

Screening and Preventive Interventions for Oral Health in Children and Adolescents Aged 5 to 17 Years

US Preventive Services Task Force Recommendation Statement

US Preventive Services Task Force

IMPORTANCE Oral health is fundamental to health and well-being across the lifespan. Oral health conditions affect the daily lives of school-age children and adolescents, leading to loss of more than 51 million school hours every year. Untreated oral health conditions in children can lead to serious infections and affect growth, development, and quality of life.

OBJECTIVE The US Preventive Services Task Force (USPSTF) commissioned a systematic review to evaluate screening and preventive interventions for oral health conditions in children and adolescents aged 5 to 17 years.

POPULATION Asymptomatic children and adolescents aged 5 to 17 years.

EVIDENCE ASSESSMENT The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for oral health conditions (eg, dental caries) performed by primary care clinicians in asymptomatic children and adolescents aged 5 to 17 years. The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of preventive interventions for oral health conditions (eg, dental caries) performed by primary care clinicians in asymptomatic children and adolescents aged 5 to 17 years.

RECOMMENDATIONS The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of routine screening performed by primary care clinicians for oral health conditions, including dental caries, in children and adolescents aged 5 to 17 years. (I statement) The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of preventive interventions performed by primary care clinicians for oral health conditions, including dental caries, in children and adolescents aged 5 to 17 years. (I statement)

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Summary of Recommendations

Population	Recommendation	Grade
Asymptomatic children and adolescents aged 5 to 17 years	The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of routine screening performed by primary care clinicians for oral health conditions, including dental caries, in children and adolescents aged 5 to 17 years.	I
Asymptomatic children and adolescents aged 5 to 17 years	The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of preventive interventions performed by primary care clinicians for oral health conditions, including dental caries, in children and adolescents aged 5 to 17 years.	I

USPSTF indicates US Preventive Services Task Force.

See the Summary of Recommendations figure.

Table 1. Summary of USPSTF Rationale

Rationale	Assessment
Detection	Inadequate evidence about the accuracy of screening for oral health performed by primary care clinicians in identifying asymptomatic children and adolescents aged 5 to 17 y who have or are at increased risk for oral health conditions (eg, dental caries).
Benefits of early detection and preventive interventions	<ul style="list-style-type: none"> • Inadequate evidence to assess the benefits of screening for oral health conditions (eg, dental caries) performed by primary care clinicians in preventing negative oral health outcomes in asymptomatic children and adolescents aged 5 to 17 y. • Inadequate evidence to assess the benefits of preventive interventions performed by primary care clinicians for oral health outcomes in asymptomatic children and adolescents aged 5 to 17 y.
Harms of early detection and preventive interventions	<ul style="list-style-type: none"> • Inadequate evidence to assess the harms of screening for oral health conditions performed by primary care clinicians in asymptomatic children and adolescents aged 5 to 17 y. • Inadequate evidence to assess the harms of preventive interventions performed by primary care clinicians for oral health conditions (eg, dental caries) in asymptomatic children and adolescents aged 5 to 17 y.
USPSTF assessment	<ul style="list-style-type: none"> • Due to a lack of evidence, the USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening by primary care clinicians for oral health conditions (eg, dental caries) in asymptomatic children and adolescents aged 5 to 17 y. • Due to a lack of evidence, the USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of interventions by primary care clinicians to prevent oral health conditions (eg, dental caries) in asymptomatic children and adolescents aged 5 to 17 y.

Abbreviation: USPSTF, US Preventive Services Task Force.

Preamble

The US Preventive Services Task Force (USPSTF) makes recommendations about the effectiveness of specific preventive care services for patients without obvious related signs or symptoms to improve the health of people nationwide.

It bases its recommendations on the evidence of both the benefits and harms of the service and an assessment of the balance. The USPSTF does not consider the costs of providing a service in this assessment.

The USPSTF recognizes that clinical decisions involve more considerations than evidence alone. Clinicians should understand the evidence but individualize decision-making to the specific patient or situation. Similarly, the USPSTF notes that policy and coverage decisions involve considerations in addition to the evidence of clinical benefits and harms.

