Developing a framework for priority-setting in evidence synthesis: a case study of Cochrane Oral Health

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AGP	aerosol generating procedure
AMSTAR	A MeaSurement Tool to Assess systematic Reviews
CADTH	Canadian Agency for Drugs and Technology in Health
CDHE	Catastrophic dental health expenditure
CDSR	*Cochrane Database of Systematic Reviews*
CEA	Cost-effectiveness analysis
CHNRI	Child Health and Nutrition Research Initiative
COH	Cochrane Oral Health
COHRED	Council on Health Research and Development
DCPs	Dental Care Professionals
DUETS	Database of Uncertainties about the Effects of Treatments
ECC	Early childhood caries
ENHR	Essential National Health Research
GEEOH	Global Evidence Ecosystem in Oral Health
GEM	Global Evidence Mapping
GBD	Global burden of disease
GFHR	Global Forum for Health Research
ICTRP	International Clinical Trials Registry Platform
JLA	James Lind Alliance
MOSS	Cochrane Musculoskeletal, Oral, Sensory and Skin Network
NaCTeM	National Centre for Text Mining
NICE	National Institute of Health and Care Excellence
PICO	Participants, Intervention, Comparator and Outcomes
PPE	personal protective equipment
PPI	patient and public involvement
PROSPERO	International Prospective Register of Systematic Reviews
PSP	Priority Setting Partnership
QALY	quality-adjusted life year
REPRISE	REporting guideline for PRIority SEtting of health research
SDCEP	Scottish Dental Clinical Effectiveness Programme
SPARK	Center for Systematic Reviews on Health Policy and Systems Research (University of Beirut, Lebanon)
WHO	World Health Organization

Abstract

Background: The aim of this research was to develop and present a framework for setting priority questions in evidence synthesis. Cochrane Oral Health (COH), an international research group tasked with the production of systematic reviews in oral health was used as a case study to test the framework.

Methods: The priority setting literature was examined for themes to form the framework. Five phases of the research were established from the literature: information gathering, stakeholder consultation, mapping and ranking the results, implementation, and evaluation. The information gathered in phase one included data on how COH's existing reviews were being used, areas where new studies were being registered that might go into new systematic reviews, and an analysis of guidelines to look for evidence gaps. Stakeholders were consulted in an open survey, and the results of the James Lind Alliance Priority Setting Partnership in Oral Health were also incorporated. The priority questions established by these phases of the research were mapped against COH's existing reviews to establish which reviews might be updated and where there may be scope for a new review. An international panel of stakeholders was convened to rank the final priorities so that the number of priority topics was congruent with COH's resources. An implementation plan was written in consultation with COH, using an established tool to guide decision making. Finally, an evaluation of the priority setting process was undertaken using an existing best practice checklist and the mandatory standards for priority setting set by Cochrane.

Results: The information gathering phase provided important context to the priority setting process, revealing that caries prevention and management were the most prevalent topics in terms of usage of existing reviews. Examination of new studies registered showed that there may be some new priority areas for COH to explore, although most of the studies identified would fit into COH's existing reviews. The examination of evidence gaps found a large number of uncertainties identified by guideline developers, and once again, the prevention of oral disease, particularly caries, was an important theme. The information gathering phase also identified some weaknesses in the evidence-base in oral health however, which called into question whether some of the uncertainties were genuine evidence gaps. The stakeholder consultation phase found that the prevention and treatment of oral disease were the priorities, and stakeholders were interested in evidence which supports their day-to-day oral hygiene regime. They were also concerned with vulnerable groups that may be at high risk of developing oral disease. Mapping the data from these two phases onto COH's existing reviews resulted in 26 new topic areas and 51 priority reviews to update. These were ranked by an international panel convened to produce a top 15 new reviews and a top 30 to be updated, in line with COH's business plan. The implementation phase produced an implementation plan, to integrate the identified priorities into COH's workflow, and the tool used to guide implementation proved to be a useful and pragmatic. The final evaluation of the priority setting process found that the framework directed a priority setting process that met all of Cochrane's mandatory standards and generally performed well against the existing good practice checklist.

Conclusion: The framework developed during the course of this research was pragmatic and flexible, and produced a manageable number of systematic reviews for COH to undertake. The research also revealed some issues with the evidence base in oral health, which may be resolved by evidence producers working more closely with guideline developers and other stakeholders.

Declaration

No portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

Copyright statement

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Preface: about the author

For the past thirteen years I have worked as information specialist at Cochrane Oral Health, a research group specialising in systematic reviews, based in the Division of Dentistry, School of Medical Sciences at the University of Manchester. My background is in library and information management, I gained an MA with distinction in the discipline in 2001, after studying history and literature for my undergraduate degree. I then went on to study for an MPhil in information and knowledge management at Manchester Metropolitan University. Working as an information specialist for Cochrane is an extremely fulfilling career, both in terms of the work itself and the opportunities it brings. Helping international teams of reviewers to find the studies they need to complete their reviews is intellectually challenging and always interesting. But I have also been able to branch out and explore my other interests which include scientific communication and knowledge dissemination. I set up and developed Cochrane Oral Health's social media channels and blog, and now also edit the group's newsletter and website, with the aim of reaching a wide audience with Cochrane evidence. Communicating clearly and concisely the results of often complex reviews is difficult but very rewarding. From 2012 to 2019, I was also seconded to work for Cochrane to train and mentor others in their role as information specialist. Teaching and training others to do the job has been a real highlight of my working life, and has brought me numerous new skills and confidence.

My interest in priority setting originally came from collecting statistical information on Cochrane Oral Health's reviews, and looking into how they were being used and by whom. It was always my feeling that the group were not making the best use of this information, and that it could give a real steer on where to concentrate the group's efforts in time and resources. My interest in knowledge dissemination also made me understand the importance of including stakeholders: knowing who our audience are and what they want is a key part of priority setting. Priority setting as a topic thus combines my interests in information retrieval and scientific communication, and seemed a good fit with my knowledge and experience of evidence synthesis. I was also offered the opportunity to be part of Cochrane's Embedding Prioritisation Working Group in 2018, which was set up to enable priority setting amongst Cochrane's different entities. As part of this group I helped to write Cochrane's guidance on priority setting, and facilitated workshops online and face-to-face at Cochrane's annual colloquia. This thesis was inspired by the many people involved in that group, and I thank them all.

Chapter One: Background and Introduction

1.1 Introduction

"Without national priorities for health, countries cannot guide research expenditure, promote science, technology, innovation for health; stimulate human resource development for research nor negotiate with partners for targeted funding and long term efforts"

(Council on Health Research for Development, 2010, p. 6)

Research in healthcare should address questions of relevance to make it meaningful for society (Karimkhani *et al*, 2016, p. 1152). Funding is often limited, as are other resources such as time and personnel (Bero and Binder, 2013, p. 472), and so it is important to understand which health care research topics have value, and which should take priority over others. Given the scarce resources available, the issue of research waste should also be considered; an effective prioritisation process means that the needs of potential users of research are met. It is also important to determine that research has not been done before, or is not currently in progress, before embarking on a new research project. Involving people in unnecessary and unimportant research is unethical and wastes resources. (Chalmers *et al*, 2014, p. 156). Glasziou and Chalmers (2016) have stated that "85% of health research is being avoidably wasted". This is an alarming number, but despite the importance of prioritising research questions and undertaking only necessary research, the process of setting priorities is controversial (Hall *et al*, 2018, p. 444). A concentration on particular areas of research implies a disinvestment in other areas, and the question of whose values should be taken into account and how when deciding where resources are most effectively deployed in health research remains open (Hall *et al*, 2018, p. 445). It is therefore imperative that priorities are set using a robust, transparent framework, tested in a real-world context.

Cochrane Oral Health (COH) is a research group specialising in evidence synthesis. The research documented in this thesis is a prioritisation process, designed to ensure that the topics covered by COH's systematic reviews are both relevant to consumers and clinically important (Worthington, Clarkson and Weldon, 2015, p. 69).

1.1.1 Aim and objectives

The aim of this research project is to present and test a framework for priority setting in evidence synthesis, using COH as a case study. The objectives are:

1. To examine the existing literature for themes to develop a new framework for priority setting in evidence synthesis;

2. To gather information and data relevant to Cochrane Oral Health to support priority setting from existing sources and stakeholders;

3. To apply the priority setting framework to COH's work, and develop a plan with COH for implementing the results;

4. To evaluate the strengths and weaknesses of the framework, and make recommendations for adapting the framework for other groups involved in evidence synthesis.

This introductory chapter sets the context for this research project by providing a brief background to COH, and an overview of Cochrane's approach to priority setting, particularly addressing the question of whose values should be taken into consideration when setting priorities. COH has previously undertaken a priority setting exercise (Worthington, Clarkson and Weldon, 2015, p. 69), and this is also explored, alongside the reasons why the methods used in this exercise are no longer deemed to be adequate. A new framework for priority setting, to be tested in the research is presented, with four distinct phases and an evaluation set out. Finally, an unexpected challenge to the research emerged in 2020, as the Covid-19 pandemic became a global health emergency (Rothan and Byrareddy, 2020). The implications of this for dentistry are briefly discussed in this introduction, along with an explanation of how this was managed in the research.

1.2 Background to Cochrane Oral Health

COH is an international group of researchers publishing evidence syntheses in the field of oral health. Evidence syntheses in this case are systematic reviews of randomised controlled trials, although there are a small number of reviews which have a wider criteria of included studies. Khan *et al* (2003) define a systematic review thus: "A review earns the

adjective systematic if it is based on a clearly formulated question, identifies relevant studies, appraises their quality and summarizes the evidence by use of explicit methodology. It is the explicit and systematic approach that distinguishes systematic reviews from traditional reviews and commentaries." To put this in a Cochrane context, a systematic review "summarises the results of available carefully designed healthcare studies (controlled trials) and provides a high level of evidence on the effectiveness of healthcare interventions. Judgments may be made about the evidence and inform recommendations for healthcare." (Cochrane Consumer Network, 2016).

Over 900 volunteers from 40 countries are involved in authoring over 200 COH systematic reviews, which are published in the *Cochrane Database of Systematic Reviews* (CDSR) in the *Cochrane Library* (Cochrane Oral Health, 2016a, 2016b). The volunteers are usually researchers and clinicians working in the topic area who also have some knowledge of systematic review methodology, but there is also scope for involving patients or carers of patients as authors of Cochrane reviews (Cochrane, 2021).The definition used for the scope of the group's work is "the prevention, treatment and rehabilitation of oral, dental and craniofacial diseases and disorders." (Cochrane Oral Health, 2016b). As such, the area of interest includes oral surgery, orthodontics, cleft lip and palate disorders, oral cancer, oral medicine, dental caries, periodontal diseases, dental anxiety, preventive dentistry and oral hygiene maintenance (Cochrane Oral Health, 2016b). COH is funded by two streams: a grant from the National Institute for Health Research in the UK, and an international Global Alliance of organisations working in the field of oral health (Cochrane Oral Health, 2016a).

The group is part of Cochrane, a wider network of researchers, health professionals and others working to produce systematic reviews of evidence on the most effective interventions in healthcare. Cochrane was established in 1993, and named after Archie Cochrane, a world-leading epidemiologist who commented in 1972 that: "It is surely a great criticism of our profession that we have not organised a critical summary, by specialty or subspecialty, adapted periodically, of all relevant randomised controlled trials." (Cochrane, 2013). Work initially began in the field of perinatal trials to pull together and publish all the randomised controlled trials done in that area, and a bibliography was created in 1985. This led to an international collaboration to work on synthesising those trials in a series of systematic reviews, which began to be electronically published as The Cochrane Pregnancy and Childbirth Database (CPCD) in 1993

(Cochrane, 2013). The concept of an international collaboration looking at all fields in healthcare, and named after Cochrane, was presented at the New York Academy of Sciences in March 1993 (Cochrane, 2013). There are now over 50 Cochrane review groups around the world, covering different health specialties (Cochrane Oral Health, 2016a). COH was registered as part of the collaboration in June 1994 (Cochrane, 2013). COH follows the model of other Cochrane review groups in staffing and process. The Editorial Base is managed by two joint co-ordinating editors, who are academic professors, assisted by a deputy co-ordinating editor. The editorial production of reviews is supported by two managing editors and an information specialist. The information specialist is the author of this thesis. There is additional support provided by two statisticians, who are also editors with the group. A number of other editors, based around the world, work for the group on a voluntary basis. These editors provide either expertise on systematic review methodology or clinical knowledge (Cochrane Oral Health, 2016a).

Although Cochrane initially concentrated on reviewing the effectiveness of healthcare interventions tested in randomised controlled trials, the scope has since expanded to cover effective practice and organisation of care (Cochrane Effective Practice and Organisation of Care, 2021b) and diagnostic test accuracy studies (Cochrane Methods: Screening and Diagnostic Tests, 2016). Cochrane has also developed and improved methods in evidence synthesis; registering several methods groups to work on systematic review methodology (Cochrane, 2013), producing the *Cochrane Handbook of Systematic Reviews of Interventions* (Higgins and Green, 2011) and supporting the production of software products to help in the conduct and reporting of systematic reviews (Cochrane, 2013). Cochrane's work has been recognised as "an international gold standard for high quality, trusted information" (Cochrane, 2016).

1.3 Cochrane and priority setting

Priority setting has become a concern for Cochrane over recent years. An important principle for Cochrane is to make their work relevant to clinicians and patients, however resources are limited and achieving relevancy can be problematic as a result (Bero and Binder, 2013, p. 472). In 2007, a prioritisation fund was set up by Cochrane's trustees, to "gather evidence to suggest mechanisms for improving the relevance of Cochrane reviews." (Bero and Binder, 2013, p. 472). The work aimed to investigate the best approach to be taken, and answer questions such as: "Whose priorities should Cochrane

reviews address? What are the risks and benefits of prioritisation?" (Bero and Binder, 2013, p. 472). The question of whose values to take into account when setting priorities is crucial to developing a robust priority setting process.

The issue of priority setting is explicitly addressed in Cochrane's *Strategy to 2020*, a document published in 2015 to establish the organisation's aspirations and goals for the next 5 years. One of the goals is about producing evidence that is high quality, relevant and up-to-date; and an important aim within that is to "engage with patients and other healthcare consumers, health practitioners, policy makers, guidelines developers and research funders to identify questions that are most relevant and important to them; and prioritise the production and updating of Cochrane Systematic Reviews accordingly." (Cochrane, 2015). The importance of this to Cochrane was underlined with the establishment of the Cochrane Priority Setting Methods Group in 2009 (Cochrane Methods: Priority Setting, 2016). The group's aim was to "seek to identify ways to evaluate the impact of the topic selection process for new and updated Cochrane reviews across the Cochrane Collaboration and suggest methods and process on how systematic reviews can inform topic selection for future clinical research." (Cochrane Methods: Priority Setting, 2016). Their work has involved promoting and investigating priority setting methodologies within Cochrane.

As a result of this work, the Priority Setting Methods Group made four recommendations:

1. Each Cochrane Group should be asked to commit to a priority setting process
2. Central guidance should be provided by Cochrane, but this should be flexible in terms of implementation.
3. Key stakeholders should be involved and strategies implemented to ensure their involvement.
4. Cochrane should evaluate priority setting based on set criteria, and liaise with external groups.

(Nasser *et al*, 2013a, p. 480).

The Priority Setting Methods Group later added the recommendation that an "equity lens" should be used to ensure that systematic reviews do not only address questions that are priorities in high income countries, to the neglect of issues in low and middle income countries (Nasser *et al,* 2013b, p. 512). A checklist has been developed to address these

issues. Questions to be asked during the priority setting process include: are specific strategies considered to minimise barriers to reach disadvantaged or less accessible populations? Are differences in prevalence, severity and urgency of health problems in different settings considered when evaluating gaps in research? Has the impact of the health intervention in low and middle income countries been considered? (Nasser *et al,* 2013b, p. 516).

Cochrane's work on priority setting was accelerated in 2018, when a number of working groups were convened to work on knowledge translation. One of these groups was tasked with "embedding prioritisation" into Cochrane review groups (Cochrane Community, 2020), and producing the guidance recommended by the Cochrane Priority Setting Methods Group. The Embedding Prioritisation Working Group have produced a number of resources, including a repository of useful papers, example documents such as priority setting plan templates, and case studies on priority setting within Cochrane (Cochrane Training, 2020c). Most importantly, they have produced a guidance note, setting out mandatory and desirable criteria for priority setting within Cochrane (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019).

Mandatory criteria are:

- Establish a team to lead the priority setting process.
- Engage with at least one stakeholder group, e.g. guideline developer, funder, consumer organization, professional society, etc.
- Publish, through relevant Cochrane channels, the intention to conduct a priority setting process, to give external and internal stakeholders (Cochrane Groups, Networks and Fields) an opportunity to be involved.
- Document the priority setting plan, detailing stakeholder engagement, methods and criteria that will be used for the priority setting process.
- Document the implementation of the priority-setting process and make it available on the individual Group, Network or Field website. The documentation must include a summary of the exercise undertaken, and contain enough information for stakeholders to get a clear idea of the process used.

- Publish a list of priority topics (in the form of new or existing review titles or placeholder titles where the precise question is yet to be determined) on the individual group or field website where appropriate.
- Ensure that priority reviews are promoted on publication.
- Provide formal feedback on the results of the priority setting process to the stakeholders that were involved in it.
- The priority-setting exercise should be repeated at regular intervals, according to emerging treatment and intervention options within the Group, Network or Field scope and changing stakeholder needs. At a minimum, the exercise should be repeated within five years.

(Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019).

Only the systematic reviews that are prioritised using a process that follows these criteria are considered to be "priority" reviews by Cochrane. It is therefore important that COH's process follows the mandatory standards set out in the guidance note. The guidance note does not specify a methodology for Cochrane groups to follow: "It does not recommend a standardized approach for all Cochrane Groups to use, instead it aims to help them determine the best approach for their work according to their specific goals and resource constraints." (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019). This recognition that priority setting may have differing aims and objectives has left Cochrane groups able to develop their own priority setting methodologies, tailored to their context and resources. However, groups must set priorities according to the values of their stakeholders. Stakeholders are loosely defined as "guideline developer, funder, consumer organization, professional society, etc."

To that end, this research project explores the possibility that a new model can be adopted for prioritising topics for systematic reviews, combining the best of the approaches presented in the literature, tailored towards a particular topic area and context. COH was used as a case study, to test whether the methodology is effective. The group have previously attempted a priority setting exercise, this is outlined below. However, the advent of Cochrane's guidance note has rendered the methodology used as not fit-for-purpose, as it does not meet all of the mandatory criteria. As it was initiated in 2011, it is

also now out-of-date, going by Cochrane's five year currency mandatory standard. This research project was therefore commissioned by COH, with the aim of producing a set of priority review titles that have undergone a process that meets the mandatory standards. The broad nature of COH's scope, covering all clinical specialties in dentistry and other disciplines which are involved in the care of the teeth and mouth (such as oncology) make this a challenging concept. Beyond the immediate need to set priorities for COH, the remit was broad: a framework or methodology was not prescribed. The research documented in this thesis was designed to produce a framework for priority setting that is appropriate for evidence synthesis, which could be adapted for other groups working on systematic reviews. The concept, scope and design are original and were developed during the course of the research.

1.4 Cochrane Oral Health and priority setting

COH previously undertook a priority setting process in the 2010s, to ensure that the topics that were being explored by the group were relevant and timely. At the time that the work of priority setting was undertaken, COH had 215 systematic review titles registered (Worthington, Clarkson and Weldon, 2015, p. 69). These were mainly intervention reviews of randomised controlled trials, but two were on diagnostic test accuracy (Cochrane Oral Health, 2016a). These were divided into eight specialty areas: orthodontics, paediatric dentistry, periodontology, operative and prosthetic dentistry, dental public health, oral and maxillofacial surgery, oral medicine, and cleft lip and/or palate. The prioritisation method was piloted in 2011 in the orthodontics speciality, a further exercise was undertaken in paediatric dentistry in 2013, and the other specialties were examined in 2014 (Worthington, Clarkson and Weldon, 2015, p. 69).

Authors of systematic reviews published by COH in each specialty were contacted and asked to rank current registered titles in order of priority. An expert panel was then identified by the co-ordinating editors of COH, and convened in each topic area. Expert panels consisted of Cochrane editors, clinical and research experts, and high-impact journal editorial board members. They comprised between 11 and 22 members, depending on the topic area. Members were invited to a teleconference to discuss the top 15 titles identified in each area by Cochrane authors in the initial ranking exercise. They were also asked to consider whether any research gaps existed in the portfolio of systematic reviews. A parallel survey was also conducted, to find out the opinions of the general public. The

survey was open to all, and conducted electronically. Participants were asked for their areas of concern with regards to oral health, and invited to pose three questions to which they would like answers. The results of the survey were discussed with the expert panel members prior to the teleconferences. 81 people responded to the survey, contributors were from 15 countries, but the results were heavily skewed towards the UK, where 64% of respondents were domiciled (Cochrane Oral Health, 2014). Oral health maintenance, and prevention of gum disease and decay were the biggest areas of concern identified by the survey, the elderly and children were identified as the groups that should be prioritised (Worthington, Clarkson and Weldon, 2015, p. 71).

The result of this process was an identified 81 priority titles among the existing portfolio, and a further 15 new titles for development. Some of the new titles were a result of merging and expanding some of the existing titles, to make them more clinically relevant (Worthington, Clarkson and Weldon, 2015, p. 71).

This exercise provided important data, but can be regarded as suboptimal in terms of priority setting, since it largely relies only on the subjective opinion of panel experts, without other data informing the process. Other, more objective, data which may be important to the priority setting process was not considered. For example, in terms of existing titles, what are the most accessed, read, and cited by other researchers? In terms of new titles, where are the existing uncertainties and gaps in the literature? The problem of research waste requires some investigation of current evidence uncertainties, so that resources are directed to those areas that are most neglected (Chalmers *et al*, 2014, p. 159). However, this was not done in this case. It can also be argued that breaking down COH's portfolio into specialty areas means that the scope of the group was not seen as a whole. The risk of this is that some specialty areas receive more attention than they may warrant, and some are not given the highest priority status that they require. This approach also meant that COH ended up with 96 priorities, which is almost half of the total portfolio. This number of priority titles may not be manageable in terms of time and resources.

Additionally, the survey that was conducted was relatively small-scale, and heavily skewed towards high or middle income western countries. Only 4 out of 81 respondents were from lower or lower middle income countries (Cochrane Oral Health, 2014), which is not representative of Cochrane's global audience. The survey was also not integrated into the priority setting methodology in a systematic way, the participants of the expert panels were

informed of the results, but not required to take them into account when forming their decisions on the priority titles. The priority topics were not suggested by the survey and it is unclear what role it played in setting COH's priorities. It is not clear therefore, that patients and consumer views were thoroughly taken into account, as specified in the Cochrane 2020 strategy goal (Cochrane, 2015).

The expert panel teleconferences can be regarded as focus groups, defined by Hughes and Dumont (1993, p. 776) as "in-depth group interviews employing relatively homogenous groups to provide information around topics specified by the researchers". However, the use of focus group discussion within priority setting has been criticised for its lack of anonymity, meaning that some participants may not express their opinions freely, or may have their opinions influenced by others they perceive to be more knowledgeable or higher status (von der Gracht, 2012, p. 1527). This may result in bias in the process.

For COH's next prioritisation exercise, a new approach is therefore required. This approach must also adhere to Cochrane's mandatory standards for priority setting, which were published five years after COH's previous priority setting concluded (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019). By these standards, the previous priority setting exercise was now out of date, as it is mandatory to repeat priority setting at least every five years (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019). It also did not include a published priority setting plan, and was not documented in detail.

For the new priority setting process, a steering group was convened to ensure that the project was sponsored by leadership, consisting of the COH's two joint co-ordinating editors, one of the group's senior statistical editor and the group's information specialist (the author of this research thesis and the manager of the project). A priority setting plan was developed and made available on the group's website, so that the process was transparent (Cochrane Oral Health, 2018, see Appendix A). The aim was to both scope out new topics which may not have been previously explored by COH, but also to see which systematic review titles in COH's existing portfolio were still high priority. This would give the group guidance on which reviews to update. COH's latest grant from their funders states that the group will produce fifteen new systematic reviews, and thirty updated reviews over a three year funding period. This gives a total of 45 systematic reviews to be produced by a small editorial team consisting of two co-ordinating editors, a deputy co-

ordinating editor, a statistical editor, two managing editors and an information specialist, authored by volunteer teams around the world. This sets the context for a new priority setting process. This requires a robust and transparent framework, based on the interests and values of COH's stakeholders.

1.5 A new proposed framework for priority setting

The framework used in the research documented in this thesis was built using the existing literature on priority setting methodologies. This literature is further explored in Chapter Two, however a key paper examines several concepts of best practice that have emerged from the literature. In 2010, Viergever *et al* reviewed the literature on priority setting in health research and gathered together the best practice elements from previous studies. They established a checklist outlining the nine common themes that they had identified, the first five of which relate to planning the priority setting exercise, the next two on conducting the exercise and the final two on evaluating the process:

1. Context: priority setting processes should have a clear focus and scope. The available resources for the exercise should be outlined, along with the goals, values and principles.

2. A comprehensive approach: this relates to the methods used in the prioritisation. Is a comprehensive approach appropriate, or should regional or context specific methods be developed?

3. Inclusiveness: all relevant constituencies and stakeholders should be involved. There should be a robust mechanism for ensuring that there is appropriate representation of people with expertise.

4. Information gathering: the information to be gathered should be chosen with care. This could include technical data, the views of a broader group of stakeholders, a previous priority setting exercise, reviews of the literature.

5. Planning for implementation: translating priorities to actual research should be planned. Who will implement the results of the prioritisation, and how?

6. Deciding on priorities: criteria should be chosen on which to focus the discussion.

7. Methods: choose a method for deciding on priorities. Should it be consensus based, metrics based or a combination?

8. Evaluation: evaluate the process, what went well, what could be improved?

9. Transparency: a clear report should be written that discusses the approach used.

(Viergever *et al*, 2010).

The framework developed by the research documented in this thesis encompasses points three to nine of these best practice elements, since the first two elements (context and approach) had already been set by COH, and Cochrane with the mandatory standards presented in the guidance note (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019). The only topics of interest are those suitable for evidence synthesis which fall under COH's scope, and both new and existing systematic review titles were under consideration. The focus was therefore established. The resources comprise those available to the group, i.e. the time of a part-time postgraduate research student. The values are those set out in Cochrane's mandatory standards: inclusivity of stakeholder views, transparency and currency. The approach was context-specific, and was undertaken with Cochrane's international audience in mind, with a particular focus on interventions which may be appropriate for lower and lower-middle income countries (Nasser *et al,* 2013b, p. 516).

Hall *et al* (2018, p. 454) have identified putting priority setting into practice as the number one challenge in the field, and the number one area most in need of research. Their survey of 100 experts in priority setting, drawn from the members of the International Society for Priority in Health found that 29% of responses said that the application, adaption and improvement of the process was the key area for development. 31% of responses said that the most important research area for the future was addressing the implementation gap, between frameworks and achieving actual change (Hall, *et al* 2018, p.454). It is therefore important not only to propose a new model, but to test it in practice, building on previous studies. The new framework was therefore tested in a real-world context.

The proposed model is a mixed methods approach, analysing quantitative data from several sources, in combination with an integrated survey of consumers or members of the public and a ranking survey, where participants include clinicians, guideline developers and consumers. They chose and ranked the final list of priority topics in order of importance.

The framework developed in this research has five elements or phases, which should be undertaken in any priority setting process in evidence synthesis. Within these elements, the methodology chosen could vary according to resources available, including time and personnel. These elements can be described as an "information gathering phase" (relating to point 4 of the best practice checklist item outlined by Viergever *et al* (2010)), a "stakeholder consultation phase"(relating to point 3), a "mapping and ranking phase" (relating to point 6), an "implementation" phase (relating to point 5), and an "evaluation" phase (relating to point 8). Points 7 and 9 were addressed throughout all five phases of the project, various methods were used in each phase, and transparency was achieved by reporting the methods and findings of each phase in detail on COH's website. The methodologies underpinning each of these five phases in COH's priority setting process are outlined in more detail below.

1.5.1 Cochrane Oral Health's information gathering phase

Three projects were undertaken in the information gathering phase, with data feeding in from the three projects. These are further explored in Chapter Three.

The first project was the collection of metrics on COH reviews. This stage of the project was designed to utilise existing data on reviews already published, to see which are used most often. This helps COH target those reviews which may need updating and crucially, it directs resource away from reviews which are not currently used.

The second project was a review of developments in the evidence base. The information gathering phase should be comprehensive as possible (Viergever *et al*, 2010), and this second phase adds to the data collected in the first step, but is more concentrated on the commission of new reviews, rather than the updating of existing reviews. The aim was to explore areas where there are trials that could be incorporated into new systematic reviews by a search of various trials registries. Technologies such as text mining have been utilised

to analyse new and upcoming interventions across COH's scope. Welsh *et al* (2015, p. 345) commented that the most difficult and labour intensive part of their priority setting process was the analysis and screening of retrieved trials, so text mining was adopted as a novel technique in the priority-setting context to provide efficiencies in the process.

Alongside a search for new trials, the information gathering phase also explored where there might be questions which are yet to be answered. The third project in this phase examined guidelines for oral health clinicians published since 2005, to determine where guideline developers believe there are gaps in the evidence that may be filled by a Cochrane systematic review.

1.5.2 Cochrane Oral Health's stakeholder consultation phase

Chapter Four outlines the methods and results of the stakeholder consultation phase, which involved data inputs from two sources. The first part of the stakeholder consultation phase was the collection of priority questions from members of the general public and consumers of Cochrane reviews. Inclusiveness is an important part of Viergever *et al*'s (2010) best practice guidance for priority setting. Input from consumers, patients and members of the public is vital in achieving inclusiveness. The previous priority setting exercise by COH attempted to include a consumer survey; however this was not incorporated into the priority setting in a meaningful way. This research project rectifies this by building in survey results in a more structured way, including it in the overall analysis of the data. The call for feedback was actively promoted in lower or middle income countries, to encourage participation from different healthcare contexts. The work of the James Lind Alliance (JLA) is also explored in this context. The aim of the JLA is to give patients and carers a voice in the priority setting process, and they have a clear methodology for doing this (Crowe, 2016), which is outlined in Chapter Two. The JLA has recently conducted a priority setting partnership in oral health (James Lind Alliance, 2019) so the questions developed by this approach were included in the priority setting exercise in the second part of the stakeholder consultation.

1.5.3 Cochrane Oral Health's mapping and ranking phase

The methodology and results of the mapping and ranking phase of the project are discussed in Chapter Five. This phase of the project was designed to filter and refine the data

gathered in the "information gathering phase" and the "stakeholder consultation phase" to provide a manageable set of priorities. These were then mapped against COH's portfolio, to investigate gaps which are not currently covered by a Cochrane review. At this stage, topic areas were rejected if they were not suitable for Cochrane evidence synthesis – for example, it is beyond the scope of COH to look at the prevalence of a condition in a population, so any questions relating to prevalence were not progressed. Overlap with other Cochrane groups was also considered at this stage. For example, the Cochrane Anaesthesia Group has a published review on the efficacy of local anaesthetics for dental treatment, and so COH would not undertake this review, even if prioritised. However, COH might liaise with the Cochrane Anaesthesia Group, and inform them that this topic is a priority for future updating.

Expert and consumer opinion was solicited in a final consultation, where participants ranked the priority topic areas identified in the previous stages. Inclusiveness also involves seeking expert opinion, and this is particularly important when reviews are to be used in clinical practice. Experts were clinicians in the field; but also involved other stakeholders, including consumers and guideline developers. Input was sought from participants from lower and lower middle income countries, and an international perspective was gained by inviting a global set of stakeholders to join the ranking panel. The list of priority topics was then shared with the COH's editorial base team for implementation.

1.5.4 Cochrane Oral Health's implementation phase

The priorities were further refined in the implementation phase, which examined the viability of each of the ranked priority topics. An implementation plan was developed in consultation with COH, to ensure that the reviews are undertaken or updated as required. This is an important part of Viergever *et al*'s (2010) best practice principles. Akl *et al* (2017a) have developed a tool which aids in the implementation of identified priorities. The SPARK Tool includes 22 items gathered through an extensive literature review and user testing at Cochrane's annual colloquium in Hyderabad in 2014 (Akl *et al*, 2017a), making it particularly relevant to Cochrane's context. The tool is divided into two modules, and module 2, which considers the appropriateness and feasibility of the priorities for systematic review teams is applicable to the implementation of the priorities developed during the process. The following nine criteria were considered for each ranked priority question at implementation stage:

i. The question can be translated into an answerable systematic review question;
ii. There are no available or adequate systematic reviews on this question;
iii. Primary studies are available for inclusion in this systematic review;
iv. There is adequate human capacity to undertake the systematic review;
v. There is adequate operation/management capacity to undertake the systematic review;
vi. The systematic review is feasible within the expected timeframe;
vii. Conducting the systematic review contributes to sustainable capacity to conduct future reviews;
viii. Conducting the systematic review is a social responsibility;
ix. Conducting the systematic review does not raise any ethical concerns.

(Akl, *et al*, 2017a).

The topics identified as priorities were considered in the light of this checklist, and formed the basis of reports (see Appendix B) put forward to the COH editorial base team to guide implementation of the priority setting process. Full details of the implementation phase are given in Chapter Six.

1.5.5 Evaluation of Cochrane Oral Health's priority setting process

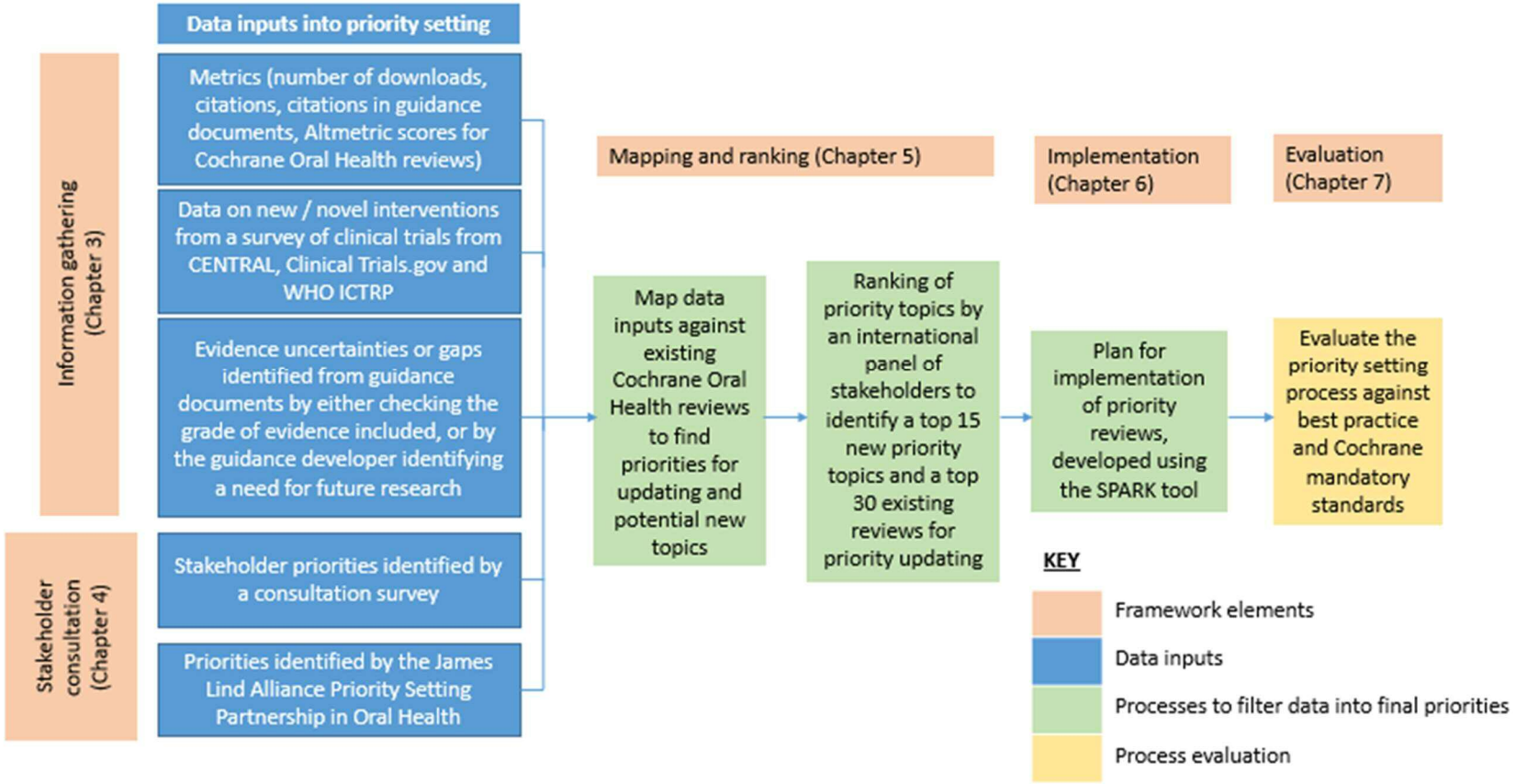
The final phase of the work was to evaluate this framework using the best practice checklist developed by Viergever *et al*. (2010). This is not unprecedented. Mador *et al* (2016) have used Viergever *et al* (2010)'s checklist as an evaluation tool, to assess their priority setting exercise in the Canadian provinces. They were able to show a series of "lessons learned", to help with further prioritisation exercises. They found that they could highlight flaws and benefits to their methods; for example, the importance of the information gathering phase was highlighted when the priority setting focus group said that they did not have all the relevant information in advance. Viergever *et al*'s (2010) checklist was used to similar effect in this research project, to ensure that the priority setting exercise followed best practice. Cochrane's priority setting guidance is also considered at this stage,

to ensure that all mandatory standards for priority setting within the organisation have been met (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019). These methods are further explored in Chapter Seven.

