



Commentary on reviews of potential relevance to the development of NICE public health guidance on “Oral health: local authority strategies to improve oral health, particularly among vulnerable groups”

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Introduction

Following the presentation of the initial review of the evidence, the question arose as to whether there may be evidence of relevance to the guidance under development in existing reviews not covered by the initial search strategy. Extant reviews thought of possible relevance were identified by members of the committee and NICE analysts. In addition, following review of these reports and discussion at PHAC, the question on the role of school-based fissure sealant programmes in oral health promotion arose. This commentary also examined four reports of relevance to that issue.

Aim of this work

This work aimed to review the additional reviews identified, to determine their potential relevance to the guidance under development and comment on the aspects of the review that may provide additional evidence.

Methods

The reviews provided to the NICE team were screened for possible relevance by three independent reviewers. Those thought of potential relevance were then subject to full assessment by the author of this report and an expert commentary provided on the review conduct and findings.

The reviews were summarised under the following headings.

- The title, authors and date of the review
- The background of the authors / bodies undertaking the review
- The relevance of the reviews to the guidance under development (in the opinion of the current reviewer)
- The stated aims of the review
- The review methodology
- The conclusions of the review
- The limitations of the review (in the opinion of the current reviewer)

It should be noted that while the title, authors, stated aims, methodology and conclusions of the review are directly extracted from the reviews, those elements of the information extraction process titled “limitations of the review” and “the relevance of the reviews to the guidance under development” represent the expert opinion of the author of this paper.

Results

In total 50 reviews were identified as possibly relevant.

These could be assigned to four categories:

- (i) Reviews examining the effectiveness of community or group-based interventions either dental or “generic” i.e. addressing a wider health promotion issue – which may have implications for oral health
- (ii) Reviews of interventions delivered one-to-one or at the chair-side
- (iii) Systematic reviews of fluoride delivery mechanisms
- (iv) Thought pieces / commentaries / random traditional reviews which put forward arguments based on argument or logic rather than presenting organised reviews of primary research evidence.

Reviews in categories (ii) and (iv) were deemed not relevant and were excluded. Following screening 18 reviews were thought worthy of full assessment.

The topic and nature of these reviews are listed in Table 1.

NATURE OF REVIEW AND TITLE	AUTHORS	DATE PUBN.	PAGE
General reviews of oral health promotion			
<i>Technical report 20. Effectiveness of oral health promotion: A review.</i>	Kay and Locker	1997	6
<i>A systematic review of the effectiveness of health promotion aimed at improving oral health.</i>	Kay and Locker	1998	
<i>Effective oral health promotion: Literature review, Technical report Number 20.</i>	Sprod A, Anderson R, Treasure E.	1996	9
<i>Evidence-based oral health promotion resource.</i>	Rogers	2011	12
<i>Strategies and approaches in oral disease prevention and health promotion.</i>	Watt	2005	15
Reviews involving a specific intervention (inc. Cochrane Reviews)			
<i>Fluoride toothpastes for preventing dental caries in children and adolescents. (Cochrane review)</i>	Marinho VC, Higgins JP, Logan S, Sheiham A.	2003 (Update 2009)	17
<i>Fluoride mouthrinses for preventing dental caries in children and adolescents. (Cochrane review)</i>	Marinho VC, Higgins JP, Logan S, Sheiham A.	2003 (Update 2009)	19
<i>Fluoride varnishes for preventing dental caries in children and adolescents. (Cochrane review)</i>	Marinho VCC, Worthington HV, Walsh T, Clarkson JE.	2013	21
<i>Fluoride gels for preventing dental caries in children and adolescents. (Cochrane review)</i>	Marinho VCC, Higgins JPT, Logan S, Sheiham A.	2002	24
<i>Topical fluoride (toothpastes, mouthrinses, gels or varnishes) for preventing dental caries in children and adolescents. (Cochrane review)</i>	Marinho VCC, Higgins JPT, Logan S, Sheiham A.	2003	26
<i>One topical fluoride (toothpastes, or mouthrinses, or gels, or varnishes) versus another for preventing dental caries in children and adolescents. (Cochrane review)</i>	Marinho VCC, Higgins JPT, Sheiham A, Logan S	2004	29
<i>Combinations of topical fluoride (toothpastes, mouthrinses, gels, varnishes) versus single topical fluoride for preventing dental caries in children and adolescents. (Cochrane review)</i>	Marinho VCC, Higgins JPT, Sheiham A, Logan S.	2004	31
<i>Preventing dental caries through school based sealant programs: updated recommendations and reviews of evidence.</i>	Gooch BF, Griffin SO, Gray SK et al.	2009	34

<i>Sealants for preventing dental decay in the permanent teeth.</i> (Cochrane review)	Ahovuo-Saloranta A, Forss H, Walsh T, et al.	2013	38
<i>School-based dental sealant programmes.</i>	Association of State and Territorial Dental Directors	2003	41
<i>Task Force on Community Preventive Services. Reviews of evidence on interventions to prevent dental caries, oral and pharyngeal cancers, and sports-related craniofacial injuries.</i>	Truman BI, Gooch BF, Sulemana I, et al;	2002	43
<i>Comparing the costs of three sealant delivery strategies.</i>	Griffin SO, Griffin PM, Gooch BF, and Barker, LK.	2002	45
<i>Fluoridated milk for preventing dental caries.</i> (Cochrane review)	Yeung CA, Hitchings JL, Macfarlane TV et al.	2005	47
Reviews involving a specific population group			
<i>Health promoting schools and health promotion in schools: two systematic reviews.</i>	Lister-Sharp D. et al.	1999	49
<i>Maternal and Child Oral Health - Systematic Review and Analysis.</i>	Murdoch Children's Research Institute.	2009	52
<i>A review of the effectiveness of oral health promotion activities among elderly people.</i>	McGrath C, Zhang W, Lo EC.	2009	56
Reviews involving a specific condition / disease			
<i>Does oral health promotion improve oral hygiene and gingival health?</i>	Watt RG and Marinho VC.	2005	59
<i>Evidence summary: Achieving equity in community-based obesity prevention intervention for children and adolescents.</i>	Clark R, Waters E, Armstrong R, Conning R, Petrie R.	2009	62

Table 1 Topic and nature of reviews in this commentary

SUMMARY OF REVIEWS

General reviews of oral health promotion

<p>Review</p>	<p>Technical report 20. Effectiveness of oral health promotion: A review. London: Health Education Authority.</p> <p>A systematic review of the effectiveness of health promotion aimed at improving oral health. Community Dental Health. 1998;15(3):132-44.</p>
<p>Authors</p>	<p>Kay EJ and Locker D. 1997, and 1998.</p> <p>This review was commissioned in 1996 by the NHS Health Education Authority. The research was carried out by Dr Liz Kay, Department of Oral Health and Development, University of Manchester in collaboration with Professor David Locker, Community Dental Health Services Research Unit, University of Toronto.</p>
<p>Relevance of review to guidance under development</p>	<p>This review is amongst the most influential published in the area of oral health promotion. Although it was published in 1997/98, this review is still regularly quoted in the dental literature. The essence of this review can be summarised in the following statements:</p> <p>“There is no evidence in the literature that oral health promotion per se effects caries rates, even if changes in behaviour are achieved, unless fluoride is being used.”</p> <p>“The alteration of attitudes and beliefs in order to promote health via an extremely heterogeneous collection of methods is possible. However, evidence that such changes lead to health benefit is not available.”</p> <p>Prior to this review, oral health promotion essentially comprised health education. Published in the wake of the Ottawa Charter, this review was influential in moving attempts to improve oral health toward an upstream, multi-sectorial, common-risk-factor approach.</p> <p>Some of the evidence statements, particularly those relating to school toothbrushing schemes have been superseded by subsequent research.</p> <p>The review did not specifically focus on interventions for vulnerable groups, but recognised children from deprived</p>

	<p>backgrounds and the elderly as such.</p> <p>Recommendation: This review recognised that there are benefits from individual oral health education in a clinical setting, but from a population perspective traditional oral health education approaches – especially in the absence of fluoride, do little to result in a sustained health benefit. This test should be applied to any recommendations made in the guidance.</p>
<p>Review Aims</p>	<p>The review was designed to examine the effectiveness of oral health promotion from five perspectives:</p> <ul style="list-style-type: none"> • interventions designed to reduce dental caries • interventions designed to improve oral hygiene and gingival health • studies aimed at changing oral health knowledge, attitudes, beliefs and behaviours • impact on sugar consumption • mass media dental health campaigns
<p>Review Methodology</p>	<p>The review involved computerised and hand searching of 94 scientific journals, plus personal contacts with experts and practitioners. The retrieved papers were critically appraised and the results synthesised by mainly quantitative statistical analysis.</p>
<p>Review Conclusions</p>	<p>The main findings as set out by the authors were:</p> <p>Interventions designed to reduce dental caries Evidence concerning the effectiveness of the use of fluoride in reducing caries is strong. Thus, health promotion interventions which incorporate the regular use of one or other of these items are effective as long as compliance is achieved. Daily brushing with a fluoride toothpaste is easier to achieve than regular use of other fluoride supplements. There is no evidence in the literature that oral health promotion per se effects caries rates, even if changes in behaviour are achieved, unless fluoride is being used.</p> <p>Interventions designed to improve oral hygiene Oral health promotion on an individual level is effective for reducing plaque levels. However, there is strong evidence that the changes achieved are short term and are not sustained. Interventions designed to improve oral hygiene are effective even when very simple direct instruction is used. Cognitive-behavioural techniques are not required in order to achieve changes in plaque levels. School based toothbrushing campaigns aimed at improving oral hygiene have not been shown to be effective.</p> <p>Interventions designed to improve gingival health Reduction in plaque levels almost always, but not invariably, leads to reductions in inflammation and bleeding of the</p>

	<p>gingivae. The lack of specificity of this relationship and the unknown long term health consequences of gingivitis make evaluation of oral health promotion in this field very difficult.</p> <p>Studies aimed at changing oral health knowledge, attitudes, beliefs and behaviours</p> <p><i>Knowledge, attitudes and behaviour</i> Improving individuals' knowledge of dental health matters can be achieved through oral health promotion and oral health education. The clinical, behavioural and health significance of these shifts in knowledge are unknown and there is some evidence that there are no consequences from improvements in knowledge. However, aside from the ethical responsibility to disseminate scientific knowledge to the public, improving knowledge of the public, professionals and policy-makers may prepare the ground for other interventions such as the creation of more supportive environments.</p> <p><i>Attitudes and beliefs</i> The alteration of attitudes and beliefs in order to promote health via an extremely heterogeneous collection of methods is possible. However, evidence that such changes lead to health benefit is not available.</p> <p><i>Behaviour</i> Since very few studies measure behaviour directly, it is difficult to evaluate the effect of oral health promotion on behaviour. Reported behaviour and behavioural intention can be altered and oral hygiene behaviour can be improved in the short term by simple educative interventions.</p> <p>Sugar consumption There are remarkably few evaluations of the effect of oral health promotion on sugar consumption, and those which are available frequently use reported behaviour as the measurement instrument. Thus, evaluations of health promotion aimed at altering sugar consumption often describe changes in knowledge levels rather than altered habits or lifestyles.</p> <p>Mass media dental health campaigns Although little evaluative research has been published, the available evidence indicates that mass media campaigns are ineffective for promoting either knowledge or behaviour change. However, they may have some value in raising awareness and agenda setting as part of an overall oral health promotion strategy.</p>
<p>Limitations of the review</p>	<p>As noted by the review authors, over 30% of the literature reviewed was published in 1984 or before. Reflecting the nature of much of the published literature there was a heavy bias towards one-off interventions focused on individuals and very little representation of other health promotion approaches. A considerable proportion of the activity reviewed may therefore reflect upon an outdated style of practice. This statement dates to the time of the review in 1997.</p>

Review	<p>Effective oral health promotion: Literature review, Technical report Number 20. 1996 Cardiff, University of Wales, College of Medicine</p>
Authors	<p>Sprod A, Anderson R, Treasure E.</p> <p>The authors are academics at the University of Wales College of Medicine</p>
Relevance of review to guidance under development	<p>This review was very influential when first published and together with the review of Kay and Locker, highlighted the limitations of the traditional health education approach taken in dentistry prior to that time. Although now dated, it highlights some issues of relevance to the development of the current guidance. These include the limited lasting effect of a health education approach and the potential of a whole population approach to widen oral health inequalities.</p> <p>Recommendation: In developing the current guidance it would be useful to check that some of the fundamental principles identified in this review are taken into account.</p>
Review Aims	<p>The main aim of the literature review was to identify oral health promotion practices which have been shown to be effective or ineffective.</p>
Review Methodology	<p>The review covered worldwide English language publications only.</p> <p>The search was conducted primarily for those papers published in the period between 1982 and 1995 and articles were identified through Medline, printed indices, sources already known to the authors and from the reference lists of retrieved papers.</p> <p>The key words used in the search were: effectiveness; evaluation; dental health education; health promotion; oral health; dental hygiene; preventive dentistry; mouth diseases – prevention and control; tooth injuries; gum shields/mouth protectors; oral cancer/oral neoplasms.</p> <p>The review identified 230 potentially relevant papers of which 70 were subject to full evaluation.</p>
Review Conclusions	<p>Clinical Effectiveness</p> <ul style="list-style-type: none"> • There is clear evidence that oral health education/promotion can be effective in bringing about changes in people’s knowledge, and in improving oral health <p>Approaches to oral health promotion</p> <ul style="list-style-type: none"> • It is unclear whether one-off oral health promotion initiatives are sufficient to improve individuals’ oral health

