

School-Based Sealant Programs

An Innovative Approach to Improve Children's Oral Health

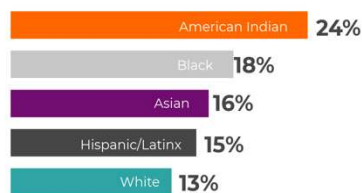
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Introduction

Across the United States, one in five children is suffering from a chronic disease that, if left untreated, could have lasting effects on their growth and development.¹ Dental caries, or tooth decay, is the most common chronic disease experienced in childhood, five times more prevalent than asthma.² Children in low-income families face greater risk and are twice as likely to have untreated tooth decay as children from higher-income neighborhoods.³ The impact on children of color is disproportionate, as well: in North Carolina, American Indian children are almost twice as likely as non-Hispanic white children to enter Kindergarten with untreated decay.⁴

15%
of North Carolina kindergarteners sampled statewide had untreated dental decay, with disparities by race and ethnicity

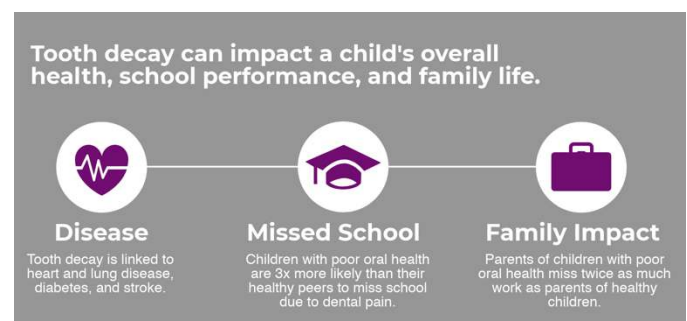


This brief explores the impact of dental caries on children's overall health and academic success, and how North Carolina can take steps to improve children's oral health through the use of school-based sealant programs.

Impact of Caries on Children's Health and Well-Being

Dental caries can have lasting impacts on a child's overall health. Children who experience caries in their baby teeth risk damage to their developing permanent teeth as well as surrounding baby teeth.⁵ When children have dental pain, they have difficulty eating, sleeping, and learning. Some children have such difficulty eating they become malnourished and risk "failure to thrive" as a result of tooth pain.⁵ In extreme cases, bacteria from an abscessed tooth can spread to the brain, causing meningitis and even death.^{6 7}

Tooth decay can impact a child's overall health, school performance, and family life.



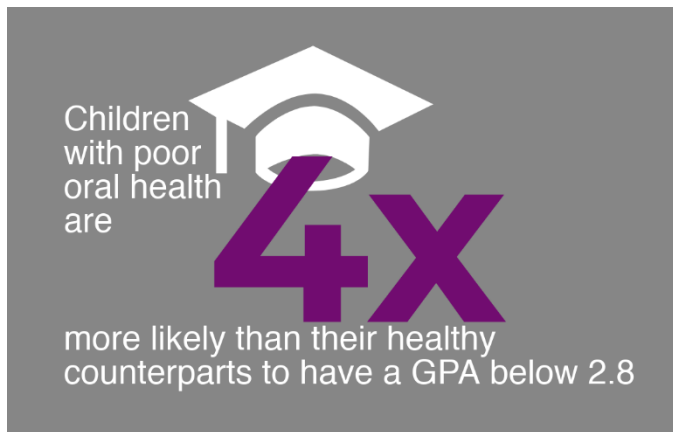
- Disease**
Tooth decay is linked to heart and lung disease, diabetes, and stroke.
- Missed School**
Children with poor oral health are 3x more likely than their healthy peers to miss school due to dental pain.
- Family Impact**
Parents of children with poor oral health miss twice as much work as parents of healthy children.

Over a person's lifetime, tooth decay is linked to heart and lung disease, diabetes, stroke, and more.² In some cases, oral infection and systemic disease is bidirectional, such as with diabetes: people with diabetes are at increased risk of periodontal disease, which can in turn contribute to an increase in blood sugar.⁸ There is evidence that, in some cases, oral

bacteria can be aspirated into the lungs, causing respiratory infections such as pneumonia.⁹ Tooth loss and gum disease may also increase the risk of cancer.¹⁰

While caries impacts a child's long-term health, the consequences of tooth decay can also be immediate. When children's oral health suffers, so does their ability to learn. School absences caused by oral pain impair academic performance and contribute to preventable achievement gaps.¹¹ Children with poor oral health are more likely to miss school due to dental pain than their healthy peers and are more likely to have a GPA below 2.8.