Chapter Eight is a discussion of the research documented in this thesis, outlining the major issues raised by the study, the applicability of the research, the limitations of the study and opportunities for future research.

Figure 1 shows a visual representation of the thesis.

Figure 1: Priority setting process framework: a visual representation of the thesis



1.6 The Covid-19 pandemic and the outcomes of this research project

A significant challenge arose during the course of this research project. The final phase of data collection coincided with a global public health crisis, the Covid-19 pandemic. Covid-19 is a novel coronavirus, which first emerged in China in late 2019, and spread across the world in a matter of months (Rothan and Byrareddy, 2020). The World Health Organization (WHO) declared Covid-19 to be a pandemic on 11 March 2020 (Cucinotta and Vanelli, 2020, p. 157), and the final phase of data collection for this research project took place from April to June 2020. This phase was the ranking phase, where an international panel was convened to order the final priority list. The potential impact of the disease on this study was significant, as priorities identified in earlier stages of the research may no longer be applicable in the new environment created by the pandemic. In this section, the implications of the pandemic for dentistry are briefly examined, along with the impact on this research project.

1.6.1 Covid-19: the implications for dentistry

Covid-19 has had a very significant impact on dental care around the world (Meng, Hua and Bian, 2020, p. 481). Lockdowns, with people confined to their homes except for food shopping and exercise, were instituted internationally (Meng, Hua and Bian, 2020, p. 481). In many places, dentists were only able to perform emergency procedures (Grossman *et al*, 2020, p. 964). Routine services such as dental check-ups were put on hold (Grossman *et al*, 2020, p. 964). Many of the services performed by dentists were not able to restart fully because of the risk posed by aerosol-generating procedures (AGPs) (Meng, Hua and Bian, 2020, p. 483). Many common dental procedures involve the use of high-speed hand pieces and ultrasonic instruments, which cause droplets of blood and saliva to "aerosolise" in the air, creating an environment where Covid-19 could be transmitted from an infected patient to health-care workers or subsequent patients (Meng, Hua and Bian, 2020, p. 483). In addition, there is some evidence to suggest that even where dental services were open, there was reluctance to use them. Abdalqadir (2020, p. 28) notes a 38% reduction in emergency dental patients in China at the peak of the outbreak, and "non-urgent cases reduced to three tenths of the pre-Covid-19 level" (Abdalqadir, 2020, p. 28).

The pandemic raised important questions for dentistry, including what type of personal protective equipment (PPE) was required, how to safeguard the dental care team and their

patients, what type of infection control measures should be in place, and what type of procedures can be undertaken and how (Meng, Hua and Bian, 2020, p. 483). It has also brought new forms of working into prominence (Telles-Araujo *et al*, 2020). Teledentistry has been defined as "the remote provision of dental care, advice or treatment through the medium of information technology, rather than through direct personal contact with any patient(s) involved." (DentalProtection.org, 2020). This way of providing dental services has been utilised for hard-to-reach, remote communities in previous studies (Estai *et al*, 2018, p. 147), however the coronavirus lockdown provides new opportunities to explore new modes of working for the dental care team.

1.6.2 Covid-19: the implications for this research project

It is inevitable that a public health crisis of this magnitude will have an impact on priority setting, and particularly for this study, when provision of primary health care services including dental care is impacted. For example, topics which explore oral care in the home environment might be preferred over those which evaluate interventions which can only happen in the dental clinic. Interventions where aerosols are produced might be less relevant in the new post-pandemic environment. Emergency dental care, and how to deal with oral pain may become of greater interest. Preventive care may also be prioritised over treatment. Inevitably, the pandemic has also created new areas for evidence synthesis, and dentistry is no exception. COH produced some rapid reviews in conjunction with Cochrane Ear, Nose and Throat, looking at whether mouthrinses and nasal lavage could provide protection against coronavirus for healthcare workers and their patients (Cochrane Oral Health, 2020b), and an additional review on aerosol generation and efforts to mitigate the spread of airborne particles in the dental clinic (Cochrane Oral Health, 2020c). COH has also produced a webpage of resources, providing information on guidance for dentists and oral health care practitioners around the world, and links to Cochrane reviews on Covid-19 (Cochrane, 2020d). Members of the COH team also contributed to rapid reviews of guidance on aerosol generation and helping dentists return to work. A dental and oral care commentary on Cochrane's review on personal protective equipment was produced and published on the group's website (Cochrane Oral Health, 2020d).

The uncertainty posed by Covid-19 is a test for the flexibility of the framework used in this research project. Priority setting must always by its nature contain an element of redundancy, as soon as priorities are set, they run the risk of becoming outdated as the

research and clinical landscape changes. A global pandemic which may fundamentally change the way health care services are provided may expedite this redundancy, as well as accelerating the speed of research in some areas and decelerating it in others. The priority setting research which forms the basis of this thesis was almost complete when the pandemic was declared posing a considerable challenge. However, some adjustments were made to the final stage of data collection, where a panel of stakeholders including guideline developers, clinicians, consumers and researchers was convened to rank the priority topics. The panel were asked to comment on whether there were any topics that COH should undertake as a response to the pandemic. The impact of Covid-19 was also addressed in terms of implementation of the ranked priorities, where consideration was given as to the relevancy of the priority question in the light of the challenges to dentistry in the Covid-19 environment. One extra question was also added to the elements of the SPARK tool used for implementation of the priority setting process: “Is the topic still timely post-Covid-19 pandemic?”. The findings of this part of the research are discussed in Chapters Six and Seven, and were shared with the editorial base team, who are tasked with implementing the prioritisation and ensuring that the priority topics are converted to systematic reviews.

1.7 Conclusion

Priority setting in health care research is important to both using scarce resources responsibly and to guard against research waste. The research documented in this thesis is the development of an original framework to set priorities in the evidence synthesis context. It was tested in a real-world research group: COH. The framework consists of five phases, which are explored in chapters three to seven: information gathering, stakeholder consultation, mapping and ranking, implementation, and evaluation. It combines elements of best practice in priority setting as presented in the literature, and blends quantitative analysis of data with the qualitative interpretative analysis of opinions from members of the public and experts in the field. The information gathering phase was designed to establish where there might be evidence gaps to be filled by new research, how current reviews are being used and by whom, and how quickly the research landscape is changing in oral health. The stakeholder consultation phase ensures that the voices of different stakeholder groups, including clinicians and patients, are heard in the development of new priorities. The framework has evolved to ensure that only research that is needed is implemented, to protect the scarce resources of COH. To that end, in the implementation

phase a plan has been developed to help COH deliver on the priority titles. The framework also contains an evaluation stage to consider how the priority setting process worked in practice and what lessons might be learned for future exercises.

There are two distinct contributions to knowledge of this research project. The first is the priority topics established in the research. This project is the most ambitious attempted in terms of priority setting in the oral health evidence synthesis context. COH's previous priority setting exercise was more limited in scope and did not involve consumers in a meaningful way. Other priority setting projects in oral health (further explored in Chapter Two) have not been specifically developed for the evidence synthesis context, and most were suboptimal in terms of priority setting. The second contribution to knowledge is the framework itself, which has been developed to be adaptable for other groups working in the evidence synthesis context. Techniques that are novel to the priority setting context, such as text mining, are used in the data analysis. This project also explores elements such as the SPARK tool (Akl, *et al*, 2017a), which according to the literature has not yet been tested in a real-world context. The five phases of the framework are examined in subsequent chapters.

Chapter Two: Review of the literature

2.1 Introduction

This review considers the background and different approaches to priority setting as presented in the literature. The approaches discussed include "information gathering and analysis" approaches, which use quantitative data to set priorities; "stakeholder consultation approaches", which take a more qualitative approach, taking into account the opinions and reasons of a range of participants; and "mapping approaches", which attempt to produce maps of the evidence base and prioritise gaps. These theoretical approaches have been adopted in a wide variety of healthcare research settings, and the practical application of priority setting is explored, both in terms of evidence synthesis, and the field of oral health. Techniques used in these three approaches were used to build the framework for priority setting used by COH in this research project, the framework is outlined in Chapter One, Section 1.5.

2.2 Priority setting: background

The idea of priority setting originated in the discipline of health economics, as a response to the limitations of funding and resource (Goddard *et al*, 2006, p. 80). Olsen (1997, p. 626-627) has commented that there are three philosophies which may guide approaches to priority setting in healthcare:

1. Utilitarianism: based on the philosophy of Jeremy Bentham, health resources are distributed in such a way to guarantee the greatest happiness of the greatest number of people.

2. Egalitarianism: this is based on strict equality, all citizens get an equal share of health resources.

3. Maximin: some inequality is inevitable and acceptable, priority must always be given to the one with the worst initial health provided that there can be a positive outcome.

The Maximin approach has most often been evident in the early frameworks developed to

set priorities in health research, with the global burden of disease being a central concept. The Institute for Health Metrics and Evaluation (2019) defines this as a "comprehensive picture of what disables and kills people across countries, time, age, and sex. The Global Burden of Disease (GBD) provides a tool to quantify health loss from hundreds of diseases, injuries, and risk factors, so that health systems can be improved and disparities can be eliminated". For example, the WHO's priority setting exercise in medicine begins with an examination of the global burden of disease, and an elimination of those conditions where pharmacotherapies are not proven to work (Kaplan *et al*, 2013), thus directing priority funding to those conditions which are providing the biggest problem for those with the poorest health. The issue of equity and the promotion of equality, along with the protection of the most vulnerable, are strong themes in the priority setting literature, and this is less about the happiness of the majority than a moral imperative. WHO define health in terms of human rights:

> "the enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition"
>
> (Global Forum for Health Research, 2009).

From the inception of the first priority setting exercises, the reduction of mortality and morbidity amongst the poorest and most deprived has been considered to be important (Rudan *et al*, 2007, p. 595). The Global Forum for Health Research has argued that the goal of priority setting is to "identify neglected areas and invest in research that will result in improved interventions for the populations in greatest need" (Global Forum for Health Research, 2009). Rudan *et al* (2007) have outlined the background and history of health priority setting in research, which largely emerged from the requirement to reduce child mortality and morbidity in low and middle income settings. The Commission on Health Research for Development was established in 1990, "the first truly significant international initiative aimed towards a systematic approach to setting priorities in global health research." (Rudan *et al*, 2007, p. 598). The Commission's review identified inequality in how international research is funded, and introduced the concept of the 10/90 gap, "less than 10% of global research funds is devoted to 90% of the world's health problems." (Rudan *et al*, 2007, p. 598). As a result, countries were encouraged to undergo a national priority setting exercise, to develop a context-specific healthcare research agenda, a programme referred to as Essential National Health Research (ENHR) (Rudan *et al*, 2007,

p. 598). Pierson and Millum (2018, p.6) have stated that "The vast majority of health research resources are used to study conditions that affect a small, advantaged portion of the global population", and in that sense priority setting can be both controversial and political. The examples they give are the polio vaccine, which benefitted people in high income countries first, and the lack of research in Chagas disease, which primarily affects people in low income and marginalised populations in Latin America (Pierson and Millum, 2018, p. 6). A similar point could be made about the Covid-19 vaccination, where significant global inequality in supply has been highlighted by Kavanagh *et al* (2021). They estimate that by July 2021, only 1.2% of Covid-19 vaccinations were available in low income countries, and only 14% in low and lower middle income countries, despite these countries containing 40% of the world's population, whereas 50% of the US population had been fully vaccinated (Kavanagh *et al*, 2021). Ensuring that lower and lower middle income countries are considered fairly in priority setting has been a key component of early projects in the discipline.

In 1993, the Council on Health Research and Development (COHRED) was set up (Council on Health Research and Development, 2013). In 2000, it reported on experiences from developing countries and compiled a series of lessons learned (Rudan *et al*, 2007, p. 598). In 2010, COHRED produced guidance on priority setting, based on strategies developed in low and middle income settings. They recommended a cyclic management process in priority setting, with 6 key practical steps. The available evidence on health research in a particular setting should be mapped, including the production and use of health research. The scene should be set in terms of focus and scope, and partners engaged. The best method of prioritisation should be chosen with context and local needs in mind. Importantly, a mixed methods approach was recommended, utilising all available data. Planning, engaging stakeholders and evaluating the process were considered key, as was having a final implementation plan (Council on Health Research for Development, 2010).

Viergever *et al* (2010)'s review of best practice in priority setting, outlined in Chapter One, covers much the same points, but with an increased emphasis on transparency. COHRED laid the foundations for priority setting, but did not propose a cohesive methodology for how to accomplish this goal. Various methodologies have emerged from the literature. The earliest priority setting exercises in healthcare tended to focus on quantitative data, and used a series of metrics and data analysis to gather information to set priorities for healthcare. Information gathering and analysis has therefore become one of the most

common priority setting methodologies (Viergever *et al*, 2010).

2.3 Information gathering and analysis as an approach to priority setting

The emphasis on gathering information in the form of numbers and hard data in priority setting in health care was evident from the inception of the discipline in the late 1980s and early 1990s. Daichman *et al* (2013, p. 75) have commented that priority setting in healthcare partly arose as a response to a sharp increase in the costs of healthcare due to the rapid development of new technologies. Cost-effectiveness analysis (CEA) of health interventions was one approach taken: "each intervention should be evaluated in terms of medical effectiveness by using economic costs. Cost-effectiveness analysis can be utilised for choosing among competitive alternatives when resources are limited." (Daichman *et al,* 2013, p. 76). CEA was generally used to compare an existing intervention for a healthcare problem to a new strategy, with a result calculated by a unit of additional costs. Quality adjusted life years (QALYs) are an example of this as a unit of measurement. A QALY is equal to one year lived in perfect health, and is a way of measuring disease burden. QALYs have been used to set priorities in terms of directing resources to treatments and interventions that maximise efficiency (Weinstein, Torrance and McGuire, 2009, p. S5). This notion of the burden of disease, and how to measure it, had a significant influence on the early priority setting methodologies. Global bodies like WHO tended to recommend quantitative processes for priority setting, which involved collecting measurable data (Global Forum for Health Research, 2009).

In 1996, the WHO Ad Hoc Committee on Health Research produced a report: *Investing in Health Research and Development* (Global Forum for Health Research, 2009). This outlined a five step process for prioritisation, which was in essence a hard data gathering and analysis exercise, with no qualitative input, and no input at all from patients or consumers. This included an investigation of the disease burden, establishing the risk factors that were responsible for the persistence of disease, an assessment of the current knowledge to reduce or eliminate the burden, a calculation of the cost-effectiveness of interventions and an assessment of the resources currently available (Global Forum for Health Research, 2009). It particularly focused on policies to encourage investment in research that was of relevance for poor nations (Rudan *et al*, 2007, p. 598).

The Global Forum for Health Research (GFHR) was founded in 1998, with the intention of

addressing the 10/90 gap (Rudan, *et al*, 2007, p. 598). GFHR have built on the WHO model by making it more robust and linking the five elements outlined above with evidence for each context. In 2004, GFHR produced the Combined Approach Matrix, a tool for setting priorities in research for health. For example, the burden of disease information would be linked with determinants of that disease in a particular country, and the level of knowledge of a condition would be linked with current known interventions. The resulting evidence would be displayed on a Matrix, and summarised against four elements: institutional dimensions, health policies, policies in sectors other than health (e.g. housing policy) and macro-economic policies. This Matrix was developed further in 2009, with the edition of an equality dimension, where issues of economic and social inequality are added to the knowledge contained in the Matrix (Global Forum for Health Research, 2009).

Information gathering and analysis approaches often include a "ranking" element, where data is gathered, considered against criteria, and then ranked in terms of importance. In 2007, *The Lancet* embarked on advocacy in terms of improvement of maternal and child health in a series of papers, these focused on the identification of priority areas for research. A Delphi study was conducted to rank a limited number of general research themes in the discipline, using the knowledge and expertise of a wide range of clinicians and academics with experience of lower and middle income countries (Rudan, *et al*, 2007, p. 600). Delphi studies are a methodology used to "aggregate expert opinions on future developments and incidents", and were initially developed by the RAND corporation in the United States (von der Gracht, 2012, p. 1525). The classic Delphi process consists of a series of rounds undertaken with subject experts, the first round is a relatively unstructured open set of questions, resulting in a qualitative analysis of the results. From this analysis, a more structured questionnaire is developed for the second and subsequent rounds, with feedback given to the participants at each stage (Powell, 2002, p. 378). Participants can change their responses throughout. Although some have claimed that the aim is to reach a consensus, the real target is a stable set of answers that would not be changed by subsequent rounds (von der Gracht, 2012, p. 1525). Delphis are characterised by anonymity, to mitigate against the persuasion or peer pressure inherent within focus groups or other techniques (Goodman, 1987, p. 730). Since they attempt to provide a statistical answer from subjective opinion, Day and Bobeva (2005, p. 112) have credited the Delphi with spanning the divide between the positivist / quantitative paradigm and the qualitative / interpretative paradigm. COHRED have recommended the Delphi as one of the methods to

be used in priority setting, alongside the collection of other data (Council on Health Research for Development, 2010).

A further information gathering and analysis approach to priority setting found in the literature is that developed by the Child Health and Nutrition Research Initiative (CHNRI) (Viergever *et al*, 2010). The CHNRI method has 15 steps, and is targeted at international agencies, large research funding donors, governments and policy makers (Rudan, *et al*, 2008, p. 720). Process managers are selected, and decide on context-specific criteria for setting health research priorities, taking into account the burden of disease. These are then used to score proposed health research options, the score represents "a measure of collective optimism among technical experts of the likelihood that each option would satisfy each priority setting criterion in turn" (Rudan *et al*, 2008, p. 727). The scores are then ranked, and linked with investment decisions.

The most commonly used comprehensive approaches to priority setting found in a review of the literature were the Combined Matrix Approach, the CHNRI method, and the COHRED management process described above, along with the Essential National Health Research (ENHR) approach (Viergever *et al*, 2010). The ENHR approach has a strong focus on planning; with preparatory work including awareness raising, the identification of appropriate stakeholders, and analysis of the context to produce an initial list of research areas that can be considered by the stakeholders in further rounds. This approach also includes a weighting system, with participants asked to score potential research themes against set criteria (Okello and Chongtrakul, 2000).

This kind of information gathering and data analysis approach has been utilised by organisations such as the Canadian Agency for Drugs and Technologies in Health (CADTH) (Husereau *et al*, 2010, pp. 342-343). Like Cochrane, CADTH is involved in producing evidence for making healthcare decisions. Their priority setting process considered gathering data on disease burden, clinical impact, alternatives, budget impact, economic impact and available evidence. Each of these elements was given a weighting, with clinical impact and disease burden most important. The process was judged to "work well" and be "easy to implement" (Husereau *et al*, 2010, p. 346).

Although these four approaches may be suitable for deciding on health research priorities on a national level, it is not clear that they are suited to deciding on priorities for an

individual research area. Information gathering approaches have also been criticised for lack of real-world applicability, although the CADTH example seemed to work in practice. Hacking and Cleary (2016) have been critical of WHO's model, arguing that it needs considerable amendment to be applied to real-world contexts, and that it involves an inherent contradiction, in that improvements in efficiency were to be made, then the disease burden would change, thus affecting the cost-effectiveness of the interventions side of the model. They believe that the impact of these interventions in different scenarios is important to take into consideration, as the picture is complex and developing (Hacking and Cleary, 2016). The WHO's model is a quantitative only model, which does not take into account the potential ranking of other factors, which may need a different approach with more qualitative data from stakeholder engagement (for example, issues of equity) (Hacking and Cleary, 2016).

Tromp and Baltussen (2012) have criticised the commonly used four approaches for their lack of transparency, claiming that most prioritisation applications have a fixed set of criteria and do not have a clear explanation of the rationale behind their adoption for the prioritisation exercise. They have attempted to combine all possible prioritisation criteria with the components of an effective health system (e.g. service delivery, health workforce, available technology, financing, etc). At each stage, there is a definition of the health prioritisation criteria. It is similar to the Combined Matrix Approach in that conceptual maps are developed, but it builds on and develops this technique. However, it is important to note that this research was looking at priorities in health care generally, and not priorities for health research.

Listl *et al* (2019, p. 263) have questioned the use of the QALY as a measure of the effectiveness of healthcare inventions in the oral care context. The example they give is dental anaesthesia. They argue that the QALY value of dental anaesthesia is close to zero because "the pain, suffering and anxiety relieved is of such short duration" (Listl *et al*, 2019, p. 267). However, the fact that people undergoing dental treatment are willing to both receive and pay for dental anaesthesia suggests that it does have value to the patient. QALYs may therefore have limited applicability for some healthcare interventions, and their use may not be appropriate for priority setting in dentistry.

A further criticism that can be levelled at approaches which look purely at measureable, quantifiable data is the lack of involvement of patients or consumers. Snow, Crocker and

Crowe (2015) comment that: “A major cause of medical research ‘waste’ is lack of attention to the real-world needs of those who would benefit from research… There have been calls for this gap to the closed by inviting patients and carers to help shape research priorities”. While some stakeholder involvement is apparent in these four approaches, particularly in the “ranking” element of the process, it is not clear that the term “stakeholders” includes patients or consumers. Kapiriri (2018) found that the stakeholders involved in a lower income country setting were more likely to technical stakeholders, policy makers and funders than patient groups.

The arguments for involving patients or consumers are strong. Madden and Morley (2016) put forward three convincing arguments for wide involvement in priority setting. Firstly, there is a moral and ethical argument, in terms of the rights of individuals to be involved in research that affects their own health. Secondly, the relevance and quality of the research may be positively affected by the involvement of people with experiential knowledge of the issues at stake. Finally, they argue that the legitimacy of the process is strengthened by the involvement of consumers, and that the prioritised research may gain more support as a result. Mc Conalogue *et al* (2017) found that “the early and meaningful engagement of stakeholders in the research process [can]… facilitate evidence uptake.” Their research into global health priorities for the UK’s Department of International Development found that research impact was increased when stakeholders had influence over “the topic selection, research process and outcome implementation” (Mc Conalogue, *et al*, 2017). It can also be argued that where health care and health care research is often funded by taxation, as in the UK, patients should be involved in priority setting as a moral imperative (Oliver, *et al* 2004). Consumers may also be involved because “their experience and insights can complement those of health professionals and researchers, so that collectively these people can produce ‘better’ research. ‘Better’ research may be research that: has a higher methodological or ethical quality; produces findings which are more relevant to practical decisions made by consumers and those caring for them; is presented in more accessible and widely disseminated reports; or more appropriately influences policy and practice.” (Oliver, *et al*, 2004).

Nevertheless, a study by Hall, *et al* (2018, p. 448) solicited the opinions of experts in priority setting, and found that the establishments of the four frameworks described above was cited as the most valuable achievement of the priority setting research field. Quantitative data is still a valuable tool in priority setting.

Information gathering is undertaken as part of this study by considering the impact and utility of the reviews that COH has already published, rather than examining more general data on the burden of disease or the economic impact of oral health interventions. Although disease-burden has been emphasised as an important set of data to consider in many of the priority setting exercises conducted to date (for example Doyle *et al*, 2005; Cochrane Skin, 2018; Petersen, 2005; Kaplan *et al*, 2013), there is some evidence to suggest that burden of disease is not well understood in the topic area of oral health, particularly in lower income country contexts (Petersen, 2005, p. 72; Janakiram *et al*, 2017). Janakiram *et al*'s research found that there was little surveillance of oral health in lower income countries: "The absence of a national surveillance system for oral health masks the severity and extent of the oral disease burden and limits the basis for advocacy on improving oral health to health decision makers" (Janakiram *et al*, 2017). This means that the whole spectrum of disease in oral health may not be considered when calculating burden of disease data. Globally, data is lacking on some key areas in oral health, including oro-dental trauma and oral mucosal diseases (Petersen, 2005, p. 72). It is therefore questionable as to whether the data is reliable enough to use to set priorities.

It is also questionable that cost-effectiveness data could have added to this priority setting process. A recent study by Hettiarachchi *et al* (2017, p. 122) found that whilst cost effectiveness studies on oral health interventions were increasing and were generally of a good quality, they tended to be limited to high income countries. Although they found twenty three cost unit analysis studies in oral health, only two were conducted in Asia and none in Africa, Latin America or South America (Hettiarachchi *et al*, 2017, p. 122). There is also the question of whether the cost of an intervention should be a driving factor in the analysis of its effectiveness when prioritising topics for health care research. Rather, it might be more important to analyse the cost-effectiveness of an intervention in a priority area whilst undertaking the evidence synthesis, so that a considered analysis can add to the evidence base.

This priority setting process is highly focused on producing a number of priority topics for a specific function (evidence synthesis) and for a specific topic (oral health) in a global context, so much of the preparatory work of establishing the context has already been done. However, it was important to collect quantitative data to support this by considering which Cochrane reviews are still current and should still be kept up-to-date. The

quantitative data that is gathered therefore gives a picture of which COH reviews are used most often and by whom. This data was collected by taking into account the number of downloads, the number of citations and how often the review was discussed on social media. COH's reviews are often used to provide evidence for international guidelines, and this is a metric by which the group is measured by their funding body. The number of times reviews were cited in guidelines was also collected.

In addition to exploring the metrics on COH's existing reviews, information and data was gathered on any clinical trials registered that could form part of the research landscape in terms of new areas for COH to explore, and considering what research was required by guideline developers (see Chapter Three). Finally, like many of the information and data gathering approaches, COH's priority setting process also includes a ranking element, where a panel was convened to decide which of the identified priorities are the most important. This was not a 'classic' Delphi however, as only one round was undertaken, and due to COH's international stakeholder groups, it was an online exercise. Nevertheless, the final rankings were weighted in terms of importance to the panel, following the process established in early priority setting data analysis approaches.

The new proposed framework outlined in Chapter One does not rely exclusively on quantitative data however. It is an attempt to combine information gathering with an approach which takes the views of clinicians, policymakers, patients and consumers into account in a stakeholder consultation.

2.4 Stakeholder consultation approaches to priority setting

Some organisations have gone beyond quantifiable, hard data and have attempted to engage stakeholders in priority setting. Stakeholder engagement and equity are common themes in the health research priority setting literature, and involving patients or healthcare consumers is particularly emphasised. Equity is a particular concern in the Accountability for Reasonableness Framework, which establishes fairness as a key goal in priority setting, "recognising the limits of consumer choice, accountability for reasonableness requires that the rationales for limits to services be public and be based on reasons or rules that 'fair-minded' people can agree are relevant to pursuing appropriate patient care under necessary resource constraints." (Daniels and Sabin, 1998, p. 51). Ratcliffe *et al* (2017, p. 654) have noted that in studies on consumer preferences in priority setting criteria, fairness and equity

are found to be of central importance, in both quantitative and qualitative studies. Key to this idea of "fairness" are four conditions: public accessibility to decision making, relevancy (i.e. clearly stated rationales for decisions), decisions that can be subject to appeal, and a mechanism for enforcing decisions (Daniels and Sabin, 1998, p. 57).

Martin, Giacomini and Singer (2002, p. 283) have emphasised that fair priority setting should go beyond transparency and involve lay persons and healthcare consumers in the process. The James Lind Alliance (JLA) in the UK has done this by establishing priority-setting partnerships. The JLA was created to address the mismatch between the priorities of researchers and the priorities of patients, which was further demonstrated by Crowe *et al*, (2015). They found that research on pharmaceutical interventions was preferred by researchers, but that it was low priority for patients. Analysis of registered clinical trials showed that patient views were seldom taken into account in setting research agendas. The aim of the JLA is therefore to give patients a voice; and to bring together patients, carers and clinicians to identify and prioritise unanswered questions about the effectiveness of treatments (Crowe, 2016). Treatment uncertainties are explored for questions. Crowe *et al* (2015) state that: "An uncertainty is judged to exist when 'no up-to-date (three years), relevant and reliable systematic reviews of research evidence addressing the uncertainty about the effects of treatment exist, or up-to-date relevant and reliable systematic reviews of research evidence show that uncertainty exists".

The partnerships follow a prioritisation process that results in ten treatment uncertainties for consideration by research funders. In five key stages, stakeholder groups are identified, and then consulted. The consultation process includes an analysis of existing research recommendations from clinical guidelines and existing systematic reviews, and so there is an element of information gathering. Uncertainties are then established and linked by theme, and checked to ensure that they are genuine uncertainties. The partners then work together to prioritise the uncertainties into a manageable number. Techniques used here include electronic voting. The shortlist is then refined in a face-to-face priority setting workshop, involving up to 30 people representing all stakeholder groups. The final stage is to report the findings and create research questions from the agreed priorities. These are then fed through to funding agencies and other research bodies. Any treatment uncertainties that are not on the final list are not lost, but catalogued and fed into a database, where they are collected for future researchers (Crowe, 2016). Elliott *et al* (2016) have attempted to add efficiencies to this approach, by introducing an online

element. Their topic area was chronic kidney disease, and a concern for the priority setting team was the ability of participants with chronic illness to travel, so they developed an online Wiki to allow participants to engage in a priority setting workshop. They tested this approach against the standard JLA workshop approach in a randomised controlled trial. However, they found that the Wiki method was less satisfactory for the participants, and that it led to very different results than the workshop process. But given the nature of Cochrane's international focus, it may be that engaging participants online in a prioritisation process is essential. Face-to-face meetings are costly and resource intensive to hold on an international basis.

Elberse *et al* (2012) have also emphasised the importance of patient or consumer involvement in priority setting, using a process that was highly structured by a clinically-focused advisory committee. They conducted a case study to involve patient groups in setting a research agenda for medical products. They recruited 29 patient groups. They used semi-structured interviews and focus groups to prioritise research questions in 15 disease domains, and the rationale for decisions was explored. They found that patients were willing to be involved in the process, but they kept the scientific integrity of the process intact by ensuring that the advisory committee and not the patients determined the focus, set the criteria and kept the mandate for decision making.

The James Lind approach is the most high-profile stakeholder consultation method in the literature, but other researchers have undertaken this kind of process outside of the James Lind Alliance framework. Ratcliffe *et al* (2017) undertook a mixed methods study of which criteria were most important to lay persons in deciding on priorities for health care resource allocation and research. Equity issues were found to be important here, but these extended beyond looking at the considerations of lower and middle income countries. The question of whether age and lifestyle choices should play a part in deciding which resources were allocated was addressed, and whether taking these issues into account was equitable or not (Ratcliffe *et al,* 2017, pp. 656-657). The issue of burden of disease was also considered very important. For example, should a life threatening disease which affects relatively few people be prioritised over a very common disease which affects many more people and their quality of life (Ratcliffe *et al,* 2017, pp. 658)? This is a very pertinent question for COH. The remit of the group covers oral cancer, which affects much less people globally than dental caries (World Health Organization, 2019). If burden of disease was taken into account in terms of the percentage of the population affected by it,

caries would be the number one priority. However, oral cancer is life threatening, and has very serious implications for the quality of life for those affected. Oral cancer is also much more prevalent in some populations than others (World Health Organization, 2019). The question of where to target resources is nuanced and complex, and equity issues are significant.

Sibbald *et al* (2009) have developed a priority setting framework which puts a strong emphasis on both stakeholder engagement and transparency. The framework is divided into process and outcome concepts. The process concepts include stakeholder engagement (stakeholders are explicitly stated as including patients and members of the public), the use of transparent processes, clarity around information management and the information supplied to the decision makers. Any value choices should be based on the values of the organisation and there should be a formal revision or appeal mechanism. Outcomes include improved understanding of the stakeholders, who should have gained insight into priority setting and organisation. Sibbald *et al* (2009) believe that stakeholders should be able to see the results of the process, and should be aware of any actions taken as a result of the prioritisation process. The institution that is setting the priorities should learn from the experience, and have aligned priorities with their goals. Involving stakeholders should lead to increased stakeholder satisfaction. Consumers should be able to accept the priority setting decisions, even if they do not agree with the outcomes. The final outcome is around transparency, and publicising and promoting the decisions made, which should result in changes to policy.

Goold *et al* (2017, p. 600) have argued that consumer involvement must be done in any priority setting exercise, and although Seixas (2018) recognises that this may create tension between participant involvement and economic efficiency, he argues that this tension should be resolved by greater (not less) democratic involvement: “Engaging the public is a challenging task that requires continuous learning. The enormous barriers inherent to this process should by no means serve as an excuse for lack of action and for adhering to a technocratic discourse” (Seixas, 2018, p. 347).

Morley *et al* (2016) have identified some of these barriers in the Cochrane context. Lack of time and resources, the problem of identifying the “right” consumers, and concerns about the potential impact on scientific rigour were highlighted. “Right” consumers in this context were consumers with critical appraisal skills, with some knowledge of systematic

reviews. Madden and Morley (2016) have reported issues around the education of consumer participants: such as a lack of understanding of what constitutes "uncertainty" and the outcomes often being questions that are not appropriate research questions.

Sibbald *et al* (2009) conclude that: "Priority setting is complex, difficult, contentious and often controversial. Developing a conceptual framework is a necessary first step to approaching the evaluation of successful priority setting." They acknowledge that their own process has limitations, for example, the inclusion of health outcomes is not part of their framework. Improved health may be an important goal to measure. However, the approach of "health gain" has been criticised by Hall *et al* (2018, p. 453), as some areas do not fit neatly into this paradigm. End of life care is an example. Hall *et al* (2018, p. 451) have also recognised the difficulty of involving consumers in the process; engagement was the third most important challenge identified by their survey of experts in priority setting.

Given the importance of engaging stakeholders in priority setting, this research project has attempted to involve them in the form of clinicians, patients, policy-makers, guideline developers and members of the public. This was done in three ways:

1. Using the top 25 topics from the James Lind Alliance Priority Setting Partnership in Oral Health. The stakeholders that were consulted in this process were similar to COH's stakeholders, namely people who have received oral and dental health interventions, formal and informal carers of people who have been dental patients, dentists, dental care professionals (DCPs) and other health and social care workers involved in oral health interventions (James Lind Alliance, 2019).

2. An open, online survey was conducted, in which anyone could ask a question about their mouth, teeth or gums and how to keep them healthy.