	<p>significantly for long periods.</p> <ul style="list-style-type: none">• There is evidence that programmes using more innovative approaches than the Medical/Behavioural model, have more potential for longer-term behaviour changes. They are more likely to be based on models of education and health behaviour change which recognise the full variety of factors which influence a person's ability to comply with any messages given.• Limited short-term behaviour changes are achievable using simple persuasive approaches, and greater or longer-changes appear possible by using more tailored approaches which are based around active participation and addressing social, cultural and personal norms and values. The use of appropriate language and simple messages is important in avoiding confusion• Preventive and comprehensive clinical approaches (including the appropriate use of fissure sealants) to oral health promotion can be effective in reducing the incidence of caries. However, this approach is intensive, and may not reach those in greatest need. <p>Fluoridation</p> <ul style="list-style-type: none">• Water fluoridation is effective at preventing dental caries. It is cheap, safe and reaches the whole population. There is evidence that it reduces inequalities in health.• Fluoride toothpaste is another important and effective method of delivering fluoride, although it will not reach the entire population.• Fluoride supplements have been shown to be effective in clinical trials. Evidence for their effectiveness in home and community schemes is at best equivocal and often shows them to be ineffective.• This literature review has found no measures that will achieve the same levels of prevention as fluoridation for the same resources. <p>Timing</p> <ul style="list-style-type: none">• It is not clear whether there are better or worse ages for effective health promotion campaigns as all age groups are able to benefit from such programmes, although elderly people may require more support than younger people.• Relatively stable and resistant attitudes and behaviours have already become established by early adolescence. Longer-term health gains are possible if the social environments of the very young are targeted. <p>Target groups</p> <ul style="list-style-type: none">• Several oral health promotion activities have been effectively conducted by personnel from non-health sectors, and incorporated within daily routines and settings such as schools and the workplace. There is evidence of spread
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	<p>of effect to other family members from these settings.</p> <ul style="list-style-type: none"> • Some studies show that health education which targets whole populations may increase inequalities in health. • Changing personal behaviour appears to be more difficult for some groups than others; this may result in blaming the victim for not making the appropriate behaviour changes. <p>General</p> <ul style="list-style-type: none"> • The small number of studies on the effectiveness of screening for the early detection of oral cancers and pre-cancers provide no strong evidence of effectiveness or ineffectiveness. Further research is required to establish the value of this preventive measure. • Regulating and encouraging the use of properly fitted mouthguards by players in high-contact team and field sports can substantially reduce the number of sports-related dental injuries. • The oral health promotion activities reviewed have mainly fallen within the Ottawa Charter categories of developing personal skills and reorientation of health care services. Future practices and evaluation research should try to develop other strategic aims of the Ottawa Charter.
<p>Limitations of the review</p>	<p>This review was published in 1996 and so is now quite dated. It was limited to English language papers and falls short of the rigour that would be expected in a contemporary systematic review. However, it represents a reasonable attempt to describe the then existing literature on the effectiveness of oral health promotion. It was published contemporaneously to the review of Kay and Locker and like that review, has since publication, received considerable attention in the field of oral health promotion and is still cited regularly.</p>

Review	Evidence-based oral health promotion resource. Government of Victoria Department of Health, Melbourne, 2011.
Authors	Rogers JG. This report was produced by the Prevention and Population Health Branch, Government of Victoria, Department of Health, Melbourne, Australia. The evidence-based review section of this Evidence-based oral health promotion resource is an update of Evidence-based Health Promotion: Resources for planning. Number 1 Oral Health, Department of Human Services, 2001. The 2001 resource was developed for the Department of Human Services by Dental Health Services Victoria (DHSV) in association with the University of Melbourne Dental School. The current resource has drawn on the 2006 report Evidence based review of oral health promotion prepared for the department by the Consortium of DHSV and the University of Melbourne Co-operative Research Centre (CRC) for Oral Health Science.
Relevance of review to guidance under development	This review is highly relevant to the guidance under development. The remit in many places parallels the scope of the NICE work. The way in which the evidence has been presented (a combination of life course and at risk groups) may well be useful in providing ideas as to how the evidence from the current review is organised. Recommendation: This review provides very helpful ideas as to how the outcome of the current work could be presented.
Review Aims	The foreword states that this resource is designed as a practical summary for policy development and program implementation. The question ‘Why is action needed?’ is addressed. Oral diseases and their causes are outlined along with the common risk factors between oral and other diseases. The most effective strategies for prevention are presented based on a systematic review of the literature. These strategies are outlined according to seven priority groups and settings and also by Victoria’s Integrated Health Promotion categories. There are also sections on program planning and evaluation, and resources and references. The review questions were: <ul style="list-style-type: none"> ○ What are effective oral health promotion strategies for the Victorian population? ○ What innovative oral health promotion strategies show promise for the Victorian population? ○ What information and research gaps exist?
Review Methodology	The oral health promotion literature in English for the period June 1999 to June 2010 was systematically searched for programs relevant for Victoria. The previous review (<i>Evidence-based Health Promotion: Resources for planning. Number 1 Oral Health</i>) covered the literature up to May 1999. The search also included systematic reviews of broader health

	<p>promotion interventions that promote oral health, such as those promoting a healthy diet.</p> <p>The evidence for interventions was organised under seven priority groups and settings:</p> <ol style="list-style-type: none"> 1. pregnant women, babies and young children (0–4 years)/childhood settings 2. children and adolescents/school settings 3. older people/residential care settings 4. Aboriginal and Torres Strait Islander people 5. culturally and linguistically diverse communities 6. people with special needs 7. workplace settings. <p>The evidence is also presented under the five Integrated Health Promotion categories used in Victoria:</p> <ol style="list-style-type: none"> 1. screening and individual risk assessment 2. health education and skill development 3. social marketing and health information 4. community action settings 5. supportive environments <p>A total of 791 articles were identified through electronic searches, and an additional 355 articles via broader network searches. After a review of abstracts and relevant full articles, 202 articles were included, describing 181 studies. This included 28 ‘grey literature’ papers such as project reports. A total of 31 systematic reviews and two literature reviews were included.</p>
<p>Review Conclusions</p>	<p>The evidence in this report is summarised as follows</p> <p>Many factors ‘cause’ oral diseases. Economic, political and environmental conditions influence the social and community context, which in turn affects oral health-related behaviour. The oral disease risk factors (such as high sugar diets, poor hygiene, smoking and excessive alcohol intake) are also risk factors for obesity, diabetes, cancers, heart disease and respiratory diseases. Incorporating oral health promotion into general health promotion by taking a ‘common risk factor’ approach is likely to be more efficient and effective than programs targeting a single disease or condition. While oral diseases share common risk factors, and an integrated approach is appropriate, certain specific oral health promotion aspects also require addressing. These aspects include the use of fluoride, oral hygiene and timely, preventively focused dental visits. Effective and innovative oral health promotion interventions are summarised. A summary of oral health</p>

	<p>promotion interventions by Integrated Health Promotion categories and population, settings and priority groups. The Integrated Health Promotion (IHP) categories are: screening and individual risk assessment; health education and skill development; social marketing and health information; community actions; and settings and supportive environments. Interventions are presented by population approaches and for high-risk groups in key settings. Table 1 shows the strength of evidence for each intervention type.</p>
Limitations of the review	<p>This review is focused on the state of Victoria, Australia. It is complex in presentation but mirrors very closely the task and scope of the current review.</p>

Review	Strategies and approaches in oral disease prevention and health promotion. Bulletin of the World Health Organization, (2005) 83(9): 711-718. http://www.who.int/bulletin/volumes/83/9/711.pdf
Authors	Watt RG The author is a dental academic based at University College London.
Relevance of review to guidance under development	This review is of relevance to the guidance under development. It provides a very clear synopsis of moves away from an individualised, health educational approach to improving oral health to an approach based on the principles set out in the Ottawa Charter. It translates the concepts in general health promotion to oral health promotion. It will be important to ensure that the principles set out here, such as the common-risk factor approach, social determinants of oral health and different preventive strategies (population, targeted-population and high-risk individual) are considered and reflected appropriately in the guidance under development. Recommendation: This is an expert commentary on current approaches to promoting oral health and the approaches reflected should be reflected in the guidance under development.
Review Aims	The aim of this paper was to outline public health strategies to promote oral health and reduce inequalities.
Review Methodology	The formal search strategy for papers that informed this review is not stated nor is the timeframe for papers included. <i>Included papers</i> A series of WHO policy reports and reviews provided guidance on the public health principles underpinning the development of oral health strategy. A range of Cochrane and other systematic reviews that have assessed the effectiveness of oral health interventions are summarised. Key publications on oral health and a collection of international case-studies have been used to provide practical details of the public health approaches used to promote oral health. <i>Exclusion criteria</i> No formal exclusion criteria are stated.
Review Conclusions	The paper reviews the Ottawa Charter and describes subsequent conferences that have focussed on Health Promotion Policy. A Table summarising the evidence from a series of systematic reviews of oral health interventions is presented. The author concludes that the most significant limitation of these largely clinical and educational interventions is that they fail to achieve sustainable improvements in oral health as the programmes are palliative in nature and largely ignore the underlying factors that create poor oral health. As a result, inequalities, rather than being reduced, may be increased because those with more resources are able to benefit the most from the interventions delivered. The author goes on to describe the public health approach to disease prevention and oral health promotion and summarises the concepts involved in the “social determinants of health”, the “common risk factor approach” and preventive strategies including the “high-risk”, “population” and “targeted-population” approach. The report reiterates that clinical preventive and educational

	<p>approaches alone can only achieve limited short-term effects and may indeed widen health inequalities. Rather than relying on preventive and health education programmes targeted at high-risk individuals, a mix of complementary public health approaches is required which focus both on assisting individuals and communities to avoid disease and on the creation of supportive environments, conducive to sustained good health. Policy development, organisational change, community action and legislation are all approaches that can be used to prevent oral diseases. In combination these strategies should address the broader determinants of oral health.</p> <p>The criteria for developing oral health strategies, based on WHO guidance on the development and evaluation of public health policy, present a set of criteria that can be used as a framework within which to assess the quality of oral health strategies.</p>
<p>Limitations of the review</p>	<p>This review takes the form of an expert commentary. It comprises a summary of policy documents and translates the implications of these from promoting health in general to oral health promotion.</p>

Review	Fluoride toothpastes for preventing dental caries in children and adolescents. Cochrane Database of Systematic Reviews, 2003 CD002278. Updated 2009
Authors	Marinho VC, Higgins JP, Sheiham A, Logan S. This Cochrane review was conducted by dental academics based at University College London
Relevance of review to guidance under development	This review is of direct relevance to the guidance under development. It confirms the clinical effectiveness of fluoridated toothpaste and includes a meta-analysis involving 42,300 children. Much of this evidence comes from clinical trials conducted in schools – though the toothpaste would be used at home. Recommendation: This review provides significant evidence to the guidance under development.
Review Aims	This review sought to determine the effectiveness and safety of fluoride toothpastes in the prevention of caries in children and to examine factors potentially modifying their effect.
Review Methodology	<i>Search methods</i> The authors searched the Cochrane Oral Health Group’s Trials Register (May 2000), the Cochrane Central Register of Controlled Trials (CENTRAL) (The Cochrane Library 2000, Issue 2), MEDLINE (1966 to January 2000), plus several other databases. They hand-searched journals, reference lists of articles and contacted selected authors and manufacturers. <i>Selection criteria</i> Randomised or quasi-randomised controlled trials with blind outcome assessment, comparing fluoride toothpaste with placebo in children up to 16 years during at least 1 year. The main outcome was caries increment measured by the change in decayed, missing and filled tooth surfaces (D(M)FS).
Review Conclusions	Seventy-four studies were included. For the 70 that contributed data for meta-analysis (involving 42,300 children) the D(M)FS pooled PF was 24% (95% confidence interval (CI), 21 to 28%; P < 0.0001). This means that 1.6 children need to brush with a fluoride toothpaste (rather than a non-fluoride toothpaste) to prevent one D(M)FS in populations with caries increment of 2.6 D(M)FS per year. In populations with caries increment of 1.1 D(M)FS per year, 3.7 children will need to use a fluoride toothpaste to avoid one D(M)FS. There was clear heterogeneity, confirmed statistically (P < 0.0001). The effect of fluoride toothpaste increased with higher baseline levels of D(M)FS, higher fluoride concentration, higher frequency of use, and supervised brushing, but was not influenced by exposure to water fluoridation. There is little information concerning the deciduous dentition or adverse effects (fluorosis). Supported by more than half a century of research, the benefits of fluoride toothpastes are firmly established. Taken

	<p>together, the trials are of relatively high quality, and provide clear evidence that fluoride toothpastes are efficacious in preventing caries.</p> <p>Fluoride toothpastes have been widely used for over 3 decades and remain a benchmark intervention for the prevention of dental caries.</p>
Limitations of the review	None

Review	<p>Fluoride mouthrinses for preventing dental caries in children and adolescents. <i>Cochrane Database of Systematic Reviews</i>, CD002284. 2003 Updated 2009</p>
Authors	<p>Marinho VC, Higgins JP, Logan S, Sheiham A.</p> <p>This review was conducted by dental academics based at University College London.</p>
Relevance of review to guidance under development	<p>The review is very relevant to the guidance under development. It suggests that school based fluoride mouthrinsing programmes are effective. The review notes that fluoride mouthrinses have been used extensively for the past 30 years to prevent dental caries in children. The use of rinses was especially widespread in organised school-based programmes in countries experiencing high caries prevalence in the 1970s and 1980s. Doubts about the effectiveness of fluoride mouthrinse as a population strategy began in the mid-1980s in view of the decline in dental caries, and their presumed cost effectiveness was challenged. The current view is that fluoride mouthrinsing programmes are only appropriate for high caries groups of children. While supervised, school-based, programmes remain a popular procedure in America in non-fluoridated communities, in Scandinavia and in several other countries these have been discontinued, based on caries decline and the widespread use of fluoride toothpastes. School based mouthrinsing programmes have never been common in the UK.</p> <p>The main issue with mouthrinsing is that the procedure is not recommended for children under 6 years of age, due to the risk of acute and chronic fluoride ingestion. The review points out that there are data implicating fluoride mouthrinse use by preschool children as a risk factor for dental fluorosis (enamel defects) caused by young children chronically ingesting excessive amounts of fluoride during the period of tooth formation) because some young children might swallow substantial amounts. Mouthrinsing would therefore do nothing to address the 5 year old outcome target set in the Public Health Framework. It would therefore be suitable only for older children.</p> <p>Further limitations of mouthrinsing are that it “medicalises” decay prevention whereas brushing with fluoride toothpaste is seen as a habit that should be initiated and developed and can become a normal part of daily health and hygiene routines.</p> <p>Importantly fluoride mouthrinsing will do nothing to address gingival and periodontal health – i.e. it does not remove dental plaque. Thus while toothbrushing addresses the prevention of dental caries and periodontal disease, fluoride mouthrinses address only the former.</p> <p>Recommendation: This review provides important evidence to the guidance under development.</p>

