

# Screening for dental disease in children aged 6 to 9 years

## Proposal for archiving: internal review against programme appraisal criteria for the U K National Screening Committee

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**The UK National Screening Committee secretariat is hosted by the Department of Health and Social Care**

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About the UK National Screening Committee (UKNSC)

The UK NSC advises ministers and the NHS in the 4 UK countries about all aspects of [population screening](#) and supports implementation of screening programmes.

Conditions are reviewed against [evidence review criteria](#) according to the UK NSC's [evidence review process](#).

Read a [complete list of UK NSC recommendations](#).

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## Plain English summary

Tooth decay, or cavities, is the most common dental disease in children. Despite a decline in dental caries, in recent years, it remains a health concern. The 2022 Oral Health Survey found that about 1 in 4 children in England aged 5 have dental caries. In the most deprived areas, dental caries is nearly 3 times more common than in the least deprived. Early detection of dental caries is crucial. Timely intervention can prevent pain, tooth loss, and harm to permanent teeth.

Currently, the UK National Screening Committee (UK NSC) does not recommend routine screening for dental disease in children.

In November 2023, the US Preventive Services Task Force published a systematic review on oral health screening in children, concluding that there is insufficient evidence to support routine screening for dental disease in this population. In response, we conducted a thorough assessment of their review and examined any new studies that emerged up to August 2024 to determine whether high-quality evidence exists to support for screening.

Based on the findings from the US review and our subsequent literature search, we conclude that there is no new evidence since the 2019 review indicating that screening for dental disease effectively reduces untreated cases among children. Consequently, we recommend that the existing guideline of “no screening” for dental disease in children remains unchanged due to the lack of supporting evidence.

# Executive summary

## Purpose of the review

The purpose of this updated review is to assess the effectiveness of screening for dental disease in children 6-9 years old in the UK.

## Background

Dental caries is the most common form of dental disease in children. It was estimated that in 2022 around 24% of 5-year-old in England had experienced dental caries, and the prevalence was higher in more deprived areas. Dental caries can be prevented if observed early, avoiding complications and impact on permanent teeth development.

## Focus of the review

The 2019 review commissioned by UK NSC, identified no relevant studies that reported on the effectiveness of screening for dental disease in children. In November 2023, the US Preventative Service Task Force (USPSTF) published a comprehensive systematic review on screening for oral health among children. Therefore, we used this review as the evidence base to evaluate: 1) the accuracy of screening tests to identify children with oral health issues; 2) the effectiveness of oral health screening programmes in primary care setting, and 3) the harms of screening to prevent oral health issues, and to further assess these questions against population screening criteria 4, 11, and 13. We further assessed the quality of the systematic review, and conducted an updated literature search till August 2024.

## Recommendation under review

Screening for dental disease among children aged 6 to 9 years is currently not recommended in the UK. This is based on the 2019 UK NSC review that found no evidence to support a change in existing policy.

## Findings and gaps in the evidence of this review

There is lack of evidence (1 study) on the effectiveness of screening tests in identifying children with dental disease in primary settings. No study was found in screening tests accuracy of dental disease among those with increased risk of dental disease, and no study was found in evaluating harms and benefit of a screening programme for dental disease.

## Recommendations on screening

The updated review found lack of evidence to support a change to the current recommendation on screening for dental disease in children aged 6 to 9 years.

## Limitations

The evidence base for this updated review is drawn from a recent large systematic review published in late 2023. However, we assessed the review using AMSTAR 2 tool and determined it to be “Very good” quality. To incorporate any new evidence since their publication, we

conducted an updated literature search till August 2024. Therefore, we are confident the evidence base supporting this review is comprehensive and up to date.

## Next steps

The UK NSC recognises that tooth decay is a very important health issue. Dental diseases and other oral conditions have a substantial impact on children's general health.

However, due to the lack of evidence supporting screening for dental disease in children, we recommend removing it from the list of conditions we regularly review until or unless new evidence emerges that suggests it should be reviewed again.

Early detection of dental disease and timely intervention can prevent pain, tooth loss, and harm to permanent teeth. Although prevention initiatives fall outside the UK NSC's remit, the committee remains strongly supportive of interventions that focus on early prevention of dental disease among children.

