's Level of Agreement, "The public health hygienist who provided services at our school was easy to communicate with.", Seal!ND, Participating School Survey, by School Year



3. The public health hygienist who provided services at the respondent's school was knowledgeable about oral health matters (Q3.C).

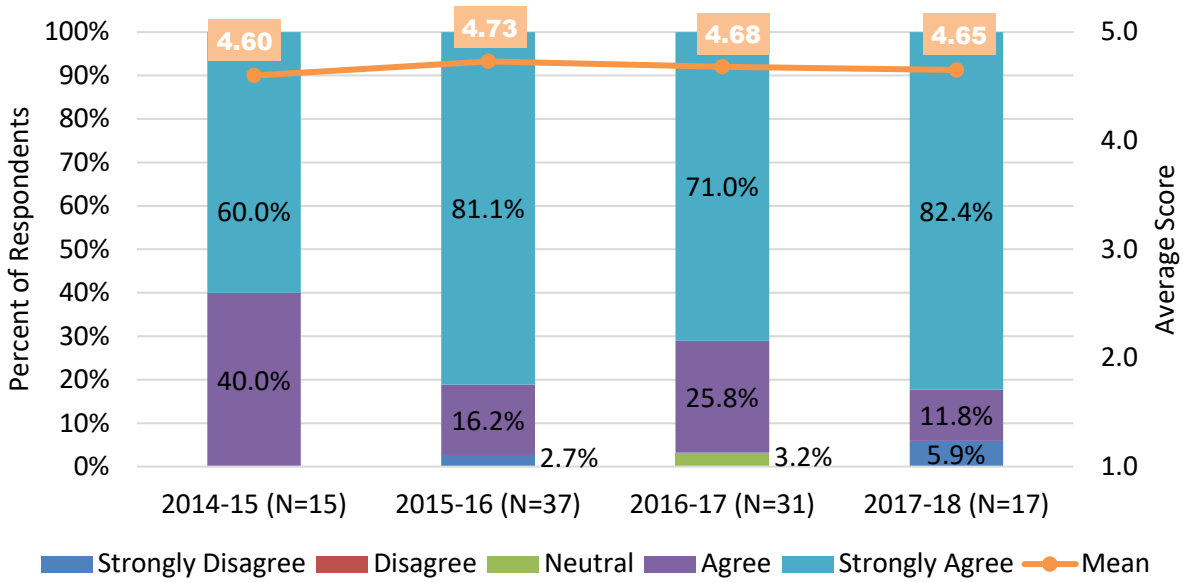
Nearly all respondents either agreed or strongly agreed with the statement that the public health hygienist who provided services was knowledgeable about oral health matters. Ninety-four to 100 percent of respondents either agreed or strongly agreed with the statement over the four-year period. In 2017-18 and in 2015-16 one respondent strongly disagreed with the statement. Average scores of 4.60 and higher in each of the program years indicate widespread

agreement with the statement suggesting overall agreement that the public health hygienist who provided services in the respondent's school was knowledgable about oral health matters (Table 16, Figure 19).

Table 16. Respondent's Level of Agreement, "The public health hygienist who provided services at our school was knowledgeable about oral health matters.", Seal!ND, Participating School Survey, by School Year

	2014-15 (*N*=15)		2015-16 (*N*=38)		2016-17 (*N*=31)		2017-18 (*N*=17)	
	%	*n*	%	*n*	%	*n*	%	*n*
Strongly Disagree	0.0	0	2.7	1	0.0	0	5.9	1
Disagree	0.0	0	0.0	0	0.0	0	0	0
Neutral	0.0	0	0.0	0	3.2	1	0	0
Agree	40.0	6	16.2	6	25.8	8	11.8	2
Strongly Agree	60.0	9	81.1	30	71.0	22	82.4	14
Mean (Std. Dev.)	4.60 (0.51)		4.73 (0.73)		4.68 (0.54)		4.65 (1.00)	

Figure 19.
Respondent's Level of Agreement, "The public health hygienist who provided services at our school was knowledgeable about oral health matters.", Seal!ND, Participating School Survey, by School Year



