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Program Evaluation: North Dakota Department of Health Seal!ND 2016-2017

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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 preventative oral health care to low-income and underserved children. 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 helps to identify 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 45 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.

The program provides dental screening, oral health education, dental sealant and fluoride varnish application with retention checks in the spring to monitor outcomes. Seal!ND also identifies students with additional oral health care needs. Students with additional oral health care needs were referred 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. The North Dakota Oral Health Program 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 preventative treatment through a proven community-based approach.

Seal!ND was launched in the 2012-2013 school year. In the first year of the program, 43 schools participated. However, in 2013-2014, Seal!ND was available in only two schools due to the loss

of funding from the Health Resources and Services Administration (HRSA). Funding was restored in 2014-15 and 18 schools offered the sealant program. The number of participating schools increased to 40 in 2015-16 and in the 2016-2017 school year, 41 schools participated in the program. The program is supported by funding from the Centers for Disease Control (CDC) and Health Resources and Services Administration (HRSA).

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, 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 North Dakota State University Center for Social Research used 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 (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 5.99 percent and calculated using methods as described in Griffin et al. 2014. Sealant retention rate of 89 percent was based on secondary data as reported in Griffin et al. 2014.

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 Center for Social Research 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 participant 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 2016-17, the North Dakota Oral Health Prevention Coordinator sent invitations to 42 individuals at 41 participating schools (one school had two individuals that coordinated activities Seal!ND) requesting they complete a brief questionnaire. Three subsequent reminders

were sent and ultimately 31 individuals completed the survey for a 73.8 percent response rate. Response rates were slightly higher in 2014-15 and 2015-16, 94.4 and 95.0 percent, respectively.

Respondents were asked to rate 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 three program years are reported for all questions except the open-ended questions. Responses for the open-ended questions are only reported for the 2016-17 school year.

Findings

Cost effectiveness analysis and Seal!ND Participating School Survey results are reported in the following sections.

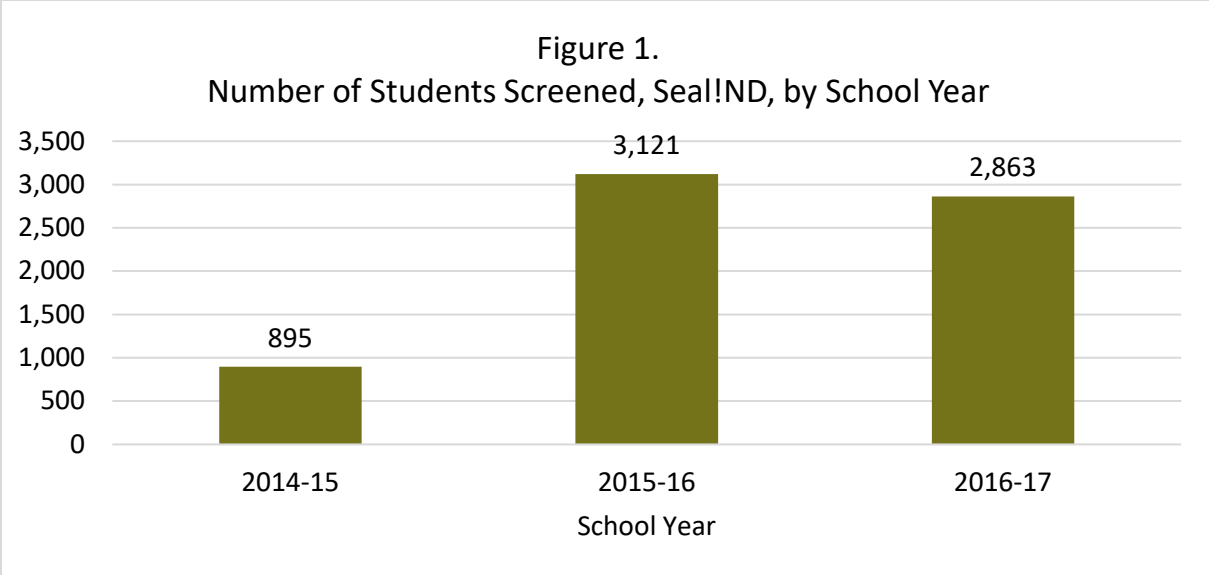
Annual Measures and Cavities Averted

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

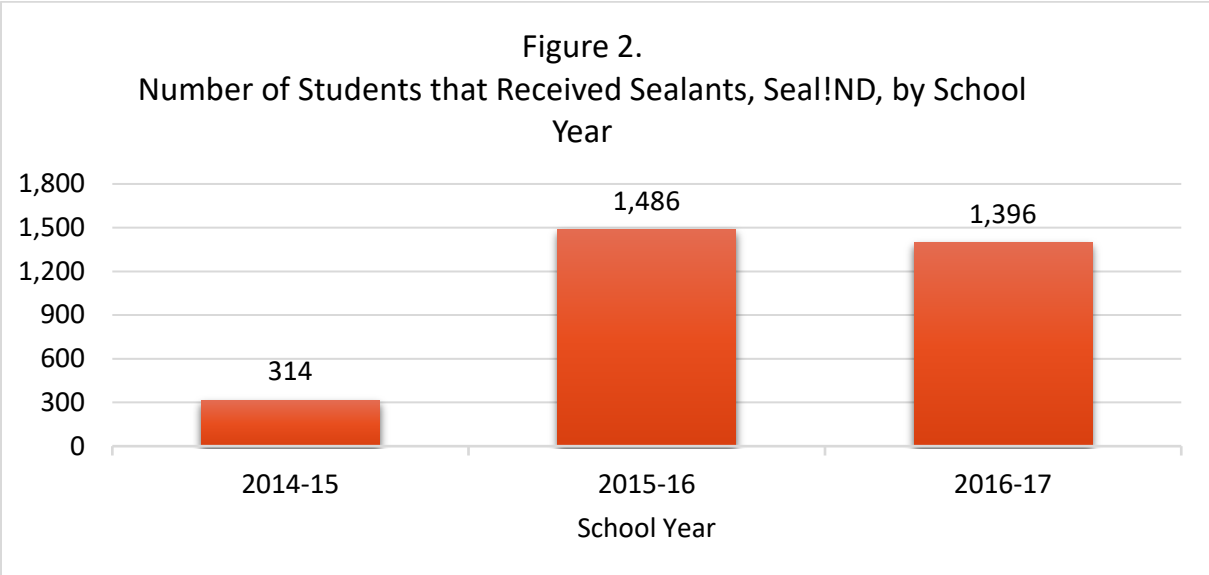
Student Demographics

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. In 2016-17, 24 schools continued to participate in the program and 17 new schools enrolled in the program for a total of 41 schools that participated in the program (Table 1).

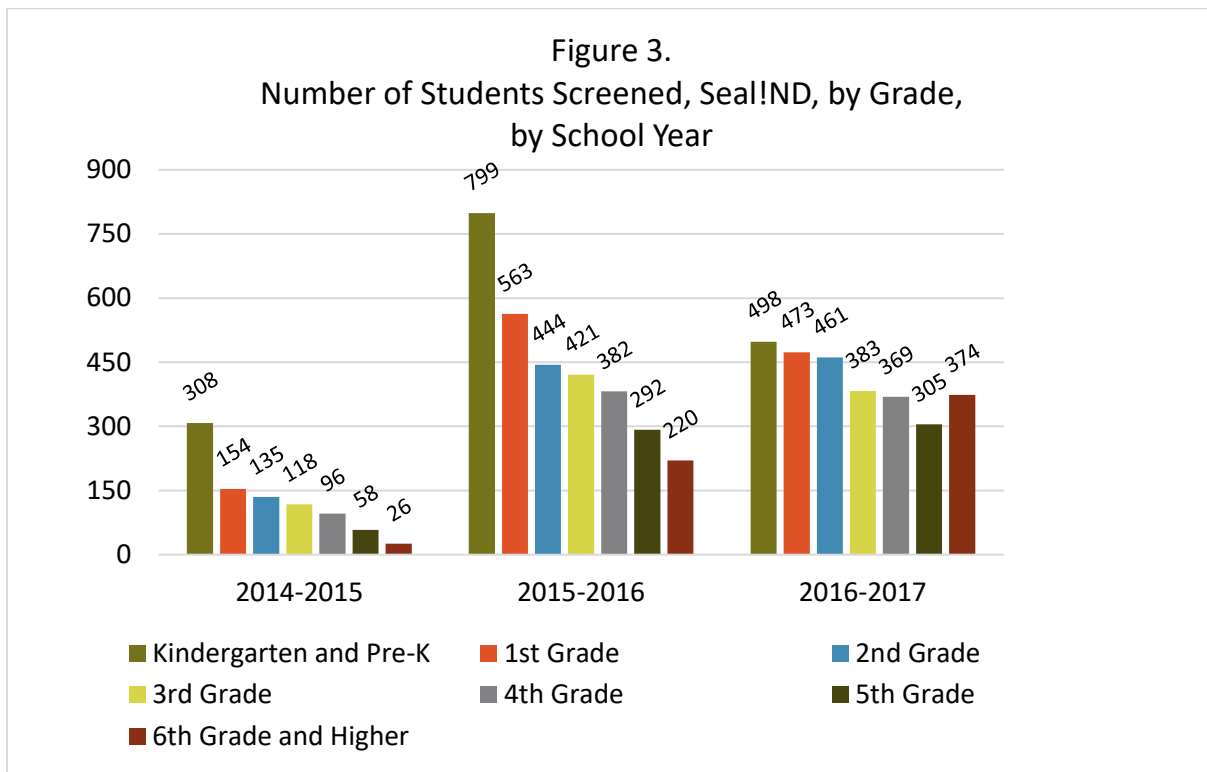
The number of children screened increased substantially in 2015-16 increasing from 895 children screened in 2014-15 to 3,121 in 2015-16 (Figure 1, Table 1). The number of children screened declined slightly in 2016-2017 to 2,863, however that does not necessarily indicate program ineffectiveness. Some children that were previously screened may have been referred to a dental provider. Participating school enrollments may vary from year to year affecting screening totals.