# Introduction and approach

## Background

Dental diseases and other oral conditions have a substantial impact on general health. The most common form of dental disease in children is dental caries (tooth decay), which is a preventable disease that can occur at any age from the appearance of teeth after around 6 months of age. A number of biological and behavioural risk factors influence the occurrence of caries, and early detection can stop or even reverse the course of the disease.[1]

Untreated, dental caries can cause pain and tooth loss, outcomes that can be prevented if treated early. Trauma to the primary incisors can interfere with the development of permanent teeth, with early diagnosis indicated to prevent complications.[2, 3]

Prevalence rates of tooth decay in UK children have fallen; however, caries remains a significant health problem.[4] National Dental Epidemiology Programme for England reported in their 2022 oral health survey that 23.7% of 5-year-old children had experienced tooth decay, a prevalence similar to the 2019 and 2017 surveys, which reported 23.4% and 23.3%, respectively.[5]

According to the 2022 report, there are significant regional, socioeconomic, and ethnic group differences in the prevalence and severity of dental decay.[5] Children from the most deprived areas (35.1%) had a higher prevalence of experiencing dental decay than did those from least deprived areas (13.5%). In relation to ethnic groups, 'Other Ethnic Groups' (44.8%) and the Asian/Asian British ethnic group (37.7%) had significantly greater prevalence rates of dental decay experience than other groups.

There is evidence that children from lower income families are disproportionately affected with higher levels of obvious or extensive decay.[5] While association between deprivation and caries outcomes weakened over time, an increased trend was observed in the association between carious teeth and deprivation in 5 year olds.[6] Due to possible short-term and long-term consequences of dental disease, preventive strategies are important.

## Current policy context and previous reviews

Guidance in the UK is focused on prevention with an emphasis on effective interventions for improving dental health. In 2021, the Office for Health Improvement and Disparities, Department of Health and Social Care published the updated prevention toolkit for clinical teams, "Delivering better oral health: an evidence-based toolkit for prevention". This is an evidence based toolkit to support dental teams in improving their patient's oral and general health; however, this toolkit does not specifically target children.[7] The National Institute for Health and Care Excellence (NICE) guidance on oral health (public health guideline PH55 2014)[8] makes a number of recommendations including that 'targeted supervised tooth brushing schemes are considered for nurseries and primary schools in areas where children are at high risk of poor oral health.' The NICE Quality standard QS139,[9] quality statement two says 'Local authorities provide oral health improvement programmes in early years services and schools in areas where children and young people are at high risk of poor oral health'. In Scotland, the Scottish Intercollegiate Guidelines Network (SIGN) published a national clinical guideline, "Dental interventions to prevent caries in children" (SIGN 138) in 2014.[10]

Until 2019, the UKNSC reviews focused on evidence for screening for dental caries, but in 2019, following expert advice, the scope was broadened to include all dental diseases.[11] To ensure that earlier evidence supporting screening for dental disease was not missed, the search of the review was extended without date limits. Two published systematic literature reviews looking at screening for dental disease were hand-searched and added.[12, 13] These systematic literature reviews found no significant differences between screening and no screening in levels of dental disease or prevalence of dental caries, but did not find evidence on the effect of screening on untreated dental disease.[11]

Following on from the conclusions in the 2013 review,[14] which found the screening test considered had low sensitivity, there was a lack of evidence on the effectiveness of preventive measures, and a lack of evidence on screening 6- to 9-year-old children for dental disease by the school dental service in England. The 2019 review did not look to identify further evidence on the accuracy of the screening test, the inequalities in the distribution of the condition, the risk factors involved, or the effectiveness of prevention or treatment strategies.[11] Therefore, the 2019 UKNSC review looked only for new evidence of the effectiveness of screening for dental disease in children aged 6 to 9 years since the previous UKNSC review, because these were extensively evaluated by previous UKNSC reviews. Studies considered relevant were randomised controlled trials (RCTs) conducted in the UK or countries with populations similar to the UK and systematic reviews of these comparing screening to no screening and reporting levels of untreated dental disease in children aged 9 and younger.

The 2019 updated review identified no relevant studies that reported on the effectiveness of screening for dental disease in the specified population; however, evidence from previous UKNSC reviews (2013) suggests that screening for dental disease is not effective in reducing levels of dental disease.[14] The 2019 review suggested that efforts should be increased to detect children at high-risk in areas with high levels of dental decay for example among groups, such as those with special needs, with other medical conditions, or in more socially deprived populations.[11]

In November 2023 the USPSTF has published a systematic review addressing key questions aimed at evaluating the accuracy of the screening tests to identify children and adolescents who have oral health issues and the effectiveness of oral health screening programmes performed in primary care to prevent negative oral health outcomes.[15] The systematic review also looked at the harms of specific interventions to prevent oral health issues.

The systematic review found that evidence on screening was very limited.[15] No study compared outcomes of primary care screening versus no screening in children and adolescents ages 5 to 17 years. No study evaluated the diagnostic accuracy of primary care screening for identifying children at risk of future oral health issues. Only one study dated back in 1997 was found looking at diagnostic accuracy in screening caries among school children by trained nurse compared to dentist examination as the reference standard test.