3. In the final stages, a panel of stakeholders was convened to rank the final priorities in order of importance.

The methodology and results of the stakeholder consultation are explored in Chapters Four and Five.

2.5 Mapping evidence as an approach to priority setting

The final type of approach to priority setting explored in this review is the creation of evidence maps, or "gap maps". Evidence maps are an attempt to document the range of research activity across a broad topic area (Campbell Collaboration, 2018). They can be useful in priority setting because they provide a guide to the high quality research that already exists and should not be prioritised for further research, and they also indicate where the "gaps" may be. The "gaps" then become the potential priority topics. These gaps may be where there is no evidence at all, or where the evidence exists but is of poor quality. The Campbell Collaboration (2018) have studied the history and characteristics of evidence maps in both the health care literature, and in social care topics. They found fifteen organisations who were producing evidence maps, and found that each took a different approach. The common themes led them to the following definition (with optional elements in square brackets):

> "An evidence and gap map is a systematic [visual] presentation of the availability of relevant evidence [of effects] for a particular policy domain. The evidence is identified by a search following a pre-specified, published search protocol. [The map may be accompanied by a descriptive report to summarize the evidence for stakeholders such as researchers, research commissioners, policy makers, and practitioners]. Evidence maps summarize what evidence there is, not what the evidence says."
>
> (Campbell Collaboration, 2018).

Miake-Lye *et al* (2016) undertook a review of evidence maps and found 39 papers. 67% of these were looking for gaps in the evidence and future research needs. However, they did not find any standard accepted methodology for producing evidence maps. They recommend that further work is needed to standardise methods in the field. Miake-Lye *et al* (2016) did note some common elements across the studies. Evidence maps usually derive from a broad systematic search, and they found that there was some grouping of both the type of intervention for particular healthcare problem and the type of studies available on each intervention. The evidence map was often organised as a cross-tabulated matrix, and the visual elements of this approach are highlighted as a particular strength. However, Miake-Lye *et al* (2016) also caution that keeping these visual summaries up-to-date as new evidence is published may become challenging.

The need for this type of overview of the evidence is a product of the growth of evidence generally with the availability of the internet and publication of evidence in various databases, grey literature sources and websites (Snilstveit *et al*, 2013). Research is scattered as a result. Pulling evidence together on a topic and making sense of it can be a major task. Making it available and accessible to a non-technical audience provides further challenges (Snilstveit *et al*¸ 2013). A Cochrane systematic review is an attempt to do this but the advantage of a gap map over a systematic review is that it is broader in scope. Typically, a systematic review concentrates on a single condition, or a primary outcome, with a detailed analysis of effectiveness of interventions. The aim of a gap map is different; it provides an overview of the characteristics of the evidence base, and it is less detailed as a result (Snilstviet *et al*, 2013).

One example of the use of gap maps in practice is provided by Bragge *et al* (2011). The Global Evidence Mapping (GEM) initiative was launched to map the evidence relating to traumatic brain injury and spinal cord injury. Their process was similar to other priority setting processes, in that stakeholders (clinicians, patients, policymakers, carers and researchers) set the boundaries for the research and identified key questions. A broad literature search was undertaken to investigate the evidence for the key questions. The end result was 53 high priority questions, with 11 gaps. In terms of seven of the questions, no studies at all were identified, in four cases, no evidence beyond case studies were available. This evidence is useful for research funders because it demonstrably shows that research is needed on these questions, they are both high priority and lacking in evidence (Bragge *et al*, 2011).

Although gap maps are a useful tool, Snilsveit *et al* (2013) point out that they have limitations. They are generally focused on the effectiveness of interventions, and so may miss key information on other aspects of healthcare research, including predictive factors and barriers to implementing an intervention. Their dearth of detail means that they the lack context and nuance that others (such as Sibbald *et al,* 2009) have identified as vital to the priority-setting process. However, Snilsveit *et al* (2013) advocate their use as one method that can be used to set health research agendas, but that should not be used alone: "Users should consider gap maps as one of a multitude of tools and sources of information to aid decision making for policy and practice."

It is also arguable how much gap maps contribute to priority setting, just because something represents an evidence gap, it doesn't necessarily mean that the topic is high priority, just that the research has not been done. It would be more useful to combine the gap map with additional information, such as a stakeholder consultation or other information gathering approach, to see where the priorities lie.

Although this study has not attempted to produce an evidence map in the visual sense, some mapping against gaps in currently available guidance has been attempted. A survey of clinical guidelines was undertaken, exploring the questions that guideline developers still feel need to be answered. In terms of this research project, these represent uncertainties in the evidence base, and provide an indication of where the gaps may be in systematic review evidence and also in primary research. These uncertainties, along with the results of the stakeholder consultation, were mapped against the group's existing systematic review portfolio. This determined whether the uncertainties had already been addressed, or whether there was scope for a new systematic review or an update of the evidence. This is further explored in Chapters Three and Five.

Three approaches have been examined in this review of the literature: information gathering and analysis, stakeholder consultation and evidence mapping. All have their advantages and disadvantages. Information gathering approaches may lack applicability to the real world, but provide an important picture of the changing research landscape. Stakeholder approaches may involve increased complexity and education of consumers, but provide insight into the process that cannot be gained from simply examining quantifiable data. Gap mapping provides a useful overview but lacks context. Reviews of priority setting in practice will now be examined to see how it has worked in real-world contexts, and in particular, what the issues in implementing priority setting might be.

2.6 Priority setting in health research: overviews

There have been several studies which have reviewed different priority setting approaches and how they have been applied in practice. Bryant *et al* (2014) have undertaken a review of priority setting in high income countries. Their literature search found eleven priority setting exercises that had taken place in the United Kingdom, the United States, Australia and Canada. They found that the vast majority used workshops or focus groups, or these techniques in combination with others. Stakeholder surveys were used in four of the

exercises. Two priority setting processes used the nominal group model, where idea generation and consensus building are attempted in a single meeting. “A question is posed, then responses from participants are sought, collated and disseminated to the wider group. Participants are then asked to prioritize the ideas put forward by group members.” (Bryant, *et al,* 2014). They found that the Delphi technique had only been used in one of the cases to rank priorities; ranking mechanisms varied widely, with some exercises using a simple counting method and others using a much more sophisticated technique incorporating data on mortality and morbidity. Nine of the eleven exercises sought input from consumers. In none of the cases was there a systematic assessment of the outcomes of the priority setting processes.

Bryant *et al* (2014) found several barriers to implementation of priority setting. Priority setting exercises can be resource intensive, and there can be difficulties if the stakeholders do not clearly understand the context, or are not given enough information on the state of the current literature. Interestingly, there was also a reluctance to share ideas amongst some groups, which Bryant *et al* (2014) believe is a result of the competitive nature of research. One priority setting exercise was less effective because researchers did not want to put forward their research projects for fear that they would be appropriated by others. Recommendations put forward include having a clear structure, piloting questionnaires where feasible, and having separate consultations for “non-professional” consumers. Bryant *et al* (2014) conclude that there is no consensus on how to prioritise, and that there has been a failure in evaluating the effectiveness of priority setting.

Nyanchoka *et al* (2019, pp. 103-105) have identified 139 studies that described methods to identify gaps and priorities for health research. 49 of these specifically focused on priority setting, and five methods were identified across thirty of these 49 studies. The methods included Delphi studies (4 studies), quantitative surveys (1 study), knowledge synthesis (defined here as scoping reviews and systematic reviews, 3 studies), stakeholder consultation priority setting approaches (such as JLA partnerships, 20 studies) and global evidence mapping methods (2 studies). Nyanchoka *et al* (2019, p. 105) conclude that there is no consensus on methodology, and that there are a wide variety of approaches. The term “research gap” is itself open to interpretation and definitions varied widely. The lack of clarity can be seen as a barrier to implementation of priority setting, and Nyanchoka *et al* (2019, p. 108) recommend that more work is undertaken “to improve the understanding of the methods and investigate ways to give the public, patients, clinicians, health researchers,

decision-makers and funders more opportunities to know what methodologies are available and can be used."

Youngkong, Kapiriri and Baltussen (2009) reviewed priority setting in the context of developing countries. They found a similarly varied picture over eighteen studies. Eleven of the studies involved more than one stakeholder, with policymakers being the most commonly utilised stakeholder group. Ten of the studies involved focus groups or interviews, eight involved a review of the literature. Other criteria considered included cost-effectiveness, disease burden, disease severity, and poverty reduction. A "wide range of approaches" was undertaken, with rating and ranking scales used for the final determination of priorities in many cases. Evaluation of the impact of the priority setting was often not undertaken however, and this was a major drawback in the research (Youngkong, Kapiriri and Baltussen, 2009, p. 931).

Viergever *et al* (2010) have also reviewed the priority setting literature, and their resulting best practice checklist was outlined in Chapter One, Section 1.5. This checklist was used to evaluate the priority setting framework outlined in this research project (see Chapter Seven). They found that stakeholder involvement was an indispensable part of priority setting, and that priority setting was often a pragmatic process, limited by resources and heavily dependent on context and environment (Viergever *et al*, 2010). Stakeholder involvement should be conducted in a fair way; stakeholders should represent "different expertises" and "balanced gender and regional participation." This is a particular challenge for Cochrane, as an international body. A face-to-face focus group involving a group of people recruited from one area is not appropriate and potentially does not make COH's research applicable in other regions or areas.

Viergever *et al* (2010) also found that priority setting used varied methodologies. These were divided into 'consensus based approaches' (similar to the stakeholder approaches examined here) and 'metrics based [information gathering] approaches'. Consensus based approaches with stakeholder engagement were found to "improve the acceptability of the exercise; individual ranking prevents the dominance of a few participants" (Viergever *et al*, 2010). To this end, transparency at all stages is emphasised as key: "potential implementers of health research priorities are unlikely to adopt or use priorities unless they are fully informed of all aspects of the priority setting process; transparency increases the credibility and thus the acceptability of the final result. Therefore, the report should not be

limited to stating a list of priorities, but should also explain how these priorities were established and by who." They also found that approaches that combine consensus with metrics were common, "research options are then first individually prioritised and consequently discussed (or vice versa)" (Viergever *et al,* 2010).

All of these reviews have similar findings in terms of the barriers to priority setting. The lack of clarity on methodology can be seen as a drawback, which has led to both issues in implementing the priority setting process, and to evaluating it (Nyanchoka *et al,* 2019, p. 108). Follow-up on the outcomes of priority setting is often lacking. Lack of resources and time continue to be significant barriers experienced by groups who are attempting to prioritise, with this being unsurprisingly a particular issue in low income contexts (Youngkong, Kapiriri and Baltussen, 2009, p. 937). The need to educate stakeholders on the purpose and meaning of the priority setting takes up a considerable amount of resource (Bryant *et al*, 2014). Transparency is also a goal to be attained, but many processes fall short, organisations can be reluctant to share their processes and outcomes (Bryant *et al*, 2014). It seems clear however, that whichever methodology is adopted, it is important to adhere to a framework, to give structure and focus to the priority setting process. It is also important to be transparent about this framework and the proposed implementation of the priorities, to provide clarity to stakeholders and to provide a thorough evaluation of the methods used. This study has attempted to do this, and the process is evaluated and discussed in Chapters Seven and Eight.

Although there is wide variation in the methodologies used in practice, Viergever *et al* (2010) view this as a strength of the discipline, rather than a weakness. They conclude their review of the literature with the statement that a gold standard in priority setting is not attainable or desirable, so such a conceptual framework may be difficult to establish for all contexts. This was recognised by Cochrane in their development of the *Guidance note for Cochrane groups to define systematic review priorities* (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019). Cochrane state that: "While the approach towards priority setting described in this guidance note is flexible, the KT Working Group has defined a set of mandatory ('must do') standards that Groups, Networks and Fields need to comply with." These are outlined in Chapter One, Section 1.3. Elements within these standards reflect the good practice criteria identified by Viergever *et al* (2010), including engagement with at least one stakeholder group, and transparency by publishing widely priority setting plans and methodologies. This provides

a recognition that there is variation in the resources available to those undertaking priority setting within Cochrane.

Priority setting in the specific context of evidence production and systematic reviews will now be explored, with reference to the ways other Cochrane groups have attempted to go about the process.

2.7 Priority setting in evidence synthesis and systematic reviews

The only systematic review specifically on evidence synthesis and priority setting to date is by Fadlallah *et al*, (2020). They found 28 studies addressing prioritisation for systematic reviews, and one on scoping reviews. The studies were published between 2005 and 2019. Twelve of the included studies were from Cochrane entities. The most frequently reported method was reviewing the literature, but even this only appeared in five of the studies. Ranking of the priorities was done in 28 of the 29 studies, and research gap analysis in 24 of the studies (Fadlallah, *et al*, p. 71). Only one study did not include stakeholder involvement of some kind. Health care providers were the stakeholders most frequently involved (in 24 of the 29 studies), patients were involved in just over half of the studies (54%) (Fadlallah, *et al*, p. 75). Members of the public were only involved in 8 of the studies. In 25 of the 29 studies, virtual methods were used to engage stakeholders, although some form of face-to-face meeting was also done in 39% of the studies . Again, Fadlallah *et al*, (2020, p. 68) found "wide variation across studies in the steps of prioritisation and the prioritisation criteria." One aspect that Fadlallah *et al*, (2020, p. 77) consider is "the refining of topics into an actionable form". This is particularly pertinent to this study, as the priorities generated have to be suitable for an evidence synthesis or a systematic review. They comment that "moving from a policy issue to a focused synthesis question with specific and well-defined elements is a critical step". Implementation and follow-up were also poorly reported in the studies reviewed by Fadlallah *et al* (2010, p. 82) which seems to be consistent with other studies in the field.

As Fadlallah *et al* (2020, p. 68) discuss, Cochrane groups have taken various approaches to priority setting over the years. Cochrane's Priority Setting Methods Group established a Prioritization Methods Fund. This has financed five initiatives to explore prioritisation in Cochrane reviews (Nasser *et al,* 2013a, p. 475), and other prioritisation exercises within Cochrane have also been identified. Twenty-nine out of sixty-six Cochrane entities had

undertaken a priority setting exercise by 2013 (Nasser *et al,* 2013a, p. 476). The Priority Setting Methods Group considered each priority setting exercise against criteria drawn from Sibbald *et al* (2009) and the Accounting for Reasonableness framework (Daniels and Sabin, 1998, p. 51). These are priority setting frameworks which emphasise stakeholder involvement. The Priority Setting Methods Group have looked for relevance to stakeholders, publicity and the establishment of an explicit process, the existence of an appeals mechanism, effective information management, and enforcement of the decisions in each priority setting process. They found that only fifteen of the twenty-nine processes examined had a structured, transparent approach. Only two involved four or more types of stakeholder, and only one had an appeals process. Only two had a structured strategy to evaluate the priority setting process (Nasser *et al*, 2013a, p. 477).

Some of these processes would fall into the definition of information gathering approaches. For example, the Cochrane Airways Group wanted to take a pragmatic approach, and prioritised updates and new reviews using data that was already in existence. The aim was to identify 25 to 35 high priority topics and become more selective over what was published. They utilised existing healthcare uncertainties, expert opinion and a decision tool. A face-to-face workshop or iterative process was not conducted. There were four different strands to the exercise:

1. Understanding patient uncertainties. Data from the James Lind Alliance was used to find out where evidence uncertainties existed in the field.

2. Piloting a prioritisation tool to assess whether individual reviews needed updating. This was a flowchart to support decision making, utilising the statistical software STATA. The literature was searched for trials for Airways systematic reviews, these were then assessed to see whether the inclusion of the trials in the systematic review would change the results. This process was piloted on the Group's top reviews, ranked by website hits and citations in other papers.

3. A survey of the Group's editors, where 14 editors selected their top ten reviews and ranked them.

4. Horizon scanning for new review titles, based on literature searching and assessing the results.

The priority topics were decided by the editorial team, based on the data from the four strands of research. The process did not follow a formal methodology (Welsh *et al*, 2015, p. 342).

Stakeholder consultation approaches were more common. The Cochrane Consumers and Communications Group conducted a prioritisation exercise in March 2015. They had a clear focus and a specific number of topics they wanted to identify for new reviews. The first step was an online survey, conducted with people with an interest in the topic area. These included health policy makers, health professionals, researchers, consumers and carers, and the wider community. 151 people took part. 191 priorities were suggested, these were streamlined to 22 when similar ideas were grouped together. A workshop was then held with 28 people representing all stakeholders, including people from indigenous and non-English speaking backgrounds. This resulted in 12 identified priorities, which were converted into five review questions. Consumers were involved at every stage, and will be involved in writing the resulting systematic reviews (Synnot, 2016).

In January 2016, the Cochrane Tobacco Addiction Group combined their 20th anniversary celebrations with an opportunity to undertake a prioritisation exercise. The project was designed to raise awareness of the group's work, to identify where further research is needed, and to identify specific research goals from a stakeholder perspective. In stage one, guideline developers, policy makers, clinicians, health professionals, smokers, ex-smokers and researchers were targeted to take part in a survey, the aim of which was to identify the gaps in the group's portfolio of systematic reviews. Crucially, this was an international project, involving participants from lower and middle income countries. 304 people took part. Stage two is described as a "simplified Delphi", where the findings were fed back to a subsection of the participants, who were then asked to prioritise the remaining uncertainties at a workshop. 15 new themes for research have been identified, each with three unanswered questions (Cochrane Tobacco Addiction Group, 2016). The clear message which emerged was: "there are still many unanswered research questions in the areas of tobacco use prevention, harm reduction and cessation" (Cochrane Community Blog, 2018). The group's prioritisation exercise had a direct impact on funding for health research in the United Kingdom, when the National Institute for Health Research issued a funding call in 2018 for research in the areas identified by the group (Cochrane Community Blog, 2018). The Cochrane Tobacco Addiction Group was also successful in

their bid for funding to undertake an overview of reviews on behavioural interventions, which was a direct consequence of the priority setting project (Cochrane Community Blog, 2018).

The Cochrane Incontinence Group and the Gynaecological Neuro-oncology and Orphan Cancers Group have both used the JLA approach to priority setting. Uncertainties were gathered, the data was analysed and verified using published systematic reviews, and priorities were then set after a consultation period. JLA facilitators used a Delphi approach to reach a consensus on a final set of priority topics (Cochrane Community Blog, 2017). In the case of the Cochrane Incontinence Group, the exercise was completed nine years ago. It has been instrumental in guiding the portfolio of reviews and more recent work has concentrated on refreshing the list produced during the JLA process (Cochrane Community Blog, 2017).

Only one group appears to have conducted a purely mapping approach to priority setting, without involving consumers or stakeholders beyond the editorial team or Cochrane Networks. The Cochrane Bone, Joint and Muscle Trauma Group took a different approach from the others detailed so far, relying on existing data and input from experts from another Cochrane entity (the Care of Older People Field). The focus was identifying two priority questions in a particular area (hip fractures). The existing portfolio of the group was mapped against a conceptual framework, formed around key treatment decisions in hip fracture. Gaps between existing reviews and available treatments were sought. Experts from the two Cochrane entities were identified and invited to discuss the gaps via email. Responses were evaluated against whether or not there were existing randomised controlled trials on the intervention. Two titles were identified and agreed by the project team, to be registered by the group (Handoll *et al*, 2013, p. 491-2).

There are more examples of Cochrane groups applying one or more methods to their priority setting process, settling for a hybrid approach. The Cochrane Musculoskeletal Group used both information and data gathering and stakeholder engagement. They piloted a priority setting method, the aim of which was to identify ten research questions for the group to work on next. They recommended that this methodology could be used annually, with a different condition explored in each round. The condition of interest for the pilot was osteoarthritis. The emphasis was on patient perspectives and health equity. Five bibliographic databases were searched to identify existing systematic reviews on

osteoarthritis. Two workshops were held, one with people who had osteoarthritis, and one which included clinicians and Cochrane authors. The workshops were brainstorming sessions, with a dialogue on health equity incorporated. The result was a number of research topics, which participants then ranked for importance. The research team developed ten questions, which were then prioritised using an online survey. The pilot was limited by the lack of participation of people from lower and middle income countries, and by the identification of topics which may not be suited to systematic reviews (Jaramillo *et al*, 2013, p. 504).

The Cochrane Public Health Group took a similar approach. They convened an international taskforce of research advisors to identify and nominate global research needs. People representing interested organisations were asked to participate through teleconferences and email. The literature was searched for existing systematic reviews in the field, and a list of useful review topics for decision making within public health agencies was developed. Four factors were considered by the taskforce: burden of disease, importance to developing countries, avoidance of duplication and opportunity for action. Taskforce contributors were given the opportunity to nominate topics they felt were important in this context. Each member was then asked to identify their ten prioritised topics, and a final top fifteen was developed (Doyle *et al*, 2005, p. 194).

The Campbell and Cochrane Equity Group is a collaboration between Cochrane and the Campbell Collaboration, which aims to find and facilitate the use of evidence on health inequities, defined as “avoidable differences in health outcomes” (Tugwell *et al*, 2017). They also took a mixed-methods approach. They held a two-day meeting with a panel of stakeholders, and developed a group of five pilot topic areas. Systematic reviews on these topics were retrieved and assessed for information on morbidity and mortality outcomes. Data about the population, interventions, comparisons, outcomes and effect size were extracted from the papers. Five stakeholder panels were convened in each area, and interventions and outcomes were screened for both currency and cost-effectiveness. The CHNRI priority rankings were then used for the interventions, looking at ease of implementation, health system requirements, relevancy to different settings and impact on inequities. Safety concerns were also taken into account. Each intervention was given an overall rating, and the interventions were then ranked. The emphasis on this exercise was on knowledge translation of existing Cochrane reviews. Drawbacks included securing the involvement of experts who were often not available due to other commitments, and

gaining consensus agreements from the panels. The panel members also found the number of interventions and outcomes daunting, and felt that they gave undue preference to interventions with which they were familiar.

Cochrane Sexually Transmitted Infections is the only Cochrane group based in a low or middle income country. For their exercise, they adapted the Health Technology Assessment prioritisation method. Trial reports were mapped from the group's specialised clinical trials register. This data was used to produce a list of potential questions and evidence gaps. An online survey was launched, generating a list of 15 questions. These were then mapped to the group's portfolio. Both stakeholder engagement and gap mapping were therefore explored. Their method confirmed which questions were of the highest priority and which important titles were missing (Cochrane Community Blog, 2017).

The Cochrane Skin Group undertook their prioritization exercise to coincide with their 20th anniversary, and it ran during 2017. A range of stakeholders were consulted, including professional societies, guideline developers, healthcare commissioners and patient representatives in an email survey. They were asked to suggest their top five new titles for inclusion in the Skin portfolio, they were also asked to rank these in order of importance. Contacts included the WHO, the National Institute for Health and Care Excellence, the American Academy of Dermatology, European Academy of Dermatology and Venereology, the European Dermatology Foundation, British Skin Foundation, the National Eczema Society, L'Association Française de l'Eczéma, the National Eczema Association, and two Cochrane fields (Child Health and Nursing). The James Lind Partnerships undertaken in topics under their scope were also reviewed for suggestions for further research. The group also used global burden of disease data produced by the WHO to identify the most needed topics. The final shortlist was sent to the editors in the group, who rated their preferences (Cochrane Skin, 2018).

All of the Cochrane Groups considered here have used some kind of survey in their prioritisation process, apart from the Bone, Joint and Muscle Trauma Group. Only one had used a weighted scoring scheme. There was input from consumers or patients as stakeholders in some processes, but not others. All have produced publications to promote transparency, however none have gone into the detail of why the priority decisions have been made. The views of those from lower and middle income countries were not always sought. Some of the groups have considered the existing evidence base, particularly with

regards to gaps in their own portfolio, and areas where new interventions are being developed. Both of those factors would seem important to include in any prioritisation process, along with representation of stakeholder views including both consumers and clinical experts.

As the Cochrane guidance on priority setting is relatively new, it is difficult to determine what impact this is having on approaches to prioritisation, however it is clear that many previous approaches would not now be considered optimal, as they lack the transparency and structure required (Nasser *et al*, 2013a, p. 477). There is also little evidence that any of the Cochrane groups have documented the impact of priority setting, for example, demonstrating how many of the priority topics identified became priority reviews, and whether these reviews were subsequently included in guidelines or changed clinical practice in any way. Some groups have documented the production of the priority reviews. For example, the Consumers and Communications Group have a webpage showing the priority reviews that are currently underway (Cochrane Consumers and Communications, 2020). However, it may be too soon to demonstrate that the reviews produced as a result of their priority setting process have had a measurable impact on practice, as the reviews only recently reached publication stage.

In summary, it is clear that there is no fixed "best practice", gold standard methodology in Cochrane, which reflects the general state of priority setting. A range of different methods have been tried in practice, some in combination with one another. Each would seem to have advantages and drawbacks (Kaplan *et al*, 2013).

The priority setting processes examined in this chapter contributed to the design of the framework developed in this research project, outlined in Chapter One, Section 1.5. The link between the framework elements and the literature will now be discussed.

2.8 The development of the framework

The framework developed in this research has five elements or phases (see Chapter One, Section 1.5). Each of the phases was derived from the literature, and is presented as an overarching structure that can be used when conducting priority setting in an evidence synthesis context. Viergever *et al*'s 2010 paper, which developed a best practice checklist for priority setting, is a key resource for the development of the framework, and the checklist was used in the final evaluation of the process, outlined in Chapter Seven. Some

of the checklist items also form the basis of the framework itself. Viergever *et al*'s (2010) paper is an important contribution to the priority setting literature, and provides general guidance based on previous priority setting exercises. Other researchers in the field have also seen this paper as pivotal. For example, Iqbal *et al* (2021) used the checklist to assess the quality of priority setting processes and the involvement of black and minority ethnic communities. It was used by Crowe *et al* (2021) to develop criteria to undertake priority setting with the LGBTQ+ community. Fadlallah *et al* (2020) used the checklist to cluster and classify the steps of priority setting in their systematic review of priority setting exercises. It has been used in many priority setting processes to assess and evaluate success, including Iqbal *et al* (2021b), Mador *et al* (2016), Doolan-Noble *et al* (2018), Tong *et al* (2015), Reveiz *et al* (2013) and McGregor *et al* (2014).

Viergever *et al*'s (2010) paper has been very influential. However, it was developed in very specific circumstances. An analysis of research priority setting exercises within the World Health Organisation was undertaken, along with and interviews with staff, although a search of the literature was also undertaken to identify best practice outside the World Health Organization context. It is unclear whether the best practice checklist is as applicable for priority setting in evidence synthesis. The research documented in this thesis has taken some of the principles described in the best practice checklist, and will test them in a real-world, evidence synthesis research group.

The first phase in the framework is the "information gathering phase", gathering existing data to support priority setting is recommended by Viergever *et al*'s (2010) best practice checklist. As has been demonstrated from the literature, effective priority setting requires some data inputs, in order to understand where the need for future research is most pressing. It would be reasonable to assume that this is relevant across a range of priority setting exercises, not only in evidence synthesis. The World Health Organization and the Global Forum for Health Research (Global Forum for Health Research, 2009), and the Child Health and Nutrition Initiative (Viergever *et al*, 2010) provided early guidance in priority setting, and the gathering of existing data was key to their process. All of the priority setting processes examined in this literature review have done this preparatory gathering of existing data to some extent; some have used burden of disease data, some have used cost effectiveness data or QALYs, some have used citation data or reviewed the evidence base. However, most have also supplemented this approach with some form of stakeholder consultation. Subsequent reviews to Viergever *et al* (2010) have also

emphasised the need to gather existing data to set the context and explore the evidence base (e.g. Fadlallah *et al*, 2020, Nasser *et al*, 2013a and World Health Organisation, 2020d). It was therefore important to include this element in the framework.

The second element to the framework is the stakeholder consultation phase, essentially another data input as stakeholder preferences and opinions as to the most important priorities are sought. The James Lind Alliance in the UK has to some extent set the standard for how to conduct stakeholder involvement, particularly with patient groups or consumers (Madden and Morley, 2016). This is also an important part of Viergever *et al*'s (2010) checklist, they describe it as "indispensable". A recent review by Tan *et al* (2022) found that stakeholder involvement was the most frequently reported element of priority setting. Although it is possible to conduct a priority setting process without involving external stakeholders at all (for example, Handoll *et al*, 2013, p. 491-2), there are important reasons to involve stakeholder groups in the process, not least the acceptance of the resulting research outputs by those stakeholders who need to use the research (Madden and Morley, 2016). Examples of stakeholder involvement in priority setting the literature are numerous, and this includes in the evidence synthesis context. Fadlallah *et al*'s (2020) systematic review of priority setting found that 28 out of 29 priority setting exercises in evidence synthesis (including in Cochrane review groups) had some form of stakeholder involvement, these have included surveys, Delphis, focus groups and meetings with policymakers and guideline developers. Stakeholder consultation therefore became the second element of the framework.

The third element is the mapping and ranking phase. The data collected in the information gathering phase and through stakeholder involvement needs to be mapped in order to evaluate where there might be evidence gaps to fill with new research. A mapping approach was therefore incorporated into the framework. Early priority setting processes have undertaken this type of mapping, including the COHRED approach (2013) and the GFHR approach (Global Forum for Health Research, 2009). The James Lind Alliance methodology also involves this type of mapping (Crowe, 2016). Fadlallah *et al*'s (2020) systematic review refers to this as "research gap analysis". They found that this commonly done in the evidence synthesis context, with 24 out of 29 identified priority setting processes including this technique. They therefore recommend it as a key part of priority setting, in order that research waste (in this case, commissioning a systematic review or evidence synthesis project where one already exists) is combatted. Ranking the priorities

so that a manageable number of reviews is commissioned was also included in this part of the framework. This is advocated in Viergever *et al* (2010), and was done by just over half the evidence synthesis groups in Fadlallah *et al*'s (2020) systematic review. Again, ranking is commonly done in priority setting, and is a feature of the James Lind Alliance methodology (Crowe, 2016) and early influential priority setting processes (such as the COHRED 2013 approach, and the ENHR approach (Rudan *et al*, 2007)).

The implementation phase is the fourth element in the framework, and is again an important element in Viergever *et al*'s (2010) best practice checklist. There is a consensus in the priority setting literature that implementation is a highly desirable aspect of priority setting, but that it is rarely or poorly reported (see Tan *et al*, 2022, Angell *et al,* 2016, p. 1389, Hall *et al* 2018). This is a gap in the literature that this research project seeks to fill, by documenting how the research priorities were translated into deliverable projects by those tasked with undertaking the research. Fadlallah *et al*'s (2020) systematic review found that implementation was addressed by less than half of their sample. They comment that "An implementation strategy can help ensure translation of the outputs of priority-setting exercises into research projects that ultimately improve the health of populations", indicating that this is an essential step to the final uptake of the priority questions.

The final element of the framework is the evaluation phase. Again, this is an area that is poorly reported in the literature (Tan *et al*, 2022), but has been emphasised in both Tan *et al* (2022) and Fadlallah *et al* (2020). Viergever *et al* (2010) comment that "evaluation of the process used to set priorities can increase the quality and acceptability of the process." Early guidance provided by the ENHR process also stresses the importance of evaluation, with evaluation built into the process at each step (Okello and Chongtrakul, 2000). Evaluation was a key step in Cochrane Consumer and Communications Group's priority setting process (Synott *et al*, 2020), and calls for more evaluation of priority setting were highlighted by Bryant *et al* (2014), Manafo *et al* (2018) and Nasser *et al* (2013a). Evaluation was therefore incorporated into the framework as an essential element.

These then were the five essential elements that make up the framework:

- Information gathering;
- Stakeholder consultation;
- Mapping and ranking;
- Implementation;

- Evaluation.

Although the literature demonstrated the importance of these five aspects of priority setting, the papers examined found wide variation in methods used to achieve the aims of priority setting. This was even true of the very specific context of evidence synthesis. Fadlallah *et al* (2020)'s systematic review on the evidence synthesis context included 29 priority setting processes, but found that there was little consistency and "no best practice in priority setting due to differences in context, purpose and topic breadth". This is an acknowledged issue with developing a "one-fits-all" standard methodology (Nasser *et al*, 2013a, Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019). Therefore, the framework developed in this research is designed to guide those embarking on priority setting in evidence synthesis on the essential steps to take without prescribing a specific methodology of what data to collect, how to collect it or how to engage with stakeholders. The framework will be applied in a real-world example, priority setting at Cochrane Oral Health, to give final recommendations and lessons learned from the application of the framework (see Chapter Eight).

One of the objectives of this research is therefore to apply this priority setting framework to Cochrane Oral Health's work. In order to put this priority setting process into context, other priority setting processes within oral health will now be examined.

2.9 Priority setting in oral health

Aside from COH's own priority setting exercise, as outlined in Chapter One, Section 1.4, there is a paucity of research in oral health research prioritisation. A few studies have been conducted in particular contexts, and a James Lind Alliance Priority Setting Partnership in oral health concluded in 2019.

Jerkovic *et al* (2017) have conducted a Priority Setting Partnership study to identify priorities in oral health care amongst the elderly in the Netherlands. In a series of focus groups, they found that the greatest need was for oral health awareness raising programmes, and better organisation of oral health services (Jerkovic *et al*,2017, p. 503). Chi (2017) has looked at research priorities in pediatric dentistry, and recommends that research is directed towards a screening tool to identify those parents who are likely to refuse interventions such as topical fluoride for caries prevention (Chi, 2017, p. 613).

However, it is not clear from the research how this conclusion was reached, as methodology was not reported in any depth. Antunes *et al* (2016) did an analysis of the Brazilian public health journal Revista de Saúde Pública and found that the most common themes in oral health research were dental caries, fluorosis, periodontal disease and malocclusions, and considered that these issues were the main priorities in Brazil. Griffin *et al* (2012) have looked at oral health priorities amongst older people in the United States, using data from the National Health and Nutrition Examination Survey. They found that there were four major themes emerging, based on the burden of disease (Griffin *et al*, 2012, p. 412). The first was risk of tooth loss in older adults, and they recommended research on prevention of tooth decay and gum disease as a priority in people aged 75 and older. The putative link between poor health and poor oral health was also an issue. They also found significant disparities between different ethnic groups with regards to dentition, with 52% of Black older people likely to have full dentition compared with 70% of white older people. The final theme was untreated dental disease amongst institutionalised older people (Griffin *et al*, 2012, pp. 412-415).

Palmer and Batchelor (2006) have considered priorities for research in primary dental care in the UK, and have undertaken a Delphi study. The five themes they identified as important were research into the application of evidence-based dentistry in practice, the effects of systems of renumeration on treatment patterns in practice, determining the effect of recall and the frequency of oral health check-ups, and the evaluation of cost/benefits of whole team training (Palmer and Batchelor, 2006, p. 89). However, this exercise had no input from consumers. Chestnutt and Taylor (2000) did a similar study in Scotland, with input from consultants in dental public health. The three most important priority topics from this research were prevention of caries in children, access to dental care for disadvantaged groups and the aetiology and pathogenesis of oral cancer in younger people (Chestnutt and Taylor, 2000, p. 402). None of these priority setting exercises have used any kind of robust framework, and have not followed the best practice recommended by Viergever *et al* (2010). Some of them are also very dated, and may not represent current concerns or priorities. It seems clear that priority setting in oral health is a neglected area of research.

The WHO have outlined a series of priorities, based on the global burden of disease. Petersen (2005) has commented that “Dental caries and periodontal diseases have historically been considered the most important global oral health burdens” (Petersen,

2005, p. 71). He points out that caries is still an issue in most high income countries, and that exposure to sugars in parts of the world with previously lower levels of caries (such as Africa) is on the rise. He also traces a relationship between periodontal disease and other non-communicable diseases such as diabetes (Petersen, 2005, p. 72), and comments that oral cancer is the eighth most common cancer worldwide with strong links to lifestyle factors such as alcohol use and tobacco consumption. Caries, periodontal disease and oral cancer are the three main priorities in oral health for the WHO. Petersen (2005, p. 71) also points out that oral health priorities are poorly understood in lower income country contexts. This is borne out by research from Janakiram *et al* (2017), who found that oral health care was limited in India by accessibility and poor portrayals of the severity and extent of the health burden.