4. The public health hygienist who provided services at our school was considerate to staff and students (Q3.D).

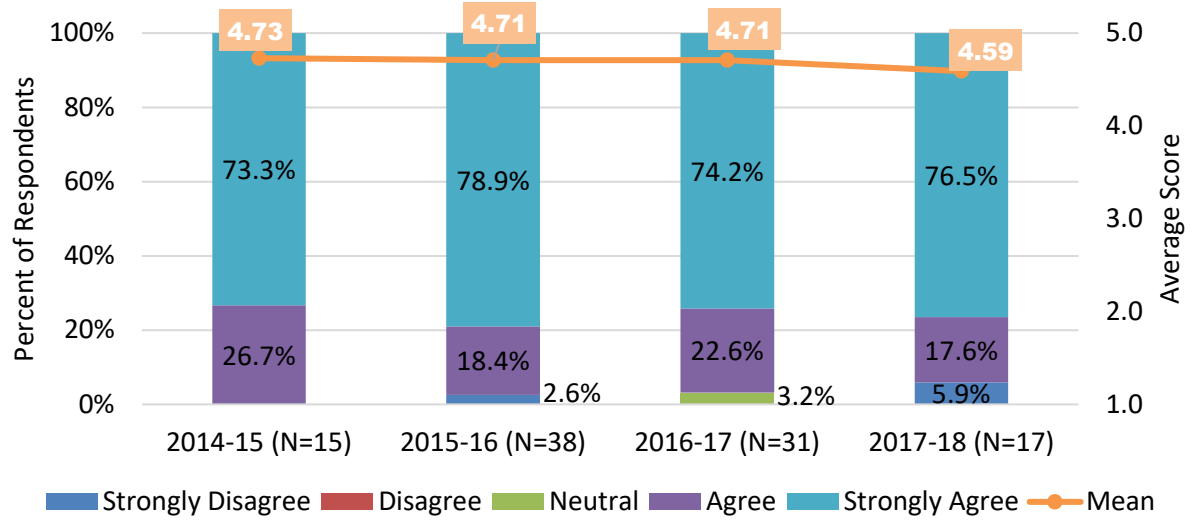
Consistent with responses to other questions regarding respondent's satisfaction with the public health hygienist that provided services in the respondent's school, public health

hygienists were rated favorably. Ninety-four to 100 percent of respondents either agreed or strongly agreed with the statement that the public health hygienist who provided services at the respondent's school was considerate to staff and students. In 2017-18 and 2015-16 , one respondent strongly disagreed with the statement and in 2016-17 one respondent was neutral. Average scores of 4.59 and higher in each of the study years indicate widespread agreement among respondents that the public health hygienist who provided services in the respondent's school was considerate to staff and students (Table 17 and Figure 20).

Table 17. Respondent's Level of Agreement, "The public health hygienist who provided services at our school was considerate to staff and students.", Seal!ND, Participating School Survey, by School Year

	2014-15 (*N*=15)		2015-16 (*N*=38)		2016-17 (*N*=31)		2017-18 (*N*=17)	
	%	*N*	%	*N*	%	*N*	%	*N*
Strongly Disagree	0.0	0	2.6	1	0	0.0	5.9	1
Disagree	0.0	0	0.0	0	0	0.0	0	0
Neutral	0.0	0	0.0	0	3.2	1	0	0
Agree	26.7	4	18.4	7	22.6	7	17.6	3
Strongly Agree	73.3	11	78.9	30	74.2	23	76.5	13
Mean (Std. Dev.)	4.73 (0.46)		4.71 (0.73)		4.71 (0.53)		4.59 (1.00)	

Figure 20.
Respondent's Level of Agreement, "The public health hygienist who provided services at our school was considerate to staff and students.", Seal!ND, Participating School Survey, by School Year



Comments and Suggestions

The third section of the survey asked respondents for their comments and suggestions regarding program improvement. Responses to the open-ended questions are only reported for the 2017-18 school year. The responses to the four open-ended questions were summarized as follows. Verbatim responses are detailed in Appendix B.

1. **Would it be helpful to receive additional information/communication about the dental sealant program? If so, what types of additional information/ communication would you like to receive?**

Thirteen respondents had suggestions for the program. Overall, the participating schools were very supportive of the program. Two schools indicated that the current information was adequate and sufficient, and another four schools replied "No", "NA", "None needed," and "there is nothing I would change about this program." For the remaining respondents regarding the additional information, they mentioned: information to add to their newsletter or post on their website, insurance/Medicaid information, and a brochure for families about general oral hygiene. Similar to previous years, respondents also suggested pamphlets that contain program information. One respondent mentioned word of mouth is the way for small schools.