Review Aims	This Cochrane review examined the effectiveness and safety of fluoride mouthrinses in the prevention of dental caries in children and to examine factors potentially modifying their effect.
Review Methodology	<p><i>Search methods</i></p> <p>The authors searched the Cochrane Oral Health Group’s Trials Register (May 2000), the Cochrane Central Register of Controlled Trials (CENTRAL) (The Cochrane Library 2000, Issue 2),MEDLINE (1966 to January 2000), plus several other databases. They hand-searched journals, reference lists of articles and contacted selected authors and manufacturers.</p> <p><i>Selection criteria</i></p> <p>Randomised or quasi-randomised controlled trials with blind outcome assessment, comparing fluoride mouthrinse with placebo or no treatment in children up to 16 years during at least 1 year. The main outcome was caries increment measured by the change in decayed, missing and filled tooth surfaces (D(M)FS).</p>
Review Conclusions	<p>Thirty-six studies were included. For the 34 that contributed data for meta-analysis (involving 14,600 children) the D(M)FS pooled PF was 26% (95% confidence interval (CI), 23% to 30%; $P < 0.0001$). Heterogeneity was not substantial, but confirmed statistically ($P = 0.008$). No significant association between estimates of D(M)FS prevented fractions and baseline caries severity, background exposure to fluorides, rinsing frequency and fluoride concentration was found in meta-regression analyses. A funnel plot of the 34 studies indicated no relationship between prevented fraction and study precision. There is little information concerning possible adverse effects or acceptability of treatment in the included trials.</p> <p>This review suggests that the supervised regular use of fluoride mouthrinse at two main strengths and rinsing frequencies is associated with a clear reduction in caries increment in children. In populations with caries increment of 0.25 D(M)FS per year, 16 children will need to use a fluoride mouthrinse (rather than a non-fluoride rinse) to avoid one D(M)FS; in populations with a caries increment of 2.14 D(M)FS per year, 2 children will need to rinse to avoid one D(M)FS. There is a need for complete reporting of side effects and acceptability data in fluoride mouthrinse trials.</p>
Limitations of the review	None

Review	Fluoride varnishes for preventing dental caries in children and adolescents. <i>Cochrane Database of Systematic Reviews</i> 2013, Issue 7. Art.No.: CD002279. DOI: 10.1002/14651858.CD002279.pub2.
Authors	Marinho VCC, Worthington HV, Walsh T, Clarkson JE The authors of this review are dental academics based in the Universities of Manchester, Dundee and Bart’s and the London School of Medicine and Dentistry, London.
Relevance of review to guidance under development	<p>This review reports on the effectiveness of fluoride varnish (FV) as a caries preventive agent and is very relevant to the guidance under development. It suggests a 43% and 37% prevented fraction in permanent and primary teeth respectively. The review did not find an association between the frequency of fluoride varnish application and estimates of prevented fractions – and thus did not show a difference in clinical effectiveness between programmes where the fluoride varnish was applied twice and those where it was applied four times per year. The settings in which the FV was applied was not explicitly discussed in the review. The titles of the included studies suggest that most were based in schools and focused on high risk children.</p> <p>The included studies cover the period 1975 – 2012 raising the issue of the impact of the higher level of caries prevalence that prevailed in historic studies on clinical effectiveness. This concern is countered by the finding that the prevented fraction was not significantly associated with baseline caries severity. This means that fluoride varnish is likely effective at the prevalence of caries pertaining in England at this time.</p> <p>The review suggests that fluoride varnish programmes (presumably targeted at high risk children) on a targeted population approach is an option that should be available to Local Authorities in their armamentarium for improving oral health – especially in younger children.</p> <p>This review concluded that there was little information concerning possible adverse effects or acceptability of treatment. However, in prescribing a FV community based programme it would be prudent to exclude children aged less than three years and to ensure that manufacturer’s guidelines with regards to the maximum volume of varnish used per child is strictly adhered to.</p> <p>(N.B. The prevented fraction referred to in this and other reviews is the measure of treatment effect presented for caries increment. The prevented fraction is calculated as the mean increment in the control group minus the mean increment in the intervention group divided by the mean increment in the control group.)</p> <p>Recommendation: This review provides evidence of the value of fluoride varnish in the prevention of dental caries in school-based programmes and is therefore of relevance to the guidance under development.</p>

	<p>Although not mentioned in this review, the benefits of FV vs the risk of fluorosis in young children should be born in mind. Some advocate that FV should not be used in children aged < 3 years – this seems prudent. (N.B. The Departments of Health in England, Scotland and Wales, all to a greater or lesser extent are promoting fluoride varnish as an element of their current health improvement programmes, particularly in young children). There is currently a large randomised clinical trial underway in Scotland on the benefits of FV in nursery schools. This will report in 2016.</p>
Review Aims	<p>To determine the effectiveness and safety of fluoride varnishes in preventing dental caries in children and adolescents, and to examine factors potentially modifying their effect.</p> <p>Objectives were stated as:</p> <p>(1) To determine the effectiveness and safety of fluoride varnishes in preventing dental caries in the child/adolescent population. (2) To examine whether the effect of fluoride varnishes is influenced by the initial level of caries severity. (3) To examine whether the effect of fluoride varnishes is influenced by the background exposure to fluoride in water (or salt), toothpastes, or reported fluoride sources other than the study option(s). (4) To examine whether the effect of fluoride varnishes is influenced by fluoride concentration or application features, such as frequency of use and prophylaxis.</p>
Review Methodology	<p>This is a Cochrane Review using standard Cochrane methodology.</p> <p><i>Inclusion Criteria</i></p> <p>The authors searched the Cochrane Oral Health Group’s Trials Register (to 13 May 2013), the Cochrane Central Register of Controlled Trials (CENTRAL) (The Cochrane Library 2013, Issue 4), MEDLINE via OVID (1946 to 13 May 2013), EMBASE via OVID (1980 to 13 May 2013), CINAHL via EBSCO (1980 to 13 May 2013), LILACS and BBO via the BIREME Virtual Health Library (1980 to 13 May 2013), ProQuest Dissertations and Theses (1861 to 13 May 2013), and Web of Science Conference Proceedings (1945 to 13 May 2013). A search for ongoing trials was undertaken on ClinicalTrials.gov on 13 May 2013. There were no restrictions on language or date of publication in the search of the electronic databases.</p>
Review Conclusions	<p>Twenty-two trials with 12,455 participants randomised (9,595 used in analyses) were included. For the 13 that contributed data for the permanent tooth surfaces meta-analysis, the pooled D(M)FS prevented fraction estimate comparing fluoride varnish with placebo or no treatment was 43% (95% confidence interval (CI) 30% to 57%; $P < 0.0001$). The pooled d(e/m)fs prevented fraction estimate was 37% (95% CI 24% to 51%; $P < 0.0001$) for the 10 trials that contributed data for the primary tooth surfaces. The trials providing this evidence were assessed as of</p>

	<p>moderate quality.</p> <p>No significant association between estimates of D(M)FS or d(e/m)fs prevented fractions and the pre-specified factors of:</p> <ul style="list-style-type: none"> • baseline caries severity, • background exposure to fluorides, • application features such as prior prophylaxis, • concentration of fluoride, • frequency of application were found. <p>The authors concluded that their review suggests a substantial caries inhibiting effect of fluoride varnish in both permanent and primary teeth, however the quality of the evidence was assessed as moderate, as it included mainly high risk of bias studies, with considerable heterogeneity.</p>
Limitations of the review	None. This is a well conducted and up to date review.

Review	<p>Fluoride gels for preventing dental caries in children and adolescents. <i>Cochrane Database of Systematic Reviews</i> 2002, Issue 1. Art. No.: CD002280. DOI: 10.1002/14651858.CD002280.</p>
Authors	<p>Marinho VCC, Higgins JPT, Logan S, Sheiham A The authors of this review are dental academics based at University College London, Bart’s and the London School of Medicine and Dentistry and the Universities of Exeter, Plymouth and Cambridge.</p>
Relevance of review to guidance under development	<p>This review is of relevance to the guidance under development in that it shows that fluoride gel is effective in preventing dental caries. However the degree of protection against caries offered is less than that found in the case of fluoride containing toothpaste and fluoride varnish. The review is more than 10 years old and the studies informing the findings date mainly from the 60s,70s and 80s, when fluoride gels were a common vehicle for the delivery of fluoride. The review found little evidence of adverse effects of fluoride gel in the studies included, but it is not clear whether none were encountered or none were recorded and reported. The introduction to the review states that the excessive ingestion of fluoride during topical application is not an uncommon occurrence and the greatest health hazard is associated with the use of 12,300 ppm F APF gels. The probable toxic dose (PTD) of 100 mg of fluoride for a 20 kg (5-6 year-old) child is contained in only 8 ml volumes of these gels. Approximately 5 ml of gel is used in a topical application of APF gel in a tray, representing a potential exposure of 61.5 mg of fluoride ion. There is a significant risk of over exposure which can result in acute toxicity (Ripa 1990). Nausea, vomiting, headache and abdominal pain are symptoms that have been reported in young people receiving fluoride gel applications. Because of the risk of over ingestion, the use of gels in young children is not recommended.</p> <p>Fluoride gels are now regarded as an outdated mode of treatment and are in any case not suitable for use in community programmes.</p> <p>Recommendation: Fluoride gels are an outmoded treatment modality of no relevance to community based programmes. They are in effect not of relevance to the guidance under development.</p>
Review Aims	<p>To determine the effectiveness and safety of fluoride gels in the prevention of dental caries in children and to examine factors potentially modifying their effect.</p> <p>The objectives of the review were reported as:</p> <p>(1) To determine the effectiveness and safety of fluoride gels in preventing dental caries in the child/adolescent population.</p>

	<p>(2) To examine whether the effect of fluoride gels is influenced by the initial level of caries severity.</p> <p>(3) To examine whether the effect of fluoride gels is influenced by the background exposure to fluoride in water (or salt), toothpastes, or reported fluoride sources other than the study option(s).</p> <p>(4) To examine whether the effect of fluoride gels is influenced by the mode of use (self-applied supervised or operator-applied), and whether there is a differential effect between the tray and toothbrush methods of application in the self-applied mode of use.</p> <p>(5) To examine whether the effect of fluoride gels is influenced by the frequency of use (times/year) or fluoride concentration.</p>
<p>Review Methodology</p>	<p>This review took the form of a standard Cochrane systematic review.</p> <p><i>Inclusion criteria</i> <i>Type of studies:</i> Randomised or quasi-randomised controlled trials using or indicating blind outcome assessment, in which fluoride gel is compared concurrently to a placebo or no treatment group during at least 1 year/school year.</p> <p><i>Search strategy:</i> The authors attempted to identify all relevant studies irrespective of language, from 1965 onwards. Relevant studies were identified by searching several databases from date of inception: MEDLINE (1966 to 1997), EMBASE (1980 to 1997), SCISEARCH (1981 to 1997), SSCISEARCH (1981 to 1997), ISTP (1982 to 1997), BIOSIS (1982 to 1997), CINAHL (1982 to 1997), ERIC (1966 to 1996), DISSERTATIONABSTRACTS (1981 to 1997) and LILACS/BBO (1982 to 1997).</p>
<p>Review Conclusions</p>	<p>The authors concluded that there is clear evidence of a caries-inhibiting effect of fluoride gel. The best estimate of the magnitude of this effect, based on the 14 placebo-controlled trials, is a 21% reduction (95% CI, 14% to 28%) in D(M)FS. This corresponds to an NNT of 2 (95% CI, 1 to 3) to avoid 1 D(M)FS in a population with a caries increment of 2.2 D(M)FS/year, or an NNT of 24 (95% CI, 18 to 36) based on an increment of 0.2 D(M)FS/year. There is little information concerning the deciduous dentition, on adverse effects or on acceptability of treatment.</p>
<p>Limitations of the review</p>	<p>This review was last assessed as up to date in 2001.</p> <p>The 25 trials were conducted between 1964 and 1996: 12 during the 1960s, seven during the 1970s, five during the 1980s and one in the 1990s. Twelve trials were conducted in USA (eight of these during the 1960's), five in Europe, four in Brazil, one in each of the following countries: Canada, Israel, Hawaii, and Venezuela. While three of the included studies clearly stated no involvement with any manufacturer of fluoride gel, 10 acknowledged assistance (product provision, etc.) and/or partial support from fluoride gel manufacturers.</p>

Review	<p>Topical fluoride (toothpastes, mouthrinses, gels or varnishes) for preventing dental caries in children and adolescents. <i>Cochrane Database of Systematic Reviews</i> 2003, Issue 4. Art.No.: CD002782. DOI:10.1002/14651858.CD002782.</p>
Authors	<p>Marinho VCC, Higgins JPT, Logan S, Sheiham A The authors of this review are dental academics based at University College London, Bart’s and the London School of Medicine and Dentistry and the Universities of Exeter, Plymouth and Cambridge.</p>
Relevance of review to guidance under development	<p>This review is of relevance to the guidance under development in that it confirms the clinical effectiveness of topical fluoride agents in the prevention of dental caries. It suggests that fluoride varnish is more effective than other forms of topical fluoride and demonstrated that supervised and professionally administered fluoride result in better clinical outcomes than self-applied.</p> <p>Recommendation: This review suggests that fluoride varnish provides greater caries protection compared with other topical fluoride modalities. Consideration should be given as to how fluoride varnish can be incorporated into a population based oral health improvement programme. However, although not mentioned in this review, the benefits of FV vs the risk of fluorosis in young children should be born in mind. Some advocate that FV should not be used in children aged < 3 years – this seems prudent.</p> <p>(N.B. The Departments of Health in England, Scotland and Wales, all to a greater or lesser extent are promoting fluoride varnish as an element of their current health improvement programmes, particularly in young children.</p> <p>There is currently a large randomised clinical trial underway in Scotland on the benefits of FV in nursery schools. This will report in 2016.</p>
Review Aims	<p>The aim of this review was to determine the effectiveness and safety of fluoride varnishes, gels, mouthrinses, and toothpastes in the prevention of dental caries in children and to examine factors potentially modifying their effect.</p> <p>The specific objectives were:</p> <ol style="list-style-type: none"> (1) To determine the effectiveness and safety of topical fluoride therapy in the form of toothpastes, mouthrinses, gels and varnishes in preventing dental caries in the child/adolescent population. (2) To examine whether the effect of TFT is influenced by the level of caries severity. (3) To examine whether the effect of TFT is influenced by the background exposure to ambient levels of fluoride in water (or salt), or reported fluoride sources other than the study option(s). (4) To examine whether the effect of TFT is influenced by the mode/setting of use (self-applied supervised use of TFT in preventive programmes, self-applied ‘unsupervised’ use of TFT at home, and operator-applied use of TFT), and if this does occur, whether there is a differential effect on caries prevention among the different forms of TFT used in each

