

to emerge for managing pit-and-fissure caries, further complicating the clinician's decision making. Accordingly, continuous critical review of the available evidence is necessary to update evidence-based recommendations and assist health care providers in clinical decision making.¹⁻⁷

The American Dental Association (ADA) Council on Scientific Affairs convened an expert panel to develop the previous evidence-based clinical recommendations for the use of sealants, published in 2008.³ In an effort to update the 2008 recommendations, the ADA Council on Scientific Affairs and the ADA Center for Evidence-Based Dentistry, in collaboration with the American Academy of Pediatric Dentistry (AAPD), convened a new working group including clinical experts, stakeholders, and methodologists to develop a systematic review⁸ and accompanying evidence-based clinical practice recommendations for publication in 2016.

Our goal for this 2016 clinical practice guideline was to provide clinicians with updated evidence-based recommendations regarding when and how the placement of pit-and-fissure sealants is most likely to be effective in preventing carious lesions on the occlusal surfaces of primary and permanent teeth in children and adolescents. The target audience for this guideline includes general and pediatric dental practitioners and their support teams, public health dentists, dental hygienists, pediatricians, primary-care physicians, and community dental health coordinators; policy makers may also benefit from this guideline to inform clinical decision making, programmatic decisions, and public health policy.

DEFINITION OF DENTAL CARIES

Dental caries is a disease caused by an ecological shift in the composition and activity of the bacterial biofilm when exposed over time to fermentable carbohydrates, leading to a break in the balance between demineralization and remineralization.⁴ Carious lesions are preventable by averting onset, and manageable by implementing interventions, which may halt progression from early stage of the disease to cavitation, characterized by enamel demineralization, to frank cavitation.³ In 2015, the ADA published the Caries Classification System, which defines a noncavitated or initial lesion as "initial caries lesion development, before cavitation occurs. Noncavitated lesions are characterized by a change in color, glossiness or surface structure as a result of demineralization before there is macroscopic breakdown in surface tooth structure."⁴

EPIDEMIOLOGY

National Health and Nutrition Examination Survey (NHANES) 2011-2012⁵ data show that 21% of children aged 6 to 11 years and 58% of adolescents aged 12 to 19 years had experienced carious lesions (untreated and treated [restored]) in their permanent teeth.

The NHANES report also found the prevalence of carious lesions in permanent teeth increased with age and differed among sociodemographic groups. Children in the 9- to 11-year range had higher carious lesion prevalence (29%) compared with children in the 6- to 8-year range (14%). Similarly, children in the 16- to 19-year age range had higher carious lesion prevalence (67%) compared with children in the 12- to 15-year range (50%). In addition, dental caries incidence for both 6- to 11-year and 12- to 19-year age groups was highest among Hispanic children compared with non-Hispanic black children, non-Hispanic white children, and Asian children. The surgeon general's report on oral health similarly indicated that Hispanic and non-Hispanic black children are at the highest risk of developing dental caries.⁶ Overall, NHANES 2011-2012 indicates a higher prevalence of untreated carious lesions in the 12- to 19-year age group (15%) compared with the 6- to 11-year age group (6%).⁵

Although there has been a decline in prevalence of caries in adolescents and children in particular, the decrease in occlusal surface caries has not kept pace with the decrease in the smooth surface caries.⁷ Although this overall decline has been attributed to preventive interventions such as water fluoridation, fluoride toothpaste, fluoride varnishes, and sealants, topical fluoride applications—such as fluoride varnishes—may have a greater effect reducing carious lesions on smooth surfaces compared with caries in pits and fissures.^{1-7,9,10}

NHANES 2011-2012 data show that 41% of children aged 9 to 11 years and 43% of adolescents aged 12 to 19 years had at least 1 dental sealant. Non-Hispanic black children had the lowest dental sealant prevalence in both age groups compared with Hispanic, non-Hispanic white, and Asian children.⁵ Therefore, underutilization of sealants is of key concern.

POTENTIAL ROLE OF PIT-AND-FISSURE SEALANTS IN PRIMARY AND SECONDARY PREVENTION

From a primary prevention perspective, anatomic grooves or pits and fissures on occlusal surfaces of permanent molars trap food debris and promote the presence of bacterial biofilm, thereby increasing the risk of developing carious lesions. Effectively penetrating and sealing these surfaces with a dental material—for example, pit-and-fissure sealants—can prevent lesions and is part of a comprehensive caries management approach.¹¹

From a secondary prevention perspective, there is evidence that sealants also can inhibit the progression

ABBREVIATION KEY. AAPD: American Academy of Pediatric Dentistry. ADA: American Dental Association. BPA: Bisphenol A. GI: Glass ionomer. GRADE: Grading of Recommendations Assessment, Development and Evaluation. NHANES: National Health and Nutrition Examination Survey.