The WHO launched a Global Oral Health Programme, which recommended that research is needed in the following areas:

- Risk factors to oral health, particularly the roles of nutrition, diet and tobacco
- The interrelationship between oral health and general health
- The relationship between oral health and quality of life
- Inequities in oral health and disease
- Oral manifestations of HIV/AIDS
- Population studies of oral mucosal lesions
- The burden of dental trauma, particularly in developing countries where road traffic accidents are more common
- Evidence on clinical care and public health practice
- Translation of knowledge into practice (crucially, in community oral health programmes)
- Health systems research into oral health promotion and preventive dentistry

(Petersen, 2005, p. 73)

Some of these issues will not be suitable for topic areas in systematic reviews, due to the type of study design required, or through lack of clinical trials. Some may not fit in COH's scope (for example, there is a HIV/AIDS Cochrane Review Group, who have undertaken some research on oral manifestations of the disease). WHO's work on oral health is also considerably out-of-date, as it was published in 2005. However, these topics do provide a

broad overview of the issues that have been flagged by the WHO, and consideration needs to be given to these when addressing the priorities of COH, particularly as access to the *Cochrane Library* is one of the key outcomes of the Global Oral Health Programme (Petersen, 2005, p. 74).

The most recent priority setting process in oral health research reported in the literature is the James Lind Alliance Priority Setting Partnership in Oral Health. It was established to find out the most important questions with regards to oral care, as it was felt that "oral and dental research was not prioritised by research funders and that funding calls could be better targeted to key areas." (James Lind Alliance, 2019). The process involved inviting questions from members of the public and interested parties, convening a panel (including clinicians, patients, researchers, policymakers) and researching the existing evidence gaps. The final top ten was arrived at over several workshops with the panel where priorities were ranked. The priority list largely agrees with the WHO's assessment that caries, periodontal disease and oral cancer tend to be the areas of importance for research in oral health, with interest in the impact of improving oral health on general health. Access to dental services, provision of support to vulnerable groups and the role of digital technologies were also emphasised. While thorough and transparent, this priority setting process was UK focused and the questions developed may not all be suitable for evidence synthesis. However, the priority questions developed by this process remain important, and so they were considered in the research documented in this thesis too and became part of COH's priority setting process (see Chapter Four).

2.10 Conclusion

This review of the literature has established some of the main themes and methodologies used in priority setting to date, linking them to the framework developed in this research, and has examined previous priority setting exercises in oral health. The literature demonstrates that promoting equity and directing resources to those individuals with the poorest health in greatest need were important drivers for early health prioritisation projects. This needs to be taken into account in any priority setting exercise, and the involvement of those with experience of low and middle income country settings is crucial. Early prioritisation projects also emphasised the need to involve stakeholders, and to set the context by gathering available information and data on the research area. This study tests a framework designed to identify the highest priority questions for evidence synthesis

in the field of oral health. This framework attempts to combine the elements set out in this review of the literature: the gathering and analysis of relevant information and metrics, stakeholder engagement (with some attention given to involving stakeholders in low and middle income settings), and the mapping and ranking of priorities. The combination of different approaches was tested within the context of COH and evidence synthesis to mitigate against some of the disadvantages of each methodology as described in this review, in order to create a more robust framework. Importantly, there is an emphasis throughout on transparency and implementation. The framework must be pragmatic and relevant to the context, and an implementation plan is vital to putting the results of this research project into practice. The methods, results and conclusions of each stage in the process is described in subsequent chapters.

Chapter Three: The information gathering phase

3.1 Introduction

A new proposed model for priority setting has been presented in Chapter One, involving five phases, and based on the best practice guidance from the literature explored in Chapter Two. The first of five phases in the framework is the "information gathering phase", where information and data is gathered to support the priority setting process (Viergever *et al*, 2010). This chapter presents the methods used to collect and analyse information and metrics about COH's existing reviews, and the evidence base in oral health pertinent to systematic reviews, and then goes on to present and discuss the results. Three projects in total were undertaken in this phase, all three were undertaken by the author of this research, working alone:

1. Collecting metrics on the usage of current Cochrane reviews;
2. A review of developments in the evidence base;
3. Evidence uncertainties as presented in clinical guidelines;

These projects are key to Viergever *et al*'s (2010) information gathering phase of prioritisation in COH's context. Collecting metrics on the usage of current Cochrane reviews offers an indication of which reviews should be considered for updates, as if an existing review is not being accessed or regularly cited, it may be an indication that it is low priority. Reviewing developments in the evidence base, in particular which interventions are being registered in clinical trials, informs whether there is scope for new reviews on novel interventions. Examining the evidence uncertainties as presented by guideline developers in guideline documents can also be an important indicator of where evidence is lacking in a topic area. Collecting and analysing this information lays the groundwork for establishing evidence gaps and focusing attention on high priority areas. The type of information and data gathered for this process was driven by the context and purpose of the priority setting: investigating evidence gaps and usage in a very defined area of health research.

3.2 Methods

3.2.1 Collection of metrics on the usage of current reviews: methodology

To begin the prioritization project, a scoping exercise was undertaken, looking at usage of existing COH reviews between 2014 and 2018, taking into account metrics in five areas. 2014 was the date of conclusion of COH's previous prioritization exercise, and so data was collected from this point onwards. A complete list of all COH reviews was retrieved from Cochrane's information system. This was imported into Excel, and data for each of the five areas was inputted.

The five areas considered were:

1. The number of times the full text of the review was downloaded from 2014 (full text downloads);
2. The number of times the review was cited in another paper according to Thomson Reuters (Web of Science citations);
3. The number of times the review was cited in another paper according to Google Scholar (Google Scholar citations);
4. The Altmetric score of the review;
5. The number of times the review has been cited in a guideline (guideline citations).

3.2.1a Full text downloads

The full text of COH's reviews is available online for download in PDF format via the *Cochrane Library*. Cochrane currently operates a "green and gold" access programme. Reviews are embargoed for 12 months (green access) unless the reviewers pay a fee to make the review open access (gold access). In addition, in certain countries all reviews are accessible free of charge to all citizens via a countrywide site licence. People may also have access through subscription-based individual or institutional licences (Cochrane Library, 2017). Wiley, the publishers of the *Cochrane Library*, make available the statistics for the number of full text downloads to Cochrane review groups in an annual report. The data from the annual reports from 2014 to 2018 was analysed for this study.

3.2.1b Web of Science citations (Thomson Reuters)

There are many ways of measuring the impact of research, these have included consideration of the impact of the research on changes policies at regional, national and international level (Smith, 2018); case studies on how the research has affected the populations it attempts to serve (Smith, 2018); individual researcher metrics such as the h-

index (Bornmann and Daniel, 2005); and journal citations. COH's research is published in the *Cochrane Database of Systematic Reviews,* which is measured by journal impact factor. This is a way of judging the importance of a particular journal in its field (Garfield, 2005), and so seemed a reasonable measure of the impact of COH. Journal impact factor is calculated by dividing the number of times a journal's articles have been cited by the number of articles that the journal has published in a given year (Clarivate Analytics, 2017). The numerator in this equation is calculated using data from Thomson Reuters's ISI Web of Science's Journal Citation Reports database. The number of citations was collected from the Web of Science database in February 2019, for all of COH's published reviews.

3.2.1c Google Scholar citations

Research by Mongeon and Paul-Hus (2016) has shown that the citation data obtained through Web of Science may not show the whole picture when it comes to citations in biomedical research. They compared coverage of biomedical journals in Web of Science to the periodicals directory maintained by Ulrich, and found that only 28% of journals in the field are indexed in Web of Science (Mongeon and Paul-Hu, 2016, p. 218). An alternative source of citation metrics was sought for this study, to compare to the citation data collected from Web of Science.

Google Scholar is a search engine rather than a database, which searches the scholarly literature including full text articles. It is designed to be "as comprehensive as possible" (De Groote and Raszewski, 2012, p. 394). Harzing and van der Wal (2008, p. 65) report that impact data for individual scholars is generally higher in Google Scholar than in Web of Science, often substantially so. They indicate that several factors account for this. These include the reliance on Web of Science indexed journals to provide cited articles, limited coverage of non-English language sources and issues with non-ISI Web of Science indexed journals. In many cases, these citations are included but only for the first author (Harzing and van der Wal, 2008, p. 64). They conclude that Google Scholar also has limitations in that it does not perform well for older articles and includes non-scholarly citations (Harzing and van der Wal, 2008, p. 65). However, it provides a robust alternative to Web of Science.

Google Scholar allows researchers to create an alert, in which an email is sent every time a particular scholarly work is cited. These alerts have been set up for all COH reviews, and

the number of citations for each review has been collected by the group since 2014.

3.2.1d Altmetric score

Altmetrics have emerged since 2010 as a new way of considering the impact of research, an alternative to the traditional impact factor (Kolahi and Khazaei, 2016, p. 569). Articles are tracked using their DOI number and the number of times an article is mentioned in the following places is counted:

1. Policy documents
2. News sources
3. Blogs
4. Online reference managers (such as Mendeley)
5. Post-publication peer review forums
6. Social media (Twitter, Facebook, Weibo, Google+, Pinterest and Reddit)
7. Other resources, such as Wikipedia and You Tube.

(Kolahi and Khazaei , 2016, p. 570)

An aggregated score is then produced and assigned to an article. This score acts as an indicator of the online attention an article has received. It is weighted, with (for example) a mention in a news article gaining 8 more points than a mention on Twitter (Altmetric Support, 2016). Costas *et al* (2014) found a weak but positive correlation between traditional impact factor and Altmetric score, and argue that the Altmetric score represents a complementary way to analyse the impact of an article.

Altmetric scores for all COH reviews are available online via the *Cochrane Library*. These scores were retrieved and documented in January 2019.

3.2.1e Guidelines citations

Fostering links with groups who develop guidelines in health care is a key component of Cochrane's Strategy to 2020 (Cochrane, 2015). A number of COH reviews have been cited in clinical guidelines, and this data provides an indicator of the review's practical utility, and it's potential to change practice. The citation results from Web of Science and Google Scholar were combined with data provided by information specialists at the UK Cochrane Centre to identify those reviews which had been sought after by guideline development

groups.

The data collected for all of these metrics was collated in an Excel spreadsheet. As some of the reviews were published during the period 2014-2018, a mean score for the four years 2014, 2015, 2016 and 2017 was calculated for two of the metrics: Google Scholar citations and full-text downloads, to give an average yearly score. If the review was published within the four year period, the score was adjusted accordingly. For example, only two years of citation and download data was available for the review *Interventions for treating bisphosphonate-related osteonecrosis of the jaw (BRONJ)* because it was published during 2016 as a new review. The total number of downloads and citations was therefore divided by two for this review, and not four. For Web of Science citation data, a yearly average score was also calculated, but across the lifespan of the review, rather than over the four years. This was because it was not possible to get year-by-year citation data from Web of Science. Therefore the total number of citations on Web of Science was divided by the number of years since publication for each review.

Although these metrics give an impression of how COH's existing reviews are performing, and which reviews may need to be updated and which discontinued, they do not help to identify whether there are new priority areas for Cochrane reviews. New priority areas were therefore examined in two ways: reviewing the developments in the evidence base and by conducting a survey of clinical guidelines. The aim was to identify any evidence gaps that might be filled by a new Cochrane review.

3.2.2 A review of developments in the evidence base: methodology

COH's reviews (with the exception of a handful of reviews) include only randomised controlled trials. To investigate the evidence base in this context meant exploring whether there had been new clinical trials registered that may fit into a new Cochrane review. As has been outlined in the literature review, Cochrane groups have used several differing approaches to prioritizing topics, and this research project builds on some of these techniques. For example, the approach of the Cochrane Airways Group was pragmatic (Welsh, *et al*, 2015, p. 342), and one of the methods used to prioritize was to look for new trials within existing review topic areas, to see whether those reviews needed to be updated, using a decision tool. One major issue that they identified with the process of using a decision flow chart was the labour intensive nature of screening the literature

searches, especially in areas where interventions were particularly complex (Welsh, *et al*, 2015, p. 345). The research documented in this thesis investigates the question of whether text mining packages could be applied to assist with this process by easing the burden involved in screening. Therefore, the two aims of the review of the evidence base were to find out if there was a substantive "direction of travel" in oral health clinical trials registered or reported since the last priority setting process in 2014; and to examine whether these trials could be identified in a less labour intensive way than was used by the Cochrane Airways Group.

Text mining, otherwise known as semantic searching, has been used in information retrieval to identify papers for inclusion in systematic reviews (O'Mara-Eves *et al*, 2015). It has been defined as "the process of discovering knowledge and structure from unstructured data (i.e., text)" (O'Mara-Eves *et al*, 2015). It has been most notably used in the systematic review context for screening studies for inclusion in reviews, but to date it has not been used to assist in the priority setting process. It can be helpful in this context because it is designed to read and analyse a large volume of texts and data in a short amount of time. Text mining makes use of Natural Language Processing (NLP) algorithms, which can pull together similar ideas and concepts, however differently they are expressed (Linguamatics, 2017). It can identify relationships and patterns across a dataset, and make these visible as structured data. This is commonly done as a "visualisation", which can take the form of a graph, map or table (Linguamatics, 2017). Text mining should make the process of identifying new evidence from a volume of literature in a particular topic less time consuming.

3.2.2a Searching for clinical trials

COH's scope was broken down into 33 conditions or diseases (see Table 1), and a search strategy was developed for each. A search was then conducted for each topic area across those databases where there were likely to be randomized controlled or controlled clinical trials. The Cochrane Central Register of Controlled Clinical Trials (CENTRAL), the WHO International Clinical Trials Registry Platform (WHO ICTRP) and the US National Institutes of Health Trials Registry (ClinicalTrials.gov) were searched. CENTRAL is part of the *Cochrane Library*, and is produced from several sources, including records from PubMed, Embase and from Cochrane review groups' individual clinical trials registries (Cochrane Library, 2015). The only studies eligible for publication in CENTRAL are

randomised controlled trials, controlled clinical trials, controlled before and after studies and interrupted time series (Cochrane Library, 2015), and so it was highly appropriate to search CENTRAL for the purposes of this study. However, the use of CENTRAL should be caveated by the fact that it does not contain diagnostic test accuracy studies, and COH had two reviews of diagnostic accuracy studies at the time of the search, with the potential for new priority titles on diagnosing oral diseases to be commissioned as a result of this project. The other two databases searched (WHO ICTRP and ClinicalTrials.gov) do contain diagnostic test accuracy studies.

WHO ICTRP is a single point of access to identify clinical trials, and is made up of trials registry records from various countries, including Australia, New Zealand, Brazil, China, South Korea, India, Cuba, Germany, the EU, Iran, Japan, Thailand, Peru and the Netherlands (WHO ICTRP, 2017). ClinicalTrials.gov is a resource which was created through the requirement for all clinical trials in the US to be registered (ClinicalTrials.gov, 2017). Although none of these three databases claims to be exhaustive, taken together they are a reasonable reflection of the evidence base in terms of clinical trials. It is a mandatory requirement for a Cochrane review to search all three (Cochrane, 2017a). As the last prioritization exercise took place in 2014, the searches undertaken for this study were limited by date, and only trials registered since 1 January 2014 were included.

Juckett (2012, p. 468) found that 500 documents was a reasonable gold standard for optimising analysis by text mining software in his study of medical records. For each topic area, the number of hits was recorded (see Table 1). If the combined total was over 500, the results from each database were imported into the reference management software EndNote. 13 of the topics met this criteria, and 13 EndNote Libraries were created.

The results of each search were checked for duplicated records, and records which were obviously not about the topic. At this stage, the records retrieved on the xerostomia topic area were excluded, as the trials identified by the search were found to be less about interventions to treat or prevent xerostomia, but more about reporting it as a side effect of a drug intervention which may have nothing to do with oral health. After excluding the trials which were only about xerostomia as a side effect, the number of remaining trials on this topic did not meet the threshold for including in the study.

Table 1: Topic areas explored for clinical trials, 2014-2017 with number of results returned

Topic	CT.gov	WHO ICTRP	CENTRAL	TOTAL
Periodontal disease	582	1246	2033	3861
Oral cancer	97	220	2425	2742
Partial / full edentulousness	290	574	1338	2202
Caries management	270	760	1020	2050
Xerostomia	130	40	1760	1930
Malocclusion	46	171	1034	1251
Gingivitis	83	415	437	935
Temporomandibular joint disorder	88	262	394	744
Oral mucositis	124	50	508	682
Root canal therapy	18	24	639	681
Impacted / unerupted teeth	111	38	442	591
Wisdom tooth extraction	71	108	338	517
Traumatised teeth	93	20	399	512
Tooth discolouration	28	39	428	495
Herpes simplex virus	60	25	388	473
Recurrent mouth ulcers	16	79	370	465
Hypersensitive teeth	137	4	194	335
Cleft lip and palate	41	50	204	295
Dental anxiety	22	71	129	222
Bisphosphonate-related osteonecrosis of the jaws	7	24	180	211
Sialorrhea	10	33	146	189
Oral lichen planus	20	82	65	167
Jaw fractures	10	26	123	159
Non-carious tooth lesions	14	5	104	123
Oral candidiasis	9	45	53	107
Periimplantitis	32	4	47	83
Dry socket	4	16	58	78
Toothache	37	3	35	75
Burning mouth syndrome	6	10	44	60
Fluorosis	2	13	29	44
Oral submucous fibrosis	4	16	24	44
Odontogenic cysts	1	5	23	29
Noma	0	0	2	2

3.2.2b Text mining packages

The titles and abstracts from each of the other 12 searches were then exported from

EndNote and uploaded to three text mining packages: Voyant, VOSViewer and TerMine. These three text mining packages were chosen because they are free of charge and because they have been put forward as examples in training courses for Cochrane Information Specialists. They have therefore already been made available to staff at Cochrane, and have been used in the systematic review process already, albeit with different aims (Glanville, 2016). As these are new technologies with regard to priority setting, three different packages were chosen in order to crosscheck that the results were consistent.

Voyant was originally developed for the digital humanities. It is a web-based text reader, which can produce word-clouds of the most commonly used words in a text (Voyant, 2017). VOSViewer is a tool developed at the Centre for Science and Technology at Leiden University. It produces textual maps, and can create a network of most frequent terms used (Levallois, 2017). These can be displayed in the form of "heat maps", with areas of colour density showing where terms occur together. TerMine is a service provided by the UK's National Centre for Text Mining (NaCTeM), based at the University of Manchester. It uses linguistic analysis to find all "candidate terms" in a text, and extracts word sequences, so that you can see the keywords in context. These can then be produced in a tabulated list (NaCTeM, 2012).

For each of the twelve eligible topics, a Word cloud was produced using Voyant. This was limited to interventions only by adding other terms as stop words, meaning that they would not appear in the Word Cloud. A heat map was produced using VOSViewer, and a table of key words in context was produced using TerMINE.

The different results were then analysed for common themes which provide a snapshot of the recent evidence in oral health to indicate where new systematic reviews are required. Clinical trials data is a useful tool, however it was also important to examine where systematic reviews might be needed to inform clinical guidelines used by clinicians in practice.

3.2.3 Evidence uncertainties as presented in clinical guidelines: methodology

After considering where new reviews might be required in terms of a direction of travel of the evidence, the next stage in the process was to consider current evidence uncertainties, and gather data on where systematic reviews may be required. Clinical guidelines were

chosen as the mechanism for exploring these uncertainties. Where the exercise in exploring the evidence base and the primary research was a "bottom-up" exercise, looking at the evidence that exists, this analysis takes a top-down approach, looking at what is required rather than what is available.

Systematic reviews have been seen as completing the circle, or bridging the gap between primary research and the creation of clinical practice guidelines (MAGIC, 2018). Policy makers and guideline developers are key stakeholders in Cochrane reviews, according to the Strategy to 2020 (Cochrane, 2015). The methods of guideline developers vary, but generally they look to high quality systematic reviews as the first level of evidence considered in terms of recommending good practice to clinicians, and they will sometimes undertake a systematic review if one does not already exist (Shekelle, 1999, p. 596). An indication from a guideline document or a consensus statement that evidence is lacking, or that high quality research is not available is a cue to develop new topics for a systematic review, and can also reinforce the importance of an existing review topic. The lack of evidence may even act as a stimulus for the commission of research projects and targeted funding (Yaffe, *et al*, 2012). The questions that guideline developers still feel they have to answer are a good indicator of where the gaps may be in systematic review evidence and also in primary research. The identification of these gaps, or evidence uncertainties, are key to understanding oral health priority setting. It is important to both understand these uncertainties across COH's scope, and to map whether the group's existing systematic reviews could potentially answer these questions.

The uncertainties have been explored by a survey and content analysis of the clinical guidelines published since 2005.

3.2.3a A survey of clinical guidelines published since 2005

Search strategies were developed in twelve key topic areas in oral health. These were areas considered to be "active" in terms of the number of clinical trials registered over the past three years, according to the survey of the evidence base (see Table 1). The topic areas were:

- Periodontal disease
- Oral cancer

- Partial / full edentulousness
- Caries management
- Malocclusion
- Gingivitis
- Temporomandibular joint disorder
- Oral mucositis
- Root canal therapy
- Impacted / unerupted teeth
- Wisdom tooth extraction
- Traumatised teeth

MEDLINE Ovid, Google Scholar and the National Institute of Health and Care Excellence (NICE) databases were searched. In the case of MEDLINE, subject searches were undertaken, and linked to the Canadian Agency for Drugs and Technology in Health (CADTH) filter for identifying guidelines and consensus statements (Canadian Agency for Drugs and Technology in Health, 2019). In Google Scholar where the search interface is less advanced, keyword searches were limited by introducing "recommendation", "guideline" or "consensus" into the title search. The NICE database search was limited to guidance documents. The search results were then screened using the Cochrane Register of Studies software, and any results that were not guidance documents were discarded, along with duplicates. However, commentaries on guidelines were retained in order to follow up the primary guideline document reference. The searches were limited to more current guidance; any guidelines or consensus statements published before 2005 were not examined. This is because the vast majority of COH's reviews were published or updated after this date, and may already have answered any uncertainties in guidelines published before 2005. Any guidelines that had cited COH's reviews over the research period were also examined. These citations were drawn from the data at held at the editorial base, which was comprised of citation results from Web of Science and Google Scholar, combined with data provided by information specialists at the UK Cochrane Centre.

The resulting list of guidelines and consensus statements was examined by retrieving the full text document. In some cases, the document had to be omitted because it was not available. Evidence uncertainties were explored in three ways:

- If the guideline had graded evidence as to level of quality according to research

design, the topics that were based on levels of evidence below that of randomised clinical trial were extrapolated;

- If the guideline had set out future directions for research, these were compiled if they were related to oral health interventions, diagnoses or prognosis;

- If the guideline neither set out future directions for research or graded evidence, the guideline was examined for phrases such as “insufficient evidence” or “low-quality evidence” or “poor quality evidence”, or “research” or “trial”.

The uncertainties that were mentioned as needing further exploration by the guidelines were inputted into an Excel spreadsheet for each topic area. These were then coded using content analysis techniques.

Content analysis has been described by Joffe and Yardley (2004, p. 56) as “the accepted method of investigating texts”. Categories are established, and the number of times the categories are used in a text are then counted (Joffe and Yardley, 2004, p. 56). Robson (2002, p. 355) has stated that “sorting out the categories is the most crucial aspect of the content analysis”, and quotes Berelson (1952) “since the categories contain the substance of the investigation, a content analysis can be no better than its system of categories” (Robson, 2002, p. 355).

For this content analysis, the uncertainties were classed in part according to the PICO structure, some categories of which were used to develop a coding scheme. PICO stands for Participants, Intervention, Comparator and Outcomes, and it is commonly used in evidence-based practice research to present a clinical question (Santos *et al*, 2007). The *Cochrane Handbook of Systematic Reviews of Interventions* (Higgins and Green, 2011, p. 17) recommends that clinical questions are structured using this framework. As this is the way that Cochrane intervention reviews tend to be organised, shaping the content analysis around some PICO elements would seem a logical step to allow easier mapping of Cochrane reviews against uncertainties found in guidelines, to find out which may already be covered by a Cochrane systematic review. Each uncertainty extracted from the guidelines was coded using the scheme. The participants element in PICO generally incorporates the population type and the health-care condition of interest (e.g. children with dental caries), however, it was divided into “condition” and “population” for ease of

categorisation. "Uncertainty type" corresponds to the type of intervention and/or study design (for example, prevention or treatment, or diagnostic). "Theme" was a broad categorisation of the intervention, and the "Uncertainty" was the granular data: the uncertainty as extracted word-for-word from the guidelines. The coding scheme is shown in Table 2, with an example.

Table 2: A coding scheme for the evidence uncertainties presented in clinical guidelines, with examples

CODING SCHEME	DESCRIPTION	EXAMPLE
Condition	Health-care condition that the uncertainty relates to.	Caries
Population	The population who would benefit from the resolution of the uncertainty	Children
Uncertainty type	Type of study/intervention	Prevention
Theme	Intervention category	Fluoride
Uncertainty	Extracted uncertainty, as presented in the guidelines	Effectiveness of fluoride varnish

The uncertainties were categorised according to the above scheme, and then analysed by topic area.

The results of these three projects in the information gathering phase were collated, and will now be presented and discussed.

3.3 Results from the information gathering phase

3.3.1 Collection of metrics on existing Cochrane Oral Health reviews: results

By January 2019, COH had 162 published reviews. A top ten of reviews for each of the metrics was produced, and the top tens are presented below. For context, the year that the review was last published by COH is included. This was current at the time this stage of the research documented in this thesis was undertaken, but some of these reviews have been subsequently updated.

3.3.1a Full text downloads

The most downloaded COH review was *Oral hygiene care for critically ill patients to*

prevent ventilator associated pneumonia, with an average of 8,116 downloads per year. This review was by far the most popular, with the next most popular being *Powered versus manual toothbrushing for oral health*. Of all of the reviews in the top ten, only three (*Oral hygiene care for critically ill patients to prevent ventilator associated pneumonia, Chlorhexidine mouthrinse as an adjunctive treatment for gingival health,* and *Interventions for preventing oral mucositis for patients with cancer receiving treatment*) did not cover the topic of caries prevention or treatment in some way.

Table 3: Cochrane Oral Health most downloaded reviews, 2014-2017 (yearly average)

Cochrane Oral Health Review	Downloads
Oral hygiene care for critically ill patients to prevent ventilator-associated pneumonia (last published 2016)	8116
Powered versus manual toothbrushing for oral health (last published 2014)	5842
Water fluoridation for the prevention of dental caries (last published 2015)	5542
Pit and fissure sealants for preventing dental decay in the permanent teeth (last published 2017)	4553
Fluoride varnishes for preventing dental caries in children and adolescents (last published 2013)	4044
Chlorhexidine mouthrinse as an adjunctive treatment for gingival health (last published 2017)	3585
Xylitol-containing products for preventing dental caries in children and adults (last published 2015)	3237
Interventions for preventing oral mucositis for patients with cancer receiving treatment (last published 2011)	3126
Operative caries management in adults and children (last published 2013)	3001
Direct composite resin fillings versus amalgam fillings for permanent or adult posterior teeth (last published 2014)	2964

3.3.1b Web of Science citations

The majority of COH reviews had received less than 10 citations in the years 2014-2018, according to the data calculated using the journals indexed by Web of Science. 60 out of 162 had received an average of five citations or less over the four year period. The most cited review was *Fluoride toothpastes of different concentrations for preventing dental caries in children and adolescents*. Three of the ten most cited were on the topic of dental implants, and *Oral hygiene care for critically ill patients to prevent ventilator-associated pneumonia* and *Chlorhexidine mouthrinse as an adjunctive treatment for gingival health*. The other four were about the treatment or prevention of dental caries.

Table 4: Cochrane Oral Health most cited reviews according to Web of Science data, 2014-2018 (yearly average)

Cochrane Oral Health Review	Citations
Fluoride toothpastes of different concentrations for preventing dental caries in children and adolescents (last published 2010)	32
Interventions for replacing missing teeth: augmentation procedures of the maxillary sinus (last published 2014)	31
Water fluoridation for the prevention of dental caries (last published 2015)	28
Pit and fissure sealants for preventing dental decay in the permanent teeth (last published 2017)	26
Oral hygiene care for critically ill patients to prevent ventilator-associated pneumonia (last published 2016)	24
Interventions for replacing missing teeth: antibiotics at dental implant placement to prevent complications (last published 2013)	21
Chlorhexidine mouthrinse as an adjunctive treatment for gingival health (last published 2017)	20
Interventions for replacing missing teeth: different types of dental implants (last published 2014)	18
Fluoride varnishes for preventing dental caries in children and adolescents (last published 2013)	17
Interventions for preventing oral mucositis for patients with cancer receiving treatment (last published 2011)	17

3.3.1c Google Scholar citations

The number of citations received by COH reviews on Google Scholar was greater than those reported by Web of Science. 89 out of 162 received a yearly average of 5 citations or less compared with 60 out of 162 on Web of Science during the period 2014-2018. The reviews cited most according to this data were again mainly concerned with the prevention or treatment of dental caries, however two of the dental implant reviews were also highly cited.

Table 5: Cochrane Oral Health most cited reviews according to Google Scholar data, 2014-2018 (yearly average)

Cochrane Oral Health Review	Citations
Fluoride toothpastes for preventing dental caries in children and adolescents (last published 2003)	47
Fluoride toothpastes of different concentrations for preventing dental caries in children and adolescents (last published 2010)	43
Pit and fissure sealants for preventing dental decay in the permanent teeth (last published 2017)	43
Interventions for replacing missing teeth: different times for loading dental implants (last published 2013)	40
Fluoride varnishes for preventing dental caries in children and adolescents (last published 2013)	40
Operative caries management in adults and children (last published 2013)	35
Interventions for replacing missing teeth: augmentation procedures of the maxillary sinus (last published 2014)	34
Interventions for preventing oral mucositis for patients with cancer receiving treatment (last published 2011)	34
Powered versus manual toothbrushing for oral health (last published 2014)	32
Oral hygiene care for critically ill patients to prevent ventilator-associated pneumonia (last published 2016)	31

3.3.1d Altmetric score

The Cochrane review *Flossing for the management of periodontal diseases and dental caries in adults* had by far the most attention on social media. Prevention and treatment of caries and gum diseases were the most popular topics, featuring in 7 of the ten reviews with the highest Altmetric scores.

Table 6: Cochrane Oral Health highest Altmetric scores as of January 2019

Cochrane Oral Health Review	Altmetric score
Flossing for the management of periodontal diseases and dental caries in adults (last published 2011)	467
Powered versus manual toothbrushing for oral health (last published 2014)	348
Water fluoridation for the prevention of dental caries (last published 2015)	330
Triclosan/copolymer containing toothpastes for oral health (last published 2013)	290
Surgical removal versus retention for the management of asymptomatic disease-free impacted wisdom teeth (last published 2016)	238
Xylitol-containing products for preventing dental caries in children and adults (last published 2015)	200
Fluoride mouthrinses for preventing dental caries in children and adolescents (last published 2016)	148
Fluoride toothpastes for preventing dental caries in children and adolescents (last published 2003)	143
Ibuprofen and/or paracetamol (acetaminophen) for pain relief after surgical removal of lower wisdom teeth (last published 2013)	135
Oral hygiene care for critically ill patients to prevent ventilator-associated pneumonia (last published 2016)	134

3.3.1e Citations in guidelines

The review *Fluoride toothpastes for preventing dental caries in children and adolescents* featured in seventeen guidelines over the period studied, and the other COH review on fluoride toothpastes was cited 16 times by guideline developers. Again, the prevention of dental caries was of significant interest, with seven of the ten most cited reviews measuring the effectiveness of various interventions.

Table 7: Cochrane Oral Health reviews most cited in guidelines, 2014-2018

Cochrane Oral Health Review	Guideline citations
Fluoride toothpastes for preventing dental caries in children and adolescents (last published 2003)	17
Fluoride toothpastes of different concentrations for preventing dental caries in children and adolescents (last published 2010)	16
Fluoride varnishes for preventing dental caries in children and adolescents (last published 2013)	11
Antibiotics for the prophylaxis of bacterial endocarditis in dentistry (last published 2013)	10
Interventions for preventing oral mucositis for patients with cancer receiving treatment (last published 2011)	10
Oral hygiene care for critically ill patients to prevent ventilator-associated pneumonia (last published 2016)	10
Pit and fissure sealants for preventing dental decay in the permanent teeth (last published 2017)	10
Fluoride mouthrinses for preventing dental caries in children and adolescents (last published 2016)	9
Pit and fissure sealants versus fluoride varnishes for preventing dental decay in the permanent teeth of children and adolescents (last published 2016)	9
Flossing for the management of periodontal diseases and dental caries in adults (last published 2011)	9

3.3.1f Aggregated top tens

As a final stage, a matrix was produced, to show which of the published reviews appeared in more than one of the top tens, to develop an overall picture of usage (see Table 8). Only one review appeared in all five top tens: *Oral hygiene care for critically ill patients to prevent ventilator-associated pneumonia. Fluoride varnishes for preventing dental caries in children and adolescents, Interventions for preventing oral mucositis for patients with cancer receiving treatment* and *Pit and fissure sealants for preventing dental decay in permanent teeth* appeared in four of the top tens.

Table 8: A matrix showing which Cochrane Oral Health reviews appeared in which of the top ten results in the five metrics considered

	ALTMETRICS	GOOGLE SCHOLAR CITATIONS	WEB OF SCIENCE CITATIONS	DOWNLOADS	GUIDELINE CITATIONS	TOTAL
Oral hygiene care for critically ill patients to prevent ventilator-associated pneumonia	X	X	X	X	X	5
Fluoride varnishes for preventing dental caries in children and adolescents		X	X	X	X	4
Interventions for preventing oral mucositis for patients with cancer receiving treatment		X	X	X	X	4
Pit and fissure sealants for preventing dental decay in the permanent teeth		X	X	X	X	4
Fluoride toothpastes for preventing dental caries in children and adolescents	X	X			X	3
Fluoride toothpastes of different concentrations for preventing dental caries in children and adolescents		X	X		X	3
Powered versus manual toothbrushing for oral health	X	X		X		3
Water fluoridation for the prevention of dental caries	X		X	X		3
Chlorhexidine mouthrinse as an adjunctive treatment for gingival health			X	X		2
Flossing for the management of periodontal diseases and dental caries in adults	X				X	2
Fluoride mouthrinses for preventing dental caries in children and adolescents	X				X	2
Interventions for replacing missing teeth: augmentation procedures of the maxillary sinus		X	X			2
Interventions for replacing missing teeth: different times for loading dental implants		X	X			2
Operative caries management in adults and children		X		X		2
Xylitol-containing products for preventing dental caries in children and adults	X			X		2
Direct composite resin fillings versus amalgam fillings for permanent or adult posterior teeth				X		1

Ibuprofen and/or paracetamol (acetaminophen) for pain relief after surgical removal of lower wisdom teeth	X					1
Interventions for replacing missing teeth: different types of dental implants			X			1
Antibiotics for the prophylaxis of bacterial endocarditis in dentistry					X	1
Pit and fissure sealants versus fluoride varnishes for preventing dental decay in the permanent teeth of children and adolescents					X	1
Surgical removal versus retention for the management of asymptomatic disease-free impacted wisdom teeth	X					1
Triclosan/copolymer containing toothpastes for oral health	X					1

The prevalence of reviews on caries prevention and management in the top tens would suggest that it is a very important issue to users of COH reviews. *Oral hygiene care for critically ill patients to prevent ventilator-associated pneumonia* would be COH's most significant review measured by the various metrics described here, possibly because its appeal is wider than just oral health practitioners and dental professionals.