	<p>mode/setting. (5) To examine whether the effect of TFT is influenced by the form of TFT used.</p>
<p>Review Methodology</p>	<p><i>Types of studies</i> Randomized or quasi-randomized controlled trials using or indicating blind outcome assessment, in which one form of topical fluoride therapy (TFT) (either as toothpaste, mouthrinse, gel or varnish) is compared concurrently to a placebo or no TFT group during at least 1 year/school year.</p> <p><i>Types of participants in the included studies</i> Children or adolescents aged 16 or less at the start of the study (irrespective of initial level of dental caries, background exposure to fluorides, dental treatment level, nationality, setting where intervention is received or time when it started). Studies where participants were selected on the basis of special (general or oral) health conditions were excluded.</p> <p><i>Search strategy</i> Relevant studies were identified (for the series of topical fluoride reviews) by searching several databases from date of inception: MEDLINE (1966 to 1997), EMBASE (1980 to 1997), SCISEARCH (1981 to 1997), SSCISEARCH (1981 to 1997), ISTP (1982 to 1997), BIOSIS (1982 to 1997), CINAHL (1982 to 1997), ERIC (1966 to 1996), DISSERTATIONABSTRACTS (1981 to 1997) and LILACS/BBO (1982 to 1997). Additional terms were used to search between 1999 and 2001.</p>
<p>Review Conclusions</p>	<p>There were 144 studies included. For the 133 that contributed data for meta-analysis (involving 65,169 children) the D(M)FS pooled prevented fraction estimate was 26% (95% CI, 24% to 29%; $P < 0.0001$). The effect of topical fluoride varied according to type of control group used, type of TFT used, mode/setting of TFT use, initial caries levels and intensity of TFT application, but was not influenced by exposure to water fluoridation or other fluoride sources. D(M)FS PF was on average 14% (95% CI, 5% to 23%; $P = 0.002$) higher in non-placebo controlled trials, 14% (95% CI, 2% to 26%; $P = 0.25$) higher in fluoride varnish trials compared with all others, and 10% (95% CI, - 17% to -3%; $P = 0.003$) lower in trials of unsupervised home use compared with self-applied supervised and operator-applied. There was a 0.7% increase in the PF per unit increase in baseline caries (95% CI, 0.2% to 1.2%; $P = 0.004$).</p> <p>The authors concluded that the benefits of topical fluorides have been firmly established on a sizeable body of evidence from randomized controlled trials.</p> <p>This review found evidence that the relative effect of topical fluoride may be greater in those who have higher baseline levels of decayed, missing and filled tooth surfaces (D(M)FS), and found no evidence that the effect of topical fluoride was dependent on background exposure to fluoridated water or other fluoride sources. In addition, a higher D(M)FS prevented fraction was shown with increased total intensity of fluoride application, with self-applied supervised use (where a higher compliance with topical fluoride interventions as recommended should be expected), and with the use of fluoride</p>

	<p>varnishes compared with the other topical fluoride modalities. Research on the effects of fluoride varnish has been of lower methodological quality however. The effect of topical fluoride also varied according to type of control group used; the D(M)FS prevented fraction was higher with no treatment compared with placebo. Unfortunately, little information is available on the effects of topical fluoride therapy on outcomes such as caries incidence in the deciduous dentition and on the likelihood of adverse effects. The authors were unable to reach definite conclusions about any adverse effects that might result from the use of topical fluorides, because data reported in the trials are scarce.</p>
<p>Limitations of the review</p>	<p>This is a well conducted review to Cochrane standards. The major limitation is that it is now some 10 years since the review content was last deemed up to date.</p> <p>It should be remembered that this review, in common with all in the Marinho series of Cochrane reviews is limited to children ≤ 16 years olds and thus these findings do not necessarily apply to adults.</p>

Review	<p>One topical fluoride (toothpastes, or mouthrinses, or gels, or varnishes) versus another for preventing dental caries in children and adolescents. Cochrane Database of Systematic Reviews 2004, Issue 1. Art. No.: CD002780. DOI: 10.1002/14651858.CD002780.pub2.</p>
Authors	<p>Marinho VCC, Higgins JPT, Sheiham A, Logan S The authors of this review are dental academics based at University College London, Bart's and the London School of Medicine and Dentistry and the Universities of Exeter, Plymouth and Cambridge.</p>
Relevance of review to guidance under development	<p>This review compares various vehicles for the delivery of fluoride and is of some relevance to the guidance under development. The authors conclude that fluoride toothpastes in comparison to mouthrinses or gels appear to have a similar degree of effectiveness for the prevention of dental caries in children. Recommendation: The comparison of topical fluorides reported in this review is of limited help in informing the guidance under development.</p>
Review Aims	<p>The review aimed to compare the effectiveness of one form of topical fluoride intervention with another when used for the prevention of dental caries in children. The primary objective was to assess the evidence on the comparative effectiveness of topical fluoride therapy (TFT) in the form of toothpastes, mouthrinses, gels and varnishes in the prevention of dental caries in children and adolescents.</p> <p>The specific objectives were:</p> <ol style="list-style-type: none"> (1) To determine whether there is a differential effect between any two forms of TFT described above (how each intervention compares with the other). (2) To determine whether there is a differential effect between professionally-applied topical fluoride varnishes and professionally applied gels. (3) To determine whether there is a differential effect between fluoride mouthrinses and professionally-applied TFT (varnishes or gels). (4) To determine whether there is a differential effect between fluoride toothpastes and any other modality of TFT (mouthrinses, gels or varnishes).
Review Methodology	<p>The format of this review is that of a standard Cochrane review. <i>Included studies</i> Included studies were randomized or quasi-randomized controlled trials with blind outcome assessment, comparing fluoride varnish, gel, mouthrinse, or toothpaste with each other in children up to 16 years during at least 1 year. The main outcome was caries increment measured by the change in decayed, missing and filled tooth surfaces (D(M)FS).</p>

	<p>Randomized or quasi-randomized controlled trials using or indicating blind outcome assessment, in which one form of topical fluoride therapy (TFT) (either as toothpaste, mouthrinse, gel or varnish) is compared with another (head to head), during at least 1 calendar or school year.</p> <p><i>Search strategy</i></p> <p>Relevant studies were identified (for the series of topical fluoride reviews) by searching several databases from date of inception: MEDLINE (1966 to 1997), EMBASE (1980 to 1997), SCISEARCH (1981 to 1997), SSCISEARCH (1981 to 1997), ISTP (1982 to 1997), BIOSIS (1982 to 1997), CINAHL (1982 to 1997), ERIC (1966 to 1996), DISSERTATIONABSTRACTS (1981 to 1997) and LILACS/BBO (1982 to 1997). Additional terms were used to search between 1999 and 2001.</p>
Review Conclusions	<p>There were 17 studies included, and 15 contributed data for the meta-analyses. Fluoride toothpaste was not significantly different from mouthrinse (pooled DMFS PF 0%; 95% CI, -18% to 19%; P = 0.94), or gel (pooled DMFS PF 0%; 95% CI, -21% to 21%; P = 1), or both gel and mouthrinse (pooled DMFS PF 1%; 95% CI, -13% to 14%; P = 0.94); heterogeneity was substantial. Results from the single trial comparing toothpaste with varnish (in deciduous teeth) were inconclusive (dfs PF 5%; CI not obtainable). The pooled results from the comparisons of fluoride varnish with mouthrinse was a non-significant difference favouring varnish (DMFS PF 10%; 95% CI, -12% to 32%; P = 0.40). Results from the single trial comparing varnish with gel (14%, 95% CI, -12% to 40%; P = 0.30) and the single trial comparing gel with mouthrinse (-14% DMFS PF; 95% CI, -40% to 12%; P = 0.30) were inconclusive (favoured varnish and mouthrinse respectively).</p> <p>The authors concluded that fluoride toothpastes in comparison to mouthrinses or gels appear to have a similar degree of effectiveness for the prevention of dental caries in children. There is no clear suggestion that fluoride varnish is more effective than mouthrinses and the evidence for the comparative effectiveness of fluoride varnishes and gels, and mouthrinses and gels is inconclusive. No conclusions about adverse effects could be reached, because no data were reported in the trials. Acceptance is likely to be greater for fluoride toothpaste.</p>
Limitations of the review	<p>The review was published in 2004 and assessed as up to date in November 2003. It is a well conducted Cochrane review. The main limitation is that all included studies predate 2001 and so it is more than a decade out of date.</p>

Review	<p>Combinations of topical fluoride (toothpastes, mouthrinses, gels, varnishes) versus single topical fluoride for preventing dental caries in children and adolescents. <i>Cochrane Database of Systematic Reviews</i> 2004, Issue 1. Art. No.: CD002781. DOI: 10.1002/14651858.CD002781.pub2.</p>
Authors	<p>Marinho VCC, Higgins JPT, Sheiham A, Logan S. The authors of this review are dental academics based at University College London, Bart’s and the London School of Medicine and Dentistry and the Universities of Exeter, Plymouth and Cambridge.</p>
Relevance of review to guidance under development	<p>This review is potentially of particular relevance to the guidance under development. It examines the additional benefit of using topical fluoride treatments (TFT) in addition to fluoride toothpaste. This is important as in “high-risk individual” or “targeted-population” approaches to caries prevention, to know the additional benefits to be achieved from receiving TFT from more than one source is important.</p> <p>However, as discussed below, this review is limited by three factors</p> <ul style="list-style-type: none"> • There were only nine studies available for inclusion in the review • The review was last assessed as up to date ten years ago • The review is limited to children (and those with special needs and from special groups were excluded). <p>Recommendation: These factors limit the usefulness of this review to the guidance under development.</p>
Review Aims	<p>To compare the effectiveness of two topical fluoride treatments TFT modalities combined with one of them alone (mainly toothpaste) when used for the prevention of dental caries in children.</p> <p>The primary objective of this systematic review was: (1) to determine whether there is a beneficial effect of adding topical fluoride therapy (TFT) in the form of mouthrinse, gel or varnish to fluoride toothpaste.</p> <p>As secondary objectives the review: (2) evaluated the addition of each TFT modality to toothpaste separately; (3) evaluated all other combinations of two TFT modalities compared to one of them.</p>
Review Methodology	<p><i>Studies included</i> Randomized or quasi-randomized controlled trials using or indicating blind outcome assessment, in which one form of topical fluoride therapy (TFT) (toothpaste, mouthrinse, varnish or gel) is compared concurrently with another in combination with it, during at least 1 calendar or school year.</p> <p><i>Types of participants in the included studies</i> Children or adolescents aged 16 or less at the start of the study (irrespective of initial level of dental caries, background exposure to fluorides, dental treatment level, nationality, setting where intervention is received or time when it started).</p>

	<p>Studies where participants were selected on the basis of special (general or oral) health conditions were excluded.</p> <p><i>Search strategy</i></p> <p>Relevant studies were identified (for the series of topical fluoride reviews) by searching several databases from date of inception: MEDLINE (1966 to 1997), EMBASE (1980 to 1997), SCISEARCH (1981 to 1997), SSCISEARCH (1981 to 1997), ISTP (1982 to 1997), BIOSIS (1982 to 1997), CINAHL (1982 to 1997), ERIC (1966 to 1996), DISSERTATIONABSTRACTS (1981 to 1997) and LILACS/BBO (1982 to 1997). Additional terms were used to search between 1999 and 2001.</p>
<p>Review Conclusions</p>	<p>The authors concluded that topical fluorides (mouthrinses, gels, or varnishes) used in addition to fluoride toothpaste achieve a modest reduction in caries compared to toothpaste used alone. No conclusions about any adverse effects could be reached, because data were scarcely reported in the trials.</p> <p>For all nine trials eligible for inclusion in the meta analysis combined (one comparing fluoride toothpaste with varnish plus toothpaste, three comparing toothpaste with gel plus toothpaste, and five comparing toothpaste with mouthrinse plus toothpaste; n = 4026), the D(M)FS prevented fraction pooled estimate from the random effects meta-analysis was 0.10 (95%CI, 0.02 to 0.17; P = 0.01), i.e. a significant difference was detected in favour of toothpaste used in combination with other topical fluorides. Numbers of children needed to treat (NNT) to prevent one D(M)FS were calculated based on the pooled D(M)FS prevented fraction and on the caries increments in the single toothpaste groups of the nine trials in the meta-analysis. The overall caries inhibiting effect (% PF) derived from the pooled results of the trials was 10% (95%CI, 2%to 17%); the caries increments in the included trials ranged from 0.8 to 2.5 D(M)FS per year. In populations with a caries increment of 0.8 D(M)FS per year (at the lowest end of the results seen in the included studies), this implies an absolute caries reduction of 0.08 D(M)FS per year, equivalent to an NNT of 13 (95% CI, 8 to 63): i.e. 13 children need to use topical fluorides in combination to avoid one D(M)FS. In populations with a caries increment of 2.5 D(M)FS per year (at the highest range of the results seen in the included studies), this implies an absolute caries reduction of 0.25 D(M)FS per year, equivalent to an NNT of 4 (95% CI, 3 to 20): i.e. 4 children need to use combined TFT to avoid one D(M)FS.</p> <p>A secondary objective of this review was to examine whether there was a beneficial effect in terms of caries prevention from the addition of each TFT modality to toothpaste separately compared to toothpaste alone or from the combined use of any other two TFT modalities separately compared to one of them alone. The authors were unable to detect a clear differential effect from all but two of the seven available comparisons. Thus, a differential treatment effect for each relevant subset in the main meta-analysis, which assessed the effect of fluoride gel plus toothpaste and toothpaste alone and of fluoride mouthrinse plus toothpaste and toothpaste alone on the permanent dentition, could not be clearly detected, whereas the evidence from one single small trial, which was not carried out double-blind, of a significant differential effect in caries reduction favouring the combined use of fluoride varnish and toothpaste over fluoride</p>

	toothpaste alone should be viewed with caution, as this is far from definite.
Limitations of the review	<p>This is a well conducted review to Cochrane standards. The major limitation is that it is now some 10 years since the review content was last deemed up to date. The number of studies that examined the combinations of TFT that are the subject of this review were very small and this severely limits the available evidence.</p> <p>It should be remembered that this review, in common with all in the Marinho series of Cochrane reviews is limited to children ≤ 16 years olds and thus these findings do not necessarily apply to adults.</p> <p>Of particular relevance to the guidance under development the studies where participants were selected on the basis of special (general or oral) health conditions were excluded from the review.</p>