The USPSTF is committed to mitigating the health inequities that prevent many people from fully benefiting from preventive services. Systemic or structural racism results in policies and practices, including health care delivery, that can lead to inequities in health. The USPSTF recognizes that race, ethnicity, and gender are all social rather than biological constructs. However, they are also often important predictors of health risk. The USPSTF is committed to helping reverse the negative impacts of systemic and structural racism, gender-based discrimination, bias, and other sources of health inequities, and their effects on health, throughout its work.

Importance

Oral health is fundamental to health and well-being across the lifespan.^{1,2} Oral health conditions affect the daily lives of school-age children and adolescents, leading to loss of more than 51 million school hours every year.^{3,4} Despite declines in untreated tooth decay in the primary teeth of young children,^{5,6} dental caries remains one of the most common conditions of childhood, and prevalence of untreated caries increases as children age.^{1,2,7} Dental caries can negatively affect a range of outcomes, including, but not limited to, eating, speaking, learning, smiling, self-esteem, and quality of life.¹ In the US, oral health

disparities are shaped by inequities in the affordability and accessibility of dental care and other disadvantages related to social determinants of health (eg, living in a rural area or immigration status).^{1,2,4,5} Asian, Black, Hispanic/Latino, Native American/Alaska Native, and Native Hawaiian/Pacific Islander children and adolescents are more likely to have dental caries compared with all children.^{1,2,4,8,9} Children experiencing poverty, children with special health care needs, children experiencing homelessness, children living in urban or rural underserved areas, and children with public insurance or without insurance are disproportionately affected by oral health conditions.¹ Untreated oral health conditions in children can lead to serious infections and affect growth, development, and quality of life.^{1,4,10}

USPSTF Assessment of Magnitude of Net Benefit

Due to a lack of evidence, the USPSTF concludes that the current **evidence is insufficient** to assess the balance of benefits and harms of screening for oral health conditions (eg, dental caries) performed by primary care clinicians in asymptomatic children and adolescents aged 5 to 17 years.

Due to a lack of evidence, the USPSTF concludes that the current **evidence is insufficient** to assess the balance of benefits and harms of preventive interventions for oral health conditions (eg, dental caries) performed by primary care clinicians in asymptomatic children and adolescents aged 5 to 17 years.

See **Table 1** for more information on the USPSTF recommendation rationale and assessment and the eFigure in the Supplement for information on the recommendation grade. See the **Figure** for a summary of the recommendation for clinicians. For more details on the methods the USPSTF uses to determine the net benefit, see the USPSTF Procedure Manual.¹¹

Practice Considerations

Patient Population Under Consideration

This recommendation applies to asymptomatic school-age children and adolescents aged 5 to 17 years. Interventions for children younger than 5 years are addressed in a separate recommendation.

Figure. Clinician Summary: Screening and Preventive Interventions for Oral Health in Children and Adolescents Aged 5 to 17 Years