3.3.2 A review of developments in the evidence base: results

The evidence base was reviewed by an analysis of clinical trials in a total of 12 topic areas. The analysis was completed by utilizing text mining software. Figures 2, 3 and 4 are examples of the results from each software package on the topic of wisdom tooth extraction. Figure 2 shows a screenshot of the results from Voyant in the form of a word cloud. The bigger the word is on the diagram the more occurrences of the word in the interventions in the text of the clinical trials records analysed. The results from VOSViewer are presented in a screenshot of a heat map in Figure 2. Red and orange areas show the most popular terms in the analysed text, the less popular are in the green and blue areas. A screenshot of the TerMine results are presented in tabulated form in Figure 4. The most common phrases are presented in order of the frequency of which they are used, which is represented by the numbers in the right-hand column.

Figure 2: Interventions for managing wisdom tooth extraction: screenshot of the results from Voyant

Figure 3: Interventions for managing wisdom tooth extraction: screenshot of the results from VOSViewer

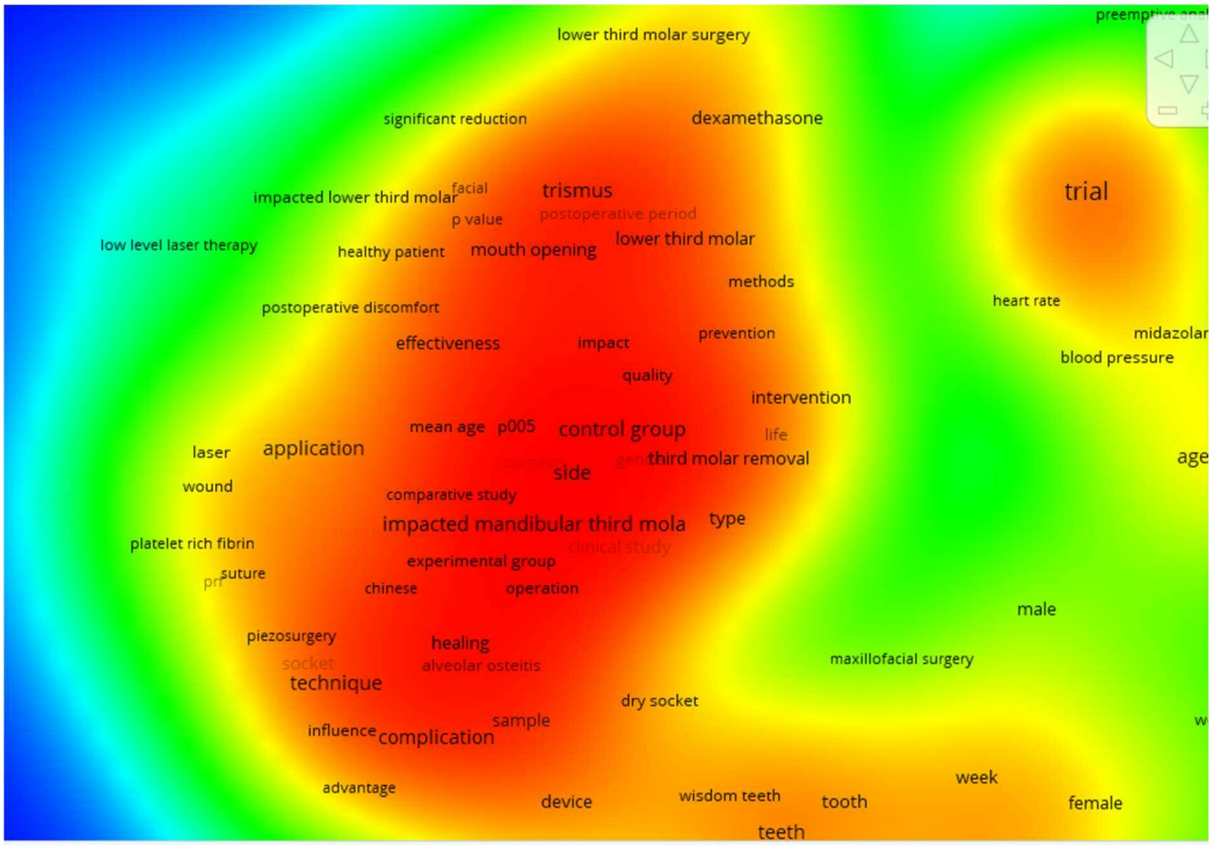


Figure 4: Interventions for managing wisdom tooth extraction: screenshot of the results from TerMine

Rank	Term	Score
1	molar surgery	182.315216
2	molar extraction	132.210526
3	control group	125.684212
4	postoperative pain	118.377052
5	clinical trial	117.32692
6	pain intensity	108.36232
7	pain relief	108.068184
8	surgical removal	107.818184
9	wisdom tooth	89.166664
10	visual analogue scale	71.021416
11	visual analog scale	69.089951
12	inclusion criterion	68.567795
13	third molar	63.262821
14	tooth extraction	59.679012
15	mouth opening	59.279999
16	surgical extraction	57.846153
17	results available	55.892086
18	exclusion criterion	55.54348
19	group a	53
20	inferior alveolar nerve	49.331959
21	pharmaceutical form	48.75
22	experimental group	45
23	facial swelling	44.842106
24	group b	44
25	molar tooth	41.142857
26	postoperative complication	40.919998
27	dry socket	39.909092
28	acute pain	39.382355
29	dental pain	39.186668
30	molar removal	38.511112
31	treatment group	35.900002
32	analgesic efficacy	35.772728
33	alveolar osteitis	34.947369
34	pain score	34.75

These three screenshots are given as examples. More details can be found in Appendix C, where the results of each text mining package for each topic are presented.

The results of the survey of the evidence-base are summarised in Table 9. The table shows the number of trials analysed and the most commonly mentioned interventions in each of the topic areas, as determined by the text mining software results.

Table 9: Results of the Clinical Trials Survey in Oral Health, 2014-2017

Topic	Number analysed	Interventions from clinical trials registered or reported 2014-2017
Periodontal disease	3,675	Root planing, oral hygiene interventions, non-surgical treatments
Oral cancer	2,592	Radiation therapy, induction chemotherapy, cisplatin and fluorouracil, prevention (tobacco use, diet)
Caries management	2,050	Fluoride (especially varnish), restoration materials, sealants
Partial / full edentulousness	1,981	Implant stability, surgery to prevent implant failure
Malocclusion	1,153	Oral hygiene in orthodontic patients, bonding of braces, rapid expansion
Gingivitis	825	Oral hygiene, toothbrushing, mouthrinse, chlorhexidine
Temporomandibular joint disorder	630	Occlusal splints, laser therapy
Root canal therapy	623	Filling materals, bond strength, anesthesia
Oral mucositis	578	Lasers, honey, caphosol, palifermin
Impacted / unerupted teeth	528	Surgery
Traumatised teeth	475	Restoration, filling materials, surgery
Wisdom tooth extraction	444	Pain relief, side effect reduction

The results were then mapped against COH's current portfolio of reviews, and planned reviews (protocols and registered titles) to see if any themes could be identified where there might be scope for a new review. The results of the mapping exercise are in Table 10.

Table 10: Areas of research mapped against current Cochrane Oral Health reviews

THEME/INTERVENTION	IS THERE A COCHRANE REVIEW?
Root planing in periodontal treatment	• Full-mouth treatment modalities (within 24 hours) for chronic periodontitis in adults
	• Treating periodontal disease for preventing adverse birth outcomes in pregnant women
	• Treatment of periodontal disease for glycaemic control in people with diabetes mellitus
	• Periodontal therapy for the management of cardiovascular disease in patients with chronic periodontitis
	• Routine scale and polish for periodontal health in adults
Oral hygiene interventions for general oral health improvement	• Psychological interventions for improving adherence to oral hygiene instructions in adults with periodontal diseases
	• Powered versus manual toothbrushing for oral health
	• Chlorhexidine mouthrinse as an adjunctive treatment for gingival health
	• Flossing for the management of periodontal diseases and dental caries in adults
	• Routine scale and polish for periodontal health in adults
	• Interdental brushing for the prevention and control of periodontal diseases and dental caries in adults
	• Supportive periodontal therapy (SPT) for maintaining the dentition in adults treated for periodontitis
	• Treatment of periodontal disease for glycaemic control in people with diabetes mellitus
	• Triclosan/copolymer containing toothpastes for oral health
Non-surgical treatments for periodontal diseases	• Full-mouth treatment modalities (within 24 hours) for chronic periodontitis in adults
	• POSSIBLE SCOPE FOR SPECIFIC NON-SURGICAL INTERVENTIONS - e.g laser therapy
Radiation therapy for oral and oropharyngeal cancer	• Interventions for the treatment of oral cavity and oropharyngeal cancer: radiotherapy
Induction chemotherapy for oral and oropharyngeal cancer	• Interventions for the treatment of oral cavity and oropharyngeal cancer: chemotherapy
Fluoride therapy for preventing caries	• Fluoridated milk for preventing dental caries
	• Fluoride gels for preventing dental caries in children and adolescents
	• Fluoride mouthrinses for preventing dental caries in children and adolescents
	• Fluoride supplementation in pregnant women for preventing dental caries in the primary teeth of their children
	• Fluoride supplements (tablets, drops, lozenges or chewing gums) for preventing dental caries in children
	• Fluoride toothpastes for preventing dental caries in children and adolescents

	• Fluoride toothpastes of different concentrations for preventing dental caries in children and adolescents
	• Fluoride varnishes for preventing dental caries in children and adolescents
	• Fluorides for the prevention of early tooth decay (demineralised white lesions) during fixed brace treatment
	• Water fluoridation for the prevention of dental caries
	• Combinations of topical fluoride (toothpastes, mouthrinses, gels, varnishes) versus single topical fluoride for preventing dental caries in children and adolescents
	• One topical fluoride (toothpastes, or mouthrinses, or gels, or varnishes) versus another for preventing dental caries in children and adolescents
	• Slow-release fluoride devices for the control of dental decay
	• Topical fluoride (toothpastes, mouthrinses, gels or varnishes) for preventing dental caries in children and adolescents
	• Topical fluoride as a cause of dental fluorosis in children
Fluoride varnish for preventing caries	• Fluoride varnishes for preventing dental caries in children and adolescents
	• Pit and fissure sealants versus fluoride varnishes for preventing dental decay in the permanent teeth of children and adolescents
Restoration materials for treating carious teeth	• Direct composite resin fillings versus amalgam fillings for permanent or adult posterior teeth
	• Replacement versus repair of defective restorations in adults: amalgam
	• Replacement versus repair of defective restorations in adults: resin composite
	• Dental filling materials for managing carious lesions in the primary dentition
	• Adhesive restorations for the treatment of dental non-carious cervical lesions
	• Antibacterial agents in composite restorations for the prevention of dental caries
Sealants for preventing caries	• Sealants for preventing dental caries in primary teeth
	• Pit and fissure sealants for preventing dental decay in permanent teeth
	• Pit and fissure sealants versus fluoride varnishes for preventing dental decay in the permanent teeth of children and adolescents
Dental implant stability	• Interventions for replacing missing teeth: different times for loading dental implants
	• Interventions for replacing missing teeth: different types of dental implants
	• Interventions for replacing missing teeth: dental implants in fresh extraction sockets
	• Interventions for replacing missing teeth: 1- versus 2-stage implant placement
Surgery to prevent dental	• Interventions for replacing missing teeth: management of

implant failure	soft tissues for dental implants
	• Interventions for replacing missing teeth: alveolar ridge preservation techniques for dental implant site development
	• Interventions for replacing missing teeth: augmentation procedures of the maxillary sinus
	• Interventions for replacing missing teeth: horizontal and vertical bone augmentation techniques for dental implant treatment
Oral hygiene in orthodontics	• Interdental cleaning in patients with fixed orthodontic appliances
	• Fluorides for the prevention of early tooth decay (demineralised white lesions) during fixed brace treatment
Bonding of braces in orthodontics	• Adhesives for bonded molar tubes during fixed brace treatment
	• Adhesives for fixed orthodontic bands
	• Adhesives for fixed orthodontic brackets
Rapid expansion in orthodontic treatment	• Surgical adjunctive procedures for accelerating orthodontic treatment
	• Non-surgical adjunctive interventions for accelerating tooth movement in patients undergoing fixed orthodontic treatment
Toothbrushing for gingivitis	• Powered versus manual toothbrushing for oral health
	• Different powered toothbrushes for plaque control and gingival health
	• POSSIBLE SCOPE FOR REVIEWS ON TECHNIQUES, DURATION, FREQUENCY
Mouthrinses for gingivitis	• Chlorhexidine mouthrinse as an adjunctive treatment for gingival health
	• Chlorhexidine mouthrinse versus other potentially active mouthrinses as an adjunctive treatment for gingival health
Chlorhexidine for gingivitis	• Chlorhexidine mouthrinse as an adjunctive treatment for gingival health
	• Chlorhexidine mouthrinse versus other potentially active mouthrinses as an adjunctive treatment for gingival health
Occlusal splints for temporomandibular joint disorders	• Occlusal interventions for managing temporomandibular disorders
Laser therapy for temporomandibular joint disorder	• This is currently an intervention in a review planned on physical therapy for temporomandibular joint disorder
Filling materials in root canal therapy	• Materials for retrograde filling in root canal therapy
	• Single crowns versus conventional fillings for the restoration of root-filled teeth
	• Endodontic procedures for retreatment of periapical lesions
Bonding in root canal therapy	• Materials for retrograde filling in root canal therapy
Anaesthesia in dentistry	• Injectable local anaesthetic agents for dental anaesthesia (not OH review),

	• Intraoperative local anaesthesia for reduction of postoperative pain following general anaesthesia for dental treatment in children and adolescents
	• Sedation versus general anaesthesia for provision of dental treatment to patients younger than 18 years (not OH review)
	• Sedation of children undergoing dental treatment
Laser therapy for oral mucositis	• SCOPE FOR NEW REVIEW
Honey for oral mucositis	• SCOPE FOR NEW REVIEW
Caphosol for oral mucositis	• SCOPE FOR NEW REVIEW
Palifermin for oral mucositis	• Interventions for preventing oral mucositis in patients with cancer receiving treatment: cytokines and growth factors
Surgery for impacted teeth	• Surgical removal versus retention for the management of asymptomatic disease-free impacted wisdom teeth
Restoration for traumatised teeth	• Interventions for treating traumatised permanent front teeth: avulsed (knocked out) and replanted
Filling materials for traumatised teeth	• Interventions for treating traumatised permanent front teeth: avulsed (knocked out) and replanted
Surgery for traumatised teeth	• Interventions for treating traumatised permanent front teeth: luxated (dislodged) teeth
	• Interventions for treating traumatised ankylosed permanent front teeth
	• Interventions for treating traumatised permanent front teeth: avulsed (knocked out) and replanted
Pain relief in wisdom tooth extraction	• Ibuprofen and/or paracetamol (acetaminophen) for pain relief after surgical removal of lower wisdom teeth
	• Paracetamol for pain relief after surgical removal of lower wisdom teeth
Reduction of side effects in wisdom tooth extraction	• Surgical techniques for the removal of mandibular wisdom teeth
	• Ibuprofen and/or paracetamol (acetaminophen) for pain relief after surgical removal of lower wisdom teeth
	• Paracetamol for pain relief after surgical removal of lower wisdom teeth

This survey of the evidence base only identified three topic areas where there may be scope for a new COH review incorporating new interventions: periodontal diseases, gingivitis and oral mucositis. Non-surgical interventions for periodontal disease are covered in part by one Cochrane review, but there may be scope for more reviews looking at interventions such as laser therapy. The duration, frequency and techniques involved in toothbrushing to manage gingival disease are also not in the current portfolio. Oral mucositis lacks reviews on honey, caphosol and laser therapy for prevention.

Other than these very defined areas, there were no specifically “new” interventions for COH reviews to target to prioritize for systematic reviews. Aside from these exceptions,

the vast majority of the interventions that were most commonly found in this search would fit into existing COH reviews, apart from the area of prevention of oral cancer. There is currently no COH review on this topic, but there is potential for reviews on programmes within dental practices to help people give up smoking, or to promote healthy eating. However, there is also the point that some of the trials identified on this topic would fit within the scope of other Cochrane groups, for example, the Cochrane Tobacco Addiction Group. On the whole, the volume of newly registered and newly reported clinical trials seems to be in topic areas that are currently well covered by the COH portfolio.

3.3.3 A survey of clinical guidelines, published since 2005: results

After reviewing the evidence-base, and looking at where there were trials for possible inclusion in new or existing Cochrane reviews, the next stage in this study was to look at the evidence using a "top-down" approach: i.e. using the need for further evidence according to guideline developers. Clinical guidelines were sought from 2005 onwards.

The search for potential clinical guidelines yielded a total of 569 records from three databases (MEDLINE, Google Scholar and Web of Science) after the removal of duplicates. COH had obtained 68 further guidelines citing their reviews by monitoring the literature, giving a total of 637. Of these, 112 were rejected as not relevant (i.e. not in COH's scope), not available or accessible, or on obtaining the full text, were not actually guidelines. This left 525 guidelines for analysis. The most represented clinical topics in the guidelines were preventing and treating caries (75 guidelines), oral cancer (70 guidelines), periodontal disease (55 guidelines) and the efficacy of dental implants (43 guidelines).

36% (191) of the guidelines listed no recommendations for future research, and did not comment on evidence gaps or areas where evidence was poor quality or lacking. This means that almost two-thirds of the clinical guidelines that were in COH's scope found areas where the evidence could be improved. 685 uncertainties were found in total from the 334 guidelines that had found gaps in the evidence.

These were coded according to the scheme outline in Table 2, and then categorised according to uncertainty type, so that common questions for further research could be extrapolated. The results of this process will now be examined. Table 11 shows the results of the survey.

Table 11: Uncertainties in the oral health literature according to guidelines identified 2005-2019

Number of guidelines analysed		525
Number of guidelines with uncertainties identified		334
Number of guidelines without uncertainties identified		191
Number of uncertainties identified		685
Theme	Condition	Number of uncertainties identified from guidelines
Diagnosis of oral diseases	Head and neck cancers	7
	Caries	3
	Temporomandibular joint dysfunction	3
	Dental neglect due to child abuse	1
	Periimplantitis	1
	Sialorrhea	1
	Malocclusions	1
	Taste disorders	1
Links between oral diseases and other conditions	Periodontal disease and links to other conditions	29
	Oral hygiene and prevention of complications in the critically ill	3
	General oral health and links with pneumonia	1
	General oral health and links with frailty	1
	Link between oral health and child abuse	1
	Caries and links with dementia	1
	Temporomandibular joint disorders and links to migraine	1
	Link between stress and oral ulcers	1
Prevalence of oral disease	HPV related oral cancers	1
	Premalignant lesions	1
	Medication related osteonecrosis of the jaw	1
	Periodontal disease	1
Prevention of oral disease	Caries prevention	93
	General oral disease prevention	49
	Prevention of oral diseases in cancer patients	30
	Oral cancer prevention	12
	Prevention of medication-related osteonecrosis of the jaws	9
	Prevention of periodontal diseases	9
	Prevention of periimplantitis	2
	Prevention of dry mouth	4
	Prevention of oral lichen planus	1
	Prevention of traumatised teeth	1
	Prevention of tooth wear	1
	Prevention of denture stomatitis	1

Prognosis of oral diseases	Prognostic factors in oral cancer	4
	Prognostic factors in medication-related osteonecrosis of the jaws	1
Risk factors for oral diseases	Risk factors associated with dental caries	16
	Risk factors associated with periimplantitis	8
	Risk factors associated with periodontal disease	5
	Risk factors associated with oral cancer	5
	Risk factors associated with medication-related osteonecrosis of the jaws	4
	Risk factors associated with temporomandibular joint disorders	2
	Measuring risk in general oral disease	2
	Risk of developing oral mucositis in cancer patients	2
	Risk factors associated with developing malocclusion	1
	Risk factors associated with oral ulcers	1
Treatment of oral disease	Treatment of missing teeth or edentulousness	71
	Treatment of caries	53
	Treatment of periodontal diseases	45
	Treatment of head and neck or oral cancer	41
	Oral surgical procedures	24
	Root canal treatment	18
	Treatment of temporomandibular disorders and facial pain	17
	Treatment of medication-related osteonecrosis of the jaws	14
	Treatment of traumatised teeth	12
	Treatment of impacted teeth	9
	Treatment of malocclusion / jaw abnormalities	8
	Treatment of periimplantitis	7
	Treatment of dry mouth	5
	Treatment of tongue-tie in infants	4
	Treatment of toothache / dental pain	3
	Treatment of dysphasia / swallowing problems	3
	Treatment of general dental disease	3
	Treatment of oral lichen planus	3
	Treatment of oral ulcers	3
	Treatment of sialorrhea	3
	Treatment of halitosis	2
	Treatment of dental sensitivity / hypersensitive teeth	2
	Treatment of sleep apnoea with oral appliances	2
	Treatment of salivary gland dysfunction	2
	Treatment of oral mucositis in cancer patients	2

	Treatments for ankylosed teeth	1
	Treatment of dental anxiety	1
	Treatment of microstomia	1
	Treatment of non-carious tooth lesions	1
	Treatment of oral graft-versus-host disease	1
	Treatment of tooth stains	1

3.3.3a Diagnosis of oral diseases

Eighteen of the uncertainties found in the guidelines were about diagnosis of oral diseases. Almost half (7 out of 18) were about diagnosis of oral or head and neck cancers, covering the efficacy of diagnostic tests including imaging techniques. Three of the uncertainties were about the accuracy of tests for diagnosis of dental caries, and three were about diagnosis of temporomandibular joint disorders. The other five uncertainties in this category were about diagnosing taste abnormalities, imaging techniques for diagnosing malocclusions, imaging techniques for diagnosis of sialorrhea, diagnosis of dental neglect in children and establishing threshholds for intervention, and the biological markers for diagnosing peri-implant diseases for those people who have dental implants to replace missing teeth.

3.3.3b Oral health and its links to other health conditions

Thirty-eight uncertainties were about the links between oral health and other health conditions. The vast majority of these (29 out of 38) were about periodontal disease in particular. The links between periodontal disease and heart disease were most important to establish, 11 uncertainties were related to this. Nine uncertainties related to periodontal disease and diabetes, and whether improved periodontal health can help to keep diabetes controlled. Seven were about whether periodontal treatment can lead to better outcomes in pregnancy.

There were another nine uncertainties in this category. Three of these were about the links between good oral hygiene and the prevention of complications in the critically ill. The other six were split between oral care and pneumonia in nursing home residents, oral health as a predictor for physical frailty in the elderly, establishing a link between oral health and child maltreatment, whether oral health can predict or control dementia, whether there was a link between stress and oral ulcers and finally, whether temporomandibular joint disorders can cause migraines to develop.

3.3.3c Prevalence of oral disease

Only four of the uncertainties were about the prevalence of oral diseases, and all four were on different topics: the prevalence of human papilloma virus (HPV) in disadvantaged women, the presence of premalignancies or oral tumours in different populations with different baseline risks, the prevalence of medication-related osteonecrosis of the jawbones in people undergoing tooth extractions, and trends in the prevalence of periodontal disease. However, establishing prevalence is not within the remit of COH, and so these topics were not relevant to this prioritisation process.

3.3.3d Prevention of oral disease

Almost one third of the uncertainties (212 out of 685) related to the prevention of oral diseases and disorders. Almost half of these (93 out of 212) were about preventing caries, and over one third of these concerned fluoride, including which mode of delivery was most effective, the effectiveness of types of fluoride (e.g. stannous, sodium or silver diamine) and the use of fluoride in certain high risk groups (e.g. the elderly, and those with autoimmune diseases like Sjogren's syndrome). The efficacy of behavioural interventions to prevent caries and the use of dental sealants were other areas where guideline developers thought research was most lacking.

Prevention of oral diseases generally was another area of concern, with 49 uncertainties identified from the guidelines. Twelve of these concerned methods of oral health promotion, and ten were about toothbrushing and the correct method, duration and amount of toothpaste to prevent oral diseases. Behavioural interventions were also an area of uncertainty in the general prevention of oral diseases, and another cited area was recall intervals and how often to visit the dentist.

Preventing oral mucositis in cancer patients was a further area of uncertainty. Lasers, growth factors and different antimicrobials and surface protectants were all interventions that were considered to need further research. Oral cancer screening to prevent oral lesions becoming cancerous, preventing medication related osteonecrosis of the jaws and preventing periodontal disease were less prominent, but also significant areas of prevention where evidence was lacking.

3.3.3e Prognosis and risk factors

Uncertainties relating to prognosis and risk factors for oral disease accounted for 51 of the 685 uncertainties. Sixteen were about risk and dental caries, primarily about developing adequate risk assessment tools. Nine were about the prognosis and risk in the development of oral cancer, concerns here included the role of alcohol, the risk of recurrence and the likelihood of oral lichen planus becoming oral cancer. Eight were around establishing the risk factors for periimplantitis, in particular the role of confounding factors including smoking. Five were about the risk factors involved in periodontal disease, with a consensus that evidence is generally lacking this area; and five were about the prognosis and development of osteonecrosis of the jaws.

3.3.3f Treatment of oral disease

Uncertainties about how to treat oral disease accounted for over half of the total, 362 out of 685. Seventy-one of these were about how to treat missing teeth or edentulousness, particularly in terms of dental implants. The most frequently mentioned uncertainties here were to do with types of materials for implant manufacture, the best type of implant placement technique, and establishing the factors for implant failure. Fifty-three uncertainties were about treating dental caries, and the type of restoration material was the most frequently mentioned uncertainty. The removal of caries was also a topic that required more research, with micro-invasive interventions such as the Hall Technique featuring in this category.

Forty-five uncertainties were around treating periodontal disease, particularly around surgical techniques and the management of tissue, and regeneration techniques such as guided tissue regeneration and platelet rich plasma. The best regime of antimicrobials and the effectiveness of supportive therapy were also mentioned in this category. Forty-one uncertainties were about treating oral cancer, most of these were around the efficacy of chemotherapy treatments, or chemotherapy combined with radiotherapy. Uncertainties around surgical treatment for oral cancer included the efficacy of transrobotic surgery, types of reconstruction technique, and which type dressing materials promoted healing.

Twenty four related to general oral surgical procedures, and almost half of these were about which type of anaesthesia to use or how best to deliver it to patients (eg injection techniques or type of mask). Other topics in this category included whether antibiotic

prophylaxis was useful for people with particular conditions or prosthetic joints, and three guideline developers stated that there was a lack of research generally on oral surgical procedures, particularly relating to rehabilitation and quality of life. Eighteen uncertainties were around root canal treatment, which type of surgical treatment is most effective and how it compares to non-surgical treatment. The next most mentioned uncertainty in this category was what type of filling material to use in the tooth.

Seventeen treatment uncertainties were about treatment of facial pain or temporomandibular joint disorders. Five of these were about the efficacy of alternative medicines, such as herbal therapies and acupuncture. Again, surgical procedures featured in this category, with uncertainties including the efficacy of the gamma knife, and the Gasserian ganglion percutaneous technique. Two guideline developers stated that there was uncertainty in all treatments for this condition.

Fourteen treatment uncertainties related to treatment of medication-induced osteonecrosis of the jaw bones. There was a consensus among guideline developers that research in this area is generally lacking, but specific areas that were mentioned included the efficacy of drug holidays to give the patient a break from medication causing the condition, the use of lasers for treatment, and the use of prosthetics such as implants. Hyperbaric oxygen and platelet-rich plasma were other treatments mentioned in this category.

Twelve uncertainties were around treating traumatised teeth. The type of surgical procedure to use was again the most mentioned uncertainty in this category. Other uncertainties were about raising the profile of out-of-hours services, the use of antibiotics to reduce revascularisation in immature teeth, reducing inflammation using corticosteroids and the long term effects of replanting a tooth.

Prevention and treatment were the most frequently occurring areas where evidence gaps appear to exist, according to the guidelines. Prevention of dental caries was a major concern, along with preventing a deterioration in general oral health. Treatment uncertainties were led by how best to replace teeth, in particular the efficacy of dental implants, but treatment of dental caries was also a major interest for guideline developers. This does correlate with the areas where clinical trials were registered in the survey of the evidence base outlined in Section 3.3.2. Establishing the prevalence of oral disease, and diagnosis of oral disease, were much less prominent as evidence gaps in the guidelines.

The emphasis on caries prevention and management also reflects the usage of COH reviews, and the existing reviews on treatment of edentulous adults with dental implants were also highly cited.

These three projects seem to show that the Cochrane reviews with most interest are generally paralleled by the interest of guideline developers and that the clinical trials that are registered are attempting to address some of the gaps. This information has important implications for priority setting. It suggests that COH may be able to use resource more effectively by updating existing reviews subject to the ongoing trials registered by in trials registries, rather than registering new review titles to undertake.

3.4 Discussion: the information gathering phase

The information gathered in this phase of the priority setting process has been useful, however each project within this stage has strengths and weaknesses which it is important to explore.

3.4.1 Current usage of Cochrane Oral Health reviews

Examining the current usage of COH reviews gives the review group a snapshot of which reviews are most in demand, and which reviews are candidates for future updates. It seems clear that the challenges of preventing and treating dental caries remain popular topics with stakeholders; whether that is researchers who are citing reviews in their own works, or people who are discussing Cochrane reviews on social media or in news outlets. The prevention of dental caries also seems to be high on the agenda of clinical guideline developers in oral health.

There are some interesting differences in the types of reviews that are cited in the work of other researchers and those which people are most likely to be discussing on social media. The reviews on dental implants were not likely gain attention on social media, but they were highly cited by other researchers. The popular topics on social media were more around whether or not to floss, whether to use a powered toothbrush, what type of toothpaste to use and whether fluoride should be added to the water supply or not. This suggests that COH reviews are being used by different stakeholders for different purposes. More “technical” topics such as what type of dental implant to use and whether or not to augment the maxillary sinus before placing implant are sought after by other researchers

and academics, but not so much by members of the public and the statistics on the full text downloads confirms this.

However, statistics of this nature should be interpreted with caution. For example, the *Cochrane Library* database where the Cochrane reviews are housed is not currently completely open access, there is a one-year embargo on free publication in some territories, and this may have an impact on the results. However, it should be said that one of the most downloaded reviews (*Water fluoridation for the prevention of dental caries*) was published during the period covered by the study and would have been subject to the embargo. This did not stop the full text of this review being downloaded an average of 5,542 times per year. There is a possibility even so that the embargo has condensed this figure, along with other reviews published during the period under study that would have been subjected to the embargo.

One interesting aspect of the study is the considerable difference between the number of reviews with Web of Science citations versus the number of reviews with Google Scholar citations. The Web of Science citations were consistently lower, for example, their top cited COH review had 32 citations, while on Google Scholar, the top cited review had 47. The two top tens were also very different in composition. There are reasons for this. Google Scholar casts its net very widely. Konkiel (2014) has outlined several explanations as to why Google Scholar citations may not be wholly reliable. Firstly, Google's definition the scholarly web is not rigorous, and items such as student handbooks and library guides could be pulled in as cites via Google's algorithm. Secondly, Konkiel (2014) argues that Google Scholar's lack of transparency around how the data is arrived at allows the system to be "gamed" to an extent, and she also found that Google was slow to issue corrections to errors. Conversely, the data collected via Thomson Reuters on Web of Science may be more limited to a narrower set of journals, however, there is some quality control in that attempts to "game" the system by inflating citations are more likely to be identified (Konkiel, 2014). However, both systems are flawed and neither may give a complete picture of the impact and usage of Cochrane reviews

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Altmetics is another system which may be open to "gaming" or manipulation of the data. As Holmberg (2014) has suggested, the line between "gaming" and legitimately promoting a piece of research is quite fine. Do the highest Altmetric scores of COH's reviews reflect legitimate online interest, or the amount of time and effort the group has taken to promote

them? Euan Adie (the founder of Altmetrics) has pointed out that there are some measures in place to guard against the more pernicious attempts to artificially inflate the online attention that an article may receive. For example, only data that is available for audit is included in an Altmetric score, and the blogs and news sources included are manually curated. Altmetric also use the data that they have collated to track unusual patterns of activity (Adie, 2013). As Altmetric scores are not yet part of the "official" impact factor for a journal or a paper, there may be less incentive to manipulate it, but this may change if the Altmetric score becomes a legitimized way of calculating impact.

A further reason for caution is that there may be a possible time lag between the publication of a Cochrane review, and the citations and attention scores starting to increase. Of the 22 reviews in the final matrix (see Table 8) only four were brand new reviews, published in the period under study. The others were review updates, or reviews which were published prior to 2014. If the research was repeated in five years, it is possible that the matrix would look very different. Nevertheless, the data gathered by considering the usage of existing reviews is important to establish where to focus attention and resource for future updates. That the data is taken from more than once source gives increased confidence that COH can meet the needs of current users and produce the evidence they require.

3.4.2 Developments in the evidence base in oral health

The survey of the evidence base did not reveal any substantive new areas of upcoming clinical trials for COH to use in evidence synthesis, except in a few very defined areas. Clinical trials identified and analysed since the last prioritization exercise were mainly on topics that would fit into the existing reviews produced by the group. In terms of the volume of clinical trials currently underway in oral health, periodontics, oral cancer, caries management and partial or full edentulousness are the areas with most ongoing research. However, most of these topic areas did not have a volume of data on any new techniques or interventions.

The exceptions were periodontal disease, gingivitis and oral mucositis, where there may be some scope for new reviews. In periodontal disease, non-surgical treatments are only partially covered by the current portfolio, and there may be scope for a review specifically on these. The duration, frequency and techniques involved in toothbrushing, particularly to

manage gingival diseases were another important area where a Cochrane review was lacking. Finally, the topic area of oral mucositis was lacking reviews on three of the most commonly mentioned interventions: honey, caphosol and laser therapy. A further highlighted area was tobacco cessation for the prevention of oral cancer. However, this topic will fall under the scope of a different Cochrane group (Tobacco Addiction).

A second aim of this part of this study was to see whether text mining could introduce efficiencies into surveying the evidence base. The text mining element of this project did not prove to be labour intensive. The screening involved in the process was minimal, as records were only screened to see whether they were about the topic or not before being included in the research. Even using three packages, the analysis of the text after uploading to the three tools took less than 10-15 minutes per topic area. The three packages also produced remarkably consistent results (see Appendix C for a full breakdown of the visualisations provided by each tool).

There were limitations in using this technique. Clinical trials were analysed in bulk across topic areas, so although there is a sense of a direction of travel in terms of interventions, any nuance is lost. This approach to the data may also hide some new and upcoming interventions which have only been tested in a few trials, although arguably if the research is at this stage then it may not be suitable for inclusion in a systematic review in any case. There was also no attempt to find clinical trials outside of the trials registries that were searched, and so any unregistered trials, or trials registered outside ClinicalTrials.gov or not included in the WHO International Trials Registry Platform portal dataset, were not included. The most that this survey can give is an impression of where the volume of evidence is leading in a particular topic area.

The evidence from this survey does suggest that the areas where trials are registered does correlate with the areas where COH reviews are used, with periodontal health, caries management and management of edentulousness being prominent. It did not however, demonstrate any particular direction of travel in terms of new innovative techniques or interventions.

3.4.3 Evidence uncertainties as presented in clinical guidelines

The final stage in the information gathering phase was to investigate evidence gaps as

presented in clinical guidelines since 2005. The extent to which this is a useful approach will now be examined.

Over the last 14 years, the search identified a total of 637 guidelines in the scope of COH, 525 were available online and they were examined for this survey. 685 uncertainties were identified from the 525 guidelines. However, the extent to which these are genuine uncertainties is unclear, does this merely reflect the fact that there may be too many guidelines in production?