2. **Do you have any suggestions about how we might be able to improve the percentage of parents/care givers who sign their children up to receive these services?**

Eleven respondents commented on this question, including two schools that replied "No," and "NA." Suggestions regarding improvement on the percentage of involved parents included personal phone calls to parents, information to post to their website or newsletter, contacting parents face-to-face to get children with poverty involved, and more information about the program for flyers or a brochure to mail home. One school noted that "most students who chose not to participate did so because they were already receiving services from their dentist." Two schools had no suggestions stating that there was ample communication with all parents and "parent participation is often hard to muster." One school said the form was confusing and that some parents "thought that if they took their students to a dentist regularly, that they couldn't or shouldn't sign up."

3. **Are there any portions of this program that are particularly burdensome to school staff? If so, which portions of the program are they? Do you have any suggestions about how we might alleviate the burden?**

Eleven school representatives responded to this question. Most respondents did not think the program was burdensome to school staff, instead, they were supportive and complimentary of

the program. Respondents from eight schools responded “No”, “NA”, “not at all a burden”, “No, I don’t think it’s at all burdensome,” or “Nope….it’s super easy”. One school noted the school’s responsibilites in the program were “effeciently organized and easy to implement” while another school asked for more notice prior to scheduling dates for a visit.

4. **Do you have other suggestions about how we might be able to improve the school-based dental sealant program?**

Nine schools responded to this question including five schools that answered “No” or “I don’t”. One school was considering hosting a health fair to recruit more students in the community to take advantage of the program. One school received feedback from families that some sealants were not done correctly and the dentist had to remove and replace them. Two other schools had positive feedback about the success of the program with hopes of participating in the future.

Key Findings and Recommendations

Conclusions and recommendations for analysis and calculation of adverted cavities and the participating school survey are detailed in the following sections.

Calculation of Adverted Cavities

Seal!ND is one example of an innovative and cost-effective approach used by the North Dakota Department of Health’s Oral Health Program. In just four years, Seal!ND has helped to prevent 3,410 cavities in permanent molars in North Dakota students and referred 1,900 students to dental providers for treatment. Preventing cavities not only saves money by avoiding health care costs but helps students do better in school. Children with poor oral health are more than three times as likely to miss school due to dental pain (Jackson, 2011). Seal!ND not only improves oral health in children, but also improves educational outcomes by helping to keep children in class and focused on learning rather than on dental pain.

The program is effectively reaching its target audience. Underserved children frequently are from homes characterized by low incomes. To target low-income and underserved children, the program targets schools for participation based on the number of students enrolled in the free and reduced-fee lunch program. In 2017-18, Seal!ND targeted schools with 40 percent or more of students enrolled in the free or reduced-fee lunch program. In the three previous years, the program’s target threshold was 45 percent. Students screened by race also suggests the program is reaching underserved children, often minorities. The percentage of minorities participating in the program is greater than the percentage of minorities statewide. This was especially evident in the number of American Indian children participating in the program. Nine percent of the state’s child population is American Indian, however 20 percent of the children who participated in Seal!ND were American Indian.

Screenings and sealant applications are timed to coincide with eruption of first molars. Students were more frequently screened in Kindergarten and Pre-K, and sealants were more frequently applied when students were in first grade and second grade. Both findings are consistent with best practices as sealants are most effective when applied soon after first molars erupt at age 6 to 7 when most children are in first grade. This would suggest that Seal!ND is effectively targeting younger children to seal first permanent molars.

Program evaluation could be improved if data were coded in a manner where actual retention rates are calculated rather than using CDC secondary sources for retention rates. While best practices call for sealant placement to be evaluated after one year, given the program is delivered during the school year, the one-year evaluation is challenging. Students would need to be tracked from year to year, increasing administrative burdens on public health hygienists. A potential alternative would be to calculate retention rates based on the six to eight-month period that coincides with fall screenings and applications, and spring screenings, applications, and retention screenings. A leading expert in effectiveness has indicated that when checking for placement issues, retention checks can be done soon after application. “Checks for material are appropriate 6 to 12 months after application.” This would suggest that calculating North Dakota retention rates using data from spring and fall screenings may be appropriate (Fontana, 2018). This would allow for a more precise determination of cavities averted in North Dakota as a result of the school sealant program.

Participating School Survey

School administrators indicated high levels of satisfaction with their experience with the school-based dental sealant program. Respondents nearly unanamously agreed that public health hygienists were well informed about the dental sealant program, that school personnel had sufficient information to promote the dental sealant program and that they understood their roles and responsibilities in delivering the dental sealant program. Responses were slightly mixed when respondents were asked to about their level of agreement related to the amount of staff time and effort required. However as schools became more familiar with the program, concern related to the amount of staff time required declined slightly. Responses suggest that the OHP is effectively communicating and collaborating with partner schools in North Dakota. The 74 to 95 percent response rate of stakeholders in participating school districts over the past four years reinforces that conclusion.

