

## Prevention of Dental Caries in Children from Birth Through Five Years of Age: Recommendation Statement

This summary is one in a series excerpted from the Recommendation Statements released by the USPSTF. These statements address preventive health services for use in primary care clinical settings, including screening tests, counseling, and preventive medications.

The complete version of this statement, including supporting scientific evidence, evidence tables, grading system, members of the USPSTF at the time this recommendation was finalized, and references, is available on the USPSTF website at <http://www.uspreventiveservices.org/>.

This series is coordinated by Sumi Sexton, MD, Associate Medical Editor.

A collection of USPSTF recommendation statements published in *AFP* is available at <http://www.aafp.org/afp/uspstf>.

### Summary of Recommendations and Evidence

The U.S. Preventive Services Task Force (USPSTF) recommends that primary care clinicians prescribe oral fluoride supplementation starting at six months of age for children whose water supply is deficient in fluoride (*Table 1*). **B recommendation.**

The USPSTF recommends that primary care clinicians apply fluoride varnish to the primary teeth of all infants and children starting at the age of primary tooth eruption. **B recommendation.**

See the Clinical Considerations section for additional information on these preventive interventions.

The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of routine screening examinations for dental caries performed by primary care clinicians in children from birth to five years of age. **I statement.**

See the Clinical Considerations section for suggestions for practice regarding the I statement.

The target audience for USPSTF recommendations is primary care clinicians, who provide a wide range of health care services to individuals. Although dentists can be considered primary care providers of oral health needs, for the purposes of this recommendation statement, a primary care clinician or primary care provider is defined as a nondental health care professional (e.g., physician, nurse practitioner).

### Rationale IMPORTANCE

Dental caries is the most common chronic disease in children in the United States.<sup>1</sup> According to the 1999-2004 National Health and Nutrition Examination Survey, approximately 42% of children two to 11 years of

age have dental caries in their primary teeth. After decreasing from the early 1970s to the mid-1990s, the prevalence of dental caries in children has been increasing, particularly in young children two to five years of age.<sup>2</sup>

### RECOGNITION OF RISK STATUS

Risk assessment tools generally evaluate risk based on factors such as demographic risk, personal and family oral health history, dietary habits, fluoride exposure, and oral hygiene practices. Information from a clinical evaluation has also been proposed, as well as qualitative or quantitative measure of oral bacterial load. The USPSTF found no studies that evaluated the accuracy of risk assessment instruments for future dental caries in the primary care setting.

### BENEFITS OF PREVENTIVE INTERVENTIONS AND EARLY DETECTION

*Preventive Interventions.* The USPSTF found adequate evidence that oral fluoride supplementation, also known as dietary fluoride supplementation, in children who have low levels of fluoride in their water and application of fluoride varnish to the primary teeth of all children can provide moderate benefit in preventing dental caries.

The USPSTF found insufficient evidence on the benefits of provider education of parents regarding oral hygiene practices to prevent dental caries in their children.

*Screening.* The USPSTF found no studies addressing the direct effect of routine oral screening examinations performed by primary care clinicians on improved clinical outcomes in children younger than five years.

### HARMS OF PREVENTIVE INTERVENTIONS AND EARLY DETECTION

*Preventive Interventions.* The USPSTF found adequate evidence of a link between early

childhood exposure to systemic fluoride and enamel fluorosis, a visible change in the appearance of the enamel due to altered mineralization. Fluorosis can range from mild (small white spots or streaks) to severe (discoloration, pitting, or rough enamel), depending on the overall systemic fluoride exposure level over time.

No studies specifically reported on the risk of fluorosis with fluoride varnish; however, compared with other topical fluoride interventions, systematic exposure to fluoride is low after varnish application.<sup>3,4</sup> It is important to consider a child's overall systemic exposure to fluoride from multiple sources (e.g., water fluoridation, toothpaste, supplements, varnish), but in the United States, enamel fluorosis presents as mild cosmetic changes in more than 99% of cases.<sup>5</sup>

The USPSTF concludes that there is limited evidence about the harms associated with fluoride varnish or other preventive

interventions for dental caries, but that these risks are likely small.

**Screening.** The USPSTF found no studies addressing the magnitude of harms of screening children from birth to five years of age for dental caries or future risk of dental caries in the primary care setting.