The systematic review found that there are several oral health preventive interventions in children and adolescents ages 5 to 17 years that, when administered in school or dental settings, improved caries outcomes.[15] However, evidence demonstrating effectiveness of such interventions when administered at home or in a primary care setting was lacking. The systematic review also found that in low socioeconomic groups, fluoride supplements were associated with a small decrease in the decayed, missing or filled teeth (DMFT) or decayed, or filled teeth (DFT) increment (mean difference <1 affected tooth), in areas of non-fluoridated water, or high caries burden settings. However, in all trials except for one, that evaluated home

self-administration in older children, fluoride supplements were administered at school under supervision. The trial looking at self-administration reported low adherence with no benefit.

The systematic review also found that fluoride gels, fluoride varnish, and sealants were each associated with improved caries outcomes when administered in schools or in dental clinics.[15]

Very few trials reported on harms of preventative interventions.[15] When they did, they typically stated that there were no adverse events, but they did not describe methods used to assess harms. No study evaluated the association between exposure to fluoride via oral health preventive interventions in children older than 5 years of age and adolescents and the risk of fluorosis. Studies looking at the risks of fluoride exposure looked principally at exposure during early childhood, at earlier stages of enamel and neurocognitive development. A challenge in evaluating harms associated with exposure to fluoride is separating outcomes related to fluoride in preventive interventions and from other sources such as food or the environment.

No study compared primary care counselling versus no counselling or primary care referral to a dental professional versus no referral were identified.[15]

## Objectives

Given the recent publication by US PSTF in 2023[15], after discussion with the reference group in January 2024, it was agreed that we use US PSTF systematic review as the source of evidence rather than commissioning a new evidence map.

The key objectives include:

1. To assess the quality of the 2023 US PSTF systematic review;
2. To assess the available evidence (based on 2023 US PSTF review) against the criteria set by UK NSC for population screening programme;
3. To run a systematic literature search to update any new evidence relevant to research questions established.

Please find the relevant Population Screening Criteria and research questions of interest.

*Table 1: Key questions for the evidence summary and relationship to the UK NSC screening criteria*

Criterion	Key questions	Studies Included
The Test		
4	There should be a simple, safe, precise and validated screening test.	How accurate is screening for oral health performed by a primary care clinician in identifying children and

	adolescents who have oral health issues?	
	How accurate is screening for oral health performed by a primary care clinician in identifying children and adolescents who are at increased risk for future oral health issues?	0
The screening programme		
11	There should be evidence from high quality randomised controlled trials that the screening programme is effective in reducing mortality or morbidity. Where screening is aimed solely at providing information to allow the person being screened to make an “informed choice” (e.g., Down’s syndrome, cystic fibrosis carrier screening), there must be evidence from high quality trials that the test accurately measures risk. The information that is provided about the test and its outcome must be of value and readily understood by the individual being screened.	How effective is screening for oral health performed by a primary care clinician in preventing negative oral health outcomes? 0
13	The benefit gained by individuals from the screening programme should outweigh any harms for example from overdiagnosis, overtreatment, false positives, false reassurance, uncertain findings and complications.	What are the harms of screening for oral health performed by a primary care clinician? 0

## Methods

The current review was conducted internally, as discussed and agreed with UK NSC reference groups. We first utilised A Measurement Tool to Assess systematic Reviews 2 (AMSTAR 2)[16] as quality assurance tool to conduct an internal evaluation of the US PSTF systematic review.

We then assessed the available evidence against the criteria set by UKNSC for population screening programme.[17] We followed the search strategies constructed in US PSTF review to identify studies relevant to the questions detailed in Table 1. We searched for Medline (via Ovid) and Cochrane library for Cochrane Central Register of Controlled Trials between 1st January 2023 and 2nd August 2024 (their last surveillance was in July 2023). We also modified their search strategies: 1) included key words to capture British spelling studies, 2) limit the search to European countries, North American countries, Australia, New Zealand, Japan, and South Korea to include study countries with comparable populations, healthcare systems, and economies to the UK, 3) limit study population search to school children only to match our research questions (i.e., exclude adolescents / youth in their original search strategies). Please see details of search strategies in Appendix 1.

## Quality assessment of US PSTF review

We used AMSTAR-2 to assess the systematic review [15] published in 2023 which informed US PSTF's decision on dental disease screening among children. Overall, we consider the review of very good quality, below is our summary of the AMSTAR-2 assessment (see Appendix 2 in detail).