Respondents also indicated high levels of satisfaction with the public health hygienists that provided services at the respondent’s school. Respondents were in near unanimous agreement that the public health hygienists were easy to contact and communicate with. Respondents also indicated near unanimous agreement that the public health hygienists were knowledgeable about oral health and were considerate to staff and students. Responses suggest the public health hygienists are viewed favorably by respondents. Again, high response rates of stakeholders in participating school districts reinforce that conclusion.

Conclusions

Overall, Seal!ND has effectively targeted and delivered a school-based dental sealant program using widely accepted best practices targeting underserved students. The program has sucessfully improved the oral health of the target population by preventing cavities and avoiding costs associted with restoritive care. The program has also sucessfully partnered with participating schools as evidenced by the high level of satisfaction of school administrators and others that interact with the program and the personnel that deliver the services of the school sealant program.

By engaging more dental providers in servicing ND schools, the OHP has successfully grown the capacity of the sealant program in a sustainable way. Working with the ND Medicaid office to gain approval of billing for services provided in a school-based sealant program will hopefully enable the program to be sustainable over the longer term. However, 2017-18 data from screening sheets used by private practice providers and FQHCs was not delivered to the OHP as detailed in the MOU. Data collection efforts need to be monitored to ensure all data required under the MOU are delivered to the OHP. Without all data, program impacts such as application of sealants, cavities prevented, adverted costs, and number of students referred for treatment will clearly be underestimated. Given the strides made to encourage private practice providers to offer school-based sealant programs and the coordination between the OHP, FQHCs and RMCM, the OHP should take measures to improve reporting by other providers so that beginning in 2018-19, other providers that offer school-based sealant programs will be tracked and reported as part of annual evaluation activities.

School participation rates should be monitored and efforts to refine communication to ensure schools do not decline to particpate because they think there is a cost for students to participate. 2017-18 was the first year the program billed Medicaid for services for students that qualified and it is not unreasonable to expect some confusion. In the future, the OHP should craft communications with the schools in such a manner to mitigate the potential for confusion.

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Appendix A
Focused Evaluation Design: School-Based Sealant Program

Focused Evaluation Design: School-Based Sealant Program
See Attachment 1 for a visual representation of the program

A. Stakeholder engagement: Key stakeholders from the school-based sealant program will be convened by the program's director, Jaci Seefeldt, for evaluating and improving the program. The Center for Social Research at NDSU will provide support and assistance for the evaluation.

B. Key evaluation questions to be answered (Divided into 2 cycles of evaluation)

Cycle 1: Program implementation issues (Completed by February 2017):

i. What are the spring retention rates for students' dental sealants? What additional information should we capture to support improvements in this program?
ii. What is the number/percentage of children in sealant programs who are receiving at least one molar sealant? Is it increasing over time in the program? How might the rates of receiving sealant be increased?
iii. What are the challenges and barriers to expanding a sealant program?

Cycle 2: Examining sealant program impacts and disseminating findings to target audiences (to be implemented after Cycle 1 improvements):