What does the USPSTF recommend?	<p>For asymptomatic children and adolescents aged 5 to 17 years:</p> <p>The evidence is insufficient to assess the balance of benefits and harms of routine screening performed by primary care clinicians for oral health conditions, including dental caries. <u>Grade: I statement</u></p> <p>The evidence is insufficient to assess the balance of benefits and harms of preventive interventions performed by primary care clinicians for oral health conditions, including dental caries. <u>Grade: I statement</u></p>
To whom does this recommendation apply?	This recommendation applies to children and adolescents aged 5 to 17 years.
What's new?	This is a new USPSTF recommendation.
How to implement this recommendation?	<ul style="list-style-type: none"> • The USPSTF found insufficient evidence to recommend for or against routine screening or preventive interventions for oral health conditions in the primary care setting for children and adolescents. • The USPSTF is calling for more research on addressing oral health in nondental primary care settings, particularly in persons who are more likely to experience oral health conditions and on social factors that contribute to disparities in oral health. • In the absence of evidence, primary care clinicians should use their clinical expertise to decide whether to perform these services.
What additional information should clinicians know about this recommendation?	<ul style="list-style-type: none"> • The USPSTF has a separate existing recommendation for children younger than 5 years that recommends prescribing oral fluoride supplements starting at age 6 months for children younger than 5 years whose water supply is deficient in fluoride and applying fluoride varnish to the primary teeth of all children younger than 5 years starting at the age of primary tooth eruption. • Dental caries refers to a multifactorial disease process resulting in demineralization of the teeth. • The evidence review focused on dental caries as the most common oral health condition and the most potentially amenable to primary care interventions.
Why is this recommendation and topic important?	<ul style="list-style-type: none"> • Dental caries is a common chronic condition of childhood; in 2011 in the US, more than 50% of children aged 6 to 11 years had dental caries in primary teeth and 17% had caries in permanent teeth. • Developmental defects in teeth, inadequate salivary composition or flow, frequent intake of dietary sugars (in foods and beverages), suboptimal fluoride exposure, and oral hygiene practices (eg, lack of tooth brushing and flossing) can increase susceptibility to dental caries. • In the US, oral health disparities are shaped by unequally affordable and accessible dental care and other disadvantages related to social determinants of health (eg, living in a rural area or immigration status). • Dental caries disproportionately affects persons living in poverty; Asian, Black, Hispanic/Latino, Native American/Alaska Native, and Native Hawaiian/Pacific Islander children and adolescents; children with special health care needs; children experiencing homelessness; children living in urban or rural underserved areas; and children with public insurance or without insurance.
What are other relevant USPSTF recommendations?	<ul style="list-style-type: none"> • The USPSTF has issued recommendations on screening and interventions to prevent dental caries in children younger than 5 years. • The USPSTF has issued recommendations on screening and preventive interventions for oral health in adults.
What are additional tools and resources?	<ul style="list-style-type: none"> • The Health Resources & Services Administration's oral health fact sheet (https://www.hrsa.gov/sites/default/files/hrsa/oral-health/oral-health-2016-factsheet.pdf) and report on <i>Integration of Oral Health and Primary Care Practice</i> (https://www.hrsa.gov/sites/default/files/hrsa/oral-health/integration-oral-health.pdf) emphasize optimal collaborations between primary care clinicians and oral health professionals. • The US Department of Health and Human Services' <i>Oral Health in America: A Report of the Surgeon General</i> (https://www.nidcr.nih.gov/sites/default/files/2017-10/hck1ocv.%40www.surgeon.fullrpt.pdf) and the National Institutes of Health's report <i>Oral Health in America: Advances and Challenges</i> (https://www.nidcr.nih.gov/sites/default/files/2021-12/Oral-Health-in-America-Advances-and-Challenges.pdf) comprehensively describe the importance of oral health to overall health and highlight advances and challenges toward improving oral health in the US. • The Community Preventive Services Task Force recommends fluoridation of community water sources to reduce dental caries (https://www.thecommunityguide.org/findings/dental-carries-cavities-community-water-fluoridation) and school-based dental sealant delivery programs to prevent dental caries (https://www.thecommunityguide.org/findings/dental-carries-cavities-school-based-dental-sealant-delivery-programs.html).
Where to read the full recommendation statement?	Visit the USPSTF website (https://www.uspreventiveservicestaskforce.org/uspstf/) or the <i>JAMA</i> website (https://jamanetwork.com/collections/44068/united-states-preventive-services-task-force) to read the full recommendation statement. This includes more details on the rationale of the recommendation, including benefits and harms; supporting evidence; and recommendations of others.

The USPSTF recognizes that clinical decisions involve more considerations than evidence alone. Clinicians should understand the evidence but individualize decision-making to the specific patient or situation.