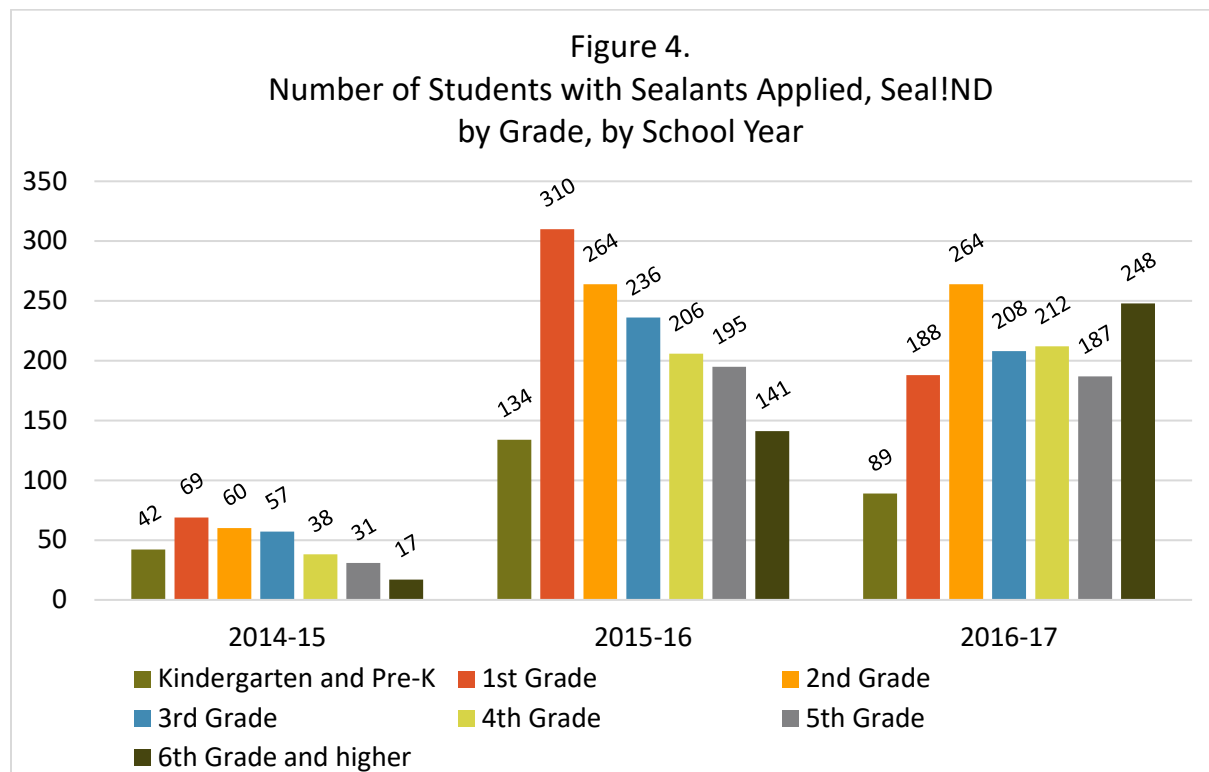
Trends were similar for the number of children who received sealants as the number of students screened. With the substantial increase in the number of participating schools, the number of students that received sealants increased from 314 in 2014-15 to 1,486 in 2015-16. The number of students who received sealants in 2016-17 was similar to 2015-16 with 1,396 students that had sealants applied (Figure 2, Table 1).



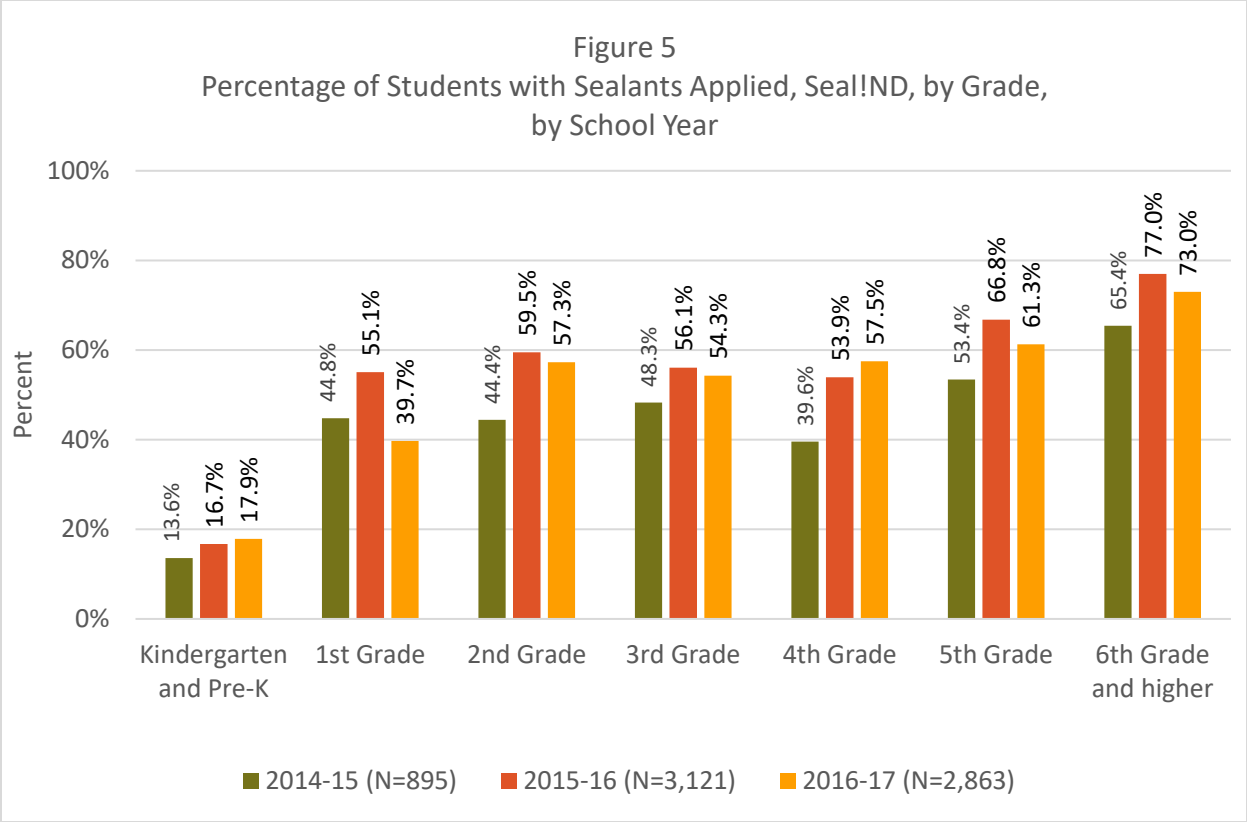
For each program year, more Kindergarten and Pre-Kindergarten students were screened than any other grade. In 2014-15, 308 Kindergarten and Pre-K student were screened (Figure 3). The number of students screened in other grades ranged from 26 to 154. Trends were similar in 2015-16 when more Kindergartners 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 374 students in 6th grade or higher. First grade students were the second most frequently screened. Fewer students were screened in higher grades, especially 6th grade or higher in all three study years. Declining program participation in higher grades is consistent with CDC best practices. CDC best practices guidelines report program participation typically drops in higher grades (CDC 2017).



While Kindergarten and Pre-K students were most frequently screened, sealants were most frequently applied to students in 1st and 2nd grade (Figure 4, Table 1). As students progressed to higher grades, the number of students that have sealants applied declines. 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.



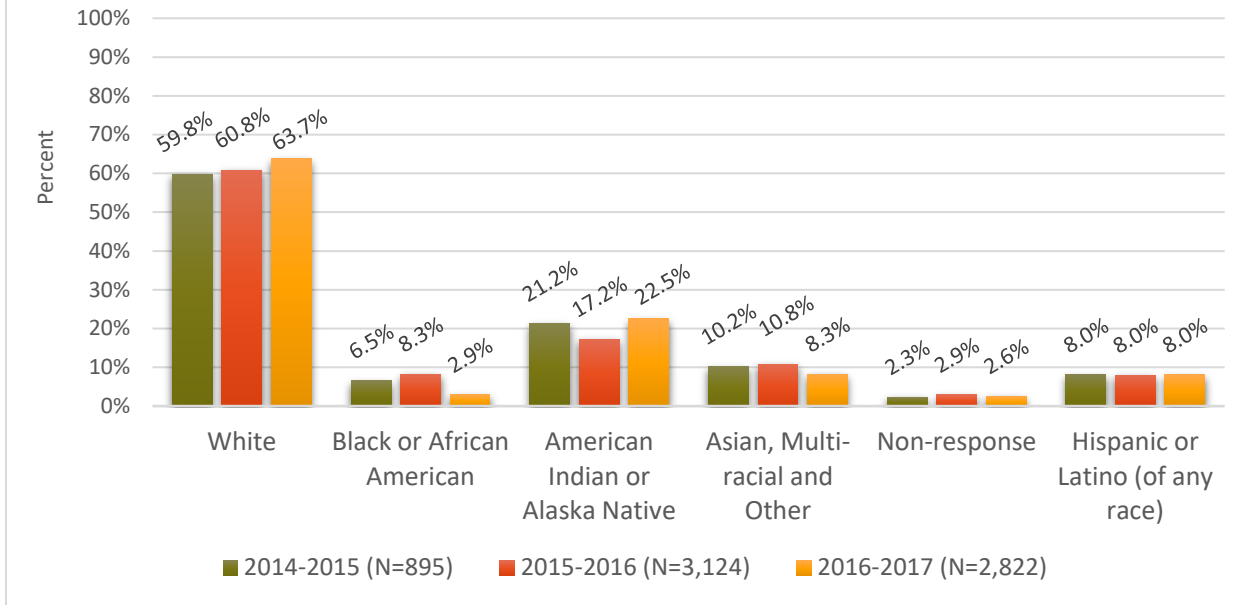
The percentage of students who receive sealants offers some perspective on overall student participation in the program and to what degree the program is reaching the target audience, including low-income and underserved populations. The percentage of children in participating schools in grades one through five with sealants applied ranged from 40 to 60 percent of all students in each corresponding grade in 2014-15 (Figure 5, Table 1). In the subsequent years the percentage of children with sealants applied in grades one through five increased and ranged from 50 to 70 percent of students in grades one through five. The percentage of children that had sealants applied was lower in all three program years for Kindergarten and Pre-K students, ranging from 13 to 18 percent. Fewer children with sealants applied 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 erupted.