**USPSTF ASSESSMENT**

The USPSTF concludes with moderate certainty that there is a moderate net benefit of preventing future dental caries with oral fluoride supplementation at recommended doses in children older than six months who reside in communities with inadequate water fluoride.

The USPSTF concludes with moderate certainty that there is a moderate net benefit of preventing future dental caries with fluoride varnish application in all children starting at the age of eruption of primary teeth to five years of age.

**Table 1. Prevention of Dental Caries in Children from Birth Through Five Years of Age: Clinical Summary of the USPSTF Recommendation**

Population	Children five years and younger		
Recommendation	Prescribe oral fluoride supplementation starting at six months of age for children whose water supply is deficient in fluoride. Grade: B	Apply fluoride varnish to the primary teeth of all infants and children starting at the age of primary tooth eruption. Grade: B	Routine oral screening examinations: no recommendation Grade: I statement
Risk assessment	All children are at potential risk of dental caries; those whose primary water supply is deficient in fluoride (defined as < 0.6 parts per million) are at particular risk. Although there are no validated multivariate screening tools to determine which children are at higher risk of dental caries, there are a number of individual factors that elevate risk, such as low socioeconomic status, being an ethnic minority, frequent sugar exposure or snacking, inappropriate bottle feeding, developmental defects of the tooth enamel, dry mouth, history of previous caries (in the child, a sibling, or mother), lack of access to dental care, and inadequate preventive measures (such as failure to use fluoride toothpaste).		
Preventive medications	Oral fluoride supplementation prevents dental caries in children with inadequate water fluoridation. All children with erupted primary teeth can benefit from the periodic application of fluoride varnish, regardless of the levels of fluoride in their water.		
Balance of benefits and harms	There is a moderate net benefit of providing oral fluoride supplementation at recommended doses in children older than six months of age who reside in communities with inadequate water fluoride.	There is a moderate net benefit of providing fluoride varnish application to all children starting at the age of eruption of primary teeth to five years of age.	The evidence on performing routine oral screening examinations for dental caries in children from birth to five years of age is insufficient, and the balance of benefits and harms cannot be determined.

NOTE: For a summary of the evidence systematically reviewed in making this recommendation, the full recommendation statement, and supporting documents, go to <http://www.uspreventiveservicestaskforce.org/>.

USPSTF = U.S. Preventive Services Task Force.

The USPSTF concludes that the evidence on performing routine oral screening examinations for dental caries in children from birth to five years of age is insufficient, and the balance of benefits and harms of screening cannot be determined.

## Clinical Considerations

### PATIENT POPULATION

This recommendation applies to children five years and younger. The USPSTF limited its consideration of caries screening and prevention by primary care clinicians to infants and preschool-aged children. The rationale for this decision was that, at the present time, nondental primary care clinicians are more likely than dentists to have contact with children five years and younger in the United States<sup>6,7</sup>; this situation changes as children reach school age and beyond. Also, as children grow older, dental professionals use sealants rather than fluoride varnish. As such, the USPSTF limited its review of the evidence of preventive interventions for dental caries to this age group. This recommendation should not be construed to imply that preventive interventions for dental caries should cease after five years of age.

### ASSESSMENT OF RISK

All children are at potential risk of dental caries; those whose primary water supply is deficient in fluoride (defined as containing less than 0.6 parts per million) are at particular risk. Although there are no validated multivariate screening tools to determine which children are at higher risk of dental caries, there are a number of individual factors that elevate risk. Higher prevalence and severity of dental caries are found among minority and economically disadvantaged children. Other risk factors for caries in children include frequent sugar exposure, inappropriate bottle feeding, developmental defects of the tooth enamel, dry mouth, and a history of previous caries. Maternal and family factors can also increase children's risk. These factors include poor oral hygiene, low socioeconomic status, recent maternal caries, sibling caries, and frequent snacking. Additional factors associated with dental caries in young children include lack of access to dental care; inadequate preventive measures,

such as failure to use fluoride-containing toothpaste; and lack of parental knowledge about oral health.<sup>8,9</sup>

Some organizations have advocated restricting fluoride varnish use to children at increased risk. Although several caries risk assessment tools exist, none have been validated in the primary care setting, nor do existing studies demonstrate that these tools, when used by primary care clinicians, can accurately and consistently differentiate between children who will develop dental caries and those who will not.<sup>8,9</sup> A risk-based approach to fluoride varnish application will miss opportunities to provide an effective dental caries preventive intervention to children who could benefit from it, particularly because currently, in the United States, infants and preschool-aged children are more likely to have regular visits with nondental primary care clinicians than dental care providers.<sup>6,7</sup>

### INTERVENTIONS TO PREVENT DENTAL CARIES

As noted previously, oral fluoride supplementation prevents dental caries in patients with inadequate water fluoridation.