Chou et al explicitly defined their inclusion and exclusion criteria alongside Population, Intervention, Comparison, and Outcome (PICO) (Item 1, score "Yes"). The research plan of the review was published for public consultation on US PSTF website. Their research plan did not include a search strategy, risk of bias assessment, or analytical plan, possibly due to the potential for changing research questions after the consultation stage. (Item 2, score "No") Given that the US PSTF has a dedicated Methods Workgroup and is a long-established independent panel of experts in medicine and research methodology, their work is widely regarded as highly reliable. They explained the inclusion of randomised or nonrandomised trials and diagnostic accuracy studies, and cohort studies were also included for research questions in screening (Item 3, score "Yes"). Authors searched 3 relevant databases (MEDLINE, Cochrane Central Register of Controlled Trials, and Cochrane Database of Systematic Reviews) and provided detailed search strategies. Although they did not include non-English papers, they have justified the decision as it would not change the conclusion of the review. Authors also searched the reference lists of included studies, and they had ongoing surveillance on the topic till July 2023 (Item 4, score "Yes"). In terms of study selection and data extraction stage, it was reported two researchers independently reviewed the titles, abstracts, and full-text articles (Item 5, score "Yes"); one researcher performed the data extraction, a second researcher reviewed the data extraction results for accuracy. Two independent researchers assessed the quality of the studies and discrepancies were resolved by consensus (Items 6, score "Yes").

Regarding the reporting quality, authors described the included studies in adequate details (Items 8, score "Yes") and provided a list of excluded studies along with the reasons for their exclusion (Item 7, score "Yes"). Authors used the pre-defined criteria developed by the US PSTF [18] to assess the risk of bias of individual studies (Item 9, score "Yes"). Conflict of interest of individual studies more prone to bias due to funding sources – for example, dental prevention products – were reported (Item 10, score "Yes"). Authors also declared no conflict of interest in the review themselves (Items 16, score "Yes"). Due to small number of studies available for the research questions we are interested in, meta-analysis was not performed. Meta-analyses were conducted for other research questions in the review by excluding studies with poor quality rating (Items 11&12, score "Yes"); moreover, authors considered the quality of individual studies

while interpreting the overall results (Item 13, score “Yes”). When great heterogeneity was observed, authors conducted analyses by stratifying potential related factors (e.g., study setting, control type) to explore the heterogeneity (Item 14, score “Yes”). Due to small numbers of studies with serious methodological limitations, authors were unable to assess for publication bias for small sample effect (Item 15, score “No”).

# Question level synthesis

## Criterion 4

There should be a simple, safe, precise and validated screening test

Question 1 – How accurate is screening for oral health performed by a primary care clinician in identifying children and adolescents who have oral health issues?

### Description of the evidence

Only one study[19] published in 1997 looking at visual screening of untreated caries among children by registered nurse with 5-hour training (sensitivity: 0.92 [95% Confidence Interval, 0.84-0.97], specificity: 0.993 [95%CI, 0.96-0.9998]) and a questionnaire completed by the children's parents (sensitivity: 0.69 [95% CI, 0.60-0.77], specificity: 0.88 [95% CI, 0.83-0.93]), compared to the dentist examination as the reference standard. The study was rated with "fair" quality, with limitations in 1) unclear predefined cutoffs for questionnaire, 2) unclear whether reference standard was applied to all screened children, 3) unclear blindness of the assessor for both reference and screening tests, 4) unclear number of compliances with screening test. Therefore, the review only found a dated study with design limitations, which demonstrates a lack of evidence regarding the effectiveness of screening tests in identifying children with dental disease in primary settings.

Question 2 – How accurate is screening for oral health performed by a primary care clinician in identifying children and adolescents who are at increased risk for future oral health issues?

### Description of the evidence

No study was found exploring the screening tests in dental disease among children who are at increased risk for future oral health issues.

## Summary of Findings Relevant to Criterion 4: not met

Only one very dated study was found regarding test accuracy on dental screening among children in primary care setting, and no study was found among those with increased risk of oral health issues. There is insufficient evidence to support the effectiveness of screening tests for dental disease, hence Criterion 4 not met.

## Criterion 11

There should be evidence from high quality randomised controlled trials that the screening programme is effective in reducing mortality or morbidity. Where screening is aimed solely at providing information to allow the person being screened to make an 'informed choice' (such as Down's syndrome or cystic fibrosis carrier screening), there must be evidence from high quality trials that the test accurately measures risk. The information that is provided about the test and its outcome must be of value and readily understood by the individual being screened

Question 3 – How effective is screening for oral health performed by a primary care clinician in preventing negative oral health outcomes?