Program Target Audience

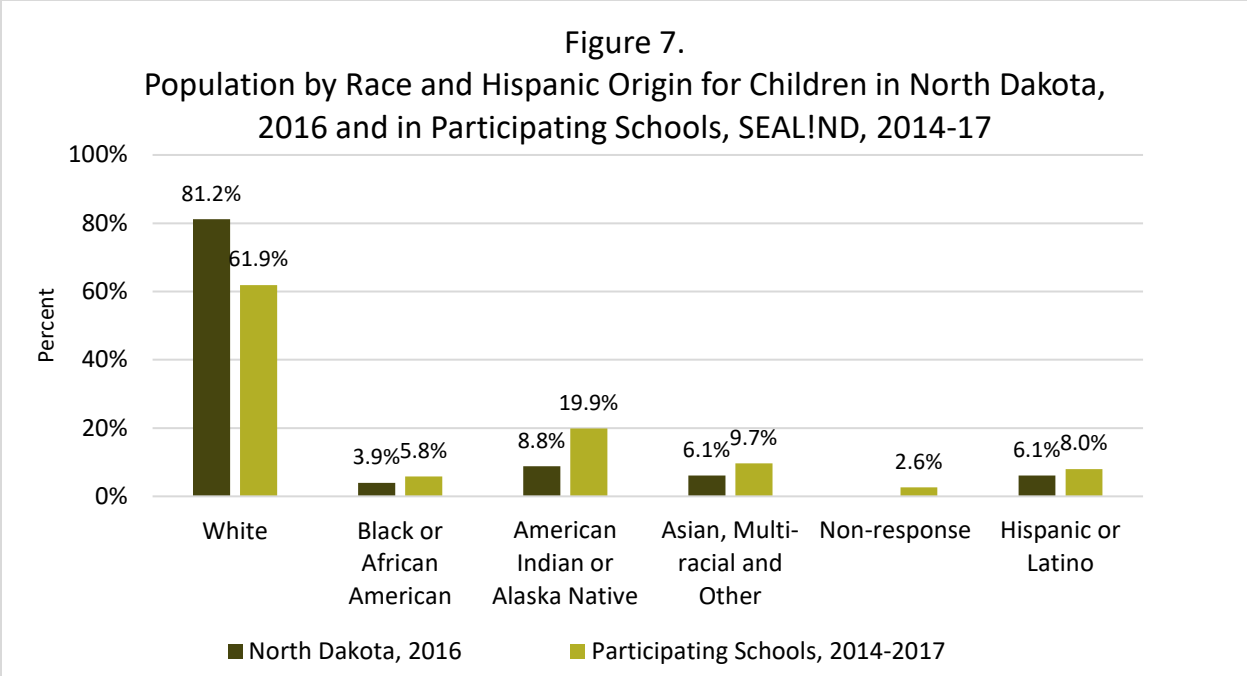
One of the goals of the school-based sealant program is to reach children that are high-risk based on socio-economic status, which frequently include racial minorities. While a majority of students who participated in the school sealant program were white, the program served a greater percentage of minority students than the overall child population distribution of the state. Over the three-year study period, approximately, 61 percent of the children screened were white, 20 percent were American Indian, and 6 percent were Black or African American. Additionally, 8 percent of students were Hispanic or Latino (of any race) (Figure 6).

Figure 6.
 Percentage of Students Screened, Seal!ND, by Race and Hispanic Origin, by School Year



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 diverse than the students that participated in the school sealant program. Over the course of the three year program period, participating minority 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 7). 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 than statewide population. This would suggest the program is effectively targeting low-income and underserved populations.



Note: The categories in Figure 7 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

The number of first molars sealed increased from 939 in 2014-15 to 4,390 in 2015-16 (Figure 8, Table 1). The number of first molars sealed dropped slightly to 3,799 in 2016-17 (Figure 8, Table 1). 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.

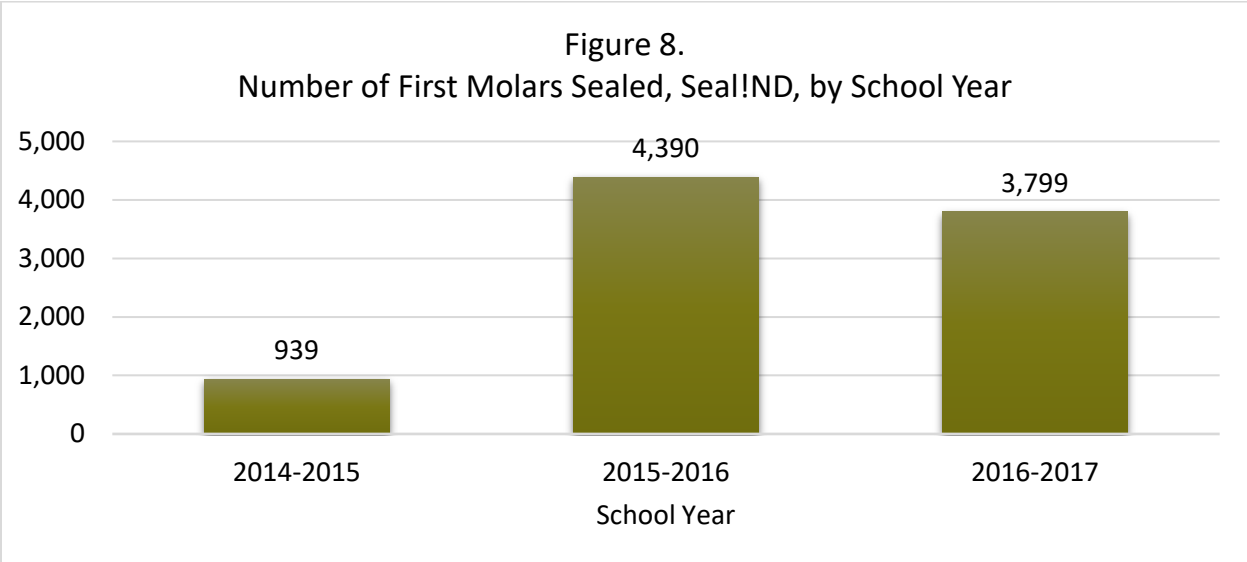


Table 1. Summary of Services Delivered, SEAL!ND, by School Year

Item	School Year		
	2014-15	2015-16	2016-17
Number of participating schools	18	40	41
Number of children screened	895	3,122	2,863
Number of children with sealants applied	314	1,486	1,396
Percentage of children screened with sealants applied	35.0	47.6	48.8
Number of 1 st molars sealed	939	4,390	3,799
Number of 1st molars, 2 nd molars and other teeth sealed	1,257	6,452	6,122
Total number of children with sealants	531	2,118	1,997
Percentage of children with sealants	59.2	67.8	69.8

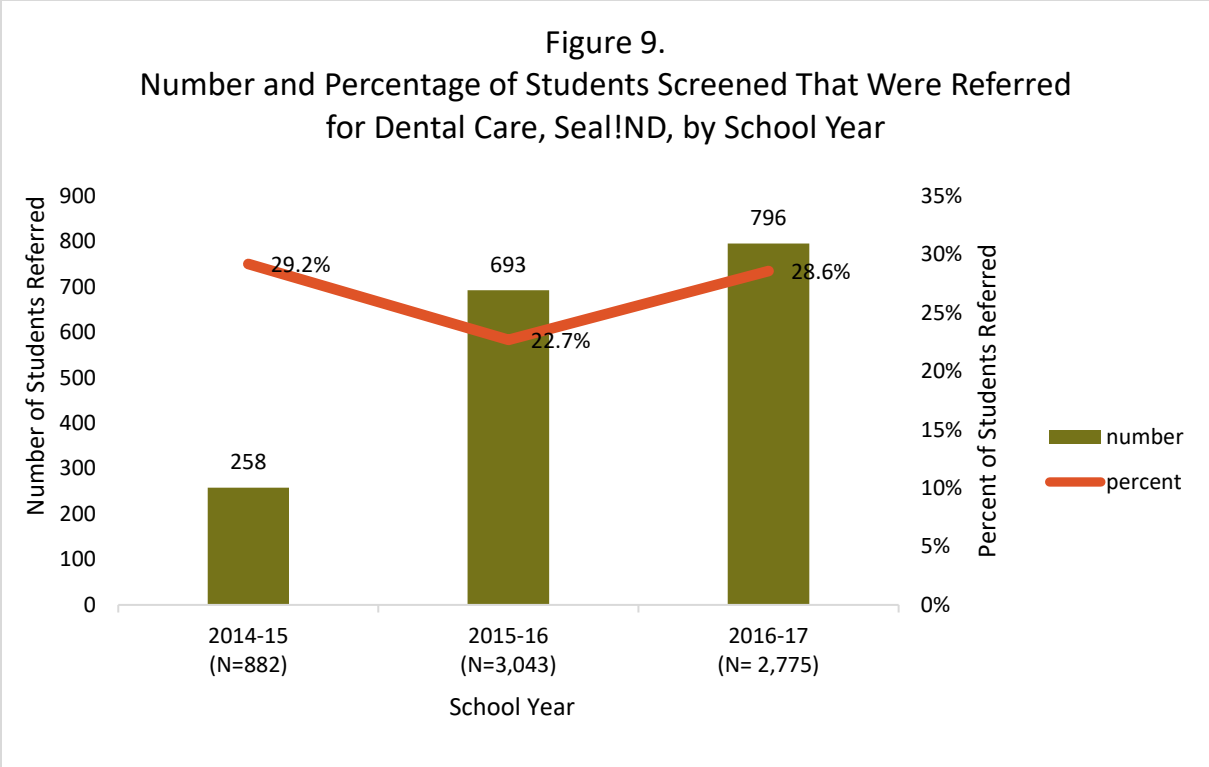
Seal!ND also provides a dental screening which identifies students with untreated cavities and refers them to local providers for treatment and dental care. In 2014-15, 262 students, approximately one-third of the students screened, had untreated cavities (Table 2). In 2015-16 and 2016-17, the number 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 decline to 23 and 29 percent, respectively.

Most of the untreated decay detected during the three-year program period was classified as early dental care. However, 209 children, or 10 percent, of children screened required urgent care over the course of the three-year study period. Urgent care was defined as “pain, infection, large decay, abscess or drainage.” Roughly one in four students screened since the program began in 2014 were identified as having untreated cavities and 1,747 children were referred for treatment over the course of the three-year study period (Table 2, Figure 9). Roughly 50 percent 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 2. Summary of Children Screened with Treated and Untreated Decay, and Referred for Treatment, SEAL!ND, by School Year

	2014-15		2015-16		2016-17	
	N=882		N=3,043		N=2,775	
	%	n	%	n	%	n
Students with treated or untreated decay	55.2	486	52.0	1,582	57.5	1,593
Students with treated decay	37.9	334	38.4	1,167	42.3	1,174
Students with untreated decay	29.8	262	23.2	707	29.0	805
Students referred for dental care	29.2	258	22.7	693	28.6	796
Students referred for immediate treatment (Urgent care)	1.5	13	3.1	93	3.7	103
Students referred for early dental care (Restorative care)	27.8	245	19.7	600	25.0	693

In each of the program years, roughly 30 percent of students screened were referred to dental providers for treatment in 2014-15 and 2015-16 (Table 2). 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 percent.



In 2014-15 it was estimated that the school-based dental sealant program sponsored by OHP prevented decay in 423 permanent molars. The number of molars with prevented decay increased in 2015-16 and 2016-17 to 1,235 and 1,524, respectively (Table 3).

Stated 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 cavities were averted per molar sealed. The ratio of cavities prevented was slightly higher in 2015-16 when the ratio was 3.6 cavities prevented per molar that received sealant (Table 3).

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 costs from cavity prevention as a result of the application of sealants was \$32,783 in 2014-15 (Table 3). Avoided costs increased dramatically in the subsequent years to \$95,713 in 2015-16 and \$118,110 in 2016-17 (Table 3). Total averted costs over the three-year study period were \$246,605 (Table 3).