Review	<p>Preventing dental caries through school based sealant programs: updated recommendations and reviews of evidence. Journal of the American Dental Association. 2009; 140(11):1356-65.</p>
Authors	<p>Gooch BF, Griffin SO, Gray SK et al. Review was undertaken by an Expert Group, sponsored by the Centres for Disease Control (CDC) in America, the Federal Agency with responsibility for health governance in the USA.</p>
Review Aims	<p>The review examined a number of technical issues and concerns about running school based fissure sealant programmes. This review aimed to examine:</p> <ul style="list-style-type: none"> - the effectiveness of sealants on sound and carious pit and fissure surfaces - methods for caries assessment before sealant application - the effectiveness of selected placement techniques - risk of developing caries in sealed teeth among children who might be lost to follow-up and for whom sealant retention cannot be ensured. <p>Previous evidence from a government funded systematic review in 2001 demonstrated the efficacy of school based fissure sealant programmes in reducing the incidence of dental caries in those at high risk of poor oral health (median decrease in occlusal (biting surface) caries in posterior teeth among children aged 6-17 years was 60 per cent).</p>
Relevance of review to guidance under development	<p>What does the above mean for the guidance currently being produced by NICE? It is accepted that school based fissure sealant programmes, if directed at localities or groups with high dental need are an effective clinical intervention and can be provided on a "high-risk targeted community approach" rather than on an "individual patient risk approach". This has been one of the long standing criteria of the British Association for Paediatric Dentistry recommendations and the basis on which school based fissure sealant programmes have been implemented in some areas in the UK. This review suggests that:</p> <ul style="list-style-type: none"> - There is good evidence that fissure sealants are an effective clinical preventive measure - Worries over "sealing-in" initial caries lesions are unfounded and would not be a reason not to recommend a community sealant programme. - Related to this there is no evidence that bacteria will proliferate under fissure sealants - Visual assessment by the examining clinician is sufficient to determine whether a tooth is suitable for sealing i.e. there is no need for advance diagnostic aids which would make placing sealants in schools difficult. However, visual examination should not include the use of a probe - There is no specific need for prophylaxis of a tooth surface before sealant placement, cleaning with a toothbrush is

	<p>sufficient, making sealant placement in a school environment easier</p> <ul style="list-style-type: none"> - Four-handed dentistry – i.e. the availability of a dental nurse increases sealant retention rates, presumably due to the ability to achieve better moisture control - Concerns over lost sealants making teeth more vulnerable to decay are unfounded – but the review does not say that teeth in such a condition are less vulnerable to decay – there is evidence to the contrary. <p>What this means is that when considering a community based programme for vulnerable children and adolescents there is good evidence that a programme to place fissure sealants is effective.</p> <p>The implications for Local Authorities is that they should consider school-based fissure sealant programmes amongst their armamentarium for preventing dental caries in the permanent teeth of children and adolescents (probably at age 6 when the first molars erupt and possibly at age 12 when second molars erupt). Such a programme should be targeted at high risk communities. The lack of an economic evaluation of this approach may be a potential draw back. Commissioning such a programme from fixed dental clinics may be an option but is probably less likely to reach vulnerable groups.</p> <p>The overall findings are that none of the perceived issues relating to using fissure sealants in a community setting are a barrier to their placement or clinical effectiveness.</p> <p>Although conducted in America, as the review deals with clinical and technical issues rather than service delivery issues the findings are applicable to children and adolescents in England.</p> <p>Recommendation: Consideration should be given to including school-based fissure sealant programmes as a tool for Local Authorities in the guidance</p>
Review methodology	<p>The review group used published findings of systematic reviews when available. When systematic reviews were not available to address the issues that were the focus of this review CDC staff members conducted analyses of the available evidence and published these in peer reviewed journals – articles which were then subsequently quoted as sources in this review.</p>
Review Conclusions	<p>In relation to each of the aims, the review came to the following conclusions:</p> <ol style="list-style-type: none"> 1 Sound pit and fissure surfaces. What is the effectiveness of sealants in preventing the development of caries on sound pit and fissure surfaces? <i>Summary of evidence.</i> Systematic reviews have found that sealants are effective in preventing the development of caries on sound pit and fissure surfaces in children and adolescents. 2 Noncavitated or incipient lesions. What is the effectiveness of sealants in preventing the progression of noncavitated or incipient carious lesions to cavitation? <i>Summary of evidence.</i> A systematic review found that pit-and-fissure sealants are effective in reducing the percentage of noncavitated carious lesions that progressed to cavitation in children, adolescents and young adults. 3 Bacteria levels. What is the effectiveness of sealants in reducing bacteria levels in cavitated carious lesions? <i>Summary of evidence.</i> A systematic review found that pit-and-fissure sealants are effective in reducing bacteria levels in cavitated carious lesions in children, adolescents and young adults.

	<p>4 Assessment of caries on surfaces to be sealed. Which caries assessment methods should be used in SBSPs to differentiate pit and fissure surfaces that are sound or noncavitated from those that are cavitated or have signs of dentinal caries? <i>Summary of evidence.</i> A systematic review found that visual assessment alone is sufficient to detect the presence of surface cavitation and/or signs of dentinal caries.</p> <p>5 Surface preparation. What surface cleaning methods or techniques are recommended by manufacturers for unfilled resin-based sealants (self-curing and light-cured) commonly used in SBSPs? <i>Summary of evidence.</i> A review of manufacturers' instructions for use for unfilled resin-based sealants found that they do not specify a particular method of cleaning the tooth surface.</p> <p>6 Effect of clinical procedures. What is the effect of clinical procedures—specifically, surface cleaning or mechanical preparation methods with use of a bur before acid etching—on sealant retention? <i>Summary of evidence.</i> The effect of specific surface cleaning or enamel preparation techniques on sealant retention cannot be determined because of the small number of clinical studies comparing specific techniques and, for mechanical preparation with a bur, inconsistent findings. Bivariate and multivariate analyses of retention data across existing studies suggest that supervised toothbrushing or use of a handpiece prophylaxis may result in similar sealant retention rates over time.</p> <p>7 Four-handed technique for applying dental sealant. Does use of a four-handed technique in comparison with a two-handed technique improve sealant retention? <i>Summary of evidence.</i> In the absence of direct comparative studies, the results of a multivariate study of available data¹⁹ suggest that use of the four-handed placement technique is associated with a 9 percentage point increase in sealant retention.</p> <p>8 Caries risk associated with lost sealants. Are teeth in which sealants are lost at a higher risk of developing caries than are teeth that were never sealed? <i>Summary of evidence.</i> Findings from a meta-analysis indicate that the caries risk for sealed teeth that have lost some or all sealant does not exceed the caries risk for never-sealed teeth. Thus, the potential risk associated with loss to follow-up for children in school-based programs does not outweigh the potential benefit of dental sealants.</p>
<p>Limitations of the review</p>	<p>This is a worthwhile and apparently well conducted review. The review takes as its starting premise, school based fissure sealant programmes are effective in reducing dental caries. The clinical effectiveness of fissure sealants is beyond doubt and the assumption here is backed up by the most recent Cochrane review on fissure sealants.</p> <p>This review states in the Introduction, "School sealant programs can be an important intervention to increase the receipt of sealants especially among underserved children. Sealant programs could reduce or eliminate racial and economic disparities in sealant use if programs were provided to all eligible, high-risk schools, such as those in which 50 percent or more of the children are eligible for free or reduced-price meals." References are provided for these statements but a critical appraisal of the strength of the evidence for these assertions is not part of the review.</p> <p>The issues dealt with in the review relate largely to technical/clinical issues of placing sealants in a school environment rather than in a dental clinic.</p> <p>The authors have dealt with the lack of systematic reviews to answer some of the technical questions posed by reviewing the</p>

	<p>sometimes limited primary research literature themselves, though they have published these reviews / commentaries in peer reviewed Journals.</p> <p>The review does not consider the economics / cost effectiveness of a school-based fissure sealant programme</p>
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Review	Sealants for preventing dental decay in the permanent teeth. <i>Cochrane Database of Systematic Reviews</i> 2013, Issue 3. Art. No.: CD001830. DOI: 10.1002/14651858.CD001830.pub4.
Authors	Ahovuo-Saloranta A, Forss H, Walsh T, Hiiri A, Nordblad A, Mäkelä M, Worthington HV. The authors of this review are academics based at the Finnish Office for Health Technology Assessment and the University of Manchester.
Relevance of review to guidance under development	<p>This review is of importance to the guidance under development. Fissure sealants are a long established preventive technology, first introduced in the 1960s. This Cochrane review, confirms their clinical effectiveness. The main issue for consideration is are they a clinical intervention or an element of a health promotion programme, or both?</p> <p>The 2003 US review by the Task Force on Community Preventive Services (see separate Table), describes the use of fissure sealants both in the context of an intervention in dental clinics and in schools and indeed a hybrid model where children are identified in schools and referred to community services for sealant placement. The studies informing this Cochrane review have been undertaken using all three of these approaches but the review results are not reported according to setting. It could be argued that a “high-risk population” approach to the use of fissure sealants is justifiable and at least one programme taking this approach has been operating in the UK for a number of years.</p> <p>Recommendation: This review demonstrates the clinical effectiveness of fissure sealants as a caries preventive measure. In developing guidance for Local Authorities, it is necessary to form a view as to whether fissure sealants are a clinical procedure for which children deemed at risk should be referred to a dental practitioner/dental hygienist, or whether there is merit in having as an option, a school-based fissure sealant programme.</p>
Review Aims	<p>The stated aim of this Cochrane review was to compare the effects of different types of fissure sealants in preventing caries in permanent teeth in children and adolescents.</p> <p>The primary objectives were:</p> <ul style="list-style-type: none"> • To evaluate the caries prevention of pit and fissure sealants versus no treatment in children and adolescents. This was carried out for different background levels of caries in the population • To compare the effect of different sealant materials for preventing dental caries in children and adolescents. <p>The secondary objectives were:</p> <ul style="list-style-type: none"> • To document and report on data concerning the retention of sealants • To document and report on any data concerning the safety of sealants and possible harmful effects.

<p>Review Methodology</p>	<p><i>Types of studies</i></p> <ul style="list-style-type: none"> • Randomised or quasi-randomised controlled trials of at least 12 months in duration in which sealants were used for preventing caries in children and adolescents. Both parallel group and split-mouth study designs were included. The unit of randomisation could be individual, group (school, school class etc.), tooth or tooth pair. <p><i>Types of participants</i></p> <ul style="list-style-type: none"> • Children and adolescents from the general population, under 20 years of age at the start of the study. <p><i>Types of interventions</i></p> <ul style="list-style-type: none"> • The review was concerned with: <ol style="list-style-type: none"> A. Comparing sealant material with a control without sealant (all sealant materials accepted except the first generation resin-based sealants) B. Comparing one type of fissure sealant with another sealant. <p>The control teeth or control groups in this review were those that did not have a sealant placed (A). When comparing the effectiveness of resin sealants with the effectiveness of other sealant materials, the resin sealant group was used as a control group (B).</p> <p>The authors included studies where sealants were placed on the occlusal or approximal surfaces of permanent premolar or molar teeth for the purpose of preventing caries, regardless of who did the application. Applications of sealants could be either on sound surfaces or on enamel lesions not previously sealed. The sealant application method used in the study could be either that of (a) direct application on the tooth surface or (b) application after mechanically preparing the tooth surface.</p> <p>The review excluded studies where fissure sealants were used concurrently with fillings. Studies that tested any other caries preventive treatments (such as fluoride varnishes) concurrently with the sealants were not included in this review. Studies where fissure sealants were used concurrently both in test and control groups with fluoride toothpaste or with fluoridated water were included.</p> <p><i>Search Strategy</i></p> <p>The authors searched the Cochrane Oral Health Group’s Trials Register (to 1 November 2012); the Cochrane Central Register of Controlled Trials (CENTRAL) (The Cochrane Library 2012, Issue 7); MEDLINE via OVID (1946 to 1 November 2012); EMBASE via OVID (1980 to 1 November 2012); SCISEARCH, CAplus, INSPEC, NTIS and PASCAL via STN Easy (to 1 September 2012); and DARE, NHS EED and HTA (via the CAIRS web interface to 29 March 2012 and thereafter via Metaxis interface to September 2012). There</p>
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	were no language or publication restrictions.
Review Conclusions	<p>Thirty-four trials are included in the review. Twelve trials evaluated the effects of sealant compared with no sealant (2,575 participants); 21 trials evaluated one type of sealant compared with another (3,202 participants); and one trial evaluated two different types of sealant and no sealant (752 participants). Children were aged from 5 to 16 years. Trials rarely reported the background exposure to fluoride of the trial participants or the baseline caries prevalence.</p> <p><i>Resin-based sealant compared with no sealant:</i> Compared to control without sealant, second or third or fourth generation resin based sealants prevented caries in first permanent molars in children aged 5 to 10 years (at 2 years of follow-up odds ratio (OR) 0.12, 95% confidence interval (CI) 0.07 to 0.19, six trials (five published in the 1970s and one in 2012), at low risk of bias, 1259 children randomised, 1066 children evaluated, moderate quality evidence). If we were to assume that 40% of the control tooth surfaces were decayed during 2 years of follow-up (400 carious teeth per 1000), then applying a resin-based sealant will reduce the proportion of the carious surfaces to 6.25% (95% CI 3.84% to 9.63%); similarly if we were to assume that 70% of the control tooth surfaces were decayed (700 carious teeth per 1000), then applying a resin-based sealant will reduce the proportion of the carious surfaces to 18.92% (95% CI 12.28% to 27.18%). This caries preventive effect was maintained at longer follow-up but both the quality and quantity of the evidence was reduced (e.g. at 48 to 54 months of follow-up OR 0.21, 95% CI 0.16 to 0.28, four trials (two studies at low risk of bias and two studies at high risk of bias), 482 children evaluated; risk ratio (RR) 0.24, 95% CI 0.12 to 0.45, one study at unclear risk of bias, 203 children evaluated).</p> <p>The application of sealants is a recommended procedure to prevent or control caries. Sealing the occlusal surfaces of permanent molars in children and adolescents reduces caries up to 48 months when compared to no sealant, after longer follow-up the quantity and quality of the evidence is reduced. The review revealed that sealants are effective in high risk children but information on the magnitude of the benefit of sealing in other conditions is scarce. The relative effectiveness of different types of sealants has yet to be established.</p>
Limitations of the review	<p>This is a well conducted Cochrane review, assessed as up to date in November 2012.</p> <p>The included studies were from around the world and comprised a variety of settings i.e. school based programmes, programmes in dental clinics or a hybrid (referral from school to clinic).</p>