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Condition Definitions

Dental caries refers to a multifactorial disease process resulting in demineralization of the teeth.¹⁰ Bacteria in the mouth metabolize sugars from food and drink to produce acids that erode tooth enamel.^{1,2,10} When left untreated, demineralization can weaken and destroy the enamel, forming cavities and causing pain, infection, and tooth loss.² Oral health conditions for this recommendation statement refer to clinical health outcomes focused on the presence and severity of dental caries, or caries burden (based on the number of affected teeth or surfaces), morbidity, quality of life, functional status, and harms of screening or treatment related to these conditions.¹ The USPSTF focused on dental caries as the most common oral health condition and the most potentially amenable to primary care interventions.

Screening Tests and Interventions

For the purposes of this review, screening included clinical assessments (eg, physical examination) and standardized risk prediction tools or a combination of approaches by primary care clinicians to identify children who have existing oral health conditions or children who might most benefit from interventions to prevent future negative oral health outcomes due to increased risk.¹ Reviewed interventions focused on preventing future dental caries, including counseling and health education toward reducing the burden of bacteria in the mouth, decreasing the frequency of refined sugar intake, and promoting resistance to caries in the teeth through use of fluoride, dental sealants, silver diamine fluoride (SDF), and xylitol.^{1,2,12,13} The USPSTF found insufficient evidence to recommend for or against screening or preventive interventions for oral health conditions in the primary care setting for children and adolescents, and suggests primary care clinicians use their clinical expertise to decide whether to perform these services.

Suggestions for Practice Regarding the I Statement

In deciding whether to routinely screen or deliver interventions to prevent oral health conditions, primary care clinicians should consider the following.

Potential Preventable Burden

Dental caries is a common chronic condition of childhood; in 2011 in the US, more than 50% of children aged 6 to 11 years had dental caries in primary teeth and 17% had caries in permanent teeth.^{1,2} In the US, an estimated 5.2% of children aged 6 to 11 years and 17% of adolescents aged 12 to 19 years had untreated dental caries in permanent teeth, based on 2011 to 2016 data.^{1,14} Developmental defects in teeth, inadequate salivary composition or flow, frequent intake of dietary sugars (in foods and beverages), suboptimal fluoride exposure, and oral hygiene practices (eg, lack of tooth brushing and flossing) can increase susceptibility to dental caries.^{1,2} Social determinants of health (nonbiological factors) associated with increased risk of oral health conditions include low socioeconomic status, lack of dental insurance, and living in communities with dental professional shortages, limiting access to dental care.^{1,2}

These inequities associated with social determinants of health can exacerbate and perpetuate oral health disparities.² For example, children experiencing poverty are more likely to experience food insecurity²; food insecurity is associated with increased intake of dietary refined sugars that elevates risk for dental caries.^{2,15}

Such disparities related to race, ethnicity, and socioeconomic status also exist in receipt of preventive interventions.^{1,4} For example, youth experiencing the highest levels of poverty are more likely to have dental caries (65%) compared with all youth (57%) but are less likely to have dental sealants on their permanent teeth (43%) than all youth (48%).¹

While evidence is limited on the prevalence of periodontal disease in children and adolescents,¹ risk in pregnant youth may be elevated.⁴

Potential Harms

Primary care screening approaches (eg, oral clinical assessments or standardized risk assessment instruments) to identify children with early untreated dental caries or children at increased risk for developing future dental caries are noninvasive and would seem unlikely to cause serious harms, but evidence is lacking. Health education and counseling to improve oral hygiene and reduce modifiable risk factors (eg, frequent intake of refined sugars) are also noninvasive.

Current Practice

The USPSTF found little evidence on current practices in primary care for screening or performing interventions to prevent dental caries in children aged 5 to 17 years. In its review of the evidence, the USPSTF found that preventive interventions are generally performed in dental settings by dental professionals. There are well-known significant barriers to providing oral health services in the primary care setting; oral health care and general health care operate as almost entirely separate systems, from training to financing and service settings.^{2,4} Primary care clinicians have variable access and familiarity with oral health interventions.^{1,4} As a result, oral health care delivery by primary care clinicians may require additional training and specific equipment to deliver screening and interventions.^{1,2} Primary care clinicians may also have reimbursement challenges and face administrative obstacles to making dental referrals and linking patients to dental care.¹ The USPSTF recommends oral fluoride supplements starting at age 6 months for children younger than 5 years with water sources deficient in fluoride and administration of varnish to the primary teeth of all children younger than 5 years after tooth eruption.¹⁶ It is unknown how frequently fluoride is administered in older children, adolescents, and adults.