Children's access to care impacts school attendance, as well; those without accessible dental care were three times more likely to miss school than their peers with access.¹² Even when attendance is regular, research finds that poor oral health disproportionately impacts academic outcomes among boys of color.¹¹



The impact of childhood caries extends to the family system, as well. Parents of children with poor oral health miss more work than the parents of healthy children.¹² Parents of children with toothaches miss more than four times the number of work days than parents of children without tooth pain; those with inaccessible dental care are twice as likely to miss work than parents of children with access to care.¹² Parents of children with untreated

oral health conditions or low access to care are often living in more economically precarious households in which missed work is especially impactful.¹³



Evidence-Based Solutions

The good news is that we can prevent tooth decay among children before it starts. Dental sealants are a low cost, evidence-based strategy to prevent tooth decay and protect children against cavities. Once applied, sealants cut cavities by 80 percent for up to two years and 50 percent for up to four years.¹⁴

Sealants are applied to the biting surface of molars (back teeth) and act as a barrier to food. The pits and grooves on molars are deep, making it difficult to remove food particles with a toothbrush. Over time, the bacteria from leftover food can cause decay. Even children with the best oral care routines benefit from sealants, because they ensure that food doesn't become stuck in hard-to-access pits and grooves.

Despite the effectiveness of dental sealants, 60 percent of school-age children nationwide fail to receive the treatment.¹⁴ Children from low-income families are less likely to have dental sealants than children from higher-income families.¹⁴ Children without sealants

experience three times as many cavities as those who have sealants.¹⁵

The CDC recommends school-based sealant programs (SBSPs) to prevent dental caries among children and protect children at risk for poor oral health.¹⁶ SBSPs are an optimal way to target preventive services to children who otherwise may not receive preventive care, particularly those from low-income households.¹⁷

School-Based Sealant Programs (SBSPs)

SBSPs offer children direct access to preventive dental care, reducing disparities in access and linking children to dental homes in their community for more extensive treatment needs.

The Association of State and Territorial Dental Directors (ASTDD) has developed best practice criteria for SBSPs, including impact/effectiveness, efficiency, demonstrated sustainability, collaboration/integration, and objectives/rationale. Best practice programs:

- Target and serve high numbers of high-risk children;
- Include a quality assurance system;
- Use the least expensive qualified personnel permitted by state law;
- Collect and analyze cost-benefit data;
- Plan for sustainable funding;
- Establish collaborative partnerships; and
- Link program goals to state/national oral health goals.¹⁸

Impact of SBSPs on Children's Oral Health Outcomes

An early adopter of SBSPs, Ohio successfully eliminated racial and ethnic disparities among children receiving sealants.¹⁹ The majority of

states define high-risk target schools as those serving more than 50% of students through the subsidized lunch program. After analyzing the data, Ohio policymakers realized that impact would be far greater, and the cost to the state only slightly higher, if schools at the 40% threshold were targeted instead. This approach opened the door to sealants for a high number of children who would not otherwise have had access.

Kansas public health agencies spearheaded a school-based screening and sealant program which has demonstrated successful improvements in children's oral health. In 2004, 55% of 3rd graders had experienced dental decay and 25.1% of 3rd graders had untreated decay. By 2012, 48% of 3rd graders had experienced dental decay, while only 9.4% remained untreated.²⁰

Oregon has school-based sealant programs in more than 75 percent of high-need schools. The programs have successfully reduced untreated decay from 36% to 20% and increased the percentage of 1st-3rd graders with at least one sealant from 30% to 52%.¹⁹

Sealant programs are cost-effective, particularly when staffed by hygienists and targeted at high-risk schools. In addition, serving all children in schools where only 20% of students are considered high-risk can improve oral health outcomes for very low comparative cost.^{21 18}

North Carolina Considerations

North Carolina is uniquely positioned to benefit from SBSPs. The majority of dentists in North Carolina practice in 20 primarily urban and suburban counties, leaving 80 percent of the state (primarily rural areas) with reduced access to dental professionals.²² Although North Carolina's dentist-to-population ratio has improved over the past several years, 72

percent of growth has occurred in urban and suburban counties, leaving geographic disparities unaddressed.²³ In addition, the American Dental Association reports that only 30.7 percent of NC dentists participated in children’s public insurance programs in 2015.²⁴

