

## **Problem**

The Centers for Disease Control and Prevention (CDC) reports that dental caries (tooth decay) affects nearly one quarter of US children aged one to five years and over half of those aged 12 to 19, and is almost entirely preventable.<sup>1</sup> Although dental disease may affect any child, children from low-income households experience more tooth decay than those from higher-income families. Data show that children aged six through 11 years from families living below the poverty threshold are almost twice as likely to have developed tooth decay in their permanent teeth as are children from families with incomes greater than two times the federal poverty threshold.<sup>2</sup> Most decay occurs on the pits and fissures of posterior tooth surfaces, for which dental sealants are the most effective preventive approach. Other factors that increase the incidence of tooth decay in children are poor dietary habits, lack of dental insurance and access to dental care, as well as inadequate exposure to the benefits of fluoridated water and dental sealants.

The Healthy People 2020 goal is for 28.1 percent of US 6-9 year olds to have at least one sealant on a permanent molar.<sup>3</sup> Dental sealant prevalence was lower among children living at or below 100 percent of the federal poverty level (26 percent) compared with children living above the poverty level (34 percent). A similar pattern was found among adolescents aged 13–15, but the difference was not statistically significant. Dental sealant prevalence was significantly lower for non-Hispanic black adolescents (32 percent) compared with non-Hispanic white adolescents (56 percent), among those aged 13–15.<sup>2</sup>

## **Methods**

The Community Preventive Services Task Force recommends school-based dental sealant programs based on strong evidence of effectiveness in preventing caries in children.<sup>4</sup> Dental sealants protect the pits and fissures of permanent posterior teeth, where 90 percent of decay occurs in school-aged children's teeth. Resin-based sealants have been preferred due to their high retention rates.<sup>5</sup> A 2013 Cochrane Collaboration review of sealant studies found that sealant placement on the occlusal surfaces of the permanent molars in children and adolescents reduces caries by 81 percent when compared to no sealant placement when followed up to two years.<sup>6</sup>

For any program, choosing the right sealant material is important. Several sealant materials are available and the most commonly used are resin-based sealants and glass ionomer cements. Current evidence comparing the effectiveness of these two materials to control caries is of low quality; therefore, recommendations on superiority of one material over another are not possible at this time.<sup>7</sup> However, although the evidence comparing caries prevention does not support one material over another, there is evidence indicating that resin-based sealants have superior retention compared to glass ionomer sealants. One systematic review found that resin-based sealants were five times as likely to be retained after two to three years of follow up compared to glass ionomer sealants.<sup>6,8</sup> Clinicians should take into account the likelihood of experiencing lack of retention when choosing the type of sealant material most appropriate for a specific patient and clinical scenario.

When selecting dental sealant materials for use in a school-based dental sealant program, the following factors should be considered:

- Cost
- Simplicity of application technique
- Retention<sup>8</sup>
- Program staffing, including use of four-handed technique<sup>9</sup>
- Programmatic policy for sealant placement on partially-erupted teeth or situations in which isolation is difficult

Program staffing considerations also include whether dentist supervision is required by state practice act. Certain sealant materials are more likely to require occlusal adjustment, and under most state practice acts, only dentists may perform this procedure.<sup>10,11</sup> The placement of sealant material demands meticulous application technique following the manufacturer's instructions.<sup>4</sup>

Sealants are not only beneficial for permanent molars, but also for primary teeth when determined that the tooth, or the patient, is at risk for experiencing caries. Radiographs should not be obtained for the sole purpose of placing sealants; nor is the use of other diagnostic aids, including a sharp explorer, recommended. A four-handed technique should be used when resources allow and teeth should be sealed, even if follow-up care cannot be guaranteed.<sup>9</sup>

Dental sealants are most effective when placed on teeth of children at highest risk for tooth decay.<sup>9</sup> "School sealant programs can be an important intervention to increase the receipt of sealants, especially among underserved children."<sup>9</sup> Targeting higher-risk schools to reach higher-risk children is a practical approach for increasing sealant prevalence through school-based sealant programs. Using a school's Free and Reduced Price Meal Program enrollment as a risk threshold provides the ability to reach higher-risk children.<sup>12</sup> Sealant programs could reduce or eliminate racial and economic disparities in sealant use if programs were provided to all eligible, high-risk schools such as those in which a significant proportion of the children are eligible for the Free and Reduced-Price Meal Program.<sup>13,14</sup> Additionally, school-based sealant programs have the potential to link students with treatment services in their community and facilitate enrollment in Medicaid and the Children's Health Insurance Program (CHIP).<sup>9,15</sup>

Access to sealants in school settings affords an opportunity for every child to grow, develop and learn free of pain from dental disease. According to the Centers for Disease Control and Prevention, dental sealants can reduce decay by 81 percent in the two years after placement, and continue to be effective for nearly five years.<sup>6,16</sup> Sealants are safe<sup>17</sup> and cost considerably less than restorations; their use can not only safely prevent dental decay but can also save money for patients, families, and states. Sealant programs based in or linked to schools are an optimal way to reach children – especially low-income children who have trouble accessing dental care. To ensure their effectiveness, school sealant programs should follow evidenced-based recommendations, monitor sealant retention and reapply if lost.