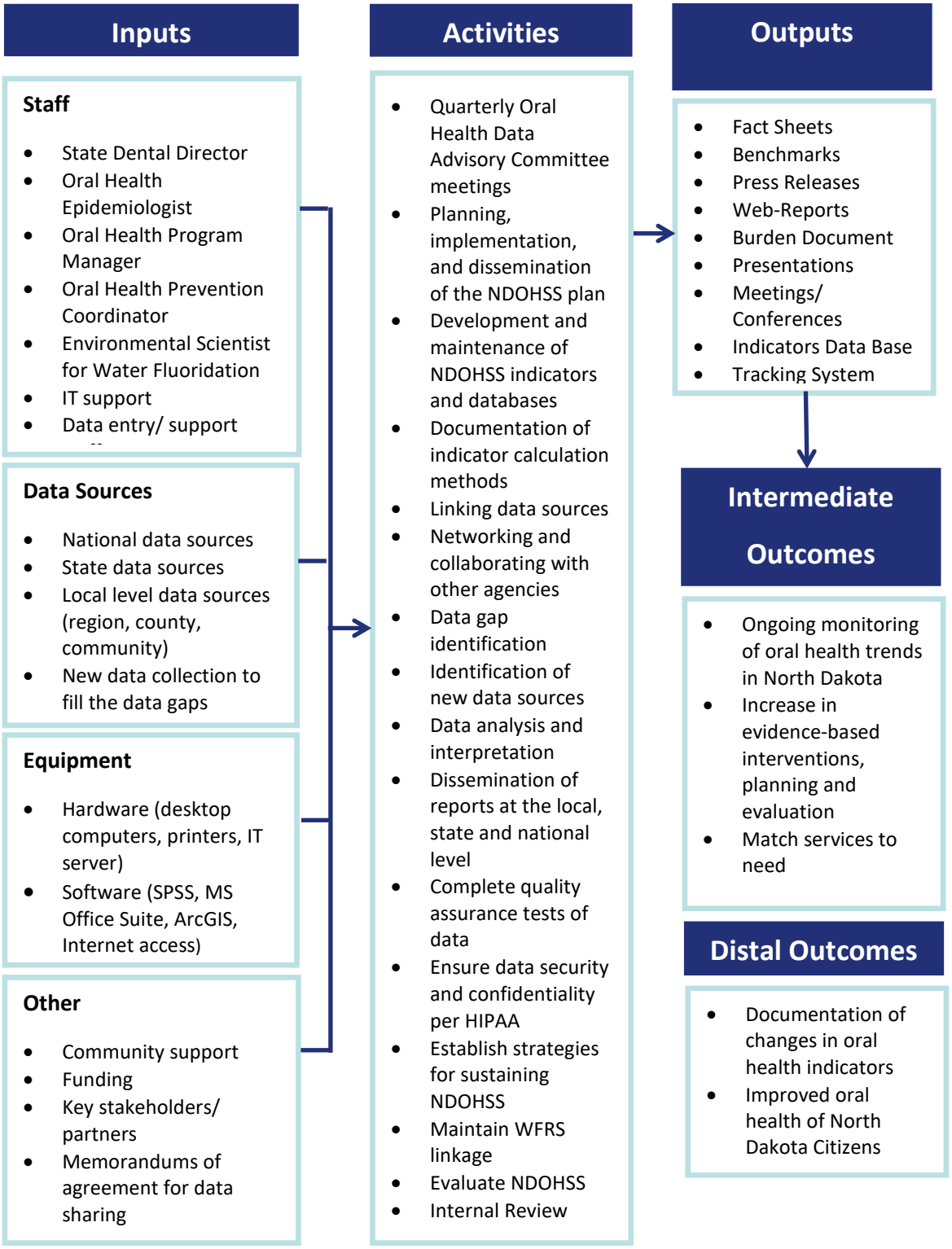
i. Are the key stakeholders and decision makers being educated on the cost savings of dental sealants?
ii. Has the program been cost-effective, efficient, and impacted the population?

C. Cycle 1 Collection of the relevant evaluation and performance data.

i. Review available data from Seal!ND housed in the Department of Health, Oral Health Program
ii. Supplement existing data by surveying and/or conducting interviews with the program's key oral health care providers and schools receiving services to better improve the program.
iii. Review data the dental sealant program surveys administered in 2015 and 2016 to school administrators at the sealant program sites.

D. Cycle 1 Data interpretation, dissemination, and continuous quality improvement (Items i & ii below are to be completed by February 2017)

i. Report evaluation findings and recommendations.
ii. Develop plan for implementing the Cycle 1 program improvements.
iii. After the program improvements have been in place for sufficient time to take effect, initiate a second cycle of evaluation and improvements to address the program's cost effectiveness and impacts.



North Dakota Oral Health Program Logic Model: School-Based Sealant Program

Appendix B
Participating School Survey: Answers to Open-Ended Questions, 2017-18

Answers to Open-ended Questions, 2017-18

1. **Whether the respondent thought it would be helpful to receive additional information/communication about the dental sealant program, and the types of additional information/communication would the respondent like to receive**.
    - Program is good
    - NA
    - The fliers were given out kind of late, but we were still able to manage and get the kids signed up.
    - I would love something that we can either stick in our newsletter or put on our website/Facebook page to get the information out to parents in more ways.
    - Jamie is outstanding and has done a fantastic job with our 576 students. There is nothing I would change about this program. The only thing we want to request Jamie EVERY YEAR
    - None needed.
    - We had some parents who were wary about the insurance/medicaid information this year. They were afraid that they would have to pay for it in the end. A hand-out geared to answer those sort of questions would be great to send home. Also, information about if you get sealants at your dentist, could you need them again, etc.
    - Word of mouth seems to be the way to go in our small school setting.
    - No
    - Received all the information necessary.
    - Yes, Parental information
    - A simple brochure for families would be nice.
    - Any pamphlets regarding general oral hygiene/care that can be shared with family are always welcome