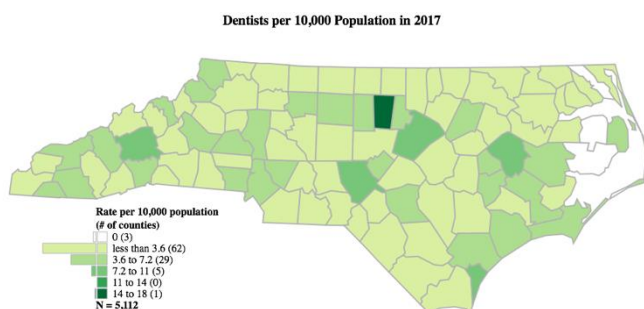
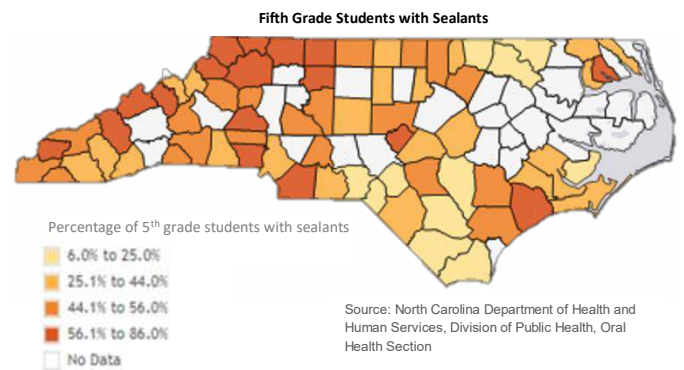
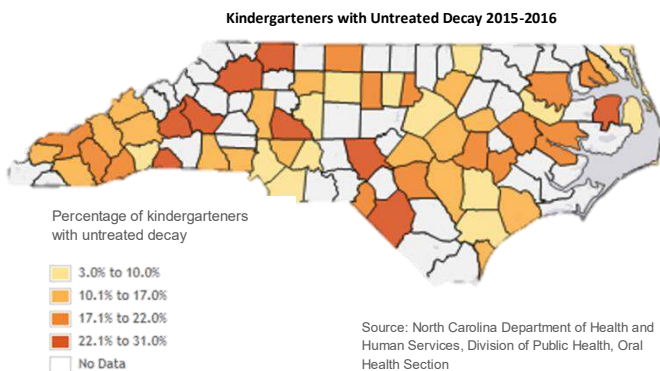
In North Carolina, innovative programs such as *Into the Mouths of Babes*, an early childhood oral health and fluoride varnish initiative, have helped decrease rates of childhood decay, though racial, ethnic, and geographic disparities remain. Across the board, children of color are more likely to arrive at Kindergarten with untreated decay than non-Hispanic white children.

Where a child grows up also impacts his or her oral health. Children in rural North Carolina are more likely to experience untreated decay than their counterparts in urban and suburban counties. These geographic disparities are mirrored by dentist-to-population ratios: the largely rural regions of the state that have persistent shortages of dentists also have higher numbers of children entering school with untreated decay.

Over the past decade, North Carolina has made enormous strides in improving early childhood access to preventive care, but the state has significant room to improve sealant access. In 2015, the Pew Charitable Trusts released a 50-state report in which North Carolina received a “D” grade for sealants, in part due to its inability to fully implement SBSPs.¹⁹

The Oral Health Section of the NC Division of Public Health, in addition to local health departments, Federally Qualified Health Centers (FQHCs), and other providers, have established sealant projects that serve different high-risk schools every year. These efforts are commendable and make good use of limited funds.

Unfortunately, significant geographic disparities persist in sealant access. While existing sealant projects have made an impact in several low-access areas of the state, students who have limited access to care are less likely to have sealants than children in higher-access counties.



Source: North Carolina Health Professions Data System, Program on Health Workforce Research and Policy, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill. See Appendix 3 for additional notes.

In order to effect large-scale change in outcomes, North Carolina would need to develop targeted, sustainable SBSPs that “live” in schools across the state.