Additional Tools and Resources

The Health Resources & Services Administration's oral health fact sheet (<https://www.hrsa.gov/sites/default/files/hrsa/oral-health/oral-health-2016-factsheet.pdf>) and report *Integration of Oral Health and Primary Care Practice* (<https://www.hrsa.gov/sites/default/files/hrsa/oral-health/integration-oral-health.pdf>) emphasize optimal collaborations between primary care clinicians and oral health professionals.

The US Department of Health and Human Services' *Oral Health in America: A Report of the Surgeon General* (<https://www.nidcr.nih.gov/sites/default/files/2017-10/hck1ocv.%40www.surgeon.fullrpt.pdf>) and the National Institutes of Health's report *Oral Health in America: Advances and Challenges* (<https://www.nidcr.nih.gov/sites/default/files/2021-12/Oral-Health-in-America-Advances-and-Challenges.pdf>) comprehensively describe the importance of oral health to overall health and highlight advances and challenges toward improving oral health in the US.

The Community Preventive Services Task Force recommends fluoridation of community water sources to reduce dental caries (<https://www.thecommunityguide.org/findings/dental-caries-cavities-community-water-fluoridation.html>) and school-based dental sealant delivery programs to prevent dental caries (<https://www.thecommunityguide.org/findings/dental-caries-cavities-school-based-dental-sealant-delivery-programs.html>).

Other Related USPSTF Recommendations

The USPSTF recommends interventions to prevent dental caries in children younger than 5 years¹⁶ and has issued recommendations for screening and preventive interventions for oral health in adults.¹⁷

Supporting Evidence

Scope of Review

The USPSTF commissioned a systematic evidence review^{1,31} to evaluate the benefits and harms of screening and preventive interventions for oral health conditions in children and adolescents aged 5 to 17 years. The USPSTF previously addressed counseling to prevent dental and periodontal disease (1996) and, most recently, screening and interventions to prevent dental caries in children younger than 5 years (2021). Concurrently, the USPSTF commissioned a systematic evidence review to evaluate the benefits and harms of oral health screening and preventive interventions in adults¹⁸; this recommendation is addressed in a separate statement.¹⁷

Accuracy of Screening Tests

The USPSTF review identified limited evidence on available clinical screening instruments or clinical assessments and their clinical accuracy to identify children and adolescents with oral health conditions in the primary care setting. The review identified a single observational study (n = 632)^{1,31} assessing diagnostic accuracy using visual screening by a registered nurse (n = 219) or a 17-item questionnaire (n = 305) completed by parents or guardians to identify untreated dental caries in children aged 5 to 12 years.^{1,31} The nurses received 5 hours of training along with written materials on screening and diagnoses.^{1,31} The visual screening approach was associated with a sensitivity of 0.92 (95% CI, 0.84-0.97) and a specificity of 0.993 (95% CI, 0.96-0.9998).^{1,31} The questionnaire, which included items on the condition of the child's mouth and socioeconomic and sociodemographic factors, was associated with a sensitivity of 0.69 (95% CI, 0.60-0.77) and a specificity of 0.88 (95% CI, 0.83-0.93).^{1,31}

The review found no evidence on screening to identify children or adolescents aged 5 to 17 years at increased risk for future adverse oral health outcomes.^{1,31}

Effectiveness of Screening

The review identified no evidence on the effectiveness of screening on future oral health outcomes.^{1,31}

Harms of Screening

The review identified no evidence on the harms of screening.^{1,31}

Effectiveness of Preventive Interventions

While the USPSTF sought evidence on interventions to prevent a broad collection of oral health conditions that could be addressed

in the primary care setting, identified studies focused on dental caries interventions performed by dental health professionals in a dental or school setting or administered in supervised school settings.