Description of the evidence

No study was found in the review to support this criterion.

### Summary of Findings Relevant to Criterion 11: not met

There is no new study found in the review, hence insufficient evidence to support the effectiveness of screening for dental disease to prevent negative oral health issues. Therefore, Criterion 11 not met.

## Criterion 13

The benefit gained by individuals from the screening programme should outweigh any harms, for example from overdiagnosis, overtreatment, false positives, false reassurance, uncertain findings and complications.

Description of the evidence

No study was found in the review to address this criterion.

### Summary of Findings Relevant to Criterion 13: not met

There is no new study found addresses the benefit and harms in dental disease screening in children, hence Criterion 13 not met.

## Results in literature search update

In summary, 34 studies were found after de-duplication. Of these, 32 studies were excluded after titles and abstract screening by two reviewers. The remaining two studies were assessed their eligibility through full-text screening. However, neither of these were eligible to be included to answer our key questions (Appendix 3, Figure 1).

# Review summary

## Conclusions and next steps

The assessment with the AMSTAR 2 quality assurance tool demonstrates that the USPSTF systematic review is of very good quality. Based on the USPSTF review, and our most updated systematic search, there is no new evidence found answering our research questions since the last review. Therefore, an externally commissioned review is not justified at this stage. Considering that since 1996, the UKNSC has recommended against population screening for dental disease in children aged 6 to 9 years (when the UKNSC recommended that such practice should be discontinued). We recommend that the UKNSC remove this condition from the list of conditions that are regularly reviewed.

# Appendix 1 — Search strategy

## Electronic databases

The search strategy included searches of the databases shown in Table 2. MEDLINE, MEDLINE In-Process, MEDLINE Daily, Epub Ahead of Print and Embase.

Table 1

Database	Platform	Searched on date	Date range of search
MEDLINE	Ovid SP	2 <sup>nd</sup> August 2024	1 <sup>st</sup> Jan 2023 to 2 <sup>nd</sup> August 2024
Cochrane Central Register of Controlled Trials (CENTRAL)	The Cochrane Library	2 <sup>nd</sup> August 2024	Jan 2023 to August 2024

## Search Strategy

We followed the search strategies constructed by USPSTF (using search terms including combinations for free text and subject headings). Additionally, we limited the population to school children (i.e., excluding adolescents), limited the study countries to those with comparable populations, healthcare systems, and economies to the UK. We also included key words to capture British Spelling studies.

Search strategies for the updated literature search are shown below

Table 2: Search strategy for MEDLINE (via Ovid) and Cochrane Central Register of Controlled Trials (CENTRAL)

### **MEDLINE via Ovid – Systematic review**

ID	Search	Hits
1	Oral Health/	21,535
2	Mouth Diseases/	18,400
3	exp Periodontal Diseases/	98,560
4	exp Tooth Diseases/	190,553
5	("oral health" or "oral disease*" or "dental caries" or "tooth decay" or "periodontal disease" or periodontitis or gingivitis or "gum disease").ti,ab,kf.	113,800
6	or/1-5	323,747
7	Mass Screening/	118,745
8	screen*.ti,ab,kf.	1,057,975
9	Risk Assessment/	315,174

10	Risk Factors/	992,750
11	risk.ti,ab,kf.	2,970,471
12	or/7-11	4,218,847
13	6 and 12	36,462
14	limit 13 to (meta analysis or "systematic review")	3,544
15	(child* or pediatric* or paediatric* or "school age*").ti,ab,kf,sh.	2,950,195
16	14 and 15	643
17	exp Europe/	1,581,062
18	exp North America/	1,716,231
19	exp Australia/ or exp New Zealand/ or exp Japan/ or exp "Republic of Korea"/	418,461
20	17 or 18 or 19	3,611,957
21	16 and 20	30
22	limit 21 to english language	30
23	limit 22 to dt=20230101-20240802	3