Table 3. Summary of Prevented Decay and Avoided Costs, Seal!ND, by School Year			
Item	School Year		
	2014-15	2015-16	2016-17
Prevented decay in permanent molars	423	1,235	1,524
Ratio of cavities prevented per number of molars sealed	2.2	3.6	2.5
Avoided cost from cavity prevention per avoided caries	\$77.50	\$77.50	\$77.50
Total avoided costs	\$32,782.50	\$95,712.50	\$118,110.00

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 school. Responses to open-ended questions can be found in Appendix B.

Dental Sealant Program

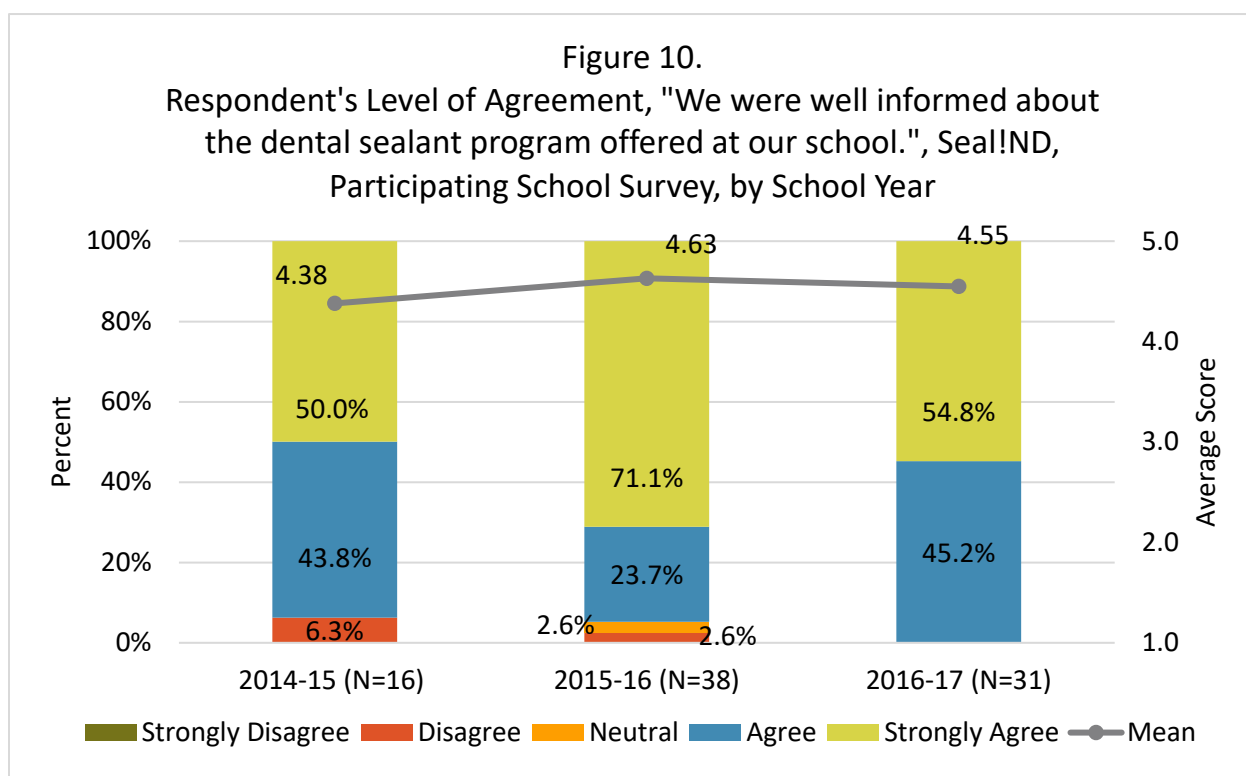
The survey respondents' level of agreement on statements related to the school's experience with the dental sealant program are detailed in the following sections. Results for the most recent study period and the previous two years are reported. Questions are as they appeared on the survey instrument.

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

In 2016-2017, 100 percent of the survey participants agreed or strongly agreed that they were well informed about the dental sealant program. Previous year's 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 (6.3% of total respondents, $N=16$ and 2.6% of total respondents, $N=38$, respectively). The average score increased from 4.38 in 2014-15 to 4.63 in 2015-16 and then decreased to 4.55 in 2016-17. Responses indicate a high-level of agreement that respondents were well-informed about the dental sealant program. Responses and level of agreement were consistent across program years (Table 4, Figure 10).

Table 4. 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)	
	%	n	%	n	%	n
Strongly Disagree	0.0	0	0.0	0	0.0	0
Disagree	6.3	1	2.6	1	0.0	0
Neutral	0.0	0	2.6	1	0.0	0
Agree	43.8	7	23.7	9	45.2	14
Strongly Agree	50.0	8	71.1	27	54.8	17
Mean (Std. Dev.)	4.38 (0.81)		4.63 (0.67)		4.55 (0.51)	

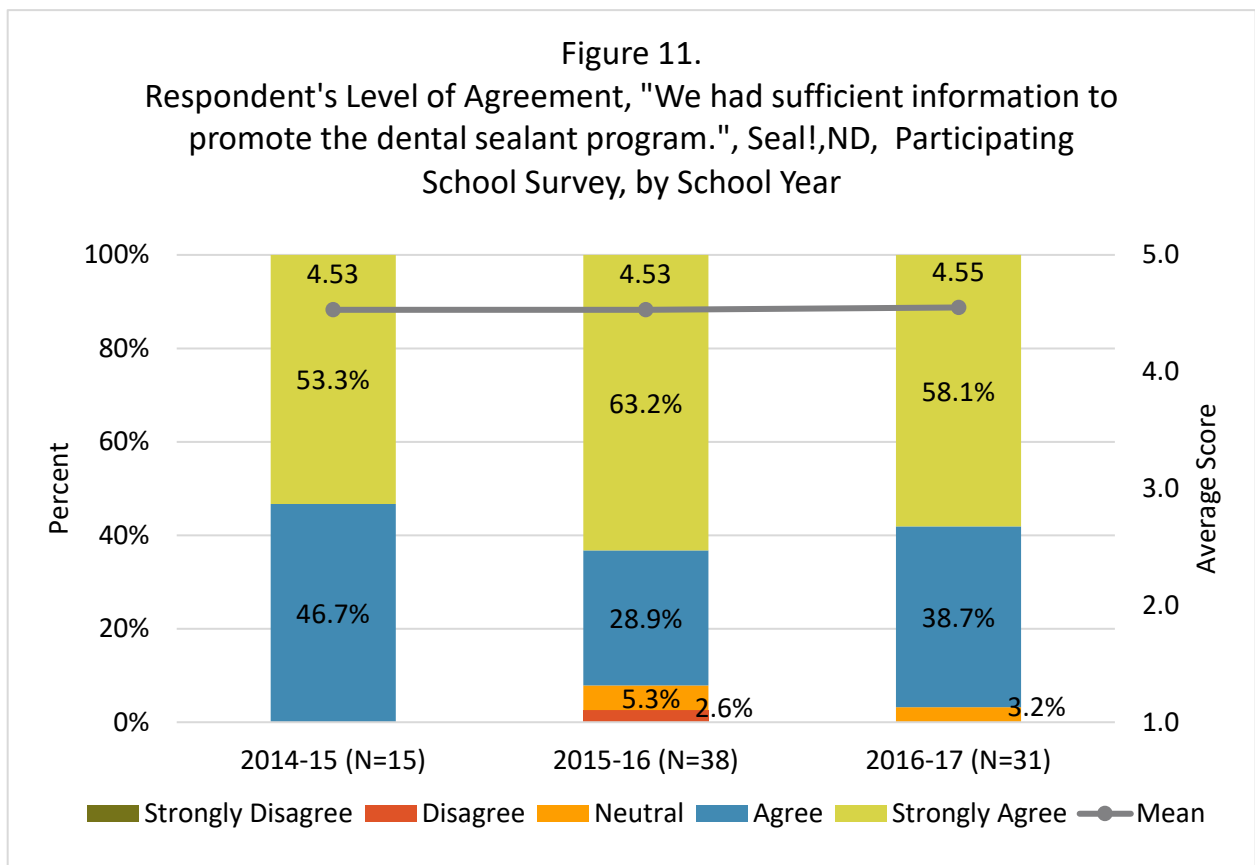


2. We had sufficient information to promote the dental sealant program (Q1.B).

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 (2.6 percent of total respondents, N=38) and two were neutral (5.3 percent of total respondents, N=38). In 2014-15, 100 percent of respondents agreed or strongly agreed they had sufficient information to promote the dental sealant program. Average scores were 4.5 for each of the program years indicating high levels of

agreement among survey respondents that they had sufficient information to promote the school sealant program (Table 5, Figure 11).

Table 5. 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)	
	%	n	%	n	%	n
Strongly Disagree	0.0	0	0.0	0	0.0	0
Disagree	0.0	0	2.6	1	0.0	0
Neutral	0.0	0	5.3	2	3.2	1
Agree	46.7	7	28.9	11	38.7	12
Strongly Agree	53.3	8	63.2	24	58.1	18
Mean (Std. Dev.)	4.53 (0.52)		4.53 (0.73)		4.55 (0.57)	