In order to successfully implement a targeted SBSP, North Carolina needs to address a key policy and practice barrier: dental hygienists should be allowed to provide preventive care to children in schools regardless of whether those children have had a prior dental exam, a practice which the vast majority of other states currently allow.²⁵

There is an opportunity to implement an innovative public/private approach, in which public health entities, including local health departments, implement SBSPs in partnership with local private dental practices. When hygienists are allowed to work in community settings under the direction of a dentist rather than on-site supervision, children can safely access preventive services at school while being referred to a community-based dental home for further treatment needs. This approach has been proven to be safe and cost-effective; analysis demonstrates a doubling in cost for programs that are staffed primarily by dentists rather than hygienists²⁶, while programs allowing patients direct access to hygienists have been proven to safely improve community health outcomes.²⁵ Additionally, it is estimated that the prevention of caries through sealant application would result in considerable Medicaid savings.²⁶

Recommendations

To improve children's oral health and academic outcomes, North Carolina should:

1. Reduce oral health disparities and target all children at high risk for tooth decay by promoting and expanding dental sealant placements in school-based settings.
2. Staff school-based sealant/prevention programs with dental hygienists operating under the direction of public or private dentists.
3. Increase children's access to sealants by eliminating unnecessary rules that limit the use of appropriately trained and licensed dental hygienists in placing sealants.

Conclusion

While tooth decay is sometimes perceived as a childhood rite of passage, it is a preventable chronic disease that has far-reaching health and social consequences. School-based sealant programs are a proven approach that the state should expand to prevent dental caries. It is time to eradicate this unnecessary, painful condition in North Carolina.

Appendix 1: Untreated Dental Decay* in Kindergarteners by County, North Carolina (2015-2016)

County	Percentage with untreated decay
Alamance	19%
Alexander	No data
Alleghany	No data
Anson	No data
Ashe	No data
Avery	No data
Beaufort	21%
Bertie	19%
Bladen	No data
Brunswick	No data
Buncombe	14%
Burke	27%
Cabarrus	15%
Caldwell	No data
Camden	No data
Carteret	No data
Caswell	No data
Catawba	No data
Chatham	No data
Cherokee	No data
Chowan	No data
Clay	No data
Cleveland	16%
Columbus	No data
Craven	No data
Cumberland	18%
Currituck	10%
Dare	9%
Davidson	5%
Davie	No data
Duplin	8%
Durham	21%
Edgecombe	No data

Forsyth	13%
Franklin	12%
Gaston	17%
Gates	No data
Graham	16%
Granville	No data
Greene	No data
Guilford	7%
Halifax	No data
Harnett	16%
Haywood	16%
Henderson	6%
Hertford	No data
Hoke	No data
Hyde	No data
Iredell	16%
Jackson	20%
Johnston	13%
Jones	No data
Lee	No data
Lenoir	20%
Lincoln	No data
McDowell	23%
Macon	16%
Madison	15%
Martin	8%
Mecklenburg	7%
Mitchell	No data
Montgomery	No data
Moore	25%
Nash	No data
New Hanover	12%
Northampton	No data
Onslow	12%

Orange	7%
Pamlico	No data
Pasquotank	16%
Pender	9%
Perquimans	20%
Person	No data
Pitt	21%
Polk	23%
Randolph	No data
Richmond	No data
Robeson	25%
Rockingham	18%
Rowan	25%
Rutherford	No data
Sampson	16%
Scotland	22%
Stanly	5%
Stokes	No data
Surry	31%
Swain	22%
Transylvania	21%
Tyrrell	27%
Union	9%
Vance	No data
Wake	5%
Warren	3%
Washington	No data
Watauga	No data
Wayne	18%
Wilkes	24%
Wilson	17%
Yadkin	No data
Yancey	No data

SOURCE: NC Department of Health and Human Services, Division of Public Health. Oral Health Section. Accessible at www.datacenter.kidscount.org/nc.

*The Oral Health Section reports that they transitioned to a regional model for delivering public health hygiene services in 2015-2016. As a result, the OHS collaborated with the Association of State and Territorial Dental Directors and the North Carolina Division of Public Health, State Center for Health Statistics to select a random sample of elementary schools that would be used to reflect both regional and statewide kindergarten assessment data.

Appendix 2: Fifth Grade Students with Sealants* by County, North Carolina (2012-2013)

County	Percentage with sealants
Alamance	31%
Alexander	48%
Alleghany	67%
Anson	44%
Ashe	82%
Avery	38%
Beaufort	No data
Bertie	No data
Bladen	21%
Brunswick	19%
Buncombe	No data
Burke	22.2%
Cabarrus	No data
Caldwell	51%
Camden	43%
Carteret	42%
Caswell	39%
Catawba	62%
Chatham	51%
Cherokee	50%
Chowan	38%
Clay	47%
Cleveland	36%
Columbus	12%
Craven	41%
Cumberland	46%
Currituck	No data
Dare	No data
Davidson	45%
Davie	No data
Duplin	50%
Durham	39%
Edgecombe	No data