Review	School-based dental sealant programmes. (2003) Report of the Association of State and Territorial Dental Directors. www.astdd.org/school-based-dental-sealant-programs
Authors	Association of State and Territorial Dental Directors This is the official association of the federal agency responsible for the delivery of community dentistry in the United States.
Relevance of review to guidance under development	The report is of relevance to the guidance under development. It affirms the clinical effectiveness of fissure sealants, and describes the models which can be used to deliver FS programmes on a community basis targeted at high-risk children. So while this approach to reducing the caries susceptibility of the vulnerable first permanent molar is possible, and was widely practiced in the USA (2003 report from which the current practice in the USA can not be discerned), the degree to which it is relevant to guidance for England in 2014 is not clear. What is clear from this paper is that if such a programme is to be introduced it needs to be targeted at schools with high caries levels. Discussing the costs of school FS programmes – this report references the work of Griffin et al (2002). This involved a comparison of the costs of sealant delivery strategies showed that among high-risk populations for dental caries , less cost and reduced caries results from placing sealants on all children of a high-risk population versus only placing sealants for those children assessed to be at risk by individual screening (a targeted population approach). Recommendation: While school-based FS programmes have been shown to be effective in the USA, it is not clear to what extent this technology and mode of delivery is relevant to oral health improvement programmes commissioned by Local Authorities. It is necessary to decide if this is a possible option that Local Authorities will wish to have in their armamentarium –although being implemented at age 6, it would have no effect on the PH Outcome Framework target in 5 year olds.
Review Aims	This report sets out to describe the best approach to school-based fissure sealant programmes
Review Methodology	The methodology is not clearly stated. The report looks like an expert report.
Review Conclusions	<i>Description of modes of operating school-based FS programmes.</i> Dental sealant programs generally provide sealants to vulnerable populations less likely to receive private dental care, such as children eligible for free or reduced-cost lunch programs. There are variations in how dental sealant programs are designed: <ul style="list-style-type: none"> • School-based programs are conducted completely within the school setting, with teams of dental providers (dentists, dental hygienists and dental assistants) utilizing portable dental equipment or a fixed facility within the school setting. • School-linked programs are connected with schools in some manner but deliver the sealants at a site other than the

	<p>school (i.e., a clinic or private dental office). School-linked programs may present information, distribute consent forms and conduct dental screening at schools.</p> <ul style="list-style-type: none"> • Hybrid programs incorporate school-based and school-linked <p><i>Conclusions on the review of the literature on school-based FS programmes</i></p> <p>In its systematic review of the literature, the Task Force on Community Preventive Services (2002) found that school sealant programs are effective in reducing tooth decay. The median decrease in caries on the occlusal (chewing) surfaces of posterior teeth in children was 60%. Based on this review, the Task Force issued a strong recommendation that school sealant programs be included as part of a comprehensive population-based strategy to prevent or control tooth decay in communities. A literature review of pit and fissure sealant in 2002 included 1,465 peer-reviewed publications from 1971 to October 2001 and reported that:</p> <ul style="list-style-type: none"> • It is clear that sealants are safe, effective and underused (in the United States), and • Pit and fissure sealant is best applied to high-risk populations by trained auxiliaries using sealant that incorporates the benefit of an intermediate bonding layer, applied under the rubber dam or with some alternative short-term and effective isolation technique, and placed on tooth enamel (outer tooth surface) that has been cleaned and etched. <p>An analysis of nine clinical studies with a randomized, half-mouth, clinical trial design and seven studies with observational study designs found good evidence that sealants are efficacious and effective in high-caries-risk children as long as the sealant is retained. Sealants are more effective in preventing further caries and providing cost savings in a shorter time span if placed in children who have high rather than low caries risk.</p> <p>Another comparison on the costs of sealant delivery strategies also showed that among high-risk populations for dental caries, less cost and reduced caries results from placing sealants on all children of a high-risk population versus only placing sealants for those children assessed to be at risk by individual screening. Among low-risk populations for dental caries, less cost results from placing sealants only for children assessed to be at risk by individual screening, compared to the strategies of placing sealants on all children or not providing any sealants.</p>
<p>Limitations of the review</p>	<p>This is an expert report from the Association of State and Territorial Dental Directors and not a formal review of the evidence – it cites various reviews. It also describes the best practice from various States operating a school-based FS programme.</p> <p>The paper is 10 years old and focuses on the situation in the USA.</p>

Review	Task Force on Community Preventive Services. Reviews of evidence on interventions to prevent dental caries, oral and pharyngeal cancers, and sports-related craniofacial injuries. Am J Prev Med 2002;23(1 suppl):21-54.
Authors	Truman BI, Gooch BF, Sulemana I, et al; This report is authored by American academics working as a Task Force under the guidance of the Centres for Disease Control.
Relevance of review to guidance under development	<p>This report is of direct relevance to the guidance under development. It suggests that school based fissure sealant programmes are very effective (median caries reduction of 60%) vs against untreated controls. The report suggests that similar effects have been seen in studies conducted both in the USA and in other countries (Guam, the United Kingdom, Australia, Spain, Thailand, and Colombia).</p> <p>The paper concludes that according to <i>Community Guide</i> rules of evidence (guidance published by CDC on adoption of community programmes), strong evidence shows that school-based and school-linked sealant delivery programs are effective in reducing decay in pits and fissures of children’s teeth. The report was published in 2003 and it is unknown to what degree this conclusion currently applies in the UK.</p> <p>Recommendation: While this review demonstrates the effectiveness of school-based fissure sealant programmes, it is difficult to say to what extent these results are directly relevant to Local Authorities planning an oral health improvement programme.</p>
Review Aims	This report presents the results of systematic reviews of effectiveness, applicability, other positive and negative effects, economic evaluations, and barriers to use of selected population-based interventions intended to prevent or control dental caries, oral and pharyngeal cancers, and sports-related craniofacial injuries. The section on school-based fissure sealant programmes are the focus of this commentary.
Review Methodology	The details of the search strategy employed is not given, but studies included had baseline caries determination between the 1970s and 1990s. The children involved ranged from 6 – 17 years. The authors report that the search identified 37 studies on the effectiveness of school-based or school-linked sealant delivery programs in reducing cumulative measures of dental caries incidence or prevalence. Of these 27 were excluded. Reasons for exclusion included, insufficient data for quality scoring, limitation in execution or design, lack of appropriate effect measure.
Review Conclusions	From the 10 included studies (22 estimates of effect), exposure to school-based or school-linked sealant delivery programs was associated with a median relative decrease in dental caries experience of 60% (range, 5% to 93%). Effect sizes were similar for studies in the United States (4 studies, 10 estimates of effect) and those outside the United States (6 studies, 12 estimates of effect). They showed a median relative decrease in cumulative caries experience of 60% (range, 23% to 78%) versus 60% (range, 5% to 93%), respectively. School-based programs showed a higher median effect (65%; range, 23% to 93%) than school-linked

	programs (37%; range, 5% to 93%). Programs in which sealants were re-applied at some point between initial application and follow-up showed a higher median effect (65%; range, 23% to 93%) than programs in which sealants were not re-applied (30%; range, 5% to 93%).
Limitations of the review	It is not clear that this review was a formal systematic review of the evidence but steps have been taken to apply some evidence criteria to the included studies. The studies cover both the United States and elsewhere, with no reported differences in school-based FS programmes between countries.

Review	Comparing the costs of three sealant delivery strategies. Journal of Dental Research, 2002, 81, 641-645.
Authors	Griffin SO, Griffin PM, Gooch BF, and Barker, LK. (2002) The authors are based at the Centres for Disease Control, Atlanta, Georgia.
Relevance of review to guidance under development	<p>This report presents primary research which involved building an economic model to determine the cost-effectiveness of various approaches to the provision of fissure sealant within a community based programme.</p> <p>The information presented is of value only in that it suggests a relationship between caries increment and the costs associated with a FS programme – when caries is sufficiently severe, it becomes cost-effective to adopt a high-risk population approach as opposed to individual assessed targeted approach.</p> <p>Recommendation: These data do not translate to the current situation in the UK. However the principle of a high-risk population approach is supported by the American data presented here.</p>
Review Aims	This study is an economic analysis which examined the relative cost effectiveness of 3 sealant delivery strategies: Seal none (SN); seal if the child is determined, through screening, to be at risk for future caries (TARGET); and seal all (SA).
Review Methodology	<p>The authors calculated the incremental cost, incremental effectiveness, and incremental cost-effectiveness (additional cost divided by additional effectiveness) of SA vs. TARGET, SA vs. SN, and TARGET vs. SN. After ranking strategies by dominance (ruling out strategies that were more costly and less effective), we used one-, two-, and three-way sensitivity analysis to examine the stability of the rankings.</p> <p>A list of assumptions made in building the model are given namely, a nine-year analytic horizon, a 3% discount rate, and zero screening costs. Estimates for sealant costs (\$27.00) and restoration costs (\$73.77), annual caries increment (0.0624 surfaces), sealant failure rate (20% in yr 1 and 3% thereafter), annual amalgam failure rate (4.6%), and sensitivity (0.635) and specificity (0.795) of screening were obtained from published studies.</p>
Review Conclusions	The authors summarised their findings as follows. Under baseline assumptions, TARGET dominated (cost less and reduced caries) SA and SN. If annual caries increment exceeded 0.095 surfaces, SA dominated TARGET, and if increment exceeded 0.05 surfaces, TARGET dominated SN. If sealant costs decreased to \$6.00 (reported cost for school programs), TARGET dominated SN for caries increments exceeding 0.007 surfaces, and SA dominated TARGET for caries increments exceeding 0.034 surfaces.

	<p>The authors stated that if we assume that the effectiveness of sealants does not vary by delivery site, in school-based/-linked sealant programs, SA could be less costly than SN for annual caries increments as low as 0.018 and less costly than TARGET for annual attack rates of 0.035 or higher. These findings suggest that, over a nine-year horizon, individualized risk assessment of children enrolled in most school-based programs may be unnecessary. School-based programs generally target low-income children who are less likely than higher-income populations to receive preventive services and to have a regular source of care.</p>
<p>Limitations of the review</p>	<p>The data presented in this report is derived from an economic model, with all of the inherent limitations and assumptions entailed in deriving the information to build the model. The data are more than a decade old and relate to the USA.</p>

Review	Fluoridated milk for preventing dental caries. Cochrane Database of Systematic Reviews.(3):CD003876, 2005. 2005;(3):CD003876.
Authors	Yeung CA, Hitchings JL, Macfarlane TV et al. This is a Cochrane review conducted by academics at Manchester and Aberdeen Universities.
Relevance of review to guidance under development	This review provides important information in the context of the current review. This review found only two studies demonstrating effectiveness of milk fluoridation. Recommendation: This review taken in the context of the current review and in combination with the Ketley et al. study referred to in the Bazian review and a recently completed PhD by Geraldine Foster at the University of Manchester, a process evaluation of a milk fluoridation scheme in the North West of England, suggests that there is insufficient evidence to include milk as a vehicle for the delivery of fluoride to vulnerable children.
Review Aims	This systematic review aimed to determine the effectiveness of fluoridated milk, as a means of delivering fluoride on a community basis, for preventing dental caries.
Review Methodology	<i>Search methods</i> The authors searched the Cochrane Oral Health Group Trials Register (28 April 2005), Cochrane Central Register of Controlled Trials (CENTRAL) (The Cochrane Library 2005, Issue 2), MEDLINE (1966 to 17May 2005), OLDMEDLINE (1950 to 1965), EMBASE (1980 to 2005 week 20), LILACS (1982 to 17May 2005), BBO (1986 to 17May 2005), SIGLE (1980 to 17May 2005), Digital Dissertations (1861 to 17 May 2005) and reference lists of relevant articles. Attempts were made to identify both unpublished and ongoing studies. There were no language restrictions. <i>Selection criteria</i> Randomised or quasi-randomised controlled trials (RCTs), with an intervention or follow-up period of at least 3 years, Comparing fluoridated milk with non-fluoridated milk. Primary outcome was change in caries experience, as measured by changes in decayed, missing and filled figures on tooth (dmft/DMFT) and surface (dmfs/DMFS).
Review Conclusions	Two RCTs involving 353 children were included. For permanent teeth, after 3 years there was a significant reduction in the DMFT (78.4%, $P < 0.05$) between the test and control groups in one trial, but not in the other. The latter study only showed a significant reduction in the DMFT until the fourth (35.5%, $P < 0.02$) and fifth (31.2%, $P < 0.05$) years. For primary teeth, again there was a significant reduction in the dmft (31.3%, $P < 0.05$) between the test and control groups after 3 years in one study, but not in the other. The results could not be pooled because of the difference in concentration of fluoride in the milk.

	The authors concluded that there are insufficient studies with good quality evidence examining the effects of fluoridated milk in preventing dental caries. However, the included studies suggested that fluoridated milk was beneficial to school children, especially their permanent dentition. The data need to be supplemented by further RCTs to provide the highest level of evidence for practice.
Limitations of the review	None

Review	<p>Health promoting schools and health promotion in schools: two systematic reviews. Health Technology Assessment. 1999;3(22):1-207.</p>
Authors	<p>Lister-Sharp D. et al.</p> <p>This review was conducted by academics at the NHS Centre for Reviews and Dissemination in York and at University of Oxford and was published by the Health Technology Assessment Programme of the NHS R&D Programme. It was published in 1999.</p>
Relevance of review to guidance under development	<p>This extensive review looks at the concept of the health promoting school per se. One old (1979) Danish dental study using this approach is described.</p> <p>Recommendation: this review does not provide much useful evidence to directly inform the guidance under development.</p>
Review Aims	<p>The objectives of this study were to:</p> <ul style="list-style-type: none"> • evaluate the effectiveness of school-based health promotion interventions through: <ul style="list-style-type: none"> ○ a systematic review of primary studies of the effectiveness of the health promoting schools approach ○ a systematic review of existing reviews of the effectiveness of other health promoting interventions in schools in the following areas: nutrition, exercise, safety, psychological aspects of health, sexual health, substance use, personal hygiene, environmental issues and family life education • indicate areas where further research is needed • make recommendations for practice in the UK, if research findings permit.
Review Methodology	<p><i>Study selection</i></p> <p>To be included in the review of the effectiveness of the health promoting schools approach, studies had to:</p> <ul style="list-style-type: none"> ○ be controlled studies or before-and-after studies evaluating school-based interventions involving health promoting activity in each of three areas: <ul style="list-style-type: none"> (i) the school ethos and/or environment, (ii) the curriculum, (iii) the family and/or community; and demonstrate active participation by the school ○ provide information about the components and delivery of the intervention ○ report all evaluated outcomes. <p>To be included in the review of existing reviews of health promotion in schools, reviews of effectiveness of health promotion interventions in schools had to:</p> <ul style="list-style-type: none"> ○ provide evidence of a systematic search ○ assess the quality of the research