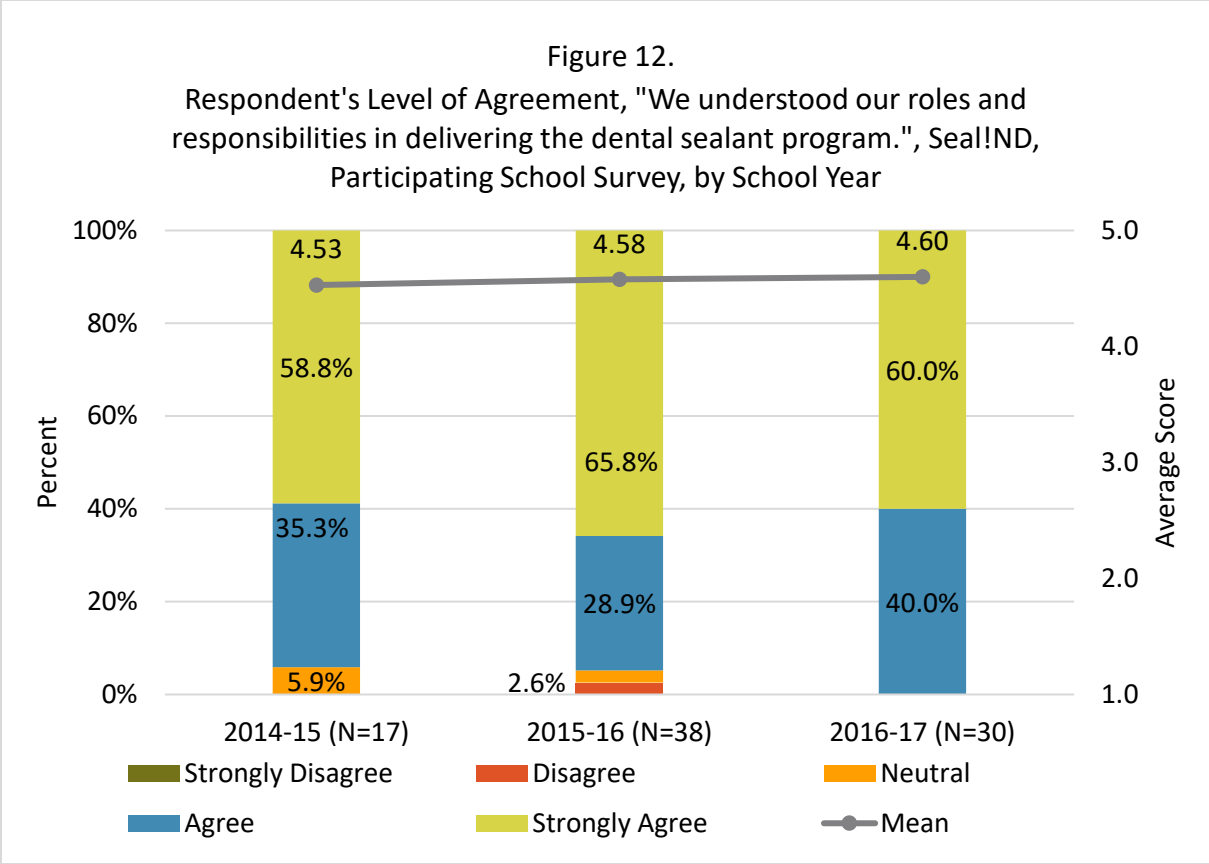


3. We understood our roles and responsibilities in delivering the dental sealant program (Q1.C).

For 2016-17, all respondents ($N=30$) agreed or strongly agreed that they understood their roles and responsibilities associated with the dental sealant program. In 2015-16, one respondent disagreed (2.6 percent of total respondents, $N=38$) and one was neutral (2.6 percent of total respondents, $N=38$). Over the course of the three-year study period, 96 percent of respondents either agreed or strongly agreed that they understood their roles and responsibilities in delivering the dental sealant program. Average scores were 4.53, 4.58 and 4.60 in 2014-15, 2015-16 and 2016-17, respectively, indicating a high level of agreement among respondents that they understood their roles and responsibilities in the delivery of the dental sealant program (Table 6, Figure 12). The level of agreement was consistent across program years.

Table 6. 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 ($N=30$)	
	%	n	%	n	%	n
Strongly Disagree	0.0	0	0.0	0	0.0	0
Disagree	0.0	0	2.6	1	0.0	0
Neutral	5.9	1	2.6	1	0.0	0
Agree	35.3	6	28.9	11	40.0	12
Strongly Agree	58.8	10	65.8	25	60.0	18
Mean (Std. Dev.)	4.53 (0.62)		4.58 (0.68)		4.60 (0.50)	



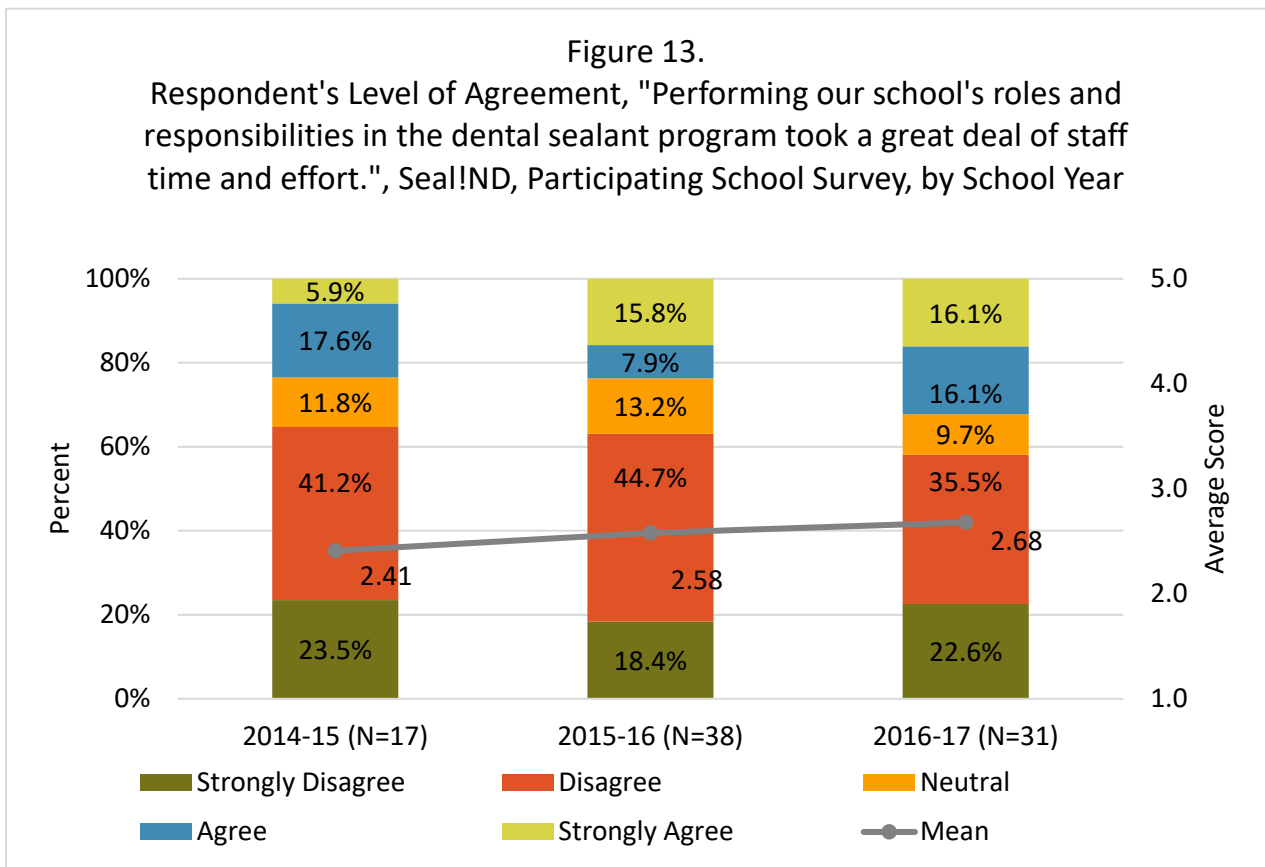
4. Performing our school’s roles and responsibilities in the dental sealant program took a great deal of staff time and effort (Q1.D).

In 2014-15 and 2015-16, roughly 60 percent of respondents either disagreed or strongly disagreed that the dental sealant program took a great deal of staff time and effort. In 2016-2017, 58 percent of respondents disagreed or strongly disagreed with the statement and 32 percent either agreed or strongly agreed. In the previous two years, 23 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 that 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). 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 responsibilities in the dental sealant program became less over time (Table 7 and Figure 13).

Table 7. 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)	
	%	n	%	n	%	n
Strongly Disagree	23.5	4	18.4	7	22.6	7
Disagree	41.2	7	44.7	17	35.5	11
Neutral	11.8	2	13.2	5	9.7	3
Agree	17.6	3	7.9	3	16.1	5
Strongly Agree	5.9	1	15.8	6	16.1	5
Mean (Std. Dev.)	2.41 (1.23)		2.58 (1.33)		2.68 (1.42)	

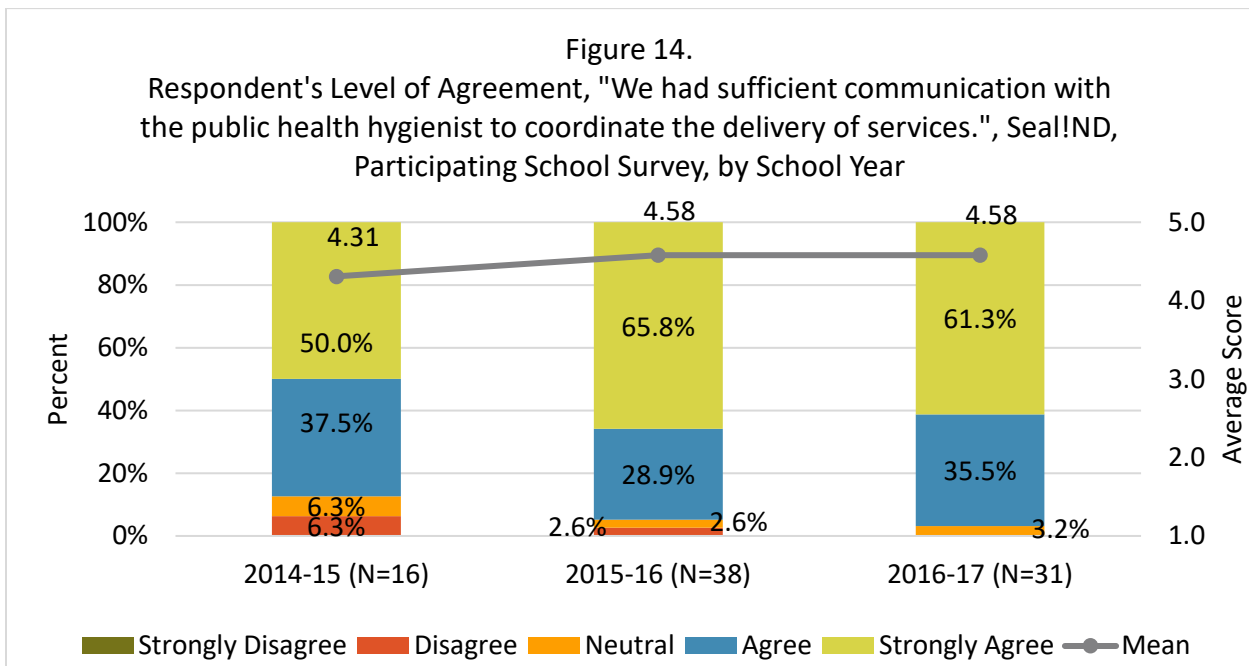


5. We had sufficient communication with the public health hygienist to coordinate the delivery of services (Q1.E).

In 2016-17, nearly 100 percent of respondents indicated there was sufficient communication with the public health hygienist to coordinate the delivery of services. One respondent was neutral (3.2 percent of total respondents, N=31). Results were similar in 2015-16 and 2014-15. In each of the previous years, one respondent disagreed or was neutral that there was sufficient communication with the public health hygienist. Average scores ranged from 4.31 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 8 and Figure 14).