**MEDLINE via Ovid – Test accuracy**

ID	Search	Hits
1	Oral Health/	21,535
2	Mouth Diseases/	18,400
3	exp Periodontal Diseases/	98,560
4	exp Tooth Diseases/	190,553
5	("oral health" or "oral disease*" or "dental caries" or "tooth decay" or "periodontal disease" or periodontitis or gingivitis or "gum disease").ti,ab,kf.	113,800
6	or/1-5	323,747
7	Mass Screening/	118,745
8	screen*.ti,ab,kf.	1,057,975
9	Risk Assessment/	315,174
10	Risk Factors/	992,750
11	risk.ti,ab,kf.	2,970,471
12	or/7-11	4,218,847
13	6 and 12	36,462
14	(child* or pediatric* or paediatric* or "school age*").ti,ab,kf,sh.	2,950,195
15	13 and 14	9,438
16	exp "Sensitivity and Specificity"/	662,459
17	(diagnos* adj2 accur*).ti,ab,kf.	123,440
18	16 or 17	754,541
19	15 and 18	257
20	limit 15 to randomized controlled trial	362
21	(random* or control* or trial or cohort).ti,ab.	6,576,954
22	15 and 21	3,486
23	19 or 20 or 22	3,699
24	limit 23 to dt=20230101-20240802	363
25	exp Europe/	1,581,062
26	exp North America/	1,716,231
27	exp Australia/ or exp New Zealand/ or exp Japan/ or exp "Republic of Korea"/	418,461
28	25 or 26 or 27	3,611,957
29	24 and 28	23

**MEDLINE via Ovid – Screening programme in primary care**

<b>ID</b>	<b>Search</b>	<b>Hits</b>
1	Oral Health/	21,535
2	Mouth Diseases/	18,400
3	exp Periodontal Diseases/	98,560
4	exp Tooth Diseases/	190,553
5	("oral health" or "oral disease*" or "dental caries" or "tooth decay" or "periodontal disease" or periodontitis or gingivitis or "gum disease").ti,ab,kf.	113,800
6	or/1-5	323,747
7	Mass Screening/	118,745
8	screen*.ti,ab,kf.	1,057,975
9	Risk Assessment/	315,174
10	Risk Factors/	992,750
11	risk.ti,ab,kf.	2,970,471
12	or/7-11	4,218,847
13	Primary Health Care/	95,175
14	("primary care" or "general practic*" or "family medicine" or "family practi*").ti,ab,kf.	208,731
15	13 or 14	242,273
16	6 and 12 and 15	580
17	(child* or pediatric* or paediatric* or "school age*").ti,ab,kf,sh.	2,950,195
18	16 and 17	220
19	limit 18 to dt=20230101-20240802	31
20	exp Europe/	1,581,062
21	exp North America/	1,716,231
22	exp Australia/ or exp New Zealand/ or exp Japan/ or exp "Republic of Korea"/	418,461
23	20 or 21 or 22	3,611,957
24	19 and 23	6

**Cochrane Central Register of Controlled Trials (CENTRAL) – Cochrane Library**

<b>ID</b>	<b>Search</b>	<b>Hits</b>
1	MeSH descriptor: [Oral Health] explode all trees	823
2	MeSH descriptor: [Mouth Diseases] explode all trees	16,953
3	MeSH descriptor: [Periodontal Diseases] explode all trees	9,106
4	MeSH descriptor: [Tooth Diseases] explode all trees	15,316
5	(oral health):ti,ab,kw	31,033
6	(oral NEXT disease*):ti,ab,kw	457
7	(dental caries):ti,ab,kw	7,700
8	(tooth decay):ti,ab,kw	618
9	(periodontal disease):ti,ab,kw	4,254
10	(periodontitis):ti,ab,kw	7,488
11	(gingivitis):ti,ab,kw	4,139
12	(gum disease):ti,ab,kw	891
13	#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12	65,356
14	MeSH descriptor: [Mass Screening] explode all trees	6,040

<b>15</b>	(screen*):ti,ab,kw	106,363
<b>16</b>	MeSH descriptor: [Risk Assessment] explode all trees	13,656
<b>17</b>	MeSH descriptor: [Risk Factors] explode all trees	38,308
<b>18</b>	(risk):ti,ab,kw	309,577
<b>19</b>	#14 OR #15 OR #16 OR #17 OR #18	389,839
<b>20</b>	#13 AND #19	12,548
<b>21</b>	(child*):ti,ab,kw	208,079
<b>22</b>	(pediatric*):ti,ab,kw	40,396
<b>23</b>	(paediatric*):ti,ab,kw	9,125
<b>24</b>	(school NEXT age*):ti,ab,kw	3,214
<b>25</b>	#21 OR #22 OR #23 OR #24	217,975
<b>26</b>	#20 AND #25 with Cochrane Library publication date Between Jan 2023 and Aug 2024, in Trials	353
<b>27</b>	MeSH descriptor: [Australasia] this term only	29
<b>28</b>	MeSH descriptor: [Australia] explode all trees	7,306
<b>29</b>	MeSH descriptor: [Europe] explode all trees	43,390
<b>30</b>	MeSH descriptor: [North America] explode all trees	34,499
<b>31</b>	MeSH descriptor: [Japan] explode all trees	5,129
<b>32</b>	MeSH descriptor: [Republic of Korea] explode all trees	1,852
<b>33</b>	#27 OR #28 OR #29 OR #30 OR #31 OR #32	89,356
<b>34</b>	#26 AND #33	8

## Appendix 2 — Quality assessment

### AMSTAR 2 Quality assessment

We used AMSTAR-2 tool to assess the systematic review conducted by US PSTF, and results are reported below.