The USPSTF also sought evidence on the effectiveness of oral health behavioral counseling by the primary care clinician on oral health outcomes but found no eligible studies for review in school-age children and adolescents. Current evidence is limited to dental professional-led or school-based education or counseling, often combined with other interventions; the counseling interventions were of uncertain feasibility to the primary care setting or reported intermediate outcomes (eg, effects of interventions on beliefs about oral health) rather than direct dental health outcomes.^{1,31} The following discussion focuses on preventive medications. Studies often had significant methodological limitations (eg, high attrition, unclear randomization, or uncertain applicability to the US) and did not report analysis by race and ethnicity, socioeconomic status, or other important social determinants of health. Studies inconsistently reported community water fluoridation levels or whether participants received oral health education, precluding evaluation of the effectiveness of these factors on oral health outcomes. Studies focused on dental caries outcomes measured as decayed, missing, or filled teeth/decayed or filled teeth (DMFT/DFT) or decayed, missing, or filled surfaces/decayed or filled surfaces (DMFS/DFS) increment (change from baseline to follow-up in the DMFT/DFT or DMFS/DFS index [number of affected teeth or surfaces]), with limited evidence on nonoral health outcomes such as quality of life or functional status, including school-related outcomes.

Fluoride

Among 7 trials that evaluated fluoride supplements vs placebo or no fluoride in children 5 years or older (n = 3382),^{1,31} 1 trial of self-administered fluoride supplements at home with low adherence found no benefit on stratified analysis (n = 438; mean difference, 0.13 [95% CI, -0.38 to 0.64]).^{1,31} In 6 other trials of supplements supervised at school, intake of fluoride supplements was associated with decreased dental caries increment in permanent teeth (6 trials; effective n = 1395; mean difference, -0.73 [95% CI, -1.30 to -0.19]).^{1,31}

Similarly, in a systematic review (26 trials)¹⁹ evaluating application of topical fluoride gel vs placebo or no gel in children aged 5 to 15 years, gel was applied at school in 19 trials or in a dental clinic in 7 trials.^{1,31} Dental professionals applied gel in 15 trials, while gels were self-applied and supervised by a dental hygienist or other non-dental professional adult in 11 trials.^{1,31} Topical gels were associated with decreased dental caries burden in permanent teeth at about 3 years (based on the DFT or DMFT score) (10 trials; n = 3198; prevented fraction, 0.32 [95% CI, 0.19-0.46]; prevented fraction is the difference in increment between the control and intervention groups, divided by the control group increment).^{1,31}

In a systematic review (14 trials)²⁰ of fluoride varnish administered exclusively by dental professionals in school settings to children 5 years or older, varnish was associated with decreased dental caries burden at 1 to 4.5 years based on the DMFS or DFS score (14 trials; n = 3419; prevented fraction, 0.43 [95% CI, 0.30-0.57]; $I^2 = 75%$) or DMFT or DFT score (5 trials; n = 3902; prevented fraction, 0.44 [95% CI, 0.11-0.76]; $I^2 = 86%$).^{1,31} A subsequent trial (n = 5397)²¹ reported findings consistent with the systematic review.^{1,31}

Table 2. Research Needs and Gaps in Screening and Preventive Interventions for Oral Health in Children and Adolescents Aged 5 to 17 Years

To fulfill its mission to improve health by making evidence-based recommendations for preventive services, the USPSTF routinely highlights the most critical evidence gaps for making actionable preventive services recommendations. The USPSTF often needs additional evidence to create the strongest recommendations for everyone and especially for persons with the greatest burden of disease. In this table, the USPSTF summarizes the key bodies of evidence needed for the USPSTF to make recommendations for screening and preventive interventions for oral health in adults. For each of the evidence gaps listed below, research must focus on screening and preventive interventions that can be performed in nondental primary care settings and be inclusive of populations with a high prevalence of oral health conditions, including Asian, Black, Hispanic/Latino, Native American/Alaska Native, and Hawaiian Native/Pacific Islander persons and persons with social determinants that contribute to disparities in oral health. For additional information on research needed to address these evidence gaps, see the Research Gaps Taxonomy table on the USPSTF website (https://www.uspreventiveservicestaskforce.org/home/getfilebytoken/xBhJwGtUHqmEvPg_gKk4nw).