Of the 525 guidelines examined, 75 were on one topic: the management of dental caries. This in itself suggests considerable research waste, and the question should be asked: is it desirable to have so many? Harrison *et al* (2010, p. E78) have argued that context is important, i.e. that clinical guidelines should be adapted to local concerns, taking a broad definition of "local" that may be as extensive as a nation or as narrow as a single clinic or hospital. However, they do not argue that clinical guidelines should be produced at this level, rather that guidelines should be adapted by institutions, regions or nations to suit their own practices and culture (Harrison *et al*, 2010, p. E79). Taking a closer look at the 75 caries guidelines reveals that 30 of them were produced by one country: the USA. All but one were intended to be applied nationally. Clinicians are faced with the challenge of finding, reading, understanding and putting into practice several different guidance documents, which may have differing methods, conclusions and recommendations. Frakt (2012) has demonstrated that there were over 360 organisations listed as developing clinical guidelines in the National Guidance Clearinghouse Database in the USA alone. He also found "an abundance of clinical guidance for some topics, [but] there is little clinical guidance on other important topics. We have lots of duplication and inefficiency alongside a dearth of information accompanied by tremendous need." This also proved to be the case in oral health. The survey revealed that some topic areas had few clinical guidelines. For example, only one on the topic of cleft lip and palate was identified.

The sheer volume of clinical guidelines made this part of the priority setting process the most labour intensive. Collecting, reading, and understanding the uncertainties presented in the guidance is not an easy task, and the fact that the guidelines are produced in duplicate across topic areas, often overlapping and using the same or similar evidence (Frakt 2012) means that the uncertainties gathered this way may not reflect the degree of uncertainty, but rather the enthusiasm for guideline development in a particular discipline.

The quality of many of the guidelines produced may also be open to question. Glenny *et al* (2009) surveyed 105 clinical guidelines in dentistry using the AGREE checklist, a tool developed to appraise the methodological rigor of guidance documents. They found that the majority of guidelines in their survey had flaws. They scored particularly poorly on rigor of development, stakeholder involvement and applicability to practice. Statements of editorial independence, such as conflict of interest and funding statements, were rarely given. Glenny *et al* (2009, p. 141) conclude that: "Before steps are taken to increase the uptake of specific sets of guidelines, the guidelines need to reflect an unbiased and comprehensive synthesis of the research literature and expert opinion." In the last ten years, this does not appear to have changed significantly. In the sample of 75 caries management guidelines, 53 did not attempt to grade or appraise the evidence on which their recommendations were based. The uncertainties identified this way may therefore reflect subjective opinion rather than genuine gaps in the evidence base.

The other factor that it is important to bear in mind is that lower and middle income countries rarely produce guidelines in dentistry, and so the uncertainties produced for this research project are skewed towards higher income countries. In the sample of 75 caries management guidelines, none were produced in a lower or lower middle income country. 55 out of 75 were produced for and by European or North American countries. The evidence gaps that need to be filled in lower and middle income countries may be markedly different than those in high income countries.

Given the issues with clinical guidance as a marker for identifying evidence gaps, it may be necessary to adopt a different approach to identifying uncertainties in future iterations of this research project. Rather than surveying all available guidelines for a given period, which is time-consuming and potentially dependent on low-quality recommendations, some quality appraisal should be undertaken before using the guidelines for this purpose. Considerable effort should also be made to seek out documents from lower and lower middle income countries, which may not be indexed on conventional medical databases.

The evidence uncertainties identified from guidelines did largely correlate with the other information gathered in this phase however. The COH reviews most in demand were those around prevention of oral disease, particularly caries and periodontal disease, and the promotion of gingival health. The type of dental implant, and application techniques were

also topics featured in COH's most commonly cited and downloaded reviews. The clinical trials found in the survey of the evidence base, project two of the information gathering phase, were clustered around management of periodontal disease, treatment of oral cancer, caries management and dental implants. The interventions studied in the trials were not markedly different from the interventions which featured in COH's existing reviews. The uncertainties gathered from guidelines were also around the prevention of oral disease, especially caries and periodontal disease. The most effective ways to remove caries and questions around dental implants also featured in the uncertainties. This suggests that the circle of clinical trials going into systematic reviews to fill evidence gaps for guidance might be working well.

However, the question remains as to the nature of the uncertainties. Fluoride as an intervention for preventing caries is a case in point. It featured in five of the most downloaded and cited COH reviews. It was also strongly represented as an area where clinical trials were registered, fluoride varnish being one of the most commonly mentioned interventions according to the results from TerMINE and Voyant. 36 of the uncertainties found in clinical guidelines concerned fluoride. However, fluoride was first added to toothpaste in the 1950s (Ksander, 2006) and there seems little doubt about its efficacy for preventing dental decay (National Health Service, 2018). Is there really much uncertainty about its effectiveness? The questions and uncertainties appear to be around the detail of the intervention, rather than the intervention itself: which method should be used to apply fluoride to teeth, what the concentration should be, and whether high strength fluoride is needed for populations at high risk of developing caries. There is also considerable controversy around the safety of fluoride, particularly in high doses, and its link to adverse events like fluorosis (National Health Service, 2018). The clinical trials registered since 2014 may not be addressing these issues. Parts per million, the way to measure fluoride concentration, was a commonly retrieved term, but there is little other evidence from this study that the type of fluoride or the manner of application is being investigated by clinical trials, and the questions around the detail may be being missed.

To test this, a closer look at the trials is warranted. 432 clinical trials on fluoride and caries were retrieved in the survey of the evidence base. A more careful examination of the titles and abstracts of these trials showed that the detail of the intervention was in fact being addressed by these studies. In 19% of the trials, fluoride was being tested in a specific population at high risk of caries (most commonly people wearing orthodontic appliances,

followed by children, and much less commonly cancer patients and the elderly). 15% of the clinical trials looked at the type of fluoride, compared with a different type, most commonly this was silver diamine fluoride. 10% of the studies compared modes of application and 7% were about the concentration of fluoride in fluoride products. 5% looked at fluorides as part of testing the effectiveness of a wider range of interventions in an oral hygiene programme.

However, not all the studies were addressing the questions and uncertainties presented in guidelines. In 21% of these trials, fluoride products were used as a comparator, to test whether another intervention to manage caries was more or less effective, and 16% of the studies were not testing fluoride at all, but using it as an adjunct when testing something else against another intervention or a placebo. Almost 4% of the studies were still designed to test the effectiveness of fluoride against a placebo treatment, when the efficacy of fluoride for preventing tooth decay does not appear to be a matter of uncertainty. Only 1.4% of the studies were designed to study adverse events related to fluoride as their main topic, however, this may be covered in other studies as an outcome.

If many of the trials registered are addressing the uncertainties, the question of why there remains so much uncertainty in dental guidance is an open question. It may be that the guidelines developed are not robust as was found in Glenny *et al*'s (2009) study, and that the literature is not adequately examined before guidance is developed. Or there may be issues with the quality of the primary research. Even if the trials are designed to address uncertainty, if those trials are inadequately powered, or at avoidable risk of bias, they will produce low-certainty evidence that cannot be relied upon to answer the uncertainty. 86 reviews in COH's review portfolio (excluding those over five years old where the evidence is not recent) had as a conclusion that there was not enough evidence from robust primary research to come to a decision on the effectiveness of the interventions under study. Saltaji *et al* (2017) looked at the quality of clinical trials in the oral health field, and found that although there was a trend towards improvement over time, "results of risks of bias, risks of random error, and reported methodological quality assessments were still unpropitious, indicating substandard quality and a high potential for bias." (Saltaji, *et al* 2017). They also found a high number (83.3%) of the clinical trials they studied in dentistry had industry sponsorship, which may also influence the amount of bias in the study (Saltaji, *et al*, 2017). Lundh *et al* (2017) undertook a Cochrane review on industry sponsorship, and they found that industry sponsored studies were more likely to have favourable results and

conclusions and that this could not be explained by “standard 'Risk of bias' assessments” (Lundh, *et al*, 2017). Although this review was not focused on dentistry, it does suggest that industry sponsorship is problematic for independent and rigorous primary research. However, this issue of bias should be caveated as bias is not the only reason why a primary study may be downgraded according to the GRADE methodology used by Cochrane. There may be other reasons that the evidence is insufficient (including for example, indirectness, where the intervention under study is not directly applied to the population of interest) (Siemieniuk and Guyatt, 2020).

Closing the loop between guidelines, systematic reviews and primary research is complex, as demonstrated by this study. The number of guidelines or trials registered in a particular area does not necessarily reflect the amount of uncertainty, or the importance of the topic. Nevertheless, this examination of information and data relevant to priority setting in oral health evidence synthesis has been of value.

3.5 Conclusion

Information collected during the course of the research project as described in this chapter provides context to the priority setting process: this was the usage of COH reviews, the themes and interventions in trials registered since the last priority setting process was undertaken, and the evidence uncertainties as presented in guidelines. The data from the three projects implies that there is some correlation on the issues that may need to be addressed by COH reviews in the future. However, some limitations to this data has also been discussed. Some of the data on the usage of COH reviews may be limited due to publishing embargoes and the time lag between publication and the review being cited. The number of citations is also inconsistent between the two sources that were used (Google Scholar and Web of Science). Examining the clinical trials registered since the last priority setting exercise was done by using text mining software to pull out the main themes. However, this may have missed some important nuance, and only gives a “direction of travel” for the primary research. The uncertainties from guidelines may reveal issues either with the guidelines or the primary research, as much as they reveal topics that have not been researched at all. The data therefore supplies context, but is not enough in and of itself to set priorities for COH. The next step of the priority-setting framework therefore sought to address the questions of stakeholders, in particular, members of the public.

Chapter Four: Stakeholder consultation phase

4.1 Introduction

This chapter details the stakeholder consultation phase of this project. As outlined in Chapter Three, data gathered on the uncertainties and new trials registered in the topic area can provide valuable information to support decisions in priority setting, and this was supplemented with data on how COH's current reviews are used. However, approaches which solely rely on information gathering for setting priorities have been criticised for lacking "real-world" applicability, and for ignoring the needs of stakeholders (see Chapter Two, Section 2.3). The research documented in this thesis combines the information gathering approach with stakeholder consultation as data inputs into priority setting.

A number of studies in the priority setting field have outlined the importance of gathering evidence from patients, members of the public and evidence "consumers" (see Chapter Two, Section 2.4). These are considered to be important stakeholders in healthcare priority setting (Crowe *et al*, 2015), however they are not the only stakeholders. Cochrane's priority setting guidance document (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019) has a mandatory requirement that Cochrane groups "engage at least one stakeholder group" (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019) and a highly desirable requirement that engagement with *multiple* stakeholder groups is sought. Cochrane gives examples of stakeholders as "guideline developer, funder, consumer organization, professional society, etc" (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019). Crucially, Cochrane's priority setting guidance emphasises the need to reach beyond Cochrane's network to involve external voices (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019). It was therefore important to involve stakeholders in the priority setting process. COH has a broad definition of stakeholders: in the Priority Setting Plan, stakeholders were defined as the editorial base team, COH editors and clinical advisors, COH's Global Alliance (a funding arm consisting of representatives from international oral health organisations), the Global Evidence Ecosystem in Oral Health partnership (GEEOH), clinicians and professionals working in the field, consumers and members of the public, and colleagues from Cochrane's wider collaboration of networks, fields and centres (see Appendix A).

While there are several well-established professional societies serving the oral health

community, many of which produce guidelines and offer access to clinicians, establishing a contact with a consumer organization to involve patient as stakeholders was more challenging. Oral health is a broad topic area which encompasses acute and chronic diseases which are potentially life limiting (such as oral cancer) and preventable but endemic conditions such as dental caries. No one consumer organization can encompass all of the scope of COH. However, it is also true that mouth care and oral health affects everyone, and so potentially any member of the public could be a potential stakeholder in COH. The stakeholder consultation phase of the priority-setting framework was designed with this in mind, by utilising an open survey which could be completed by any person who had a question or an uncertainty about oral health management.

As COH's priority setting process was underway, the James Lind Alliance (JLA) was completing a Priority Setting Partnership (PSP) in oral health. This involved consultation with a wide group of similar stakeholders and so it was decided to include the results of this PSP in COH's priority setting process. However, Cochrane's Priority Setting Working Group has stated that using the results of an existing exercise by an external body such as the JLA is by itself not enough to meet the mandatory requirements for priority setting within Cochrane (Cochrane Training, 2020a), so consultation with stakeholders by COH was also required.

COH is a member of the Global Evidence Ecosystem for Oral Health (GEEOH) (Cochrane Oral Health, 2020a). The GEEOH is an attempt to link bodies and associations involved in producing evidence in dentistry and oral health, with the aim of reducing research waste and fostering closer international collaboration. Member organisations include the International Association for Dental Research (IADR), the American Dental Association (ADA), the Scottish Dental Clinical Effectiveness Partnership (SDCEP), Public Health England and the World Health Organization (WHO). These organizations include some of COH's key stakeholders, in the form of guideline developers and policymakers, along with clinicians and researchers in oral health. The links that COH has with these organizations were leveraged for this study, particularly in the ranking phase, which is further discussed in Chapter 5.

This priority setting framework therefore sought to involve key stakeholders, including members of the public, clinicians, guideline developers and policymakers in several ways:

1. An exploration of questions developed by the JLA Oral Health PSP, reusing the data from this established process that was completed in 2019.

2. An online, open consultation, for anyone to access and ask questions about the care of their mouth, teeth and gums.

3. A ranking exercise, where a panel of key stakeholders drawn from the GEEOH and other groups, including clinicians, consumers, policy makers and guideline developers, ranked the priorities which emerged from the other stages of this process.

The methods and results of the first two approaches are examined and discussed in this chapter. The ranking exercise is further explored in Chapter Five.

4.2 Methods

4.2.1 Questions developed by the James Lind Alliance Oral Health Priority Setting Partnership: methods

The JLA method has been briefly described in Chapter 2 (see Section 2.4). JLA has emphasised the need to involve a wide set of stakeholders in priority setting (Crowe, 2016). Madden and Morley (2016) have argued that there are numerous studies showing a mismatch between the priorities of academics and clinicians, and the priorities of people with direct experience of a health condition, and that PSPs offer an opportunity to bridge this gap:

> "In PSPs, 'hard' evidence-informed ideals inevitably meet 'soft' participatory practices."
>
> (Madden and Morley, 2016)

The JLA Oral Health PSP was concluded in December 2018, and the details were published on the Partnership's website (James Lind Alliance, 2019). Questions were solicited from stakeholder groups, related to interventions in oral and dental health, these were gathered by an open-ended questionnaire (James Lind Alliance, 2017). The stakeholder groups included lay people, patients, carers, and clinicians.

Existing sources of information about treatment uncertainties were then examined, to see if the questions or topics provided by the stakeholder groups were genuine uncertainties, or whether they had already been clearly answered (James Lind Alliance, 2017). These sources included guidelines and existing systematic reviews. The remaining questions were ranked by the partner organisations, and then the final top 25 questions were taken to a final priority setting workshop, where a top ten was produced. Participants in the final workshop also included "lay people, patients, carers of patients and a range of clinicians" (James Lind Alliance, 2017).

Twenty five questions resulting from the Oral Health PSP were published on the JLA website (James Lind Alliance, 2019). Priority setting via the JLA system has been described by a participant as a "robust and well-respected process that is generally inclusive and promotes genuine partnership working to identify research priorities of importance to service users and healthcare professionals" (James Lind Alliance, 2019). As this process had only recently concluded in the topic area in Oral Health's scope, it was important to include the findings of the Oral Health PSP in the research presented in this thesis, to ensure the widest possible representation of stakeholder views.

The twenty-five questions were uploaded to an Excel spreadsheet. As in the exploration of published guidelines for evidence gaps outlined in Chapter Three, Section 3.2.3a (see Table 2), the questions were broken down using the PICO structure, to identify the populations, conditions and interventions involved in the topic. These were then mapped against COH reviews (see Chapter 5, Section 5.3 for the results of this exercise). Mapping against Cochrane reviews revealed where there were gaps in the evidence, and where there might be already registered reviews which may need to be updated.

4.2.2 Cochrane Oral Health's online stakeholder consultation: methods

In addition to the priority questions identified through the JLA Oral Health PSP, COH launched an open online consultation to collect priority questions in 2019. The survey was designed by the author of this research project, and the data was collected and analysed by her alone. There were three reasons to conduct a consultation separately from the JLA PSP. Firstly, the Cochrane Priority Setting Working Group have stated that Cochrane groups need to go beyond the involvement of an external organization to meet the mandatory requirements for priority setting (Cochrane Training, 2020a). Secondly, the JLA process is

not specifically set up to find priority topics for systematic reviews. The JLA has a particular focus on primary research, and Cochrane reviews constitute secondary research. The Oral Health PSP was initiated because "few large scale clinical studies were being conducted in the UK (as evidenced by the size of the National Institute for Health Research (NIHR) Oral and Dental Portfolio), [and] that much oral and dental research in this area was fragmented and could be more ambitious, collaborative and multi-centre" (James Lind Alliance, 2019). As COH was looking at prioritising topics for systematic reviews only, the emphasis of the PSP was slightly different.

Finally, the JLA Oral Health PSP is UK focused, with funding from the NHS National Institute of Health Research. Cochrane is an international network, and it was important to cast the net more widely, and ensure that there was input from non-UK consumers whose questions may be very different, in particular from consumers in low and lower middle income countries. The lack of representation of consumers from low and middle income countries was found to be a particular flaw in organisations undertaking systematic reviews in a scoping review by Morley *et al* (2016). It was therefore important to try to maximise participation from consumers from these countries, who are operating in a different context and environment from participants in a JLA PSP.

The Lime survey tool was used to construct an online form, aimed at anyone with an interest in oral health evidence; whether that is patients, carers, members of the public or clinicians. The form was open-ended, and designed to collect oral health questions that people felt needed to be answered (see Appendix D). A preamble explaining the purpose and goal of the priority setting exercise, and setting out how the data would be used was posted on COH's website, with a link to the form. The preamble was checked for language and clarity by a representative from a patient and public involvement group (PPI). The form was voluntary, and anonymous. None of the questions were compulsory and no personal data was collected, apart from country of residence. This data was collected to ensure there was an international representation.

Respondents had up to ten boxes in which to enter any questions they had, and there was no limit as to how much text could be in each box. They were guided towards framing their question in PICO elements to aid mapping against COH's current reviews, as the page header asked them to think about whether the question was about certain populations, and which disease or condition was of interest. They were also asked to think about whether

their question was about treating an existing disease, or preventing a condition from developing. Finally, they were invited to leave any further comments they had about the prioritisation of COH review topics, and invited to sign up to receive a periodic bulletin on progress, and also directed towards COH's website to read more about the process.

The form was promoted in COH's newsletter, and via Twitter and Facebook. COH's overseas editors were contacted to request that the consultation be shared with their networks, in order to ensure an international perspective. The link was shared with Cochrane's Child Health Field, so that it could be promoted amongst those with an interest in paediatric dental care, but there was no response to the request to share the link. However, Cochrane's communications team did share the link and it was extensively promoted during World Oral Health Day (20 March 2019). The feedback form and preamble are available in Appendix D.

Responses were collected via the Lime Survey tool and analysed, and the results are presented in Chapter 4, Section 4.3.2. For consistency, they were coded as per the content analysis scheme outlined in Chapter Three, Section 3.2.3a (see Table 2), and in the same way as the questions generated by the JLA PSP. Once again, the questions were broken down into PICO concepts around populations, conditions and interventions, and classed into broad themes depending on the study type (diagnostic, treatment, prevention etc).

4.3 Results

4.3.1 Results of the James Lind Alliance Priority Setting Partnership

The JLA Oral Health PSP identified a total of twenty-five questions through their priority setting process, which is briefly outlined in Chapter Two, Section 2.4. These were then discussed and ranked at the PSP focus group, and they were published on the JLA website in 2019.

The questions are presented as ranked by the participants in the process, from 1 (most important) to 25 (least important) in Table 12:

Table 12: The 25 top uncertainties or unanswered questions in oral health as determined by the James Lind Alliance Priority Setting Partnership

1	What is the best way to prevent tooth decay, and reduce oral health inequalities at a community or population level?
2	How can access to dental services be improved for the general public?
3	What are the most effective ways of increasing early detection/diagnosis of oral cancer?
4	How can access to dental services be improved for the people with additional needs
5	How can dental health professionals work with other health professionals to help improve oral health?
6	How can basic oral hygiene be achieved for people with additional care needs?
7	How to improve communication between dental teams and patients/carers?
8	Is there a role for dental health professionals in treating oral health problems to improve general health?
9	What is the best way to prevent gum disease, and reduce oral health inequalities at a community or population level?
10	What role do digital technologies play in the provision of dental care?
11	What is the best way to treat patients who are dentally anxious?
12	What are the best ways of managing oral conditions associated with cancer treatment?
13	Do dental care professionals have a role in screening and treating for general health problems?
14	What is the best way for dental teams to manage gum disease?
15	What are the barriers/enablers to maintaining a healthy mouth (across different populations and settings)?
16	How can people be encouraged to reduce sugar consumption for oral and general health?
17	What are the most effective ways of managing potentially malignant disorders (e.g oral lichen planus)?
18	What is the best way to prevent gum disease in individuals?

19	What is the best way to manage teeth missing for any reason (e.g. tooth decay, trauma, developmental conditions) and at any age?
20	What is the best way to prevent tooth decay in individuals (of all ages)?
21	Is cleaning in between teeth needed for maintaining good oral health?
22	What interventions are best at managing tooth grinding/clenching?
23	Is the use of a daily mouthwash at home, useful for maintaining good oral health?
24	What are the long-term health effects (including harms) of tooth whitening?
25	Should dental professionals recommend e-cigarettes?

The first thing to note about the uncertainties developed by the JLA PSP is that they are very broad, and (with a couple of exceptions) generally much broader than the scope of an individual Cochrane review. This was a challenge to the content analysis structure used for the data analysis. For example, the question ranked 10th is "What role do digital technologies play in the provision of dental care?". When planning research to answer this question, this could be interpreted in many different ways, as digital technologies could be applied across all areas of dentistry. In diagnosis, digital technologies such as intra-oral cameras may be used to generate data about the health of the mouth and help to diagnose tumours and pre-cancerous lesions, but could also be used to diagnose dental caries. Digital technologies such as apps can be used in preventive dentistry, to remind people to brush their teeth, or to attend a dental appointment. Digital technologies can also be used in dental treatment. One example is the use of 3D printers to create prostheses and dentures to replace missing teeth.

The broadness of the topic areas is reflected in the fact that almost half (12/25) of the topics are about general dentistry and mouth health, rather than targeted at specific conditions. Bruxism, dental anxiety, edentulousness, oral lichen planus, oral mucositis in cancer patients and tooth staining all featured specifically in one of the 25 questions. Oral cancer and dental caries featured in two, and gum diseases featured in three. The questions did not generally target specific populations or age groups either, only two of the questions out of 25 were directed to people "with additional care needs", although these are not specified.

The questions were also analysed by broad theme in terms of the uncertainty type. Two of the questions were about diagnosis, one on oral cancer and one on oral health professionals' ability to diagnose issues in general health. Six of the questions were categorised as "Management", as they were broad in scope, looking at prevention and treatment of a condition. Almost half of the topics were around prevention of oral disease, demonstrating that prevention is still a major concern and an area of uncertainty. Preventive measures that warranted more research included access to dental services, interventions within the community, dietary interventions and oral hygiene interventions. Some specific interventions were mentioned, including interdental cleaning, mouthwashes, and the use of e-cigarettes in oral cancer prevention. Four of the questions were around uncertainties in the treatment of oral conditions including missing teeth and dental anxiety. One question was around the general barriers and enablers for good oral health.

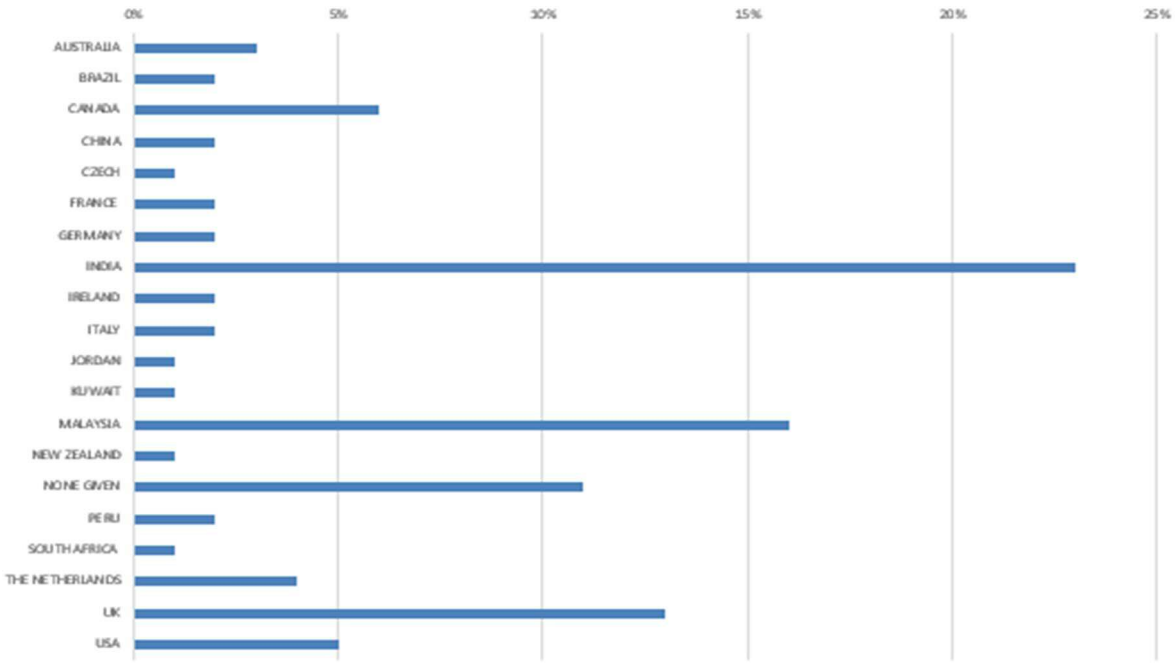
The general nature of the questions made it difficult to map them across to COH's current portfolio of review titles. Many of the questions were covered or partially covered by a series of Cochrane reviews, and these were noted. New topics not already covered by a Cochrane review were noted separately. Five of the 25 questions did not fall under the scope of COH. 'How can dental health professionals work with other health professionals to help improve oral health?', 'How can access to dental services be improved for the general public?' and 'How can access to dental services be improved for the people with additional needs?' are questions that fall under the scope of the Cochrane Effective Practice and Organisation of Care Group, which specifically looks at service and health system interventions. 'How to improve communication between dental teams and patients/carers?' is a question that falls within the remit of the Cochrane Consumers and Communications Group, and there is already a Cochrane review on e-cigarettes, produced by the Cochrane Tobacco Addiction Group (Hartmann-Boyce *et al*, 2016). These questions were not therefore progressed by COH. The full details of this mapping process are outlined in Chapter Five.

4.3.2 Cochrane Oral Health online stakeholder consultation: results

In addition to the questions generated by the JLA PSP in Oral Health, an open, online survey was hosted on the COH website to see what questions people had about their mouth, teeth and gums. COH stakeholders include clinicians, patients, academics,

researchers, policymakers and the public, and all had the opportunity to input into the survey, which was available for anyone to complete. A total of 168 people responded to the survey, and they had 211 questions that they felt needed to be answered in oral health. Participants came from nineteen countries, although 19 respondents did not disclose their country of origin. One of the stated intentions of this part of the exercise was to ensure international representation, particularly from low or lower middle income countries. Only one of the countries represented in the online survey (India) is classified by the World Bank as a low or lower middle income country (World Bank, 2019). However, India was also the country with the most respondents, almost a quarter (23%) of the questions came from people in India. Malaysia had the next highest number of respondents at 16%, followed by the United Kingdom at 13%. There were respondents from South America (Brazil and Peru), South Africa, the Middle East (Jordan and Kuwait), Australasia, Europe and North America. An international representation was achieved with at least 74% of respondents coming from outside the United Kingdom.

Figure 5: Number of respondents to Cochrane Oral Health consumer feedback consultation by country of residence



The results of the stakeholder consultation are presented below, categorised into broad themes, and grouped by population, condition and intervention.

4.3.2a Diagnosis of oral diseases

Only four out of the 211 questions were about the diagnosis of oral disease. Three of these were about how to diagnose oral cancer at an early stage. One was about diagnosing periodontal diseases.

4.3.2b Oral health and its links to other health conditions

21 out of 211 (9.9%) questions were about establishing links between oral health and other conditions. Periodontal disease was a particular concern here, and whether periodontal health could be a factor in pregnancy complications, renal failure, diabetes, heart disease, and autoimmune diseases. General oral health's impact on overall health was a further concern, particularly with regard to children and their wellbeing. Two people asked whether oral hygiene regimens could prevent hospital acquired pneumonia. One person asked about establishing a link between cleft lip and palate and racial discrimination, a further question was whether dental and medical staff collaborating could improve all health outcomes.

4.3.2c Prevention of oral disease

Half of all the questions from the consultation were about the prevention of oral disease. This was a concern in 106 of the 211 submitted questions. In 64 cases, the questions were about preventing general oral disease, rather than a specific condition. The topic areas with the most questions in this category were toothbrushing (the duration, frequency and technique), preventing oral disease with behavioural interventions (such as promotion of healthy low-sugar diets, encouraging dental check-ups, and promoting oral hygiene measures) and how often to visit the dentist for a routine check. The efficacy of interdental cleaning for preventing oral disease, whether to use a mouthrinse and the best general methods of health promotion also scored highly in this category. Less mentioned questions were whether community health programmes work, how to combat oral health inequalities by looking at social factors, whether improving the oral microbiome improves oral health, the role of nutrition and nutritional supplements in oral health, what type of toothpaste to buy, the costs of preventing oral disease and how to address the potential failure of oral self-care in elderly populations.

The prevention of caries specifically was raised in 21 of the 211 questions. Most of these questions were about what the best method was generally, with no emphasis on a particular intervention. However, particular populations were of concern: the elderly, pregnant women, and orthodontic patients were all mentioned as needing special consideration in terms of caries prevention. The rest of the questions on caries prevention were distributed between wanting to know the side effects of fluoride, the effectiveness of fluoride in the water supply, how to improve the uptake of fluoride toothpaste, the efficacy of laser treatment in preventing caries, the benefits of silver diamine fluoride, and how frequently to brush teeth. Eleven questions were about the prevention of periodontal disease. Interventions covered included the effectiveness of routine scale and polish, the effectiveness of water and air flossers, the role of mouthrinses and the frequency of toothbrushing.

Other conditions in the "prevention of oral disease" category were dental anxiety (ie the issue of people missing dental check-ups because of anxiety), preventing denture stomatitis, oral cancer and oral mucositis in cancer patients. Two questions were about the best methods generally for preventing dental anxiety. Two were about preventing denture stomatitis, and the best method for cleaning dentures. Oral cancer questions were about the effectiveness of oral cancer screening, how to reduce tobacco consumption and how to establish the best method overall of cancer prevention. The effectiveness or otherwise of mouthrinses and lasers were questions on preventing oral mucositis.

4.3.2d Prognosis and risk factors

Eight questions covered prognosis and risk factors in oral disease. Four people asked about risk factors for caries, in particular the influence of breastfeeding, risk associated with alcohol and two people asked about risk assessment tools in general and how to establish which is the best one. Other questions in this category concerned the progression of dental disease in people with Human Immunodeficiency Virus (HIV), the risk of mouth ulcers in people on medication such as prostaglandin inhibitors, and the risks of tooth wear from reflux medication in postmenopausal women.

4.3.2e Treatment of oral disease

72 out of 211 questions (34%) were about treating oral diseases and disorders. Ten were about treating malocclusion: whether orthodontics is effective overall in treating malocclusions, the best type of retainer to use, whether to remove wisdom teeth to prevent orthodontic relapse, at what stage of development to get braces, the influence of malocclusion on quality of life and the effectiveness of braces for adults. Seven questions were about treatment of oral disease generally: how to improve access to dental treatment, how to combat overtreatment, and about the use of mouthrinses prior to dental treatment to decrease bacterial load. Six questions were about the treatment of caries, including the safety of mercury fillings, indications for tooth extraction, and finding out at which stage invasive treatment is needed.

Six questions related to oral surgical procedures: how to stop excessive bleeding, whether to use cortecosteroids to speed up recovery, how to speed up wound closure, whether to prophylactically remove wisdom teeth, and the effectiveness of bone grafting in maxillofacial surgery. Six questions were about treating periodontal disease. These included the use of laser treatment as an adjunct, the efficacy of bone grafting for osseous defects and establishing the most effective treatment generally. Five questions were about treating temporomandibular joint disorders. These were around the effectiveness of alternative therapies or non-pharmacological therapies, muscle relaxants, physical therapy and techniques for pain management. Four questions were concerned about the best treatment for mouth ulcers, particularly if caused by adverse events from pharmacological treatments for other conditions.

Other questions about treatment were about diastema, dry mouth, impacted teeth, missing teeth, the side effects of oral cancer treatment, treating oral mucositis, the effectiveness of surgical procedures in oral lichen planus, treating oral submucous fibrosis, the effectiveness of teethers in toddlers, the best toothpaste for hypersensitive teeth, the effectiveness of tooth-whitening products, treating tooth wear in post-menopausal women and recent trends in treating vesicullobullous diseases.

To summarise, treatment and prevention of oral disease were the areas which generated the most questions, perhaps not surprisingly. Questions around diagnosis and the links between oral health and other conditions may be of more concern to clinicians than

members of the public. Questions about the prevention and treatment generally of oral disease, rather than specific conditions, were relatively common, as with the JLA PSP. People were concerned about the effectiveness of activities like tooth brushing and mouthrinsing, and how often to go the dentist, and the evidence to support their day-to-day oral hygiene regime. This is an interesting finding, and suggests that people are more interested in learning about overall strategies to improve their oral health rather than individual treatments or interventions. It calls into question whether COH should continue updating reviews on single interventions in their current form, or whether a different approach is needed. For example, network meta-analysis is "a technique for comparing multiple treatments simultaneously in a single analysis by combining direct and indirect evidence within a network of randomized controlled trials" (Rouse *et al*, 2018, p. 103), and may be a better approach to answer questions on how best to approach general oral health care. Network meta-analysis does not simply look at whether the intervention works to improve "X" condition, but how well it works in comparison with other interventions. A further possibility for COH to explore would be umbrella systematic reviews, which are essentially syntheses of existing systematic reviews rather than syntheses of clinical trials. The questions addressed in an umbrella review may be broader and may highlight "whether the evidence-base around a topic is consistent or contradictory, and explore the reasons for the findings" (Aromataris *et al*, 2015, p. 132). It gives a high-level overview and may be more effective for comparing interventions and helping stakeholders decide on the most effective intervention from an available range for a particular condition.

High-risk groups were also a concern, as was fluoride and its possible harms. As well as these more general questions, some questions were more specific and niche, perhaps borne of personal experience. For example, one question was about tooth wear post-menopause. With hindsight, it may have been better to include a question as to why the participant felt the question was important, in order to determine how much personal experience of a condition was involved in submitting the question. Overall, the questions were diverse, with potentially many areas to explore in terms of new Cochrane reviews. They also varied in terms of scope, with some easily mapped against COH's existing reviews, and others very broad and covering several reviews in one question. As with the JLA PSP, this was a challenge in terms of analysing the data in PICO format. For example, one question, posed by a lay person in the UK was simply: "How do you prevent oral diseases?". This is clearly an important topic, but is covered by many Cochrane reviews covering different interventions and different populations. Fifty of the questions in total did not specify a

particular intervention, but were more about finding the best intervention overall to prevent or treat a particular condition.

The research questions emerging from the JLA PSP had much in common with the questions which were asked by participants in COH's consultation with members of the public. Nineteen of the twenty-five questions published on the JLA PSP website were also asked by the participants, some were asked repeatedly. The best way to prevent tooth decay at a community level, and the best ways to prevent dental caries and gum disease in individuals were questions which appeared multiple times in COH's feedback. Other questions were much less common, such as how to improve access to dental services (including by using technology as in teledentistry), how general health could be improved by oral health practitioners working together with general practitioners, treating dental anxiety and reducing sugar consumption. Five of the JLA PSP topics did not appear in the COH questions, however, in two cases questions that were indirectly related to the topics were present. The JLA PSP question 'How can access to dental services be improved for the people with additional needs?' was not directly asked in the COH survey, but there were questions around prevention of oral disease in this population, and access to dental services has an important role to play in prevention. The question 'Should dental professionals recommend e-cigarettes?' did not directly appear in COH's questions either, but there were more general questions about preventing oral cancer through tobacco reduction, and the role of the dental professional in doing this. Promotion of e-cigarettes could be one way to do this if there is evidence to prove it is safe and effective.