**Table 3 AMSTAR-2 Assessment for Chou 2023<sup>i</sup>**

Instrument questions	Rating	Notes
1. Did the research questions and inclusion criteria for the review include the components of PICO?	Yes	Population: Asymptomatic, 5-17 years children. Intervention: screening Comparator group: no screening  Outcome: dental caries (incidence or caries burden, often measured as the number of decayed, missing, or filled permanent teeth or surfaces; decayed or filled teeth or surfaces were also used in children because missing permanent teeth were less common and might not be due to caries); other outcomes included periodontal disease presence and severity, morbidity, quality of life, functional status, and harms.
2. Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?	No	The research plan was published in 2021 for public consultation on US PSTF website, and it specified review questions, inclusion/exclusion criteria.  The published research plan did not include: a search strategy, a risk of bias assessment, or analytical plan.
3. Did the review authors explain their selection of the study designs for inclusion in the review?	Yes	“Randomised or nonrandomised trials and diagnostic accuracy studies were eligible; cohort studies were also eligible for screening and preventive intervention harms.”

Instrument questions	Rating	Notes
4. Did the review authors use a comprehensive literature search strategy?	Yes	They searched MEDLINE, Cochrane Central Register of Controlled Trials, and Cochrane Database of Systematic Reviews; provided detailed search strategy; justified that including non-English papers wouldn't change the conclusion; searched reference lists of included studies; the ongoing surveillance was conducted till 21 <sup>st</sup> July 2023.
5. Did the review authors perform study selection in duplicate?	Yes	Two reviewers independently reviewed titles, abstracts, and full-text articles.
6. Did the review authors perform data extraction in duplicate?	Yes	One reviewer extracted details about study design, patient population, setting, interventions or screening instruments, analysis, follow-up, and results from each study. A second reviewer reviewed data for accuracy. Two independent reviewers assessed the quality of each study. Discrepancies were resolved by consensus.
7. Did the review authors provide a list of excluded studies and justify the exclusions?	Yes	This information was included in their full report.
8. Did the review authors describe the included studies in adequate detail?	Yes (studies of diagnostic accuracy only)	Authors extracted details in screening test (intervention), reference standard (comparator), population, diagnostic accuracy (sensitivity, specificity, positive and negative predictive value); as well as sample size, study setting (country, screener),
9. Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?	Yes (studies of diagnostic accuracy only)	Authors used the pre-defined criteria for assessing internal validity of individual studies developed by the US PSTF Methods Workgroup.  The criteria included assessment on allocation concealment, blinding among participants and assessors, and reporting bias, and beyond.
10. Did the review authors report on the sources of funding for the studies included in the review?	Yes (all research questions)	Although funding source was not reported for outcomes we are interested in, authors reported "conflict of interest" for other outcomes that are more prone to bias due to funding sources (e.g., fluoride gel and vanish)

Instrument questions	Rating	Notes
11. If meta-analysis was performed did the review authors use appropriate methods for statistical combination of results?	Yes (all re-search questions)	<p>Due to small number of studies available, meta-analysis could not be performed for the research questions we are interested in.</p> <p>Meta-analyses were performed for other research questions (i.e., prevention measures) using random effect models, and analyses were stratified on study-level factors to explore the potential sources of heterogeneity.</p>
12. If meta-analysis was performed, did the review authors assess the potential impact of RoB in individual studies on the results of the meta-analysis or other evidence synthesis?	Yes (all re-search questions)	<p>Yes, studies with poor quality rating were not included for analysis unless higher quality studies were very limited.</p> <p>“For xylitol, there were only two fair-quality trials; therefore, poor-quality trials were also included in the meta-analysis, with an analysis stratified according to quality.”</p>
13. Did the review authors account for RoB in individual studies when interpreting/ discussing the results of the review?	Yes (all re-search questions)	For xylitol, authors only included the two trials rated as “Fair” in quality assessment.
14. Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?	Yes (all re-search questions)	Authors conducted analyses stratified by study-factors including study setting, duration of follow up, age category, control type, and baseline caries burden to explore heterogeneity, and made satisfactory explanation.
15. If they performed quantitative synthesis did the review authors carry out an adequate investigation of publication bias (small study bias) and discuss its likely impact on the results of the review?	No (all re-search questions)	Due to small numbers of studies with serious methodological limitations, it was unable to assess for publication bias with graphical or statistical methods for small sample effects,

Instrument questions	Rating	Notes
16. Did the review authors report any potential sources of conflict of interest, including any funding they received for conducting the review?	Yes	The authors reported no competing interests

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<sup>i</sup> This assessment for the paper is mainly focused on screening and its diagnostic accuracy (i.e., UK NSC research questions), unless otherwise noted.