Screening for oral health in children and adolescents aged 5 to 17 years
Research is needed to assess the effectiveness and harms of primary care-based oral health screening strategies on oral health outcomes.
Research is needed on the diagnostic accuracy of oral health examinations and risk assessment tools in the primary care setting to identify children aged 5 to 17 years with oral health conditions.
Preventive interventions for oral health in children and adolescents aged 5 to 17 years
Research is needed to develop primary care-based oral health risk assessment tools to accurately identify children aged 5 to 17 years at increased risk of oral health conditions.
Research is needed to assess the effectiveness and harms of preventive interventions in the primary care setting.
<ul style="list-style-type: none"> • Research is needed to assess the effectiveness and harms of fluoride gel, fluoride varnish, sealants, silver diamine fluoride, and xylitol on oral health conditions. • Research is needed to assess the effectiveness and harms of oral health education and behavioral counseling interventions performed by primary care clinicians on oral health outcomes. To assess their impact on study participants, identification of water fluoridation status and oral health behaviors and education is needed.
Research is needed to identify the effectiveness of strategies that can be delivered in primary care settings to improve quality of life, function, or other clinically important oral health outcomes.

Sealants, SDF, and Xylitol

In a systematic review (7 trials) of resin-based sealants administered by dental health professionals in dental settings to children aged 5 to 10 years, sealants were associated with decreased risk of dental caries in the first molars at 2 years (7 trials; $n = 1322$; odds ratio, 0.12 [95% CI, 0.08-0.19]; $I^2 = 72\%$).^{1,31} Another systematic review (2 trials) and 1 additional trial found inconsistent effects associated with glass ionomer sealants vs no sealants on dental caries.^{1,31}

In a single trial ($n = 452$)²² of children with high baseline dental caries burden and suboptimal fluoridation, SDF solution administered by dental professionals was associated with fewer new surfaces with active caries in primary teeth (mean, 0.3 vs 1.4; $P < .001$) and first permanent molars (mean, 0.4 vs 1.1; $P < .001$) and decreased likelihood of new decayed or filled teeth (26.1% vs 49.7%; relative risk, 0.52 [95% CI, 0.40-0.70]).^{1,22,31} Training approaches for dental professionals were not reported.^{1,31}

The review identified 10 trials ($n = 4267$) evaluating xylitol in children 5 years or older.^{1,31} In 2 fair-quality trials, xylitol was administered under supervision at school with no benefit, or the results varied by control.^{1,31} In 1 trial ($n = 496$)²³ of children with low baseline dental caries burden, xylitol (vs no xylitol) was associated with no group differences in DMFS increment at 4 years (mean, 2.75 for xylitol for 1 year vs 3.02 for 2 years vs 2.74 for no xylitol; $P > .05$).^{1,31} A second fair-quality trial ($n = 432$)²⁴ of children with high baseline dental caries burden also found no difference between xylitol vs placebo in DMFS increment at 3 years (mean, 8.1 vs 8.3; $P > .05$) and decreased DMFS increment in the xylitol group vs the no xylitol group (mean increment, 8.1 vs 12.4; $P < .05$).^{1,31} In 8 other trials (effective $n = 1646$), xylitol was associated with some benefit, but studies had significant methodological limitations (eg, unclear randomization, allocation, or concealment).^{1,31}

Harms of Preventive Interventions

The review found very limited evidence on the harms of interventions, including a lack of evidence on exposure to oral fluoride supple-

ments in children and adolescents aged 5 to 17 years. Often, identified studies did not capture or report any harms.