## Concluding Statement

The Association of State and Territorial Dental Directors (ASTDD) fully supports, endorses, and promotes school-based and school-linked dental sealant programs that follow evidence-based guidelines as part of a comprehensive community strategy to serve the greatest number of children and adolescents at highest risk for dental disease. The ASTDD recommends school-based and school-linked dental sealant programs as an important and effective public health approach that complements clinical care systems in promoting the oral health of children and adolescents.

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<sup>1</sup> Dye BA, Li X, Thornton-Evans G., Iafolla TJ. NCHS Data Brief, Number 191, March 2015. Dental caries and sealant prevalence in children and adolescents in the United States, 2011–2012. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. <http://www.cdc.gov/nchs/data/databriefs/db191.htm>. Accessed December 3, 2015.

<sup>2</sup> Dye BA, Li X, Thornton-Evans G. Oral health disparities as determined by selected Healthy People 2020 oral health objectives for the United States, 2009–2010. NCHS data brief, no. 104. Hyattsville, MD: National Center for Health Statistics. 2012. <http://www.cdc.gov/nchs/data/databriefs/db104.pdf>.

<sup>3</sup> U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. Healthy People 2020/Oral Health. [http://www.healthypeople.gov/node/5001/data\\_details](http://www.healthypeople.gov/node/5001/data_details).

<sup>4</sup> Guide to Community Preventive Services. Preventing dental caries: school-based dental sealant delivery programs. [www.thecommunityguide.org/oral/schoolsealants.html](http://www.thecommunityguide.org/oral/schoolsealants.html). Last updated: April 2013.

<sup>5</sup> Beauchamp J, Caufield P, Crall J, et al. Evidence-based clinical recommendations for the use of pit-and-fissure sealants: a report of the American Dental Association Council on Scientific Affairs. *J Am Dent Assoc.* March 2008; 139:257-268.

<sup>6</sup> Ahovuo-Saloranta A, Forss H, Walsh T, Hiiri A et al. Sealants for preventing dental decay in the permanent teeth. *Cochrane database of systematic reviews.* 2013;3:CD001830

<sup>7</sup> Wright JT, Crall JJ, Fontana M et al. Evidence-based clinical practice guideline for the use of pit-and-fissure sealants – A report of the American Dental Association and the American Academy of Pediatric Dentistry. *J Am Dent Assoc.* 2016;147(8):672-682.

<sup>8</sup> Wright JT, Tampi MP, Graham L, et al. Sealants for preventing and arresting pit-and-fissure occlusal caries in primary and permanent molars: A systematic review of randomized controlled trials – a report of the American Dental Association and the American Academy of Pediatric Dentistry. *J Am Dent Assoc* 2016;147(8):631-645.e18.

<sup>9</sup> Gooch BF, Griffin SO, Kolavic Gray S, et al. Preventing dental caries through school-based sealant programs: Updated recommendations and reviews of evidence. *J Am Dent Assoc.* 2009;140:1356-1365.

<sup>10</sup> Scherrer CR, Griffin PM, Swann JL. Public health sealant delivery programs: optimal delivery and the cost of practice acts. *Medical decision making: an international journal of the Society for Medical Decision Making.* 2007;27(6):762-71.

<sup>11</sup> Carter NL, Lowe, NE, with the American Association for Community Dental Programs and the National Maternal and Child Oral Health Resource Center. 2016. Seal America: The Prevention Invention (3rd ed.). Washington, DC: National Maternal and Child Oral Health Resource Center.

<sup>12</sup> Siegal M, Detty A. Targeting school-based dental sealant programs: who is a “higher risk?” *J Public Health Dent.* Spring 2010;70(2):140-147.

<sup>13</sup> Centers for Disease Control and Prevention. Impact of targeted, school-based dental sealant programs in reducing racial and economic disparities in sealant prevalence among schoolchildren: Ohio, 1998–1999. *Morbidity and Mortality Weekly Report* 2001;50:736–738.

<sup>14</sup> Association of State and Territorial Dental Directors. Best practice approaches for state and community oral health programs: school-based dental sealant programs. June 2003, updated March 2015, November 2017. <http://www.astdd.org/docs/sealant-bpar-update-11-2017-final.pdf>. Accessed Sept. 18, 2010, December 28, 2015, and November 27, 2017.

<sup>15</sup> Zimmerman B. Improving the oral health of school-age children: strengthening school-based dental sealant program linkages with Medicaid/SCHIP and dental home—summary of an expert meeting convened by the Maternal and Child Health Bureau. Washington: Health Systems Research. 2006. Archived at: [www.webcitation.org/5bOm8amsY](http://www.webcitation.org/5bOm8amsY). Accessed Sept. 18, 2010.

<sup>16</sup> Griffin SO et al. Use of dental care and effective preventive services in preventing tooth decay among U.S. children and adolescents—medical expenditure panel survey, United States, 2003–2009, and National Health and Nutrition Examination Survey, United States, 2005–2010. *Morbidity and Mortality Weekly Report* (Sept. 12, 2014), [http://www.cdc.gov/mmwr/preview/mmwrhtml/su6302a9.htm?s\\_cid=su6302a9\\_w](http://www.cdc.gov/mmwr/preview/mmwrhtml/su6302a9.htm?s_cid=su6302a9_w)

<sup>17</sup> Fleisch AF et al. Bisphenol A and related compounds in dental materials. *Pediatrics* 126, no. 4 (2010): 760–768, <http://pediatrics.aappublications.org/content/early/2010/09/06/peds.2009-2693> (abstract).