2. **The respondent's suggestions on how the program might be able to improve the percentage of parents/care givers who sign their children up to receive these services.**
    - I believe that, in our school anyway, most students who chose not to participate did so because they were already receiving services from their dentist. Most students who were not regularly seeing a dentist chose to participate in this program.
    - Personal phone calls to the parents?
    - NA
    - Again, maybe just something we can put on our website or the Facebook page so they know it's coming. Also, maybe a place they can go online to sign up their kids in case they didn't receive the form.
    - We on our end need to continue to make every effort to get all of our children these needed services. We have a huge poverty population and want to really contact parents face-to-face to get these children seen.

- Maybe a mailing with information
- Probably more information to do with the above question.
- I think the form was confusing. Parents thought that if they took their students to a dentist regularly, that they couldn't or shouldn't sign up.
- Ample communication with all parents was in place.
- None
- Not really...parent participation is often hard to muster

3. **Respondents' feedback on whether any portions of the program were particularly burdensome to school staff and suggestions for alleviating the burden.**
    - No
    - MA
    - No, I don't think it's at all burdensome.
    - Absolutely nothing is burdensome. We are extremely happy with these services and appreciate you having Jamie (who already knows our staff, parents and students) come back each year.
    - Nope....it's super easy.
    - NO
    - No
    - The school's responsibilities in the program were efficiently organized and easy to implement.
    - No, No
    - Would like a little more notice prior to scheduling date for visit.
    - Not at all a burden

4. **Respondents' suggestions for improving the school-based dental sealant program.**
    - No
    - Feedback from families that they received from their dentists is that the sealants were not "quality?" Or not done correctly. The dentists removed them and replaced.
    - I don't.
    - We were talking about holding a Health Fair so we could get more community students to take advantage of your great services. We are so thankful for everything you do.
    - I think you guys do a great job with this program.
    - No
    - No
    - No
    - Great program so I hope it will be available in the future.

Appendix C
Participating School Survey Questionnaire

2017-18 ND School Dental Sealant Program Survey

1. Survey Introduction

The following brief survey asks about your school's experience with the school-based dental sealant program offered by the North Dakota Department of Health - Oral Health Program. It should only take about 5-10 minutes to complete.

Your responses and feedback will help us understand how to better align these services with the operations of the school sites where they are offered.

Thank you for your participation in this survey!

2. Perceptions of the Dental Sealant Program

The following questions ask you to rate various aspects of your school's experience with the school-based dental sealant program offered by the ND Department of Health.

Questions

Q1. Please indicate your level of agreement with the following statements about your school's experience with the dental sealant program.	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
A) We were well informed about the dental sealant program offered at our school.	○	○	○	○	○
B) We had sufficient information to promote the dental sealant program.	○	○	○	○	○
C) We understood our roles and responsibilities in delivering the dental sealant program.	○	○	○	○	○
D) Performing our school's roles and responsibilities in the dental sealant program took a great deal of staff time and effort.	○	○	○	○	○
E) We had sufficient communication with the public health hygienist to coordinate the delivery of services.	○	○	○	○	○
F) We had sufficient communication with the ND Oral Health Program regarding the operation of the dental sealant program.	○	○	○	○	○

Q3. The public health hygienist who provided services at our school was....

	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
A) easy to get in touch with	○	○	○	○	○
B) easy to communicate with	○	○	○	○	○
C) knowledgeable about oral health matters	○	○	○	○	○
D) considerate to staff and students	○	○	○	○	○

4. Comments & Program Improvement Suggestions

The following items ask for your program improvement suggestions. Please take a moment to briefly respond to these questions because your input is vitally important for making the program more effective and efficient.

Questions

1. Would it be helpful to receive additional information/communication about the dental sealant program? If so, what types of additional information/communication would you like to receive?

_____

_____

_____

_____

_____

2. Do you have any suggestions about how we might be able to improve the percentage of parents/care givers who sign their children up to receive these services?

_____

_____

_____

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3. Are there any portions of this program that are particularly burdensome to school staff? If so, which portions of the program are they? Do you have any suggestions about how we might alleviate the burden?

_____

_____

_____

_____

_____

4. Do you have other suggestions about how we might be able to improve the school-based dental sealant program?

_____

_____

_____

_____

You are about to submit the survey. If you are ready, hit the submission button below.