Table 8. 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)	
	%	n	%	n	%	n
Strongly Disagree	0.0	0	0.0	0	0.0	0
Disagree	6.3	1	2.6	1	0.0	0
Neutral	6.3	1	2.6	1	3.2	1
Agree	37.5	6	28.9	11	35.5	11
Strongly Agree	50.0	8	65.8	25	61.3	19
Mean (Std. Dev.)	4.31 (0.87)		4.58 (0.68)		4.58 (0.56)	



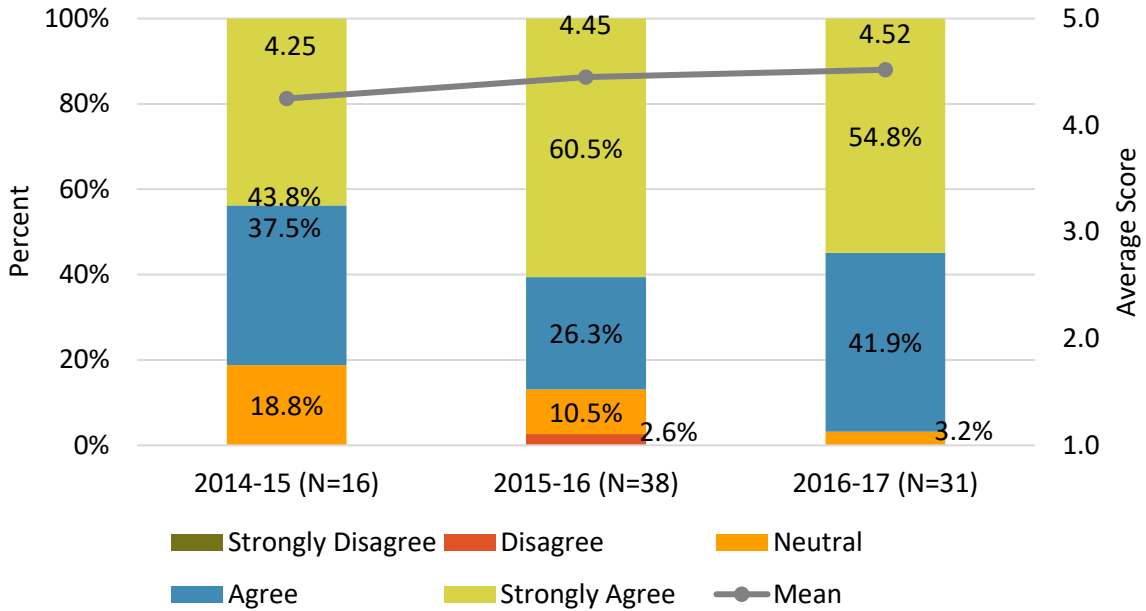
6. We had sufficient communication with the ND Oral Health Program regarding the operation of the dental sealant program (Q 1.F).

In 2016-2017, a large majority of respondents either agreed (41.9%) or strongly agreed (54.8%) that there was sufficient communication with the ND Oral Health Program 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 4.25 in 2014-15 to 4.52 in 2016-17 which indicates most respondents agreed they had sufficient communication with the OHP (Table 9 and Figure 15).

Table 9. 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)	
	%	n	%	n	%	n
Strongly Disagree	0.0	0	0.0	0	0.0	0
Disagree	0.0	0	2.6	1	0.0	0
Neutral	18.8	3	10.5	4	3.2	1
Agree	37.5	6	26.3	10	41.9	13
Strongly Agree	43.8	7	60.5	23	54.8	17
Mean (Std. Dev.)	4.25 (0.77)		4.45 (0.80)		4.52 (0.57)	

Figure 15.
 Respondent's Level of Agreement, "We had sufficient communications with the ND Department of Health 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

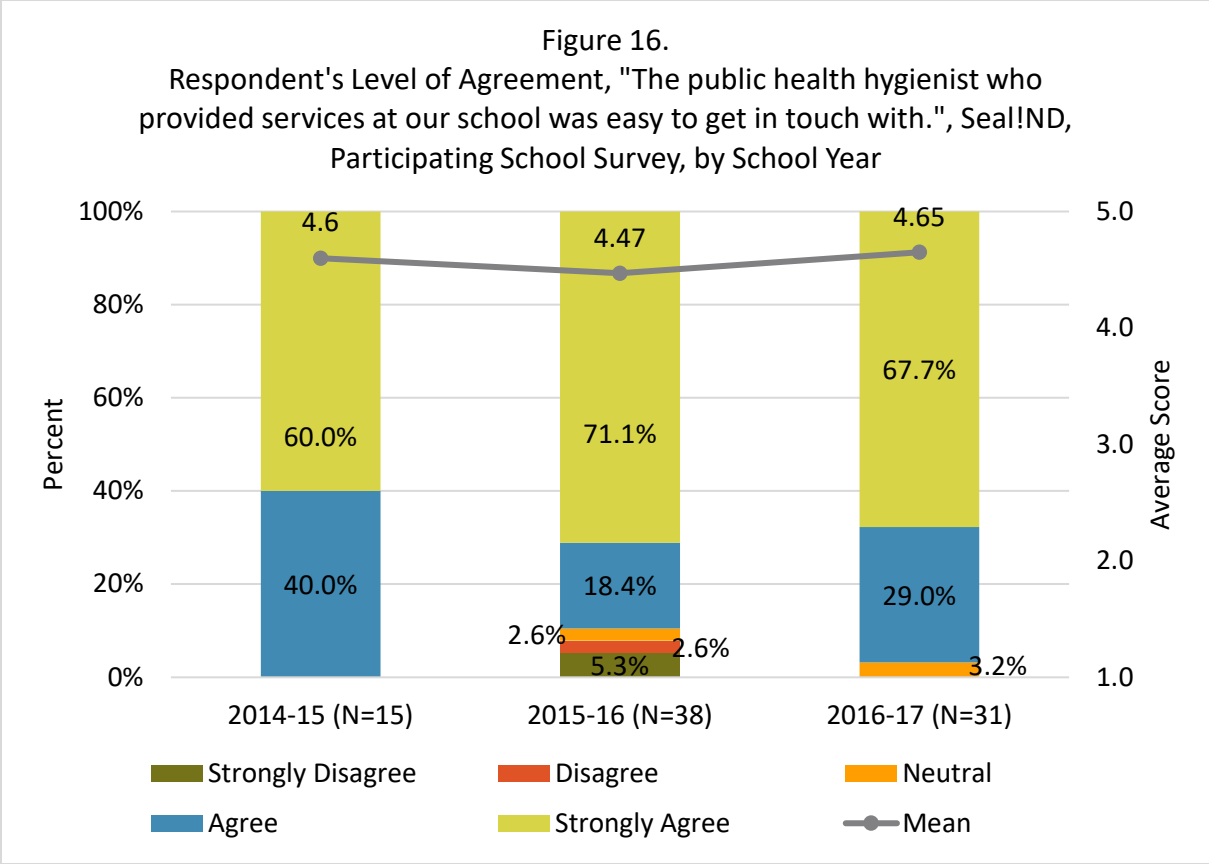
Respondents were asked to rate their level of agreement on several statements related to the service provided by the public health dental hygienist. Results for the most recent study period and the previous two years are reported. Questions are as they appeared on the survey instrument.

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-nine to 100 percent of respondents either agreed or strongly agreed with the statement over the three study periods. In 2015-16, three respondents, 7.9 percent, either disagreed or strongly disagreed with the statement. Even with a few respondents that disagreed with the statement, average scores were high, ranging from 4.47 to 4.65 indicating overall satisfaction with school personnel’s ability to contact the public health hygienist who provided services at the respondent’s school (Table 10, Figure 16).

Table 10. 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)	
	%	n	%	n	%	n
Strongly Disagree	0.0	0	5.3	2	0.0	0
Disagree	0.0	0	2.6	1	0.0	0
Neutral	0.0	0	2.6	1	3.2	1
Agree	40.0	6	18.4	7	29.0	9
Strongly Agree	60.0	9	71.1	27	67.7	21
Mean (Std. Dev.)	4.60 (0.51)		4.47 (1.06)		4.65 (0.55)	

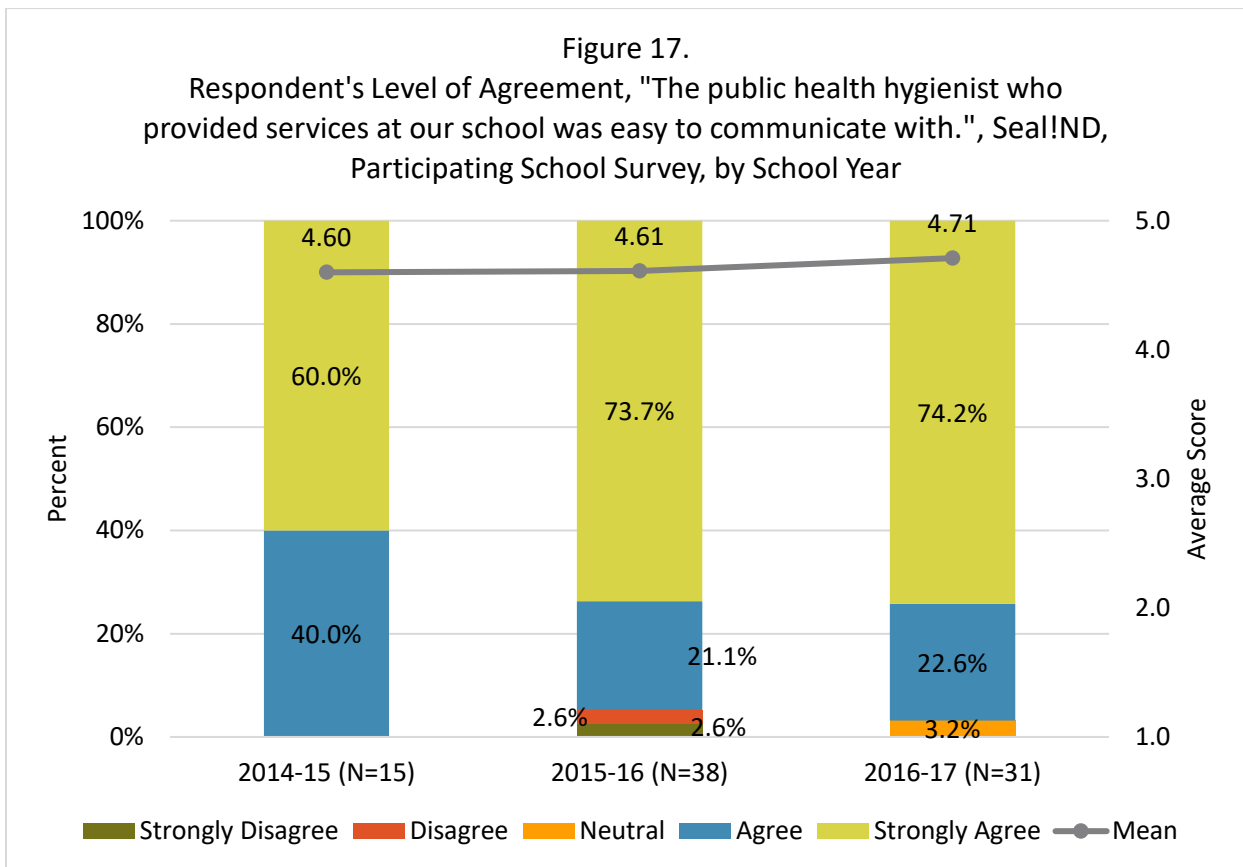


2. The public health hygienist who provided services at our school was easy to communicate with (Q3.B).

Nearly all respondents either agreed or strongly agreed with the statement that the public health hygienist that provided services was easy to communicate with. Ninety-five to 100 percent of respondents either agreed or strongly agreed with the statement over the three study periods. In 2015-16, 5.2 percent of respondents disagreed or strongly disagreed with the statement. Even with a few respondents that disagreed with the statement, average scores were high, ranging from 4.60 to 4.71, indicating overall satisfaction with respondents ability to communicate with the public health hygienist who provided service at the respondents school (Table 11, Figure 17).