The three topics that did not appear in COH's questions, even indirectly, were:

1. How to improve communication between dental teams and patients/carers?
2. What are the barriers/enablers to maintaining a healthy mouth (across different populations and settings)?
3. What interventions are best at managing tooth grinding/clenching?

This may indicate that these topics are less important to those outside the United Kingdom, or they may be more important to the stakeholders involved in the JLA PSP than the members of the public and stakeholders reached by COH's survey.

The only representation in COH's consultation from a lower or lower middle income country was from India, with 39 of the 168 responses coming from people based there. 43 of the questions were generated from these participants. Caries was the most commonly mentioned oral disease of concern, followed by periodontal disease, although general oral health maintenance also featured in seven of the questions. These three areas alone were responsible for over half the questions from the respondents in India. In terms of the numbers from the higher income countries, 68% of the questions concerned these areas. There was therefore a little more diversity in the questions coming from India, but little consistency in the conditions of interest away from these three areas. The rest of the conditions mentioned in the questions from participants based in India were split between dental anxiety, dry mouth, herpes labialis, impacted teeth, edentulousness, mouth ulcers, oral cancer, oral mucositis, oral submucous fibrosis, complications from oral surgery, oral premalignant conditions, temporomandibular joint disorders, tooth wear and vesicullobullous diseases. These were not markedly different from the conditions of concern in respondents from higher income countries, however, four conditions were exclusively mentioned by participants based in India: oral submucous fibrosis, herpes labialis, premalignant oral conditions and vesicullobullous diseases.

Oral submucous fibrosis is a debilitating condition, which is prevalent in South and South East Asia (Rao *et al*, 2020), so it is perhaps unsurprising to see that it was highlighted by a participant from the region. Herpes labialis is a common disease worldwide, the World Health Organization estimates that "several billion" people may be living with an oral infection caused by the herpes simplex virus, for which there is no cure (World Health Organization, 2020a). The participant who mentioned this condition was concerned with how to prevent it, as treatment costs can be high in a low income context (Jadhav *et al*, 2012, p. 641).

In India, oral cancer is one of the most common cancers. Varshitha (2015, p. 845) estimates that 30% of all cancers recorded in the country are oral cancers, noting that "mostly it is diagnosed at later stages which result in low treatment outcomes and high costs", and so again, it is not surprising that treating pre-malignant disease at an early stage was of concern to an Indian participant, although it may be surprising that given this it was not more of a concern to others in the survey.

By contrast, vesicullobullous diseases and their oral manifestations are less common in the Indian subcontinent (De *et al*, 2016). This question may come from more personal experience with the condition, but it is difficult to theorise without further data on why the issue was of importance to the participant.

The interventions emerging from the questions submitted by respondents in India were diverse, and did not follow a clear pattern. The most commonly mentioned intervention type was health promotion, and the best methods of promoting oral hygiene practices. Behavioural interventions were also mentioned, in terms of changing people's habits with regards to oral care. However, these two intervention types only appeared four and three times respectively. Interestingly, technological innovation and the importance of teledentistry, where dental services are provided remotely, was only mentioned by a participant in India. It was proposed as an intervention that may improve access to dental services for those living in remote locations.

In general however, the concerns of the respondents from India were not significantly different (these examples aside) from the concerns of the respondents in higher income settings. Preventing caries and periodontal diseases, and generally improving oral health were themes common across all participant's responses.

4.4 Discussion

4.4.1 Questions developed by the James Lind Alliance Oral Health Priority Setting Partnership: discussion

As the JLA PSP in oral health was so recently completed (James Lind Alliance, 2019), the results were included in the research presented in this thesis. However, there are several issues which need to be explored about the JLA process, and the Oral Health PSP in particular.

Cochrane does not allow a JLA PSP to be used for priority setting within Cochrane groups without the Cochrane group being involved from the beginning, as a partner in the process (Cochrane Training, 2020a). This is partly because the data is being collected by a third party, and therefore there is less control over the process, but mainly because the data collected by a JLA PSP is for a different purpose. Cochrane's focus is secondary research,

and the JLA PSP focus is to inform researchers where the need is for primary clinical studies (James Lind Alliance, 2019). This is the stated intention of the Oral Health PSP (James Lind Alliance, 2017). The question remains as to whether the priorities collected for primary research are similar to those for secondary research. The similarity between the questions collected by COH and those generated by the JLA PSP suggests that they may be, and the results of the JLA's PSPs may be applicable for Cochrane purposes also.

However, there are a couple of reasons why more work is needed to build on the results of the JLA PSP in oral health. The Oral Health PSP did omit several important areas of COH's portfolio, most notably the treatment of oral cancer (James Lind Alliance, 2017). It also only addressed some aspects of orthodontic treatment:

"Comparisons or biomedical evaluations of orthodontic treatment will be excluded. However, the individual and societal costs and benefits of orthodontic care may be included, as may be dental prevention and treatment of people with oro-facial clefts."

(James Lind Alliance, 2017).

It is not clear from the PSP website why these areas were omitted.

It is also true to say that the questions which emerged as the top twenty-five uncertainties were very broad, and not specific enough for a Cochrane review. They did not tend to focus on a precise intervention, and each topic would potentially cover more than one systematic review, in some cases, many more than one. The topics would need to be scoped out further before systematic reviews or clinical trials could be commissioned. This is beyond the scope of the JLA PSP, so the burden of scoping out the topics lies with researchers. The question remains as to whether the topics are so general, that they might not fulfil the purpose of filling evidence gaps or acting as a mechanism to raise the quality of research in the field.

The JLA process is generally praised for the transparency of its approach (Nygaard *et al*, 2019). However, there are some issues with the Oral Health PSP in this regard. The website contains a detailed protocol of the process to followed (James Lind Alliance, 2017), which is the approved JLA methodology. However, there is no final report, and no evaluation of the process and how it worked in terms of the Oral Health PSP. Although data is available, it has to be sought in several different places, which is not ideal. Some of

the data has been released on the JLA website, including a conference poster indicating that over one thousand questions were submitted by 607 people in a national online survey. But there is little detail on which partner organisations were involved, and how the steering group members were recruited. The steering group did contain representation from patient organizations, but they were outnumbered on the group 3:1 by clinicians. A larger number of patient or lay representatives presumably took part in the final workshops which ranked the priorities, but again, there is little detail about how this worked in practice.

A key area that is critical to best practice according to Viergever *et al* (2010) is planning for the implementation of the priority setting project. How will the research priorities be translated into actions so that funders, policymakers and researchers are aware of what the uncertainties are in a particular area? The lack of a final report on the Oral Health PSP means that this question has not been transparently addressed. There is some general information on the JLA website about the impact of their PSPs (James Lind Alliance, 2019), but nothing specifically on how the priorities established by the Oral Health PSP will be followed up.

Nygaard *et al* (2019) undertook a survey of JLA PSPs. They found that priority setting generally was growing, and that the JLA process was increasingly adopted by various groups because it is "easy to replicate" and offers a structured approach. Patient involvement was a key strength. But the study also found that the priorities that were established by the process were not always well-conceptualised, and that the mechanisms for turning the priorities into meaningful research were lacking. Further, Nygaard *et al* (2019) found that there was a lack of emphasis on involving the most vulnerable groups of people from lower socioeconomic groups: "Many respondents, particularly those associated with charity organisations, are likely to be white and middle class and to have high education attainment levels. Yet it is the individuals who are more difficult to reach, such as those in low socioeconomic groups and those who are vulnerable patients, who may have the greatest unmet needs and stand to gain the most from improved treatment." (Nygaard *et al*, 2019). Even in cases where the JLA PSP team did make attempts to involve those groups, there was limited success, suggesting that more research is needed on methods and techniques for increasing participation from people from lower socioeconomic backgrounds.

Nygaard *et al* (2019) also make the point that there may be considerable issues in relying on online surveys, as this excludes people who are not online and/or have poor levels of literacy, or for whom English is not their native language. These are barriers which will inevitably bias the data, but also may limit some people's access to the final "top ten" priority topics, since they are published in English and online. Nevertheless, Nygaard *et al* (2019) conclude that the JLA process is an "effective and sustainable model." They also believe that it goes some way in addressing the mismatch between patient needs and commissioned research.

4.4.2 Cochrane Oral Health online stakeholder consultation: discussion

Engaging with at least one stakeholder group was a mandatory requirement during COH's priority setting process, according to the guidance produced by Cochrane's Working Group on Embedding Prioritisation (2019). However, there were several ways that this could have been achieved. As discussed in Chapter Two, Section 2.7, Cochrane groups have taken differing approaches to stakeholder consultation. Priority setting workshops, such as those undertaken by the JLA, were common features of Cochrane priority setting processes, with focus groups meeting face-to-face to take part. COH did not undertake any type of face-to-face meeting with stakeholders, the whole stakeholder consultation took place online. Cochrane is an international network, and it was felt a wider perspective was needed rather than involving people from only the United Kingdom, where COH is based. The JLA Oral Health PSP was also underway at the start of this research project, and there was a danger that the priority setting of COH may essentially target the same participants, leading to the same results from both processes. A face-to-face meeting in the UK would also inevitably skew responses to the consultation towards issues that may not be a priority in other countries, particularly lower and lower middle income countries. For example, although the Cochrane Consumers and Communications Group had considerable success in recruiting people from traditionally hard to reach communities within their country (Synnot, 2016), the focus groups were all held in Australia and it is difficult to know how the priorities might translate into another context.

Nevertheless, there are significant challenges in undertaking an online only consultation, and the issues that Nygaard *et al* (2019) found with the JLA process also apply here. People who are not online would not be able to participate, and as of 2018, this was an estimated 47% of people in the world (STL Partners, 2019). Lower and middle income

countries were a particular target for the stakeholder consultation, however the problem of lack of access is more acute in the regions where these countries are more likely to be clustered. 78% of people in Sub-Saharan Africa have either no internet coverage or are not online, and this figure is 73% for South Asia (STL Partners, 2019). Poor levels of literacy and language barriers are also an issue. COH's online survey was promoted and presented only in English. Rather than an online open survey, perhaps a different strategy would have been to focus on one or two countries and undertake interviews in the participants' native language. However, again, this would cause issues in applicability of the priorities outside the context of those countries. Striking a balance between inclusivity and generalizable results remains a real challenge. Although the largest representation in the survey in terms of country of residence was the lower middle income country of India, it was the only country with respondents from a lower or lower middle income context. It could be the case that the needs and questions of those in other lower or lower middle income countries are markedly different from those put forward by the respondents from India. Although the survey was inclusive in that it allowed people to take part from wherever they were in the world, the results are still not necessarily generalizable to other parts of the globe. Focusing on one or two countries may well have had the same results as the open survey. Sumanth Kumbargere Nagraj, an editor with COH, is currently undertaking a study which takes an alternative approach, interviewing individuals from selected ethnic groups in Malaysia about their priorities in Oral Health (Kumbargere Nagraj, 2020). It will be interesting to see how the results of this study compare with those found by COH.

Recruitment to the online consultation run by COH was done via social media, which also has limitations in terms of reach, but has also been shown to increase participation in some traditionally hard-to-reach populations. For example, Jones *et al* (2012, p. 272) used the social networking site Facebook to recruit adolescent girls and found that this method considerably reduced attrition in the study. However, once again, with a global audience, the reach is only as good as the literacy levels and English language skills of the potential respondents. Using social media also has implications in terms of the age profile of those who are connecting with the survey. For example, only 11% of global Facebook users were over the age of 55 in October 2020 (Statista, 2020a). A similar number of Twitter users (12.3%) were over the age of 50 (Statista, 2020b). Using social media may not be the best way to connect with all demographics in a population, and to recruit a representative sample. Results of studies using social media as a recruitment tool show mixed results. Topolevic-Vranic and Natarajan (2016) undertook a scoping review of studies which

compared recruitment via social media with recruitment via another method, although their study only looked at recruitment for primary research. They found that 12 of their 30 included studies reported that social media was more effective, 15 found that it was less effective than another method, and two studies showed it to be the least effective out of multiple recruitment methods (Topolevic-Vranic and Natarajan, 2016). Facebook was overwhelmingly the most used tool, and also the most successful. They conclude that "the effectiveness of social media for recruitment of study participants is highly variable and dependent on specific study characteristics such as age, whether the population is difficult to reach through traditional methods, and the method used to measure the primary outcome." (Topolevic-Vranic and Natarajan, 2016). None of the included studies were done in the context of priority setting however. But it may be that this stakeholder consultation may have been more inclusive and representative if at least one other method of recruitment was identified and undertaken. This may also have led to different perspectives and life experiences being brought into the discussions. Although social media would seem to be a low-cost, low-effort recruitment strategy (Ramo and Prochaska, 2012), Topolevic-Vranic and Natarajan (2016) believe that more research is needed into its cost-effectiveness and ability to reach participants from different education groups, socio-economic groups and of different ages and ethnicities. These characteristics were not well-reported in the studies included in their research.

COH also attempted to contact the Cochrane Child Health Field, to see if they would share the link to the stakeholder consultation amongst their contacts. However, no response was received to the request. In retrospect, it may have been useful to try and leverage other links with Cochrane fields and geographic centres. There are a total of twelve Cochrane fields, whose remit is to focus on areas of interest that may cut across Cochrane review groups. They work to promote the awareness of evidence-based medicine within their context. Cochrane Primary Care and Cochrane Global Aging might have been useful in particular for promoting the survey. Cochrane's geographic centres, which act as regional hubs to support Cochrane contributors in a geographic area, might also have helped to promote the survey. However, they were not contacted individually. Some did promote the survey having picked up news of the survey from Cochrane's central communications team.

One further issue with COH's stakeholder survey was that little personal data was collected, country of origin was the only data recorded in the survey, along with the

questions posed by the respondent. This was done to maximize participation and combat "survey fatigue". Survey fatigue is a concept discussed by Olson (2014, p. 93), who believes that the availability of online tools to make surveys easy to conduct, and a general belief that online surveys are low cost and can be done quickly and easily, have led to low survey responses and potentially biased results. A study by Porter *et al* (2004, p. 64) found that lengthy surveys, which were intrusive and collected personal data, contributed to low response rates. However, in retrospect it may have been valuable to collect more personal data in order to evaluate the representativeness of the survey. Data collected may have included age, profession/job role, gender and ethnicity. Without this information, it is difficult to judge how well the survey did in terms of including respondents in difficult to reach populations. Again, it is possible that using a different method to an online survey may have produced richer data, and more in-depth conversations with participants may have produced different results. It also may have been valuable to ask respondents the reasons why they chose to submit those questions. Was it because they had personal experience of the condition, or another reason? Although this would not have had a bearing on whether the question was considered in the priority setting or not, it may have helped to evaluate the impact of the review at a later stage.

Nevertheless, despite these challenges to the methodology raising some issues of generalisability, the questions submitted in terms of both the JLA process and the COH stakeholder survey remain relevant and important in terms of priority setting. All 25 topics from the JLA PSP and the 211 questions submitted by COH stakeholders were included for analysis in the next stage of the process.

The questions generated from stakeholder consultation were broadly similar to the uncertainties gathered in the information gathering stage of the priority-setting framework (see Chapter Three). Areas of commonality were around the treatment and prevention of oral disease generally, but in particular caries and periodontal disease. The stakeholder consultation placed slightly more emphasis on prevention than treatment however. One area does stand out as different between the two phases of this project. The treatment of edentulous patients with dental implants does not appear to be a major concern for COH's stakeholders, however, it was highlighted by guideline developers and as an area of active research in the information gathering phase. This mismatch is borne out also by looking again at the citation data collected in Chapter Three (see Section 3.4.1). Although the COH reviews on the topic of dental implants were amongst the most cited by other researchers,

they did not rate highly in terms of Altmetric scores and were not widely discussed on social media. This may be one area where the volume of funding of research and the number of primary studies is out of step with the needs of patients. This disparity may be worth exploring further in future research; it may be the case that the costs involved with fitting implants make them a less attractive option for health services and patients (Jawad *et al*, 2017), and so while clinicians in the field are interested in their efficacy other stakeholders may be less engaged with the topic.

The priority topics submitted by the stakeholders were often quite broad in scope, as were the priorities developed by the JLA PSP. This leads to the question of whether COH should explore more complex methods in systematic reviews (such as network meta-analysis) to address broader questions and strategies to help people manage their overall oral health rather than concentrating on individual interventions for specific problems. However, this would have many implications for implementing the priorities, including the time and resources needed to produce more complex reviews. Resource in this case would include researchers with the experience and expertise to undertake this type of review. This may not be feasible given the available finances.

4.5 Conclusion

The stakeholder consultation and the questions produced by the JLA PSP were valuable, however, there were some methodological challenges which may have merited an alternative approach. 231 topics or questions that stakeholders felt required more or better research were generated in total from both routes to inform COH's priority setting process, minus five from the JLA PSP which were out of scope. There was much variation in the questions, but most were on the broad themes of prevention and treatment of oral diseases, most notably caries and periodontitis. All of the submitted questions and twenty of the priority topics developed by the JLA PSP were considered in the next stage of the framework, the mapping and ranking phase, discussed in Chapter Five.

Chapter Five: Mapping and ranking priorities phase

5.1 Introduction

The information gathering and stakeholder consultation phases of the project, discussed in the previous two chapters, resulted in a total of 943 potential priority topics. These were either perceived evidence gaps, existing reviews which were in demand from stakeholders, or questions that stakeholders had posed about their oral health, or had emerged from the JLA PSP. 231 of these came from the stakeholder consultation phase, and 712 from the information gathering phase. Of the 712, the vast majority (685) were from the exploration of uncertainties presented in clinical guidelines. A key stage was drawing together the data from the information gathering phase and the stakeholder consultation phase, checking for overlap, removing duplicates and mapping the identified topics against current COH reviews. This was the 'mapping' phase, which had two aims:

1. Determining whether the topic area was already covered by a COH review. If it was covered, then the review was highlighted as a review that may need updating. If it was not, it was highlighted as a potential area for a new COH review;

2. Determining whether the topic area met set criteria and constituted a priority.

The resulting, refined topics from the mapping phase were then put to an international panel of COH's stakeholders in an online ranking exercise, to determine which of the priority topics should be addressed during the current funding cycle. COH only has resource to undertake a limited number of new reviews and updates, so it was important to have a manageable number of priorities. Thirty updates were planned, and fifteen new reviews. It was therefore important to ensure that the topic areas left over after the mapping phase were refined into a more manageable set of systematic review titles. This was the 'ranking' phase of the process.

It was during this stage of the process that the Covid-19 pandemic began. As discussed in Chapter One, Section 1.6, Covid-19 had an immediate and disruptive impact on the provision of dental services, with many nations going into some form of lockdown, and only providing emergency dental treatment (Grossman *et al*, 2020, p. 964). Usual primary dental services were largely suspended due to the risks posed by aerosol-generating procedures (Meng, Hua and Bian, 2020, p. 483). At this point, it was unknown how long

this situation might last, and whether dental services would be able to restart safely, and what measures dental clinics might have to have in place. It was consequently important to try and address this in this research project. The stakeholder panel who were convened to rank the priority topics were asked whether they had any additional questions to add as a result of the pandemic. Were there questions that COH should be tackling as a priority that were related to Covid-19? The stakeholder panel submitted their questions online, as well as ranking the identified priority topics.

The methods and results of the mapping and ranking phase are discussed in this chapter. The content analysis, mapping, design of the ranking survey and the analysis of the data from the survey were conducted by the author of this research project, working alone.

5.2 Methods

5.2.1 Mapping priorities against the current portfolio: methods

In previous chapters, the process for establishing priority issues in oral health were described. Once the common questions and themes were identified in the information gathering and stakeholder consultation phases, the results were mapped against the existing portfolio of COH reviews, or planned reviews. This is a different process from creating an evidence 'gap map', as described in the literature (see Chapter Two, Section 2.5). The aim of an evidence gap map is to document and create a visual map of where high quality evidence exists in a particular research domain (Campbell Collaboration, 2018). The aim of the mapping in this study was to investigate the gaps in a specific context: Cochrane reviews. In this scenario, Cochrane reviews stand in for the high quality evidence, and the priority topics established by other methods are mapped against the reviews, to see whether the topic has already been included in a Cochrane review. This counteracts some of the criticisms of gap maps, which have been criticised for lacking nuance and context (Snilsveit *et al*, 2013). Evidence mapping is used in this research project as a tool to create an impression of where Cochrane reviews and priority topics match up, and where there may be gaps to be filled by a new Cochrane review. In order not to neglect the wider context of evidence synthesis, during the implementation phase (see Chapter Six) any topic areas identified were also checked for the availability of a high-quality, non-Cochrane systematic review. Commissioning a new Cochrane review or update where a high-quality

review already exists may constitute research waste, so it was important to ensure that non-Cochrane reviews were also considered as part of the process.

A list of COH registered titles, protocols and reviews was extracted from Cochrane's Archie information system and uploaded to Excel. The reviews, protocols and registered titles were coded as per the scheme established in Table 2, the content of each was analysed in terms of the population, clinical condition, intervention and theme (see Chapter Three, Section 3.2.3a). All of the potential priority topic areas had also been coded as per this scheme, and so this allowed a comparison of the topic areas with the Cochrane reviews. In this way, the topics that had already been covered by an existing or planned review could be identified. Any gaps between the priority issues and the current portfolio could also be mapped, and areas only partially covered by current reviews or planned reviews could be established. In addition, the level of certainty of the evidence for each existing review was noted for those reviews that had been published within the last five years. In all COH reviews published in this time period, there is a rating which determines how certain the evidence is for the outcomes of the review. There are four possibilities, very low certainty, low certainty, moderate certainty and high certainty. The level of certainty is applied by the authors of the review depending on how confident they are that the true effect of an intervention is close to the estimated effect, and determines the quality of the evidence. The Grading of Recommendations, Assessment, Development and Evaluations (GRADE) framework is used to come to these decisions (Siemieniuk and Guyatt, 2020). The level of certainty of the evidence is important to establish, as this could help to determine whether the systematic review question includes a degree of uncertainty or not. If there is high or moderate certainty evidence to support the results of the review, putting time and resources into updating that review may be considered research waste. If those questions are considered to be priorities, the reviews may still not be updated if the review question appears to be answered by the available evidence. Any reviews that had not been updated within the five year window were classed as "out-of-date".

To determine whether or not the topic area was a priority, five columns were added to the Excel spreadsheet containing the Cochrane reviews and registered titles, relating to:

1. Whether the review had appeared in one of the top ten reviews as per the metrics outlined in Chapter Three, Section 3.3.1;

2. Whether there were likely to be new trials to include as per the survey of the evidence base (see Chapter Three, Section 3.3.2);
3. Whether the review or registered title covered an uncertainty revealed by the examination of guidelines (see Chapter Three, Section 3.3.3);
4. Whether the review covered a question asked during the JLA Oral Health PSP (see Chapter Four, Section 4.3.1);
5. Whether the review mapped to a question from COH's online stakeholder consultation (see Chapter Four, Section 4.3.2).

The questions, uncertainties and priority issues were examined in turn. If an uncertainty or question from the online stakeholder consultation, the review of guidelines or the JLA Oral Health PSP was covered by an existing review, or if the review had featured in the top ten reviews in terms of the metrics outlined in Chapter Three, Section 3.3.1, or if the evidence-base survey had revealed the likelihood of new trials to include, an "X" was placed in the corresponding column on the spreadsheet.

At the end of this process, any existing reviews or registered titles that had mapped to at least three of the above five categories were put through to the next stage in the priority setting process, as a potential priority review update or, in the case of registered titles and protocols, a priority review to be completed. The results of the mapping process can be found in Section 5.3 of this chapter, and the full detail can be found in Appendix E.

During the examination of the questions, uncertainties and priority issues described above, any uncertainties or questions which did not map to a review or a registered review title, or only partially mapped, were extracted and listed on a separate spreadsheet as potential new topic areas. Any duplicate topics were removed at this stage if they had been identified during more than one of the priority setting processes, although this fact was noted. At this point, the new topic areas were sorted into the areas of prevention, treatment, prognosis and diagnosis. Potential new titles were considered for the next stage in the process provided that they were suitable for a Cochrane systematic review, and were within COH's scope as determined by COH's Priority Setting Steering Group. The new titles also had to have featured in at least two of the four priority setting exercises outlined above.

5.2.2 Ranking the priorities: methods

The next and final stage in the data collection process was to rank the priorities to ensure that the number of priority topics was within reasonable limits, so that COH have the capacity to undertake the reviews. According to the grant awarded by their funding body, COH has capacity to produce fifteen new reviews and thirty updated reviews during their funding cycle. These were then chosen as the target numbers.

The panel was recruited in three ways. COH is part of a network of evidence producers called the Global Evidence Ecosystem for Oral Health (GEEOH). Members of the GEEOH include the American Dental Association, the Scottish Dental Clinical Effectiveness Programme (SDCEP), the World Health Organization, Public Health England and the International Association for Dental Research. These groups all produce guidelines or recommendations for dental practitioners, and previously, this guidance has utilised COH reviews (Cochrane Oral Health, 2020a). Representatives from the GEEOH were emailed with more information about the study, and invited to take part in the ranking exercise. Chief Dental Officers, who feed into national policy in their respective countries were also approached to take part.

Previous COH authors were also selected at random and contacted to see if they were able to take part. COH's authors cover all dental specialty areas, and are often either practicing dentists, members of the dental care team, or dental academic researchers. Importantly, they are also from 140 countries, the aim was to try and engage an international panel for the final stage of the research documented in this thesis, so that the final priorities were more representative of Cochrane's global audience. A complete list of COH active authors was extracted from COH's information system, Archie. The results were exported to an Excel spreadsheet, and the authors were numbered. The "RAND" function was used to generate random numbers, and 40 Cochrane authors were selected at random. These were then contacted and invited to take part.

Consumers were recruited via Cochrane's "Task Exchange" platform. The aim of "Task Exchange" is to "connect people who need help with their Cochrane reviews with people who have the time and expertise to help" (Cochrane Effective Practice and Organisation of Care, 2021a). Users are able to post a task, and people can volunteer to undertake it. Users are also able to specify what type of person is required to help, in this case, the task was

targeted to “Consumers”, which in Cochrane terms is anyone who “represents patients, carers and family members with first-hand experience of a healthcare condition” (Cochrane Consumer Network, 2021). In April 2020, a task was posted by COH asking for consumer volunteers to help with the ranking of new and existing priority titles. The task was left on the platform for two weeks. Eleven people responded, of whom seven took part.

Participant invitation letters and an information sheet was sent to all people who were asked to participate. The ranking process was conducted online. A questionnaire was developed using the Lime Survey tool. The titles of existing Cochrane reviews were converted to plain language in consultation with a consumer representative so that consumer participants would understand the topics. The only demographic data collected was the name, country and profession of the participant. This was to ensure an international representation, one which covered different dental specialties, and to check who had answered the questionnaire so that reminders could be sent out to those who had not filled in the survey at the halfway stage. The survey was live for eight weeks during the summer of 2020. The data was anonymised at the close of the survey, and identifying information was removed. The invitation letter, participant information sheet and survey can be found in Appendix F.

In the questionnaire, the potential new titles or topic areas were listed, and participants were invited to choose a “top ten”, and then rank them one to ten. The topic areas had been checked by a Patient and Public Involvement (PPI) representative, and any that were not clear were converted into plain language. The panel were also asked to provide some reasoning behind their decision, and comment on why they had chosen their top three answers. They were then presented with the existing titles, and asked to select a top fifteen, again, they were asked to comment on their top three answers.

The results were analysed by taking each respondent’s top ten new titles and assigning a score to each title in the top ten. The most important ranked review title was given a score of ten, and then each subsequently ranked title was given a score of 9,8,7 etc. until the least important in their individual top ten was given a score of one. The same process was followed for existing titles, but a top fifteen was scored instead, with the highest ranked review title gaining a score of 15 and the lowest ranked gaining a score of one for each participant. The scores generated by each participant were then added together. The

maximum score a new title could achieve was 400 (forty people ranking it 1st and awarding it ten points each). The maximum score an existing title could achieve was 600 (forty people ranking it 1st and thus awarding it 15 points each). The scores were assigned and added using Excel spreadsheets.

The panel were also asked whether there were any questions not included in the ranking exercise that they felt were important for COH to answer. This was to ensure that nothing had been missed by the priority setting process. Finally, the panel were asked whether there were any specific questions that should be addressed by COH as a result of the Covid-19 pandemic. As has been discussed in Chapter One, Section 1.6, the Covid-19 pandemic had significant implications for dentistry, which were not foreseen at the start of the research project. The development of the questionnaire coincided with the Covid-19 lockdown in the UK, and it was important to gauge the opinion of the panel, to ensure that priority topics remained relevant.

5.3 Results

5.3.1 Mapping the titles against the current portfolio: the priority issues covered by an existing or registered review title

At the time of the mapping exercise, COH had 198 systematic review titles registered. 157 were established, published reviews. 41 were review protocols or registered review titles, i.e. they were systematic reviews in progress that had yet to be published. Of the 157 titles, 10 (6%) had moderate or high certainty evidence to support their conclusions. 86 (55%) had low or very low certainty evidence. 61 (39%) were classed as "out-of-date", as they were more than five years old.

Nine of the 198 titles had featured in all of the five priority setting projects described above, and were candidates for being high priority topics:

Table 13: Priority reviews for updating: topics which were highlighted in all five priority setting projects
Fluoride toothpastes for preventing dental caries in children and adolescents
Fluoride toothpastes of different concentrations for preventing dental caries in children and adolescents
Fluoride varnishes for preventing dental caries in children and adolescents

Pit and fissure sealants versus fluoride varnishes for preventing dental decay in the permanent teeth of children
Sealants for preventing dental caries in primary teeth (Protocol)
Surgical removal versus retention for the management of asymptomatic, disease free, impacted wisdom teeth
Interventions for replacing missing teeth: augmentation of the maxillary sinus
Chlorhexidine mouthrinse as an adjunctive treatment for gingival health
Fluoride mouthrinses for preventing dental caries in children and adolescents

One of these was a protocol: *Sealants for preventing dental caries in primary teeth*. However, in two cases (*Chlorhexidine mouthrinse as an adjunctive treatment for gingival health* and *Fluoride mouthrinses for preventing caries in children and adolescents*) the topic already has high or moderate quality evidence available to answer the question, according to the Cochrane review. These topics are then not topics where there is high levels of uncertainty. It may be instead that these are topics where the issue is that the evidence is not being disseminated widely enough or to the audience who need it. These two topics were treated differently, prioritised for knowledge transfer and dissemination processes rather than for updating.

Seventeen existing reviews had featured as important questions in four of the priority setting projects, and three protocols or registered titles had also featured in four, these can also be considered as potential high priority topics:

Table 14: Priority reviews for updating: topics which were highlighted in four out of five priority setting projects
Routine scale and polish for periodontal health in adults
Pit and fissure sealants for preventing dental decay in the permanent teeth
Powered versus manual toothbrushing for oral health
Chlorhexidine treatment for the prevention of dental caries in children and adolescents
Water fluoridation for the prevention of dental caries
Xylitol-containing products for preventing dental caries in children and adults
Home use of interdental cleaning devices, in addition to toothbrushing, for preventing and controlling periodontal diseases and dental caries
One-to-one oral hygiene advice provided in a dental setting for oral health
Oral hygiene programmes for people with intellectual disabilities
Interventions for replacing missing teeth: different types of dental implants
Systemic antibiotics for symptomatic apical periodontitis and acute apical abscess in adults
Topical fluoride (toothpastes, mouthrinses, gels or varnishes) for preventing dental caries in children and adolescents
Direct composite resin fillings versus amalgam fillings for permanent or adult posterior teeth
Recall intervals for oral health in primary care patients
Interventions for replacing missing teeth: different times for loading dental implants

Interventions for preventing oral mucositis for patients with cancer receiving treatment
Enamel matrix derivative (Emdogain®) for periodontal tissue regeneration in intrabony defects
Psychological interventions for improving adherence to oral hygiene instructions in adults with periodontal diseases (Protocol)
Occlusal interventions for managing temporomandibular disorders (Protocol)
Chlorhexidine mouthrinse versus other potentially active mouthrinses as an adjunctive treatment for gingival health (Registered title)

In three cases, the question had already been answered by high or moderate quality evidence. *Routine scale and polish for periodontal health in adults*, *Powered versus manual toothbrushing for oral health* and *Pit and fissure sealants for preventing dental decay in permanent teeth* will become priorities for disseminating evidence, and not necessarily for updating.

Thirty three existing reviews were covered by topics suggested in three of the five priority setting projects, and five protocols were also identified:

Table 15: Priority reviews for updating: topics which were highlighted in three out of five priority setting projects
Fluoride gels for preventing dental caries in children and adolescents
Micro-invasive interventions for managing proximal dental decay in primary and permanent teeth
Fluoridated milk for preventing dental caries
Fluoride supplementation in pregnant women for preventing dental caries in the primary teeth of their children
Oral hygiene care for critically ill patients to prevent ventilator-associated pneumonia
Sedation of children undergoing dental treatment
Oral health educational interventions for nursing home staff and residents
School dental screening for oral health
Interventions for replacing missing teeth: alveolar ridge preservation techniques for dental implant site development
Interventions for the treatment of oral and oropharyngeal cancers: surgical treatment
Interventions for preventing oral mucositis in patients with cancer receiving treatment: cytokines and growth factors
Autologous platelet concentrates for treatment of periodontal defects
Full-mouth treatment modalities (within 24 hours) for chronic periodontitis in adults
Periodontal therapy for the management of cardiovascular disease in patients with chronic periodontitis
Root coverage procedures for the treatment of localised recession-type defects
Treating periodontal disease for preventing adverse birth outcomes in pregnant women
Combinations of topical fluoride (toothpastes, mouthrinses, gels, varnishes) versus single topical fluoride for preventing dental caries in children and adolescents
Fluoride supplements (tablets, drops, lozenges or chewing gums) for preventing dental caries in children

One topical fluoride (toothpastes, or mouthrinses, or gels, or varnishes) versus another for preventing dental caries in children and adolescents
Primary school-based behavioural interventions for preventing caries
Antibiotics for the prophylaxis of bacterial endocarditis in dentistry
Interventions for the management of dry mouth: non-pharmacological interventions
Interventions for the management of dry mouth: topical therapies
One-to-one dietary interventions undertaken in a dental setting to change dietary behaviour
Triclosan/copolymer containing toothpastes for oral health
Interventions for replacing missing teeth: dental implants in zygomatic bone for the rehabilitation of the severely deficient edentulous maxilla
Clinical assessment to screen for the detection of oral cavity cancer and potentially malignant disorders in apparently healthy adults
Interventions for the treatment of oral cavity and oropharyngeal cancer: chemotherapy
Interventions for the treatment of oral cavity and oropharyngeal cancer: radiotherapy
Screening programmes for the early detection and prevention of oral cancer
Interventions for treating oral lichen planus
Pharmacological interventions for pain in patients with temporomandibular disorders
Interventions with pregnant women and new mothers for preventing caries in children
Topical silver diamine fluoride for managing dental caries in children and adults (protocol)
Dental filling materials for managing carious lesions in the primary dentition (protocol)
Interventions for managing root caries (protocol)
Adjunctive antimicrobial photodynamic therapy for treating periodontal and peri-implant diseases (protocol)
Adjunctive systemic antimicrobials for the non-surgical treatment of chronic and aggressive periodontitis (protocol)

Fluoride gels for preventing dental caries in children and adolescents and *Micro-invasive interventions for managing proximal dental decay in primary and permanent teeth* have already been answered with moderate or high quality evidence and will go forward as priorities for dissemination, and not updating.