# Appendix 3 — Study selection process

## PRISMA flowchart

Figure 1 summarises the volume of publications included and excluded at each stage of the review. No publication was found to be relevant review questions.

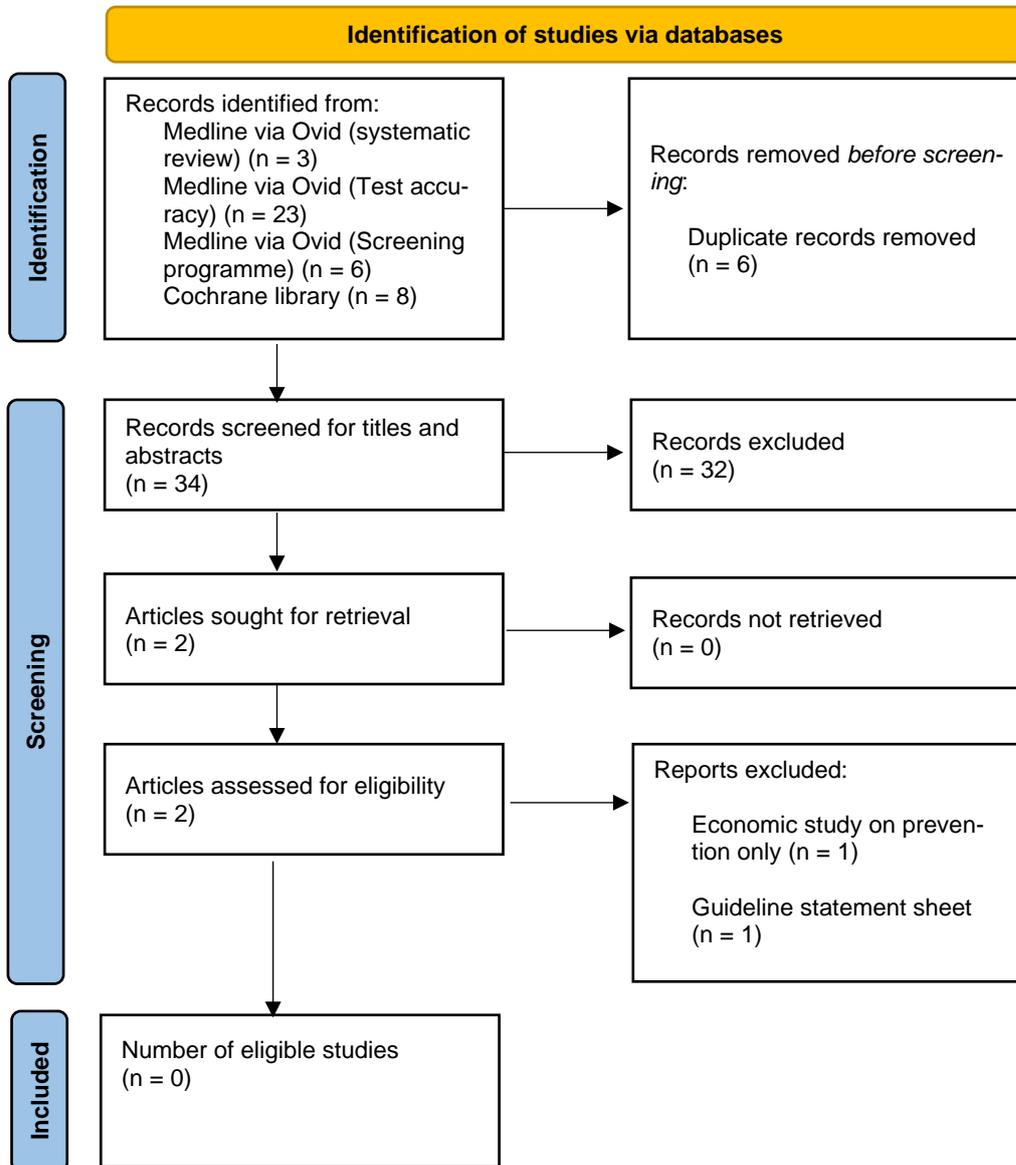


Figure 1: Study selection process for literature search update

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