Table 11. 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)	
	%	n	%	n	%	n
Strongly Disagree	0.0	0	2.6	1	0.0	0
Disagree	0.0	0	2.6	1	0.0	0
Neutral	0.0	0	0.0	0	3.2	1
Agree	40.0	6	21.1	8	22.6	7
Strongly Agree	60.0	9	73.7	28	74.2	23
Mean (Std. Dev.)	4.60 (0.51)		4.61 (0.86)		4.71 (0.53)	



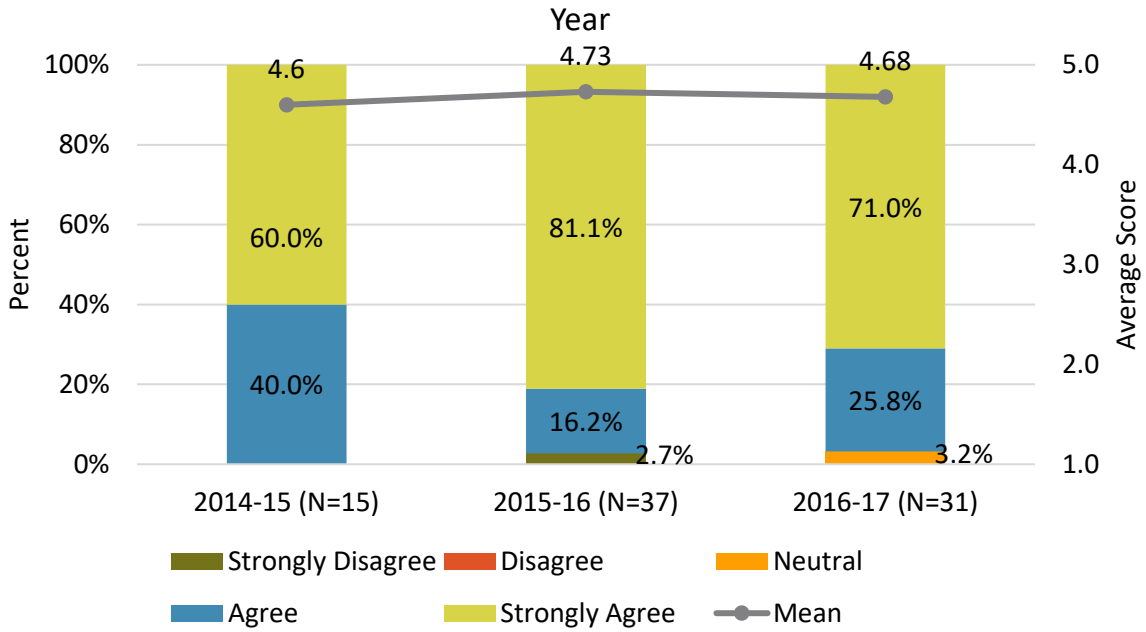
3. The public health hygienist who provided services at the respondent’s school was knowledgeable about oral health matters (Q3.C).

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-seven to 100 percent of respondents either agreed or strongly agreed with the statement. In 2015-16, one respondent strongly disagreed with the statement and in 2016-17, one respondent was neutral. High average scores of 4.6 and 4.7 indicate widespread agreement with the statement suggesting overall agreement that the public health hygienist who provided services in the respondent’s school was knowledgeable about oral health matters (Table 12, Figure 18).

Table 12. 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=37)		2016-17 (N=31)	
	%	n	%	N	%	n
Strongly Disagree	0.0	0	2.7	1	0.0	0
Disagree	0.0	0	0.0	0	0.0	0
Neutral	0.0	0	0.0	0	3.2	1
Agree	40.0	6	16.2	6	25.8	8
Strongly Agree	60.0	9	81.1	30	71.0	22
Mean (Std. Dev.)	4.60 (0.51)		4.73 (0.73)		4.68 (0.54)	

Figure 18.
 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

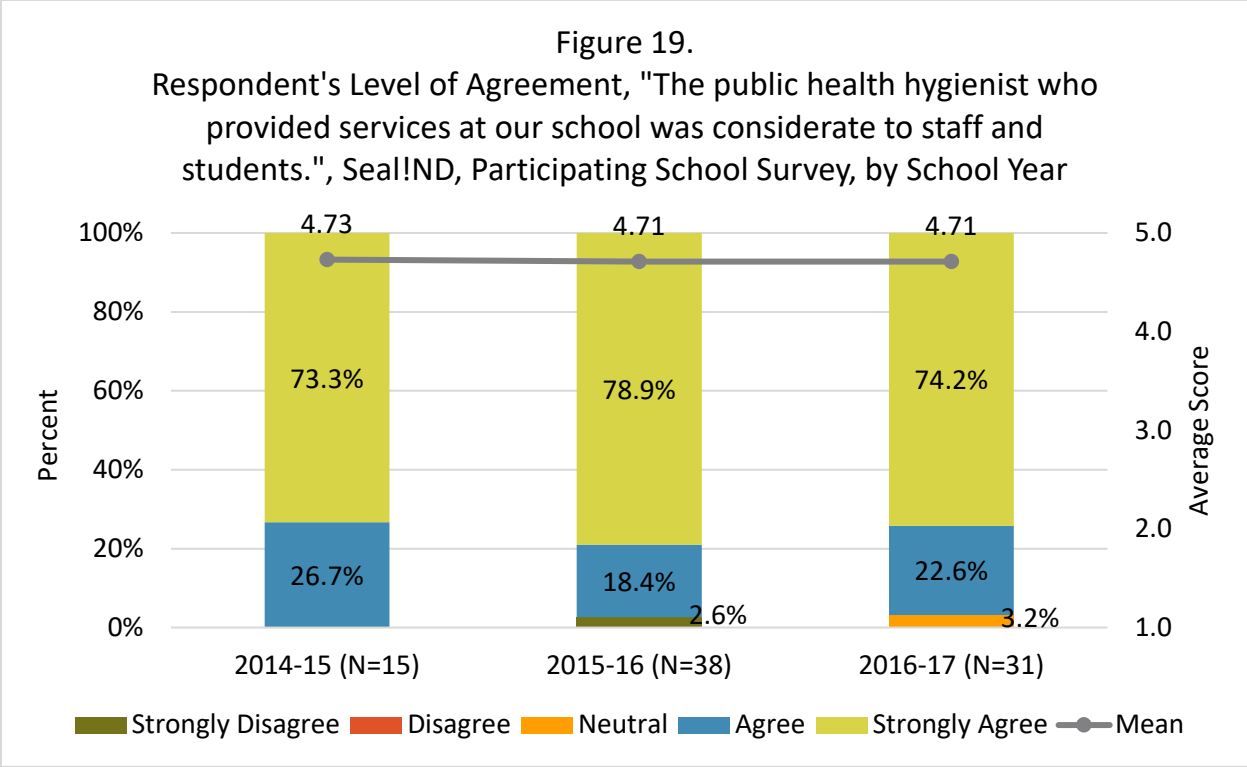


The public health hygienist who provided services at our school was considerate to staff and students (Q3.D).

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-seven 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 2015-16, one respondent strongly disagreed with the statement and in 2016-17 one respondent was neutral. High average scores of 4.7 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 13 and Figure 19).

Table 13. 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)	
	%	n	%	n	%	n
Strongly Disagree	0.0	0	2.6	1	0	0.0
Disagree	0.0	0	0.0	0	0	0.0
Neutral	0.0	0	0.0	0	3.2	1
Agree	26.7	4	18.4	7	22.6	7
Strongly Agree	73.3	11	78.9	30	74.2	23
Mean (Std. Dev.)	4.73 (0.46)		4.71 (0.73)		4.71 (0.53)	



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 2016-17 school year. The responses to the four open-ended questions were summarized as follows. Verbatium responses are detailed in Appendix A.

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?

Twenty-three respondents had suggestions for the program. Overall, the participating schools were very supportive of the program. Seven schools indicated that the current information was adequate and sufficient, and another five schools replied “No”, “NA”, “No - program has worked”, or “No, I think it’s sufficient.” For the remaining 11 respondents regarding the additional information, they mentioned: the application of online resources, flyers, articles, press releases, newly developed apps, a simple checklist to distribute the material, or adding program information to the school’s “back-to-school information”. Similar to previous years, respondents also suggested pamphlets that contain program information. One school recommended planning ahead for the new semester for information dissemination.

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?

Twenty-one respondents commented on this question, including eight schools that replied “No”, “no”, “NA”, “N/A”, or “no suggestions”. Suggestions regarding improvement on the percentage of involved parents included, helping the parent be prepared and educated prior to parent-teacher conferences, sending out flyers before the sign-up date, flyers explaining the procedure and program, performing a ‘signage blitz’ in advance, and using social media ads or text messages with the REMIND app as parents check and respond to text messages more than reading newsletters. In addition, some respondents noted that improving the percentage of parents signing-up should be the responsibility of the school more so than of the program. One school inferred that a parent who did not sign up could be obtaining services during a regular dental visit. One of the responding schools had 17 different languages, so language was identified as a potential barrier for some parents to enroll their children in the program. Another school, identified as a boarding school, did not think the situation applied to them.

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?

Twenty-three schools responded to this question. Most schools did not think the program was burdensome to school staff, instead, they were supportive and complimentary of the program. Respondents from 11 schools responded “None”, “N/A”, NA, No, “no burden here”, or “Not at all”. Three schools offered more specific suggestions. One respondent commented that a staff member was needed to walk students from the classroom and wait while students receive treatment, but the effort was very much worth it to have the kids receive the dental help. Another school had limited space for dental services so they had to do shifts with students and staff. A third school thought it was extremely busy when school started so the presence of the program represented an additional job.

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

Twenty-one schools responded to this question including 13 schools that answered “No”, “no”, “None”, “none”, “N/A”, “I don’t”, or “Not at this time”. Five other schools expressed their satisfaction and appreciation of the program. One school indicated the program gave older students planning on entering the field of oral health after graduating hands-on practice and exposure to the field.