	<ul style="list-style-type: none"> ○ include some studies with a comparison group or some before-and-after studies ○ report study details such as number of participants, give some details of the content of the interventions evaluated and include primary preventive interventions using a population approach. <p><i>Data sources</i> The following electronic databases were searched: ASSIA, BIDS, British Education Index, CINAHL, DHSS Data, Dissertation Abstracts, EMBASE, ERIC, MEDLINE, PsycINFO, PsycLIT, SIGLE, Sociofile. Reference lists were checked to identify other relevant studies, relevant web pages were scanned, and requests for unpublished data were made to people working in the field.</p> <p>Studies identified The search identified 1067 titles and abstracts relevant to health promoting schools. Of these, 111 appeared to be either useful background material or evaluations of interventions and were obtained. Twelve studies met the inclusion criteria.</p> <p>Over 200 reviews of the effectiveness of school health promotion were identified. Of these, 32 met the inclusion criteria.</p>
Review Conclusions	<p>For the major topics examined the following conclusions were reported</p> <p>The health promoting schools approach The health promoting schools initiative is a new, complex, developing initiative, and the optimum method of evaluation is currently under debate. There are indications that this approach is promising. The development of programmes to promote mental and social well-being would be likely to improve overall effectiveness and the impact of staff health and well-being needs more consideration. The development of measures of mental and social well-being is important for future evaluation. Continued investment, and ongoing evaluation are necessary to provide evidence about the effectiveness of this approach.</p> <p>Health promotion in schools This review of reviews has shown that school health promotion initiatives can have a positive impact on children’s health and behaviour but do not do so consistently. It would appear that most interventions are able to increase children’s knowledge but that changing other factors which influence health, such as attitudes and behaviour, is much harder to achieve, even in the short-term. Overall, a multifaceted approach is likely to be most effective, combining a classroom programme with changes to the school ethos and/or environment and/or with family/community involvement. This is consistent with the health promoting schools approach.</p>

	<p>Only one dental study, a 1979 study in Denmark was identified in the health schools review. This included theory and detailed instruction of tooth brushing and other oral health techniques. The dental health programme also encouraged parental support and provided parents with written information about the prevention of common oral diseases. This found that increasing curriculum input and parental involvement produced no significant differences between the dental health of the intervention group and those receiving usual care – which included free toothpaste and regular fluoride rinses.</p> <p>In the review of reviews, under the personal hygiene section the Kay and Locker and Sprod reviews were identified and are discussed (see commentary on these reviews elsewhere in this report).</p>
<p>Limitations of the review</p>	<p>This is a substantial review running to 203 pages and examined the concept of “the health promoting school”. Dental and oral health was not amongst the topics searched for. However the review did identify a 1973 Danish study which had engaged with the health promoting school concept.</p>

Review	<p>Maternal and Child Oral Health - Systematic Review and Analysis. Ministry of Health NZ. Wellington, NZ: 2009.</p>
Authors	<p>Murdoch Children's Research Institute.</p> <p>This review undertaken on behalf of the ministry of Health in New Zealand was undertaken by dental academics working at the Murdoch Children's Research Institute, Parkville, Victoria, Australia.</p>
Relevance of review to guidance under development	<p>This review is of limited relevance to the guidance currently under development. Probably the most relevant elements are the findings that relate to Question 5 i.e. improving the oral health of mothers is likely to be beneficial for the oral health of their off-spring and that Programs which provide one on one education and support to mothers are also likely to result in significant benefit particularly where they involve outreach into family homes.</p> <p>Recommendation: Aspects of this review provide evidence in the area of one to one education in the area of child health and preventing early childhood caries. However, the review overall is very much focussed on individuals and not public health or community programmes.</p>
Review Aims	<p>The aim of this report was to establish the contemporary evidence regarding the impact of the oral health of pre and post natal women (with special emphasis on disadvantaged or marginalised women) on the oral health (ECC) in their offspring.</p> <p>The review sought to answer the following questions.</p> <p><i>Question 1.</i> What is the influence of maternal oral health on gestational and peri-natal events? Hypothesis. That poor maternal oral health predisposes to poor birth outcomes. Rationale; that poor maternal oral health (predominantly periodontal disease) has been linked with prematurity/low birth weight.</p> <p><i>Question 2.</i> What is the impact of maternal health and pre and peri-natal events on the development of developmental defects of enamel? Hypothesis. That poor maternal health and/or birth outcomes predispose to developmental defects of the primary teeth. Rationale: that developmental defects of primary teeth are associated with increased caries risk.</p> <p><i>Question 3.</i> What is the influence of maternal general health on the ECC experience in their offspring?</p>

	<p>Hypothesis. That poor maternal health is associated with increased caries experience in their infants Rationale: that the health and well-being of mothers influences their capacity to optimize their child’s oral health.</p> <p><i>Question 4.</i> What is the influence of maternal oral health on ECC experience in their offspring? Hypothesis. That poor maternal oral health is associated with increased caries experience in their infants. Rationale: that poor maternal oral health (predominantly caries) is associated with an increased risk of transmitting MS, the principal micro-organism associated with initiation of ECC.</p> <p><i>Question 5.</i> How effective are interventions involving mothers in reducing ECC in their infants? Hypothesis. That reducing maternal caries experience will reduce the caries experience of their infants. Rationale: targeting maternal oral health will, through a variety of pathways, improve infant oral health.</p>
<p>Review Methodology</p>	<p>This review took the form of a systematic review.</p> <p>Data bases and other sources of information included Medline, Embase, PyschInfo, Cinnahl, Infotrac, Cochrane Library, Ovid, Te Puna, and ProQuest. The grey literature was searched using the Google search engine with appropriate domain restrictions and through contact with other researchers and workers in the area. Personal and professional networks were also used to identify unpublished work that may fit inclusion criteria. Reference lists of retrieved papers were also scanned to identify further publications and sources. Search terms and strategies were developed with reference to those published in peer reviewed works and modified appropriately for each data base.</p> <p><i>Inclusion criteria</i> Only programs that reported evaluations were included. They may have included process, impact and/or outcome measures using qualitative and/or quantitative methods and must have oral health as either a primary focus or explicitly included and evaluated as a secondary focus.</p> <p><i>Search Strategies</i> Detailed search strategies are included as appendices, the searches being tailored to each of the five questions investigated. The years covered in relation to question 1 are 1997 to 2008. In the remaining searches it was not clear that any restriction in terms of years was applied.</p>
<p>Review Conclusions</p>	<p>Question 1: What is the influence of maternal oral health on gestational and perinatal events?</p>

	<p><i>Highest level of available evidence:</i> Type I Systematic Review <i>Strength of evidence:</i> Moderate</p> <ul style="list-style-type: none">• Periodontal disease in pregnancy is associated with higher risk of poor birth outcomes in women from disadvantaged groups.• Treatment of periodontal disease in pregnant women to reduce risk of poor birth outcomes is currently not supported by evidence however is likely to be beneficial.• Control of plaque for the treatment and prevention of periodontal disease is likely to be beneficial to both mother and child. <p>Question 2: What is the impact of maternal health and pre and perinatal events on the development of developmental defects of enamel?</p> <p><i>Highest level of available evidence:</i> Type IV Observational Study <i>Strength of evidence:</i> Low to moderate</p> <ul style="list-style-type: none">• Promotion of good prenatal maternal health and nutrition may lower risks of developmental defects of enamel in their child.• Children born prematurely or those with history of significant illness in early infancy should be considered high risk for developmental defects of enamel and therefore early childhood caries. <p>Question 3: What is the influence of maternal general health on the ECC experience in their offspring?</p> <p><i>Highest level of available evidence:</i> Type IV Observational Study <i>Strength of Evidence:</i> Low</p> <ul style="list-style-type: none">• Parental smoking, particularly by mothers may increase the risk of dental caries in their offspring. In addition to the more general health benefits, smoking cessation strategies targeted towards parents may have beneficial effects on future oral health of their child. <p>Question 4: What is the influence of maternal oral health on ECC experience in their offspring?</p> <p><i>Highest level of available evidence:</i> Type IV Observational Study <i>Strength of Evidence:</i> Moderate</p> <ul style="list-style-type: none">• Although there is no very strong evidence (i.e. RCTs) regarding the relationship between parental (especially
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	<p>maternal) oral health and that of their offspring, what evidence does exist is consistently supportive.</p> <ul style="list-style-type: none"> • Interventions which aim to improve the oral health of parents are likely to have beneficial effects on the oral health of their offspring. <p>Question 5. How effective are interventions involving mothers in reducing ECC in their infants?</p> <p><i>Highest level of evidence available:</i> Type II Randomised controlled trials <i>Strength of Evidence:</i> Moderate</p> <ul style="list-style-type: none"> • Primary-primary prevention programs which aim to reduce dental caries in children by improving the oral health of mothers are supported by available evidence. • Programs which provide one on one education and support to mothers are also likely to result in significant benefit particularly where they involve outreach into family homes. • The use of lay community members in interventions is supported by a limited number of local New Zealand studies identified in the grey literature but remains to be tested in the area of child dental health.
<p>Limitations of the review</p>	<p>This is a well conducted review covering a range of questions in the area of maternal and child oral health.</p>

Review	<p>A review of the effectiveness of oral health promotion activities among elderly people. Gerodontology 2009, vol. 26, pp. 85-96.</p>
Authors	<p>McGrath C, Zhang W, Lo EC.</p> <p>This review was conducted by dental academics based at the University of Hong Kong and Wuhan University, Wuhan, China.</p>
3Relevance of review to guidance under development	<p>This review is of relevance to the guidance under development in that it deals with a vulnerable group: elderly people. However, the major limitation is the large variety of outcomes measures and settings in which the studies were conducted, together with the focus on individual interventions rather than community programmes.</p> <p>Recommendation: this review is of limited help in development of the guidance due to the focus on individually randomised interventions, of a mainly clinical nature, rather than on community interventions, applicable to Local Authorities. The few “non-clinical” studies conducted in nursing homes are specifically outwith the scope of the current NICE review.</p>
Review Aims	<p>This study aimed to review the effectiveness of oral health promotion activities among elderly people.</p>
Review Methodology	<p>Four electronic databases (PubMed, Medline, Web of Science and Cochrane library) were searched using key words in the following way: ‘(elderly OR elders OR elderly people OR aged) AND (dental OR dentistry) AND (dental health education OR health promotion OR oral health OR dental hygiene OR preventive dentistry OR mouth diseases OR tooth injuries OR gum shields OR oral cancer OR toothpaste, mouthrinse OR floss OR varnish OR antimicrobial agent OR atraumatic restorative treatment OR plaque control OR behaviour training).</p> <p><i>Inclusion criteria</i></p> <p>Papers were selected if the combination of words appeared anywhere in the paper, were published over the 10-year period, 1997–2007, and were written in English. Multiple published reports from the same study contributed only once to the review. The reference list of each retrieved paper was reviewed and any journal appearing in the reference list was added to a list of journals to be manually searched.</p> <p><i>Outcome measures</i></p> <p>The outcome measure upon which the review rested was ‘oral health promotion’. The results were reported under the headings:</p> <ul style="list-style-type: none"> • dental caries • plaque, gingival and periodontal health and oral hygiene

	<ul style="list-style-type: none"> • Knowledge attitude and behaviour
<p>Review Conclusions</p>	<p>Following a screen of 13,904 papers resulting from the above search, 17 studies (18 papers) were deemed relevant to the review.</p> <p><i>Dental Caries</i> The review identified 6 studies where dental caries was a reported outcome measure. Various combinations of fluoride toothpaste / mouthwashes were trialed, with a positive impact in caries progression.</p> <p><i>Plaque, gingival health and oral hygiene</i> Nine studies were related to plaque, gingival health and oral hygiene. These studies largely centred on clinical interventions. They studies reported included the following interventions and outcomes:</p> <ul style="list-style-type: none"> (i) varying degrees of a bio-behavioural preventive programme:- those who received intra-oral prevention experienced less tooth loss. (ii) Scaling and oral health education vs scaling on request: (lower plaque scores in the former) (iii) Chlorhexidene chewing gum vs xylitol gum vs a no gum control: (lower plaque scores in the chlorhexidene gum group. (iv) Thymol varnish vs unspecified control: no effect on plaque score (v) Oral health education at an elderly centre (sic): no effect (vi) Chlorhexidene spray: concluded a single daily spray was as effective as twice daily spray (vii) Oral hygiene interventions in a long-term hospital setting for elderly people reported improvements in denture and dental hygiene when nursing staff received hands-on instruction and assumed responsibility for subjects' daily oral hygiene compared to the provision of oral hygiene measures every 3 weeks from hygienists. (viii) A cross-over clinical trial on the effectiveness of powered toothbrushes demonstrated that they were more effective in removing plaque and controlling gingivitis than manual tooth brushing over a 3-month period. In a pre-/post-single group intervention study of 30-day duration, the use of an ultrasonic toothbrush resulted in a significant reduction in PI and GI scores. <p><i>Knowledge, attitude and behaviour</i> Two studies provided results on changes in knowledge, attitude and behaviour.</p> <ul style="list-style-type: none"> (i) Invitation for an oral health referral among elders attending a preventive general health check significantly

	<p>increased dental attendance compared with not offering the invitation.</p> <p>(ii) In an 18-month clinical trial at a nursing home there was an observed change in attitude towards accessing dental care and in establishing dental contacts among subjects who were given a support system with specially trained oral care aides from the nursing staff compared to the control group where only basic oral health education was provided.</p> <p>Overall, the authors of this review concluded that in the 10 years under review (1997-2007) increasing attention has been paid to oral health promotion activities among the elderly population and high quality evidence has emerged. However, there is a need for even higher-quality research to provide more definitive guidelines on oral health promotion practices for elderly people.</p>
<p>Limitations of the review</p>	<p>This was a well conducted and reported review. Much of the focus of the review was on the quality of the reported studies and how this had improved over a previous review conducted between 1986 and 1996.</p> <p>The major limitation is the large variety of outcomes measures and settings in which the studies were conducted, together with the focus on individual interventions rather than community programmes.</p>

Review	<p>Does oral health promotion improve oral hygiene and gingival health? Periodontology 2000, 2005, vol. 37, pp. 35-47.</p>
Authors	<p>Watt RG and Marinho VC.</p> <p>The review authors are dental academics based at University College London</p>
Relevance of review to guidance under development	<p>While this is a well conducted work that reviews systematic reviews and recently published intervention studies that investigate how to improve oral hygiene and gingival health, the findings are of limited help in the development of the current guidance.</p> <p>The review shows that short term reductions in plaque and gingival (gum) bleeding scores are achievable by a range of educational interventions. However there were no studies on the effect of oral health promotion policy or consideration of multi-sectorial or common-risk-factors interventions. The reviews and studies examined cover populations in general and there is no specific focus on vulnerable groups.</p> <p>Recommendation: There are insufficiently focused or evidence based outcomes arising from this review to provide evidence that will assist in the development of the guideline.</p>
Review Aims	<p>This work is a review of reviews. It aimed to examine the quality of the methods and summarise the findings of oral health promotion effectiveness reviews and recent oral health promotion trials in relation to oral hygiene and gingival health. The specific objectives were:</p> <ul style="list-style-type: none"> • To search for and critically assess oral health promotion systematic reviews on the effectiveness of interventions in reducing plaque and gingival bleeding. • To search for and critically assess controlled trials published subsequent to the oral health promotion reviews on the effectiveness of interventions in reducing plaque and gingival bleeding. • To summarize qualitatively the evidence on the effectiveness of oral health promotion interventions in relation to plaque control and gingival bleeding.
Review Methodology	<p>A series of databases in the Cochrane Library and Medline (via Pubmed) were searched for: [(review OR overview OR meta analys* OR ((clinical or controlled) and trial)) and (hygiene OR plaque OR gingivitis OR gingival bleeding) and (dental OR oral) and health and (education OR promotion).]</p> <p><i>Inclusion / selection criteria</i></p> <p>Reviews included were limited to reports of systematic reviews and controlled trials (randomized or quasi randomized) which specifically stated that they assessed reductions in dental plaque levels and /or gingival bleeding (gingivitis) and</p>