Forsyth	61%
Franklin	56%
Gaston	59%
Gates	37%
Graham	68%
Granville	49%
Greene	No data
Guilford	No data
Halifax	7%
Harnett	41%
Haywood	67%
Henderson	No data
Hertford	No data
Hoke	13%
Hyde	No data
Iredell	No data
Jackson	36%
Johnston	39%
Jones	33%
Lee	59%
Lenoir	No data
Lincoln	55%
McDowell	47%
Macon	37%
Madison	63%
Martin	No data
Mecklenburg	34%
Mitchell	43%
Montgomery	No data
Moore	No data
Nash	No data
New Hanover	No data
Northampton	25%
Onslow	62%

Orange	No data
Pamlico	21%
Pasquotank	No data
Pender	55%
Perquimans	60%
Person	50%
Pitt	No data
Polk	56%
Randolph	34%
Richmond	8%
Robeson	37%
Rockingham	48%
Rowan	46%
Rutherford	48%
Sampson	20%
Scotland	13%
Stanly	55%
Stokes	75%
Surry	72%
Swain	48%
Transylvania	36%
Tyrrell	No data
Union	68%
Vance	44%
Wake	No data
Warren	6%
Washington	No data
Watauga	66%
Wayne	No data
Wilkes	86%
Wilson	No data
Yadkin	No data
Yancey	63%

SOURCE: NC Department of Health and Human Services, Division of Public Health. Oral Health Section. Accessible at www.datacenter.kidscount.org/nc.

*The Oral Health Section reports that some areas of the state have not had an adequate number of public health dental hygienists to be able to gather this data every year. Additionally, some of the larger counties which have locally funded dental hygienists do not regularly conduct the standardized assessment technique due to the large number of children in their areas and other pressing priorities. Attempts to address these issues continue.

Appendix 3: Dentists per 10,000 Population by County, North Carolina (2017)

County	Dentists per 10,000
Alamance	3.9
Alexander	2.1
Alleghany	2.7
Anson	1.2
Ashe	3.7
Avery	3.3
Beaufort	4.0
Bertie	0.50
Bladen	2.0
Brunswick	3.3
Buncombe	7.4
Burke	3.7
Cabarrus	4.5
Caldwell	2.3
Camden	0
Carteret	4.7
Caswell	1.3
Catawba	5.5
Chatham	1.9
Cherokee	3.1
Chowan	3.5
Clay	4.4
Cleveland	3.3
Columbus	1.6
Craven	5.0
Cumberland	5.2
Currituck	2.6
Dare	5.4
Davidson	1.6
Davie	3.3
Duplin	1.7
Durham	6.3
Edgecombe	1.1

Forsyth	5.6
Franklin	1.5
Gaston	3.9
Gates	0.84
Graham	3.4
Granville	3.2
Greene	3.7
Guilford	5.7
Halifax	2.3
Harnett	1.8
Haywood	5.3
Henderson	4.6
Hertford	2.5
Hoke	1.9
Hyde	0
Iredell	5.0
Jackson	3.5
Johnston	2.1
Jones	0.97
Lee	5.9
Lenoir	3.8
Lincoln	3.1
McDowell	1.5
Macon	4.0
Madison	1.3
Martin	2.1
Mecklenburg	7.0
Mitchell	3.9
Montgomery	1.4
Moore	8.2
Nash	4.5
New Hanover	7.7
Northampton	1.9
Onslow	4.4

Orange	18.0
Pamlico	3.0
Pasquotank	2.7
Pender	4.1
Perquimans	1.5
Person	2.0
Pitt	7.3
Polk	2.4
Randolph	2.2
Richmond	2.0
Robeson	2.0
Rockingham	2.9
Rowan	3.5
Rutherford	3
Sampson	1.7
Scotland	2.5
Stanly	1.8
Stokes	1.3
Surry	3.6
Swain	5.3
Transylvania	2.9
Tyrrell	0
Union	3.2
Vance	3.1
Wake	7.9
Warren	2.0
Washington	0.81
Watauga	5.5
Wayne	3.4
Wilkes	2.0
Wilson	3.3
Yadkin	2.4
Yancey	2.7

SOURCE: North Carolina Health Professions Data System, Program on Health Workforce Research and Policy, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill. Accessed March 1, 2018 at <https://nchealthworkforce.sirs.unc.edu/>

*Data include active, licensed dentists in practice in North Carolina as of October 31 of 2017. Dentist data are derived from the North Carolina State Board of Dental Examiners. Population census data and estimates are downloaded from the North Carolina Office of State Budget and Management via NC LINC and are based on US Census data.

End Notes

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