One school requested small tubes of toothpaste. Students had received toothbrushes and the youngest students brush their teeth at school as they did not brush at home. Another school was wondering if parents should receive feedback after the service was done. Still another school mentioned they had a back-to-school night every year and suggested it would be a great opportunity to share information.

One respondent reported that three staff members whose children participated in the program had to have the sealants replaced because the sealants applied at school were no longer present or were not done correctly.

Key Findings and Recommendations

Conclusions and recommendations for the cost effectiveness analysis and the participating school survey are detailed in the following sections.

Cost Effectiveness Analysis

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 three years, Seal!ND has helped to prevent 3,182 cavities in permanent molars in North Dakota students and referred 1,747 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 lunch program. All participating schools have 45 percent or more of their students enrolled in free or reduced lunch programs. Students screened by race also suggest 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 that 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. 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 unanimously 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 rate their level of agreement related to the amount of staff time and effort required. However, responses that indicated concern over the amount of staff time and effort were from schools that were new to the program. Responses suggest that the OHP is effectively communicating and collaborating with partner schools in North Dakota. The 74 to 95 percent response rates of stakeholders in participating school districts over the past three 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 successfully improved the oral health of the target population by preventing cavities and avoiding costs associated with restorative care. The program has also successfully 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.

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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 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 the ND! Seal house 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.

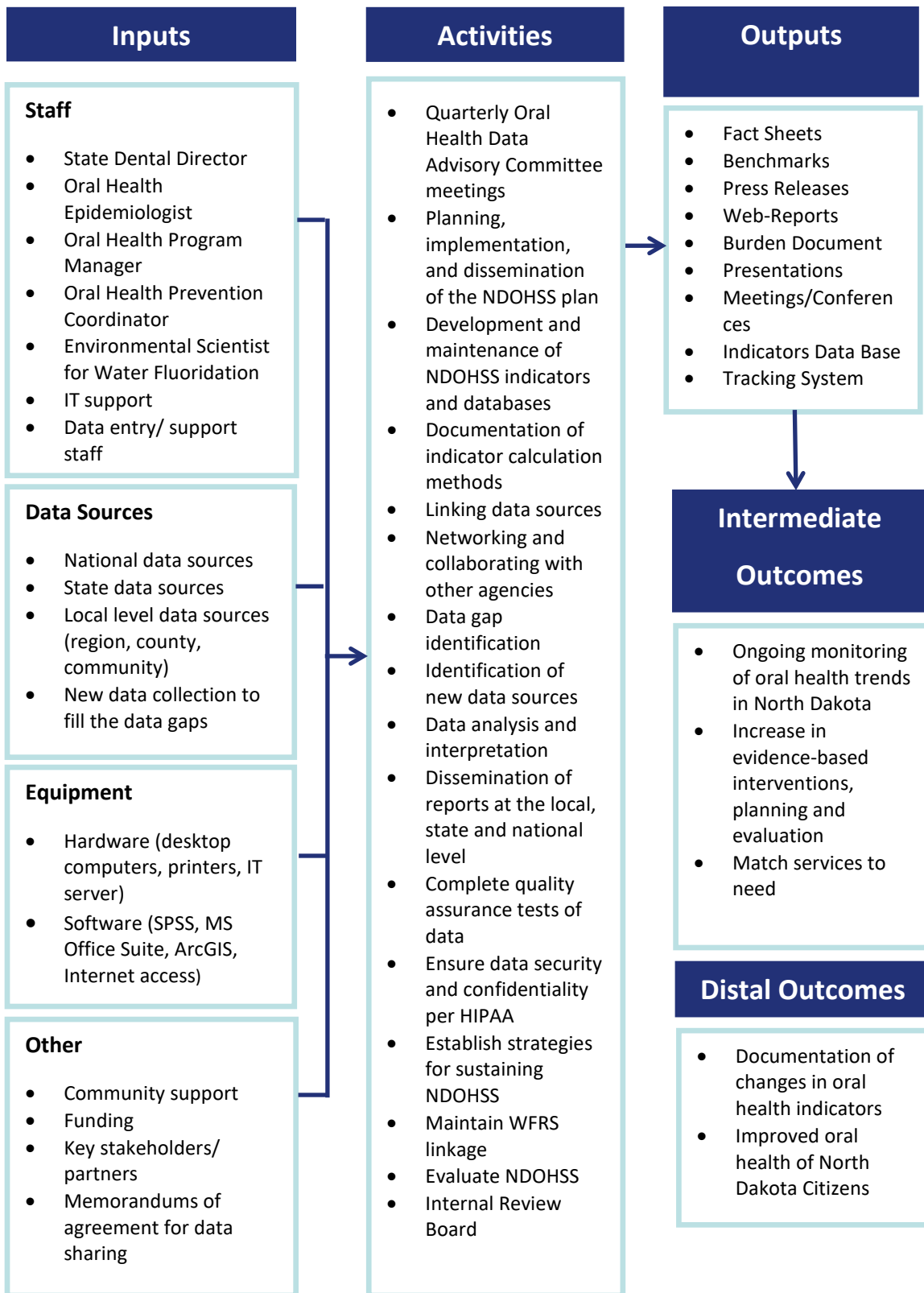


Figure 1. North Dakota Oral Health Program Logic Model: School-based Sealant Program

Appendix B
Participating School Survey: Answers to Open-Ended Questions, 2016-17

Answers to Open-ended Questions, 2016-17

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.**

- How to get signed up again..... Student training or a Unit based on Healthy Teeth/Gums. Online Resources we can put in our "Parent Resource" pages
- Flyers or articles that we could disseminate to our patrons.
- Adequate as is
- I don't recall...was there a press release sent to the Jamestown Sun by your agency/organization? That might gain some attention.
- We thought this was a very good idea. I believe the parents also thought so.
- The program is a huge plus for our school. We have a high level of poverty, and we have children who don't get to the dentist like they should. If programs like this weren't coming into the schools, they would have no dental assistance.
- Maybe a simple checklist of things that need to be done for the service.
- We truly appreciated being able to get the info before school started to put in our Back to School information. We had great turnout for our first year! If anything, perhaps a e-blast or notification to share out on our JPS app.
- Maybe some kind of pamphlet with the sealant program information.
- Information received was more than adequate.
- The information/applications that we receive are adequate
- I really can't think of anything. Next year we will have an app for our school and we can use that to notify parents more easily.
- Who should not be involved in this program and for what reason. Ex. Just had this work done!
- This was the first year that my school participated in the program. I would like to set this up earlier in the fall next year so communication in August would be wonderful.
- There was a sufficient amount of information.
- No
- NA
- I guess I thought the communication was excellent and have no additional needs.
- The information was informative.
- No
- No - program has worked.
- I think what we receive is enough. Anything else to send home to the parents would be white noise.
- No, I think it's sufficient.

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.

- If we can get a longer window --- Being able to get these releases out before Parent-Teacher Conferences.
- Need to get the word out on this program, it is a great opportunity for some parents.
- Educating parents prior to the sign up date. Possibly send a flyer to PO Box prior to introducing it at the school level.
- I think you have provided good information. We will continue to promote this at parent meetings and through our news letter and notes home; additionally we will do a 'signage blitz' in advance of the fall visit.
- I was very pleased with the total program.
- N/A
- Quick easy flyer explaining the procedure and program.
- NA
- No.
- No.
- Our school is a magnet school for the English Learners so we have families who may not understand completely what the program provides. We have 17 different languages that are spoken by our student body in their homes.
- Again, I think that is more on us than you. I think that we could work a little harder to get this information out to the families.
- no
- I think sending a text message with the REMIND app would be potentially very helpful. In my experience many parents respond to text messages when they don't check the backpack or read the newsletter.
- Social media ads
- Since we are a boarding school this issue did not apply to us.
- no suggestions
- No
- We take care of that - big help from Public Health.
- No. I think those who want to do it, sign up. The others may already have the sealant applied during their regular dental visits.
- No

3. Respondents' feedback on whether any portions of the program were particularly burdensome to school staff and suggestions for alleviating the burden.

- Your team works so well with our staff and students. Wonderful Program
- None.
- Well run program with few/no concerns
- None

- It is hard to please everybody. This is why we have administrators.
- N/A
- Super easy from the school's perspective.
- NA
- No
- No.
- No burden here
- No - they are great!
- No
- I don't feel it was burdensome at all. The teachers knew it was coming so they were prepared for it.
- The only time it becomes a struggle is when we need to walk students down and wait with them to be seen. This requires the day for a staff member but I don't see many ways around it. Sometimes it is a bit of a challenge for the Social Worker to make sure that the needs get addressed. We have many ELL families and some of them don't yet have medical assistance so that has been a time consuming piece. But it is very much worth it to have the kids' dental needs met.
- Our building is very limited for extra space; therefore we had to do some shifting with students and staff. The dental work created a lot of noise, therefore is distracting. This was the most burdensome portion of the program. It would be nice to see a portable spot that is brought in for the program so this is not an issue.
- No
- None
- The program is run well. Everything is good from our standpoint.
- No, I really appreciate [the program] coming out to the schools.
- No. I think the program is very easy for us! All we have to do is send home the consent form and make sure the kids go get it done when the day comes.
- Timing. Start up of school is extremely busy and this is an additional job. No way to problem solve.
- Not at all.

4. Respondents' suggestions for improving the school-based dental sealant program.

- Keep it as great as it is.... We appreciate it.
- no
- None
- I enjoyed working with the program. It also gave some hands-on practice for some senior girls who were planning on going into the dental field.

- N/A
- None
- We absolutely loved our first experience! Jamie was amazing with our students and staff!
- No
- No.
- none
- We ask for and receive toothbrushes as we have kids who don't have them. We also have our youngest kids brush their teeth in school as for many of them this doesn't happen at home. Getting small tubes of toothpaste would help!
- No
- I think it is a wonderful program.
- None
- No
- Three staff members from our school reported that all of their children who go to different dentists had to have their sealants replaced when they went to the dentist because the ones done at the school had either fallen out (were not there) or were not done correctly.
- No
- Good program - don't change.
- I don't.
- Do parents receive any feedback after services??? We have a Back to School Night every year. Might be a great opportunity to share information. Organizations have a table with information and answer questions for parents that need answers.
- Not at this time.

Appendix C
Participating School Survey Questionnaire

2016-17 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.

<p>Questions</p> <p>Q1. Please indicate your level of agreement with the following statements about your school's experience with the dental sealant program.</p>	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.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B) We had sufficient information to promote the dental sealant program.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C) We understood our roles and responsibilities in delivering the dental sealant program.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D) Performing our school's roles and responsibilities in the dental sealant program took a great deal of staff time and effort.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E) We had sufficient communication with the public health hygienist to coordinate the delivery of services.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
F) We had sufficient communication with the ND Oral Health Program regarding the operation of the dental sealant program.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B) easy to communicate with	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C) knowledgeable about oral health matters	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D) considerate to staff and students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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?

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.