	<p>compared health education / health promotion interventions not involving clinical professional input or the use of pharmacological interventions, such as antiplaque agents – these included school or community based programs / campaigns, professional instruction, self-instruction manuals / leaflets, home-visits, self-assessments, etc. Individual studies (trials) where the participants were from the general population, of all age groups and settings, were eligible for inclusion. Studies / trials involving special groups only, such as orthodontic patients, or involving only medically compromised groups were excluded. Studies / trials assessing only denture plaque were also excluded.</p> <p>In addition to the review of existing reviews the authors critically appraised experimental (intervention studies) published from 1995 onwards.</p> <p>The results are presented as a critical description of each systematic review and of trials published between 1995 and 2004.</p> <p>The authors identified 27 reports as potentially relevant studies (6 systematic reviews and 22 primary studies).</p>
<p>Review Conclusions</p>	<p>Quality of reviews A detailed assessment of the quality of the identified reviews highlighted a range of concerns. Particular areas of concern related to how focused the objectives of the reviews were and the comprehensiveness of the searches undertaken. None of the reviews searched for published and unpublished literature and considered all languages. Due to a lack of detail presented in the review methodologies, it was difficult to precisely determine other parameters of quality such as the appropriateness of the selection criteria and data synthesis. Other areas of weakness include the screening, data extraction and quality assessment of primary studies. Due to the limitations of the reviews, their conclusions should be viewed with a degree of caution.</p> <p>Nature and quality of recently published papers Of the 13 recently published trials, five were set in schools, four focused on adults either in a clinical or workplace setting, three targeted older people, and one, infants. All the trials evaluated educational interventions. The design quality of the trials was variable. A range of different methods were used to assess plaque and bleeding scores.</p> <p>Plaque and gingival bleeding outcomes The authors concluded that due to the variability in the quality of the systematic reviews undertaken, the findings produced were somewhat diverse. However, all the reviews identified that a reduction in plaque and gingival bleeding were achieved in the short term in the majority of studies reviewed. Precise estimates on the magnitude of the improvement are difficult to assess due to the range and diversity of outcome measures used. Very limited evidence</p>

	<p>supports any long-term reduction in plaque and gingival bleeding outcomes. The clinical and public health significance of short-term reductions in plaque and gingival bleeding outcomes is not clear. Conflicting conclusions were reached concerning the relative effectiveness of different types and styles of educational interventions. Three of the reviews highlighted the benefit of implementing more elaborate interventions, whereas the other two reviews failed to detect any difference between simple and more complex interventions.</p> <p>In the recently published trials, positive effects on plaque and /or bleeding outcomes were produced in eight studies. Although all of the studies evaluated educational interventions, no clear indication that any particular type or style of educational approach was more effective has been obtained.</p>
<p>Limitations of the review</p>	<p>This is a useful review in that it focuses on interventions to remove dental plaque and reduce gingival inflammation.</p> <p>However the lack of standardised outcome measures made direct comparison of studies difficult. None of the studies assessed or evaluated policy development or other forms of health promotion action.</p> <p>The review examined all age groups but there was no specific focus on population groups deemed vulnerable to poor oral health.</p>

Review	Evidence summary: Achieving equity in community-based obesity prevention intervention for children and adolescents, Geelong: CO-OPS Secretariat, Deakin University.
Authors	Clark R, Waters E, Armstrong R, Conning R, Petrie R. 2009. This evidence summary was produced by the Public Health Evidence and Knowledge Translation Research Groups at the University of Melbourne, Australia on behalf of the Collaboration of Community-based Obesity Prevention sites (the CO-OPS Collaboration). This group is working to develop a collaborative approach to assist the knowledge translation and exchange amongst practitioners and stakeholders who are involved in Community-based Obesity Prevention Initiatives.
Relevance of review to guidance under development	This review contains nothing of relevance to the guidance under development. Recommendation: Exclude this guidance from any further consideration in the development of the current guidance.
Review Aims	As the title suggests, this review was designed to summarise the evidence about achieving equity and relevance in community-based obesity prevention interventions for children and adolescents aged 0-18 years. This was considered important as obesity prevention programs in the community are becoming widespread, and are often implemented community-wide across various settings such as schools, local and non-government settings and community organisations.
Review Methodology	The evidence provided was based on review of 20 systematic reviews and one meta-analysis of obesity prevention interventions conducted between 2004 and 2009. The inclusion criteria for the systematic reviews were as follows: <ul style="list-style-type: none"> • Population: Included children aged 0-18 years • Interventions: Obesity prevention interventions • Outcomes: BMI, skinfold, waist measurements and adiposity were outcomes which had to have been reported on • Study designs: Included in the systematic reviews were randomised controlled trials, cluster randomised controlled trials, controlled clinical trials, controlled before and after and quasi-experimental The exclusion criteria for the systematic reviewers were: <ul style="list-style-type: none"> • Reviews conducted prior to 1999 The extent to which reviews were considered 'equity relevant' was assessed using a checklist based on a number of equity-related dimensions: Place of residence; Race / ethnicity / culture; Occupation; Gender; Religion; Education; Socio-economic

	<p>position and Social capital and networks [PROGRESS]. Reviews were scored as low, moderate or high in terms of equity relevance. The checklist observes whether a review paper considers each dimension in selecting (baseline) and assessing (outcome) studies. The conclusions of the reviews were used to guide recommendations with consideration given to equity where possible.</p>
<p>Review Conclusions</p>	<p>No reviews considered equity directly when examining the prevention of obesity in children and adolescents although some reviews did consider equity in their methods and interpretation of findings. In assessing equity relevance, 2 reviews scored high, 6 scored moderate and 13 scored low.</p> <p>This evidence summary concluded that there is not enough conclusive evidence around preventing obesity in childhood and adolescence, the evidence that exists is not strong enough to be relied upon wholly and consideration of equity in intervention research and systematic reviews is lacking.</p> <p>The summary statements are very generic and refer to promoting good nutrition in the context of preventing obesity.</p>
<p>Limitations of the review</p>	<p>This review/evidence summary was not a review of primary data. A number of summary statements are made based on the evidence and conclusions in the 21 reviews.</p> <p>Nothing in this review/evidence summary makes reference to oral health in the context of nutrition and no reference is made to the possible common risk factor / preventive interventions in the context of both oral health and obesity.</p>

Reference to reviews subject to commentary.

Ahovuo-Saloranta A, Forss H, Walsh T, Hiiri A, Nordblad A, Mäkelä M, Worthington HV. Sealants for preventing dental decay in the permanent teeth. *Cochrane Database of Systematic Reviews* 2013, Issue 3. Art. No.: CD001830. DOI: 10.1002/14651858.CD001830.pub4.

Association of State and Territorial Dental Directors. (2003) School-based dental sealant programmes. Report of the Association of State and Territorial Dental Directors. www.astdd.org/school-based-dental-sealant-programs.

Clark R, Waters E, Armstrong R, Conning R, Petrie R. 2009, Evidence summary: Achieving equity in community-based obesity prevention intervention for children and adolescents, Geelong: CO-OPS Secretariat, Deakin University. <http://www.co-ops.net.au/File.axd?id=e1cd284f-e24f-4862-a30a-e47affbfb52>

Gooch BF, Griffin SO, Gray SK et al. Preventing dental caries through school based sealant programs: updated recommendations and reviews of evidence. [Review] [66 refs]. *Journal of the American Dental Association*. 2009;140(11):1356-65. [http://www.ncbi.nlm.nih.gov/pubmed/?term=Gooch+BF%2C+Griffin+SO%2C+Gray+SK+et+al.+Preventing+dental+caries+through+school+based+sealant+programs%3A+Journal+of+the+American+Dental+Association.+2009%3B140\(11\)%3A1356-65](http://www.ncbi.nlm.nih.gov/pubmed/?term=Gooch+BF%2C+Griffin+SO%2C+Gray+SK+et+al.+Preventing+dental+caries+through+school+based+sealant+programs%3A+Journal+of+the+American+Dental+Association.+2009%3B140(11)%3A1356-65).

Kay E, Locker D. A systematic review of the effectiveness of health promotion aimed at improving oral health. *Community Dental Health*. 1998;15(3):132-44. <http://www.ncbi.nlm.nih.gov/pubmed/10645682>

Kay EJ and Locker D. 1997, Technical report 20. Effectiveness of oral health promotion: A review London, Health Education Authority <http://www.nice.org.uk/niceMedia/documents/effectivenessoralhealth.pdf>

Lister-Sharp D. et al. Health promoting schools and health promotion in schools: two systematic reviews. *Health Technology Assessment*. 1999;3(22):1-207. [B] <http://www.hta.ac.uk/fullmono/mon322.pdf>

Marinho VCC, Higgins JPT, Logan S, Sheiham A. Fluoride gels for preventing dental caries in children and adolescents. *Cochrane Database of Systematic Reviews* 2002, Issue 1. Art. No.: CD002280. DOI: 10.1002/14651858.CD002280.

Marinho VC, Higgins JP, Logan S, Sheiham A. 2003, Fluoride mouthrinses for preventing dental caries in children and adolescents, *Cochrane Database of Systematic Reviews*, CD002284. [R+B] <http://www.ncbi.nlm.nih.gov/pubmed/12917928>

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Marinho VC, Higgins JP, Sheiham A, Logan S. 2003, Fluoride toothpastes for preventing dental caries in children and adolescents, Cochrane Database of Systematic Reviews, CD002278. <http://www.ncbi.nlm.nih.gov/pubmed/12535435>

Marinho VCC, Higgins JPT, Logan S, Sheiham A. Topical fluoride (toothpastes, mouthrinses, gels or varnishes) for preventing dental caries in children and adolescents. *Cochrane Database of Systematic Reviews* 2003, Issue 4. Art.No.: CD002782. DOI: 10.1002/14651858.CD002782.

Marinho VCC, Higgins JPT, Sheiham A, Logan S. One topical fluoride (toothpastes, or mouthrinses, or gels, or varnishes) versus another for preventing dental caries in children and adolescents. *Cochrane Database of Systematic Reviews* 2004, Issue 1. Art. No.: CD002780. DOI: 10.1002/14651858.CD002780.pub2.

Marinho VCC, Worthington HV, Walsh T, Clarkson JE. Fluoride varnishes for preventing dental caries in children and adolescents. *Cochrane Database of Systematic Reviews* 2013, Issue 7. Art.No.: CD002279. DOI: 10.1002/14651858.CD002279.pub2.

Marinho VCC, Higgins JPT, Sheiham A, Logan S. Combinations of topical fluoride (toothpastes, mouthrinses, gels, varnishes) versus single topical fluoride for preventing dental caries in children and adolescents. *Cochrane Database of Systematic Reviews* 2004, Issue 1. Art. No.: CD002781. DOI: 10.1002/14651858.CD002781.pub2.

McGrath C, Zhang W, Lo EC. 2009, A review of the effectiveness of oral health promotion activities among elderly people, *Gerodontology*, vol. 26, pp. 85-96. <http://www.ncbi.nlm.nih.gov/pubmed/?term=McGrath+C%2C+Zhang+W%2C+Lo+EC.+2009%2C+A+review+of+the+effectiveness+of+oral+health+promotion+activities+among+elderly+people%2C+Gerodontology%2C+vol.+26%2C+pp.+85-96>.

Murdoch Children's Research Institute. Maternal and Child Oral Health - Systematic Review and Analysis | Ministry of Health NZ. Wellington, NZ: 2009. [B] <http://www.health.govt.nz/publication/maternal-and-child-oral-health-systematic-review-and-analysis>

Rogers JG. (2011) Evidence-based oral health promotion resource. Government of Victoria Department of Health, Melbourne. [http://docs.health.vic.gov.au/docs/doc/1A32DFB77FEFBE9CCA25789900125529/\\$FILE/Final%20Oral%20Health%20Resource%20May%202011%20web%20version.pdf](http://docs.health.vic.gov.au/docs/doc/1A32DFB77FEFBE9CCA25789900125529/$FILE/Final%20Oral%20Health%20Resource%20May%202011%20web%20version.pdf)

Sprod A, Anderson R, Treasure E. 1996, Effective oral health promotion: Literature review, Technical report Number 20. Cardiff, University of Wales, College of Medicine

Truman BI, Gooch BF, Sulemana I, et al; Task Force on Community Preventive Services. Reviews of evidence on interventions to prevent dental caries, oral and pharyngeal cancers, and sports-related craniofacial injuries. *Am J Prev Med* 2002;23(1 suppl):21-54.

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Watt RG (2005) Strategies and approaches in oral disease prevention and health promotion. Bulletin of the World Health Organization, 83(9): 711-718.

Watt RG and Marinho VC. 2005, Does oral health promotion improve oral hygiene and gingival health?, Periodontology 2000, vol. 37, pp. 35-47. [R+B]
<http://onlinelibrary.wiley.com/doi/10.1111/j.1600-0757.2004.03796.x/abstract>

Yeung CA, Hitchings JL, Macfarlane TV et al. Fluoridated milk for preventing dental caries. [Review] [44 refs]. Cochrane Database of Systematic Reviews.(3):CD003876, 2005. 2005;(3):CD003876.
[http://www.ncbi.nlm.nih.gov/pubmed/?term=Yeung+CA%2C+Hitchings+JL%2C+Macfarlane+TV+et+al.+Fluoridated+milk+for+preventing+dental+caries.+%5BReview%5D+%5B44+refs%5D.+Cochrane+Database+of+Systematic+Reviews.\(3\)%3ACD003876](http://www.ncbi.nlm.nih.gov/pubmed/?term=Yeung+CA%2C+Hitchings+JL%2C+Macfarlane+TV+et+al.+Fluoridated+milk+for+preventing+dental+caries.+%5BReview%5D+%5B44+refs%5D.+Cochrane+Database+of+Systematic+Reviews.(3)%3ACD003876)