All children with erupted teeth can potentially benefit from the periodic application of fluoride varnish, regardless of the levels of fluoride in their water. Though the evidence to support varnish is drawn from higher-risk populations, the provision of varnish to all children is reasonable because the prevalence of risk factors is high in the U.S. population, the number needed to treat is low, and the harms of the intervention are small to none.

The USPSTF did not review the evidence on the effectiveness of tooth brushing, but regular tooth brushing with fluoride toothpaste by children is very important in preventing dental caries.<sup>10</sup>

### TIMING AND DOSAGE OF PREVENTIVE INTERVENTIONS

No studies specifically addressed the dosage and timing of oral fluoride supplementation in children with inadequate water fluoridation. The American Dental Association recommendations on the dosage of and age at which to start dietary fluoride supplementation take into account the amount of fluoride

in the child's water source.<sup>11</sup> These dosing recommendations are also referenced by the American Academy of Pediatrics.<sup>12</sup>

No study directly assessed the appropriate ages at which to start and stop the application of fluoride varnish. Available trials of fluoride varnish enrolled children three to five years of age; however, given the mechanism of action of this intervention, benefits are very likely to accrue starting at the time of primary tooth eruption. Limited evidence found no clear effect on caries increment between performing a single fluoride varnish once every six months vs. once a year<sup>13</sup> or between a single application every six months vs. multiple applications once a year or every six months.<sup>14,15</sup>

#### SUGGESTIONS FOR PRACTICE REGARDING THE I STATEMENT

In deciding whether to routinely perform screening examinations for dental caries in children from birth to five years of age, clinicians should consider the following.

*Potential Preventable Burden.* Dental caries is the most common chronic disease in children in the United States. It is four times more common than childhood asthma and seven times more common than hay fever. According to the National Health and Nutrition Examination Survey, the prevalence of dental caries has increased from 24% to 28% between 1988-1994 and 1999-2004.<sup>2</sup> Approximately 20% of surveyed children with caries had not received treatment. Symptomatic dental caries in children are associated with pain, loss of teeth, impaired growth, and decreased weight gain and can affect appearance, self-esteem, speech, and school performance. Dental-related concerns lead to the loss of more than 54 million school hours each year.<sup>16</sup>

*Potential Harms.* No studies examined the harms of performing primary care screening examinations for dental caries in children from birth to five years of age.<sup>8,9</sup> However, given the noninvasive nature of an oral examination, these harms are expected to be minimal.

*Current Practice.* In one study, only about one-half of pediatricians reported examining the teeth of one-half of their patients zero to three years of age.<sup>17</sup>

#### OTHER APPROACHES TO PREVENTION

In April 2013, the Community Preventive Services Task Force recommended fluoridation of community water sources based on strong evidence of effectiveness in reducing dental caries.<sup>18</sup> It also recommends school-based dental sealant delivery programs to prevent caries.

Xylitol may have promise as an additional method to reduce the risk of dental caries. Xylitol is classified by the U.S. Food and Drug Administration as a dietary supplement and is found in over-the-counter consumer products such as wipes or gum. A single small, fair-quality trial of xylitol wipes use in children six to 35 months of age found a 91% relative reduction in decayed, missing, or filled surface increment.<sup>19</sup> However, four other studies showed no clear effect of xylitol on caries risk in children younger than five years.<sup>20-23</sup> As such, there is currently not enough evidence to formally recommend its routine use in caries prevention.

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The "Other Considerations," "Discussion," "Update of Previous Recommendation," and "Recommendations of Others" sections of this recommendation statement are available at <http://www.uspreventiveservicestaskforce.org/Page/Topic/recommendation-summary/dental-caries-in-children-from-birth-through-age-5-years-screening>.

The USPSTF recommendations are independent of the U.S. government. They do not represent the views of the Agency for Healthcare Research and Quality, the U.S. Department of Health and Human Services, or the U.S. Public Health Service.

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