A single trial ($n = 349$)²⁵ reported no adverse events of fluoride supplements; other trials did not report harms.^{1,31} Two trials ($n = 490$) found no association between use of fluoride gels and nausea, gagging, and vomiting (absolute risk difference, 0.01 [95% CI, -0.01 to 0.02]; $I^2 = 0\%$).^{1,31} A single trial reported self-limited adverse events (nausea) in 12 of 1473 children using fluoride varnish; 4 trials did not report harms.^{1,31} In a systematic review of resin-based sealants, 3 trials ($n = 775$) reported no harms and 13 trials did not report harms.^{1,31} A trial on glass ionomer sealants did not report harms.^{1,31} A single trial ($n = 452$)²² reported that SDF was associated with black staining on inactive dental caries in primary teeth (97% vs 48%; $P < .001$) and in first permanent molars (86% vs 67%; $P < .001$).^{1,31} Studies reported that SDF treatment commonly results in black staining of carious lesions.^{1,26,31} A single trial of xylitol ($n = 296$) reported 1 participant withdrawal due to diarrhea; 9 trials did not report harms.^{1,31}

Response to Public Comment

A draft version of this recommendation statement was posted for public comment on the USPSTF website from May 23, 2023, to June 20, 2023. Some comments expressed support for a recommendation for primary care screening and preventive interventions to expand dental care access and positively impact oral health disparities. The USPSTF is committed to advancing health equity and to the provision of equitable clinical preventive services to improve health. The USPSTF carefully considers evidence of benefits and harms, makes recommendations when supported by sufficient evidence, and makes recommendations on primary care-relevant services. Based on the evidence, the USPSTF cannot recommend for or against oral health screening or preventive interventions in the primary care setting for children and adolescents aged 5 to 17 years. Primary care clinicians should use their clinical expertise to decide whether to perform these services. The USPSTF is calling for additional research to fill critical

evidence gaps on this topic. Several comments agreed that the evidence is too limited to recommend for or against oral health screening or preventive interventions feasible in primary care settings in children and adolescents aged 5 to 17 years. Last, some comments expressed concern that the current I statements could be misinterpreted as recommendations against screening and preventive interventions, so clarifying language was added to emphasize that the I statements are neither a recommendation for or against screening or preventive interventions, and to highlight its recommendation for preventive interventions for children younger than 5 years in the Other Related USPSTF Recommendations section.

Research Needs and Gaps

See **Table 2** for research needs and gaps related to screening and preventive interventions for oral health in children and adolescents aged 5 to 17 years.

Recommendations of Others

The US Department of Health and Human Services' *Oral Health in America: A Report of the Surgeon General* (2000) and the National Institutes of Health's update (2020) emphasized the importance of

integrating oral health into primary care medical settings, primarily focusing on counseling, coordination, and referral.^{2,3}

The National Academy of Medicine's (formerly the Institute of Medicine) and the Health Resources & Services Administration's report *Advancing Oral Health in America* (2011) recommends strategic action for prioritization of oral health within US Department of Health and Human Services agencies and in its partnerships with other stakeholders.⁴

The American Academy of Pediatrics (AAP) recommends pediatricians perform oral health risk assessments on all children at every routine well-child visit beginning at age 6 months. The AAP also recommends fluoride varnish application according to the AAP/Bright Futures periodicity schedule (applied at least once every 6 months for all children and every 3 months for children at high risk for dental caries) and dietary fluoride supplements for all children who do not have an adequate supply of fluoride in their primary drinking water.²⁷

The American Dental Association and American Academy of Pediatric Dentistry have issued guidelines on oral health (eg, oral health education, sealants, prevention of dental caries, fluoride supplementation, and prevention of periodontitis) aimed at dental professionals.^{28,29} The American Academy of Family Physicians recommends that primary care clinicians educate patients about risks and benefits of fluoride; it recommends dietary fluoride supplements for children age 6 months through 16 years in areas where fluoride drinking water levels are suboptimal.³⁰

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