This gives a total of sixty-seven titles that featured in three or more of the priority setting projects, nine of these were not yet published, so would technically count as “new” reviews for COH, rather than updates. After this stage of the research, these were counted as potential new topic areas and went forward as new priority topics (see Section 5.3.2). Seven of the existing titles had already been answered with moderate or high certainty evidence, and so these questions were not considered high priorities as there is less need to undertake a review when the evidence is more certain.

Those existing review titles that only featured in two or fewer of the priority setting exercises were not progressed to the final stage, as there was not enough evidence to suggest that these topic areas were high enough of a priority to warrant investment in resource to undertake the reviews.

5.3.2 Mapping the titles against the current portfolio: topics for new Cochrane Oral Health reviews

The uncertainties or questions which did not map to a current COH review during the mapping process, or only partially mapped, were extracted and listed on a separate spreadsheet as new topic areas. These were potentially "evidence gaps" which had not been covered by COH reviews before. Duplicate topics were removed if they had been identified during more than one of the priority setting processes, although this fact was noted. At this point, the new topic areas were sorted into the areas of prevention, treatment, prognosis and risk, prevalence, links between oral health and other conditions and diagnosis.

Potential new titles were considered for the next stage in the process provided that they were suitable for a Cochrane systematic review, and were within Oral Health's scope as determined by COH's Priority Setting Steering Group. The Steering Group also determined that new titles also had to have featured in at least two of the four priority setting exercises outlined above in order for there to be enough evidence that they were high priority enough to move forward to the final stage. One of the methods of determining priorities, looking at the metrics in terms of citations, downloads and Altmetric scores, was not applicable to this set of titles as they had never been previously published as Cochrane reviews.

After the removal of duplicate topics across the four sets of priorities, 230 potentially new topic areas remained, 87 of these were submitted by respondents to COH's stakeholder survey (see Chapter Four). 78 of the 230 new topics were not suitable for a Cochrane systematic review, 26 of these were submitted by stakeholders. For example, some of the topics were around establishing the prevalence of particular conditions, which is not in Cochrane's remit. 28 of the topic areas were suitable for a Cochrane review, but either fell under the scope of a different Cochrane group, or had been already answered by a review from a different Cochrane group. For example, determining the effects of different

anaesthetic agents for dental procedures had already been answered by the Cochrane review *Injecting local anaesthetic agents for dental anaesthesia* (St. George *et al*, 2018), a review registered by the Cochrane Anaesthesia Group. This left a total of 124 new topic areas.

Of the 124 new topic areas, 26 had been identified by two or more of the priority setting processes. Note that the 26 includes some review titles which were already registered with COH, as these had not been progressed yet to publication. Once completed and published, these titles would count as "new" reviews rather than updates, which is why they are included in this stage of the research. These are the titles that went forward for consideration in the ranking survey, the final consultation stage of the process:

Table 16: New priority reviews: topics which were highlighted by two out of four priority setting projects (n.b. this includes Cochrane Oral Health registered titles and protocols which would be "new" reviews if prioritised, completed and published)
How often for how long and how should I brush my teeth?
Can lasers prevent mouth soreness and mouth ulcers (oral mucositis) in people being treated for cancer?
What are the best ways to prevent tooth decay and oral disease in older people?
Can tooth decay in children be prevented by changing the habits and behaviour of their parents or primary caregivers?
What are the best ways to prevent oral diseases in older people living in nursing homes or other institutions?
What role does technology play in providing dental care?
What is the best way to promote better oral health?
Does a better diet or diet supplements improve oral health? If so what are the best foods/nutrients/supplements?
What are the best ways to prevent people getting oral cancer?
Can mouthrinses stop people getting mouth soreness and ulcers (oral mucositis) when they are being treated for cancer?
Can complementary or alternative therapies stop people getting mouth soreness and ulcers (oral mucositis) when they are being treated for cancer?
Can taking probiotics (live bacteria and yeasts) prevent and control chronic gum disease (periodontitis)?
Are babies who are breastfed more likely to get tooth decay?
What is the best way to measure whether children or adults are at high risk of tooth decay?
At what stage of tooth decay should a dentist use a drill?
Can complementary or alternative therapies relieve pain in people who have pain in their jaw or face (temporomandibular disorders)?
What is the best filling material for a root canal treatment so that the filling is long-lasting?
Can sealants prevent tooth decay in children under the age of six or seven (ie before children get their adult teeth)?

Can a different type of fluoride called “silver diamine fluoride” prevent tooth decay? (registered protocol)
What’s the best filling material to use to fill cavities in primary or “milk” teeth?
What’s the best way to prevent and control cavities on the tooth root (root caries)? (registered protocol)
Can ways of helping people with gum disease to change behaviour or habits (psychological interventions) help them to follow instructions for keeping their mouth and teeth clean? (registered protocol)
Can light treatment (photodynamic therapy) be a useful additional (adjunctive) treatment for chronic gum disease (periodontitis) and dental infections caused by dental implants (peri-implantitis)?
Can antibiotics be used to treat chronic gum disease (periodontitis) without surgery? (registered protocol)
Can changing a person’s bite using splints or orthodontic braces (occlusal adjustment) prevent or treat facial and jaw pain (temporomandibular disorders)?
How does chlorhexidine mouthrinse compare with other mouthrinses as an additional treatment for gum disease?

5.3.3 Mapping the titles against the current portfolio: topics that were not progressed

Some consideration needs to be given to the topics which were either not identified as priorities, or were not put forward to the ranking stage. 139 of Cochrane’s 198 existing reviews were not identified as priority topics. These reviews may be updated in future if author teams are actively working on them, but the vast majority will be marked as “stable, non-priority” in the Cochrane Library. This is a status given to reviews that Cochrane groups do not want to progress to another update.

Only 26 out of 230 new topic areas went through to the final ranking stage, meaning that 204 priority areas were not pursued. Some of these will have been generated by questions asked by stakeholders. Topics that are not pursued by the JLA PSPs are later added to a searchable database, the Databases of Uncertainties of the Effects of Treatments (DUETS) database, in order to preserve them for future researchers (Crowe, 2016). Cochrane does not have an equivalent solution for priority topics that are not undertaken. It may be possible to preserve these on COH’s website instead for future reference.

The 26 new priority topics, and 52 priority updates were included in the final ranking survey, where a panel of experts ranked the topics in order of importance. The aim was to produce a top fifteen new topics out of the 26 for COH to undertake, and a top 30 updates from the 52 priority existing review titles.

5.3.4 Results of the ranking process: recruitment of the panel

An international panel was convened to rank the identified new and existing priority titles so that a final list could be created for implementation into COH's workflow. The aim was to present the results to a panel of approximately 30 members, as recommended in the literature for this kind of exercise (James Lind Alliance, 2020). The panel was convened virtually rather than in-person, to allow a truly international representation.
The final panel consisted of 40 members. Members were:

- Policymakers (n=4);
- Guideline developers (n=3);
- Practicing dentists, including general dentists (n=14);
- Dental specialists (such as orthodontists, oral surgeons) (n=7);
- Researchers in oral care (n=4);
- Oral health care professionals (such as hygienists) (n=1);
- Consumers (n=7).

The 40 panel members had international representation as presented in Table 17. Three panel members were representatives of lower or lower middle income countries.

Table 17: Members of the panel who ranked the priorities, by country of residence

Country	Number of panel members taking part
Brazil	1
Canada	1
Chile	1
China	1
Costa Rica	1
Croatia	1
France	1
Germany	2
Greece	1
Hungary	1
India	3
Israel	1
Italy	3
Japan	1
Malaysia	2
The Netherlands	1
New Zealand	2

Republic of Ireland	1
Singapore	1
South Korea	1
Turkey	1
United Kingdom	6
United States of America	6

5.3.5 Results of the final ranking survey: new review titles and topic areas

The panel ranked the top ten new review titles as follows:

Table 18: New Cochrane Oral Health review topics, ranked by a stakeholder panel	
New review topic	**Score /400**
What are the best ways to prevent tooth decay and oral disease in the elderly?	186
How can oral cancer be prevented?	178
What is the best way to promote better oral health?	172
What is the best way to measure the risk of tooth decay?	166
At what stage of tooth decay should a dentist use a drill?	139
How should I brush my teeth? For how long, and how often?	115
What are the best ways to prevent oral diseases in the elderly living in nursing homes or other institutions?	105
By changing parental, or primary care-giver behaviours, can tooth decay in children be prevented?	101
What is the best way to deal with cavities on the tooth root (root caries)?	98
Does a better diet or diet supplements improve oral health? If so what are the best foods/nutrients/supplements?	95
What role does technology play in providing dental care?	93
Can “silver diamine fluoride” (a type of fluoride) prevent tooth decay?	84
Can changing dental health habits or behaviour help people with gum disease?	81
Can antibiotics be used, instead of surgery, to treat chronic gum disease (periodontitis)?	78
Can taking probiotics (live bacteria and yeasts) prevent and control chronic gum disease (periodontitis)?	72

The panel were asked to comment on their top three choices, and why these were important to them. Most commonly, the panel’s comments related to the provision of dental services to elderly populations, with sixteen out of forty giving this as a reasoning behind their priority ranking. There was a recognition that the population of elderly people is growing as a proportion of the whole population, and that this group have special requirements and conditions not shared by the general population. The panel largely agreed that this was a neglected area in research, and that there was a possibility that elderly people may “slip through the net” with regards to dental check-ups and community care. One researcher

commented: “In modern western countries there is a growing concern on the poor oral health of the elderly population. This is not only in the case in the nursing homes but also in the frail elderly individuals who are living in their private homes. And in most of the cases is not subjected any more to routine dental checks and surveillance. The oral care needed for this population differs substantially from the current clinical care provided in most dental practices. Best practices and evidence how to manage oral care of this growing population have to be developed by appropriate research.” A UK based panel member wrote: “there is very little guidance currently on managing oral health in the elderly - a population with high levels of disease, high dental needs and the population that is increasing in number most rapidly.”

Twelve out of forty respondents commented on the importance of prevention in oral disease. There was a recognition of the importance of prophylaxis and the use of evidence to support preventive approaches. Comments included: “My top three choices are related to preventive alternatives which are highly required to control oral diseases in the near future.” and “I have practiced for 40 years with an emphasis on preventive dentistry for all ages - it works and we need this to be our focus.” The clinical relevance of the topic was of importance to some of the panel members, particularly whether treatments had the potential to change practice or improve outcomes and this guided their decision making. For example, a dentist commented: “With periodontitis, and especially periimplantitis frequency, and the consequences of both, periimplantitis in particular, it would be useful to investigate the effectiveness of light therapy. It has already been used in clinical work, but is also an intervention that requires considerable financial investments and education.” A guideline developer from the USA commented on the priority topic about when a dentist should resort to the drill: “Dentists have historically focused on drilling and restoring caries lesions, and it would be very interesting to see when restorations are and are not necessary in treating caries lesions. This question has the potential to inform changes to the current paradigm in the treatment of caries.”

Some of the panellists felt that current thinking around some elements of clinical practice was not evidence-based, and that a systematic review may lend support to (or refute) current guidance, or offer opportunities to highlight the lack of primary research. For example, one researcher from the UK commented: “I think reviews in this area [the management of oral disease in the elderly] would also highlight where we need more primary research which would be helpful for those of us involved in primary research and

systematic reviews." There were also several comments around the need for evidence due to controversy or lack of consensus. A dentist from Italy: "Because I have the feeling that there is a bit of controversy in this subject [measuring caries risk]. And it would be wonderful to have the best measuring tool available, for the clinic and the research." Caries risk measurement was seen as a particularly controversial topic, and one where evidence was lacking: "Most risk factors/indicators are assumed but not proven. Relying on proven measures would be a game changer." and a further comment from a panellist: "Understanding caries risk is important to informing the extent of preventive intervention required. However, currently, we don't know the best way to predict caries risk."

Decisions on how to rank topics were also driven by the burden of disease: "Dental caries remains a significant global health problem, understanding how best to measure risk and at what point dentists should intervene invasively is important." and "Chronic gum disease is extremely prevalent (at least I perceive it to be), and prevention saves on both money and suffering. Prioritising this would benefit the most people." Prioritising questions that centred around the patient was also seen as important by some of the panellists. One dentist from Malaysia commented that he had chosen two of the topics (on toothbrushing and diet) because: "They are the most common questions I get from my patients for which I don't have a definite answer. I think at least we should be able to answer these common questions with evidence."

Questions that focused on behavioural change, particularly in family settings, were seen as a priority. One of the consumer representatives, based in the USA, made this point: "Parents need to understand that the oral health behaviours we have as adults are formed in childhood. So thus my first priority, by promoting better oral health education and facts to the public, we can help parents change behaviours in their children and reinforce good habits. This in turn, will help promote better oral health overall so gum and periodontal disease can be avoided in the long run of a patient." One of the guideline developers on the panel, also from the USA, was in agreement: "It seems that dentistry has failed and mostly focused on fluoride and restorative-related means to manage dental caries. Novel approaches will further inform the impact of parents' behaviour (a family approach) to caries prevention."

Finally, the decision on how to rank the priorities was also guided by the need to provide evidence to justify investment in new technology. Example comments here included: "I

think [my chosen topic on technology in dentistry] is relevant because technology is part of the current Dentistry. It is also expensive. So, it would be great if we know which really works and is it worth it." and "Technology and digital dentistry is where dentistry will be for everyone in the future. We must have an open mind as to what is available and how to best use this in our practices."

The ranked new titles / topics areas and the comments were included in a report forwarded to the COH Editorial Base team for consideration (see Appendix B). The ten titles that were rejected as the highest priority topics were also forwarded, so that the team had a complete picture of which titles were rejected by the panel, but may still be important topics to research in the future.

5.3.6 Results of the final ranking survey: titles suggested by the panellists

The panel were asked if there were any topics that they would like to see COH undertake that had not been mentioned in the priority setting survey. The topics were then screened for duplication, and to remove any that are covered by existing Cochrane reviews. The following general topics were suggested:

Table 19: Titles suggested by Cochrane Oral Health's stakeholder panel
What is the effect of prophylactic antibiotic use prior to dental treatment for the prevention of prosthetic joint infection?
How useful are the different radiographic techniques for diagnosing dental conditions in children and adults? (diagnostic test accuracy and link evidence)
General Note: Cochrane Reviews typically consider healthy patient populations in their review questions. Inclusion or focus on special patient populations (ex: comorbidites such as diabetes, cancer, cardiovascular disease, immunocompromised).
How does simply accessing dental care improve population oral health?
What effect does oral health literacy have on access to care and patient compliance?
How does cultural competency of oral health professionals affect oral health serviced delivery in minority/indigenous populations?
Bridging the gaps between medicine and dentistry. Why are these two segregated the way they are right now? For purely historical reasons? Are patients, particularly complex cases with interdisciplinary conditions being harmed by this necessary divide?
Training of dentists occurs in a silo isolated from other body systems. Does this affect dentists' appreciation of more systemic body problems? Does this blind doctors to aspects of oral health that may implicate the rest of the body?
Use of mouthguards in children and athletes in preventing orofacial, dental injuries, and concussion

Interventions to treat oral decubitus ulcers
Diagnostic criteria for temporomandibular joint disorders
Dental fluorosis is an endemic problem in many LMICs. It would be good to know the best methods to prevent and treat such cases.
There is hardly an effort to know what is the best method to stop people from chewing betel quid.
The effectiveness of treatment results of clear aligners compared to fixed orthodontic appliances
Comparison among different orthodontic appliances treatment regarding biosafety
Autogenous dental transplant effectiveness.
The risk factors of orthodontically induced white spot lesions (a review following the template of Cochrane Prognosis)
Oral diseases with associations to other NCD's (diabetes, CVDs, overweight) ask for preventive cooperation of dental and medical professionals. Research on the the prevalence of NCDs and prevention focussing on life style from a common risk factor approach should be on the agenda of the Oral health group.
Effects of dental restorative materials (amalgam & composite) on health
When are CBCT images indicated for routine dental procedures?
Good risk assessment model in children that is applicable in a school dental service
Best endodontic materials to use in root canals (irrigation, root preparation, and root filling)
Long term outcomes after implant placement in the anterior region
I would like to know adverse effects of whitening and the best way to do it

There was a range of topics suggested, and some were either not suitable for a Cochrane systematic review, or they could be incorporated into existing reviews, or overlap with existing reviews. For example, “I would like to know adverse effects of [tooth] whitening and the best way to do it.” COH already has registered titles on tooth whitening, both at home and in a professional context. Both of these reviews consider adverse events relating to tooth whitening. The question “Comparison among different orthodontic appliances treatment regarding biosafety” considers potential adverse events in terms of orthodontic appliances, however this question may be best answered by incorporating it into COH’s numerous existing reviews on orthodontic appliances. The question “Training of dentists occurs in a silo isolated from other body systems. Does this affect dentists' appreciation of more systemic body problems? Does this blind doctors to aspects of oral health that may implicate the rest of the body?” is an interesting question, but it is not a review looking at interventions for or diagnosis of specific oral health conditions, and the training of dental

professionals does not come under COH's scope. Some of these questions also overlap with the priority titles already submitted to the panel. For example, "There is hardly any effort to know what is the best method to stop people from chewing betel quid." is part of the scope of question "How can oral cancer be prevented?". Nevertheless, the topics were put forward for consideration by the COH editorial base team.

The panel were also asked whether there were any titles that COH might consider due to the Covid-19 pandemic. The following titles were suggested, duplicates were removed, and they were then also put forward as potential topics to the editorial team:

Table 20: Covid-19 titles suggested by Cochrane Oral Health's stakeholder panel
What is the effect of interventions for reducing the production of aerosols in dental settings?
How is removable dental prosthesis cleaned in a Covid patient?
Is an airborne infection isolation room (negative pressure room) effective in eliminating risk to oral health professionals?
What is the effectiveness of extraoral high volume evacuation devices?
What is the effectiveness of N95, KN95, and different levels of surgical masks in protecting patients and providers?"
Lessons learned from Covid-19 pandemics related to oral health services? How to build on this for better preparedness and response?"
Which safety precautions are necessary / reasonable for the dental team. Not only to guard the dental team but also patients"
Is there a link between good oral health practices and a reduced risk of contagion/severity with a Covid-19 infection'
Which is the best virucidal pre-procedural rinse that can be used in dental patients during this Covid-19 pandemic?
The effectiveness and use of technology - teledentistry
Numbers of oral health practitioners infected with Covid worldwide and how many died
How to manage oral lesions in Covid-19 patients
Sterilization procedures and patient management to avoid the spread of Covid-19 and other future threats
Which procedures cause the greatest risk of infection and how can this be reduced.
The question here is how to treat the patient we don`t know if is an asymptomatic carrier of the virus

COH responded to the Covid-19 pandemic in several ways, one of which was the commission of several urgent reviews outside the priority setting process to examine issues which the pandemic had brought to light, namely the reduction of aerosols and whether the use of antimicrobial mouthrinses could potentially protect either the dental patient, or the dental health care professionals treating the patient from infection. Many of the questions above were therefore already being examined by COH. Some of the questions posed by the panel were also broader than COH's remit, or had been examined as part of Cochrane's overall response to the pandemic. "What is the effectiveness of N95, KN95, and different levels of surgical masks in protecting patients and providers?" is a question that is of relevance and importance to the whole field of healthcare professionals, and not specific to dentistry, and is examined by an existing Cochrane review on personal protective equipment (PPE). The question on the relevance and use of technology in dentistry (known as teledentistry) is covered by the broad question already submitted to the panel: "What role does technology play in providing dental care?", although the pandemic undoubtedly puts this question into sharper focus. To contrast, some of these questions were not suitable for a Cochrane review. "Numbers of oral health practitioners infected with Covid worldwide and how many died" is important to establish for many reasons, but this is not a "Cochrane-style" intervention or diagnostic review, and would best be undertaken outside the framework of a Cochrane review. Once again, despite any overlap and the unsuitability of some of the questions, these topics were put forward to the COH editorial team to inform their discussion on implementation of priority topics, which is further explored in Chapter Six.

5.3.7 Results of the final ranking survey: priorities for updating

The panel members were also asked to rank the existing titles into priority topics that might be updated over the next three or more years. Their top thirty titles to be updated were as follows:

Table 21: Cochrane Oral Health reviews to update, ranked by a stakeholder panel	
Priority reviews to update	**Score /600**
Clinical assessment to screen for the detection of oral cavity cancer and potentially malignant disorders in apparently healthy adults	274
Periodontal therapy for the management of cardiovascular disease in patients with chronic periodontitis	265
Recall intervals for oral health in primary care patients	255

Home use of interdental cleaning devices, in addition to toothbrushing, for preventing and controlling periodontal diseases and dental caries	228
Water fluoridation for the prevention of dental caries	204
Oral hygiene care for critically ill patients to prevent ventilator-associated pneumonia	191
Interventions with pregnant women and new mothers for preventing caries in children	188
Surgical removal versus retention for the management of asymptomatic disease-free impacted wisdom teeth	187
Direct composite resin fillings versus amalgam fillings for permanent or adult posterior teeth	186
Primary school-based behavioural interventions for preventing caries	182
Oral hygiene interventions for people with intellectual disabilities	179
Oral health educational interventions for nursing home staff and residents	178
One topical fluoride versus another for preventing dental caries in children and adolescents	175
Screening programmes for the early detection and prevention of oral cancer	169
Enamel matrix derivative (Emdogain®) for periodontal tissue regeneration in intrabony defects (	167
Treating periodontal disease for preventing adverse birth outcomes in pregnant women	167
Antibacterial containing toothpastes for oral health	166
Interventions for the treatment of oral and oropharyngeal cancers: surgical treatment	166
School dental screening programmes for oral health	161
Systemic antibiotics for symptomatic apical periodontitis and acute apical abscess in adults	160
Full-mouth treatment modalities (within 24 hours) for chronic periodontitis in adults	157
Antibiotics for the prophylaxis of bacterial endocarditis in dentistry	153
One-to-one dietary interventions undertaken in a dental setting to change dietary behaviour	152
Root coverage procedures for treating localised and multiple recession-type defects	150
Combinations of topical fluoride (toothpastes, mouthrinses, gels, varnishes) versus single topical fluoride for preventing dental caries in children and adolescents	145
Autologous platelet concentrates for treating periodontal infrabony defects	145
Pit and fissure sealants versus fluoride varnishes for preventing dental decay in the permanent teeth of children and adolescents	141
Sedation of children undergoing dental treatment	135
Fluoride toothpastes of different concentrations for preventing dental caries	134
Topical fluoride (toothpastes, mouthrinses, gels or varnishes) for preventing dental caries in children and adolescents	131

Again, the panel were asked to give their reasons for ranking their top three as most important. Prevention was given as a key reason by half of the panel. Comments included: "Many public oral health programs in the U.S. are focused primarily on prevention. As such, I think comparing sealants and topical fluorides would be valuable so that oral health

professionals can determine how to allocate scarce resources" and "Prevention is key going forward and therefore a strong evidence-base on which to base preventive strategies that are suited to the individual patient is needed."

The need for more clarity was also important to the panel, particularly with regard to individual interventions. For example: "autologous platelet concentrates (APC)… [have] shown excellent results… in periodontal and bone regeneration; as regards the regeneration of the gingival tissue the effect is not yet clear." and "Root coverage procedures are the primary way to cover exposed roots, but it is unclear which technique can improve the outcome during a long follow-up period.". Three panellists mentioned lack of consensus for their reason for choosing their key topics, as well as the need for more evidence: "The advice in relation to interdental cleaning forms part of our regular advice to patients, yet there is a lack of evidence behind this advice."

Burden of disease was another important reason for ranking topic areas as more important, particularly with regards to cancer and dental caries: "Dental caries remains a significant global health problem and we know that fluoride is effective at reducing decay. It would be helpful to know the relative effects of different topical fluoride methods whether using a combination of fluoride methods provides additional benefit and/ what is the most effective combination." and "Caries prevention is the topic I have chosen as this is the biggest issue amongst the pediatric population." In terms of oral cancer, the higher rates in lower and middle income countries were emphasised: "Oral cancer is a major public health issue in some parts of the world" and "Oral cancer is one of the most common cancers in the world and detection is still a crucial problem to be solved."

Lack of evidence to support policy was also a concern. Comments included: "Very few, if any, policy documents addressing the use of mild/moderate sedation in children to manage dental anxiety present the underlying evidence for their recommendations/options." and "The effect of screening (i.e. dental checks) of oral diseases is important and risk assessment is an essential part. The routine standard procedure in dental practice (every individual two times or more a year) is not evidence based. Interventions on a regular basis performed in dental practice should be subjected to evidence to prevent overtreatment." One panellist commented that: "Dental check-ups in schools are ubiquitous and while it seems common-sense that there is net benefit, there is potential for great harm should this not actually be the case."

The potential harms of treatments were a further reason why the panel members ranked certain updates as important. One panellist said “Should treatment be required, reducing the potential negative effects of dental treatment is important so that those most at risk continue to attend.” Two members of the panel were concerned about anti-biotic resistance as a particular adverse event with regards to usage in dentistry: “Antibiotics need to be carefully stewarded to slow down the development of resistance. If antibiotics are not found to be of net benefit, this could reduce usage. It could also help us evaluate the uses of antibiotics in general.” and “It is very important to have a better understanding of antibiotic use in dentistry to assist in antibiotic resistance issues worldwide.”

Of all the interventions under consideration, it seems that patient education was seen as by far the most important, with twelve panel members mentioning patient education specifically as a factor in their ranking. This was particularly the case with regards to educating parents about early childhood caries. Comments included: “Early education for the parents of children that it is their responsibility to prevent decay in their children through brushing their teeth , good nutrition and bringing them to the dentist twice a year is crucial.” and “Starting antenatally/just postnatal gets us 'in' as early as possible. If this could have an impact on ECC [early childhood caries] it would be very beneficial especially if targeted.” This was seen as important internationally: “It is my strong belief that children need to develop good oral healthcare behaviours early. These habits follow them throughout their lives. Education must begin with the parents. Many different societies, cultures have various belief systems about oral healthcare for children and adults. Through education we can help dispel any outdated beliefs.”

Cost effectiveness was a consideration in the rankings, this was something that cut across conditions and interventions. “The cost effectiveness of educating carers about oral health and developing early positive oral health habits is important.” commented one panel member, and there was a sense that preventive measures were more cost-effective: “Guidance for clinicians on the best preventive measure would be valuable - particularly from a cost-effective point of view.” and “Preventive procedures save more on costs and suffering than therapeutic ones. Using sealants or fluoride varnishes seem very common and [they] are expensive.” One panellist believed strongly that cost-effectiveness and behavioural interventions were the key: “Affordability and health behaviour should be first

addressed. If these two areas are taken care [of], the next steps such as prevention and treatment become easier."

Exploring the links between general health and oral health, or the importance of improving oral health for co-morbidities such as heart disease and diabetes was another key area for the panel. "Heart attacks and strokes are major debilitating illnesses, and many are also unaware of the potential link to gum disease. This could benefit a large number of people significantly." was the response of one panellist. The improvement of outcomes in pregnancy was also significant: "Studies as to the correlation of the body and births and how these can also be affected by gum disease would be great studies to further educate to patients how the oral health doesn't just pertain to the mouth. Oral health and body health are one [and] the same." Periodontal disease in particular was seen as something which has an impact on overall health: "The relationship between chronic systemic diseases and the periodontal disease need to be proven better." and "The systemic side effects of periodontal diseases have been reported, and should be thoroughly investigated. Periodontal diseases are most frequent oral diseases, and is important to consider them (or not, depending on the evidence) as those with systemic, heart risks, and to approach the treatment of periodontal diseases appropriately." One panellist felt that the Covid-19 pandemic was a reason to prioritise COH's review on oral hygiene interventions to prevent ventilator-associated pneumonia: "[The] Covid-19 problem reminds us how oral health is important to prevent severe lung inflammation." One member went further to maintain that there should be more cross-team working between healthcare professionals, and stated this was a reason for deciding that mouth care for cancer patients was the most important topic: "I believe dentistry and basic medical sciences should meet more in researches and clinical applications."

As with the comments on the new topic areas, support for vulnerable populations was a factor in choosing the important reviews to update. Underserved populations were mentioned by several panellists: "I chose the topics because they are more relevant to underserved populations (the majority of people from a global perspective) in order to prevent tooth decay and oral diseases." Policy makers in particular felt that serving vulnerable populations was an important function of their office. People with learning disabilities were seen as a group especially in need of help: "It is challenging to keep healthy the oral health of patients with the difficulty of learning. The update of such a review is welcome."

Only four panellists mentioned personal experience as a reason for choosing their prioritised updates, with most tending to take a broader view. One panellist had gum disease, and said that having experience of the disease both with himself and several family members, led him to believe that prevention and treatment of periodontitis was important. Another was a new parent, "interested in any interventions I can make." Two respondents ranked their topics based on their personal experience as dentists: "they are top concerns for me in my practice." Clinical relevance generally was an important factor in decision making for six of the panel members. Other reasons for prioritising topics which were mentioned less often by the panel included patient benefit and the need for early detection of disease to improve treatment options.

The results of the ranking of both new topic areas and updates were presented to the COH editorial base team in two reports (see Appendix B), along with comments from the panel members on why they thought their main priorities were particularly important. The findings and how these were implemented are further explored in Chapter Six.

5.4 Discussion: the mapping and ranking phase

Mapping and ranking the priority topics identified during the stakeholder consultation and information gathering phases of the research presented here highlighted which areas of COH's portfolio of reviews were most important, and also produced a manageable number of reviews for the group to undertake over the next funding cycle. Mapping the priority topics against the current portfolio underlined that caries prevention should be a major priority for the group. Of the nine titles which featured in all five priority setting projects, six were about preventing caries, either with fluoride or with sealants (see Table 13). But the process also revealed that some topics were being identified as high priority areas of uncertainty when there was clear evidence to answer the question. It may be that participants were choosing topics that they thought were important, rather than topics about which they had some uncertainty. Two out of the nine titles already had included evidence that was either high or moderate certainty that the intervention was effective. In total, seven of the fifty-eight existing Cochrane reviews identified as priorities before the ranking phase already had clear evidence to answer the question. Putting time and resource into updating these reviews could be considered research waste; there is an argument that time and effort should instead be devoted to changing perception that these topic areas

contain high levels of uncertainty. This may be done by promoting the results of the existing reviews more effectively. However, promoting a review that is some years out-of-date may also be problematic, as emerging evidence may change the results and clinicians may be less likely to trust evidence that is not up-to-date. This is a dilemma that should be addressed during the implementation phase.

One issue exposed by this examination of the level of certainty of the evidence that goes into Cochrane reviews, is how few of the existing COH reviews have this high or moderate certainty evidence. Ninety-six reviews had been published in the last five years, and of these, only ten in total (10%) had high or moderate certainty evidence underpinning the results. In 90% of COH reviews published in this time period, the available evidence from randomised controlled trials was insufficient to answer the review question. The limitations of primary research in dentistry have been noted in several studies (for example, Cioffi and Farella 2011, p.p. 40-41; Gianobile 2015, p.S6; Al-Namankany *et al* 2009, p. 323). A recent study by Saltaji *et al* (2017) found that although the quality of randomised controlled trials had improved over time, 40% of clinical trials in the oral health field were judged to be at risk of bias in the majority of risk of bias domains, they conclude: "in the trials of oral health interventions the methodology and reporting quality were substandard, resulting in a high potential for bias." (Saltaji *et al*, 2017). However, the picture is complex, as risk of bias is not the only reason why Cochrane may have downgraded the evidence and deemed it to be insufficient. GRADE has domains other than risk of bias by which the evidence is assessed, including imprecision, inconsistency, indirectness and publication bias (Siemieniuk and Guyatt, 2020). Nevertheless, it would seem that the evidence base in oral health may have some issues with the conduct and reporting of primary studies. The implications of this are important. Unless there is considerable improvement in the primary research base, Cochrane's efforts to identify and undertake priority reviews may be for nothing if the evidence that is included is insufficient to answer the question. It may be that Cochrane needs to work closely with those responsible for the funding and conduct of clinical trials in order to raise the certainty of the evidence in future years.

The limitations in the evidence base are of particular concern if one of the priorities is improving the health of vulnerable populations, who may be underserved by current healthcare services. It is true to say that the international panel who took part in the ranking phase thought that the provision of robust evidence for underserved populations was of a

very high priority. The top ranked new review topic was about preventing oral disease in the elderly, and another question in the top fifteen related to oral care provision for residents of nursing homes (see Table 18). There was also a review in the top thirty to be updated which concerned the oral health education of nursing home staff and residents (see Table 21). There was a general consensus amongst the panel that elderly populations were not currently well-served by the oral health evidence-base in general. People with intellectual disabilities were also prioritised, as were reviews about behavioural change and those which addressed the impact of oral health on overall health (such as *Periodontal therapy for the management of cardiovascular disease* and *Treating periodontal disease for preventing adverse birth outcomes in pregnant women*). As with all phases of this study, the main topics of caries prevention, oral cancer treatment and prevention and overall gingival health were the main areas addressed. Filling gaps in the guidance and ensuring topics remained clinically relevant, as well as tackling issues of oral care for the vulnerable were important to the panellists and should be prioritised by COH in the future. Forging links with both guideline developers and clinicians to ensure that the evidence produced is useful and relevant would seem to be important going forward.

The mapping and ranking phases involved some compromise and pragmatic decisions over how they were conducted. These are discussed below.

5.4.1 Mapping the results against Cochrane reviews: discussion

Mapping the results of the priority setting projects undertaken in this research project against the Cochrane reviews previously produced by COH was relatively straightforward; however there were some challenges. The main issue was the broad nature of some of the priority topics, which did not easily map onto Cochrane reviews. Cochrane's review portfolio has historically evolved over time. In the early days of the organisation, author teams were able to register a topic if they were knowledgeable and enthusiastic. The portfolio was not planned or systematically kept up-to-date. Therefore there are some reviews which are now out-of-date by a number of years, and others which overlap with each other. Cochrane reviews also tend to be specific: either in terms of the intervention (eg *Chlorhexidine mouthrinse for the adjunctive treatment of gingival health*) or the condition (eg *Interventions for the treatment of burning mouth syndrome*). The reviews which were more specific in terms of the intervention, combined with the broad nature of the priority topics, caused particular issues. For example, one of the priority questions was:

What is the best way to manage gum disease in individuals? This question potentially covers several Cochrane reviews, and covers both prevention and treatment. This means that a number of Cochrane reviews could be included as priority as they investigate different aspects of this question. A broad approach was taken with the mapping, and all reviews which could be potentially covered by the priority question were tagged as potential priorities. However, this approach may not be optimal. More investigation of the priority topics, to narrow the scope may have been warranted before attempting to map the topics onto existing Cochrane reviews.

Another issue with this phase of the project was the arbitrary nature of some of the decisions taken about how to include a question as a priority. Some subjectivity in priority setting is inevitable, as decisions have to be made around the parameters of the process. This is a disadvantage of not having a recognised, standard methodology for priority setting. As Khan *et al* (2019) comment: "the values or criteria that should be used to assess and prioritise research areas are not agreed across the range of groups conducting research prioritisation since these can be subjective." This is both a strength and a weakness of the current state of priority setting, in that it allows priority setting to be conducted according to context and organisational resource, but it also means that decisions taken on what constitutes a priority in that setting are not necessarily made objectively. In the case of this priority setting exercise, a pragmatic decision was made to only include topics as priorities and put them forward for ranking by the panel if they met certain criteria. Those criteria were to only put forward topics if they were featured in three or more of the priority setting projects (for existing topics) or two or more (for new topics). This was to ensure that the number of topics that the expert panel had to consider was manageable. However, different decisions could have been made at this stage. For example, there were nine existing topics that had featured in all five priority setting projects, and they could have been automatically be classed as priorities as a result, without involving the panel. Another option would have been to send all the priority topics to the panel regardless of how many of the projects had highlighted them. However, this would have meant that the panel had 164 existing titles to review, and 124 new topics. This was too many for them to consider and rank. A balance had to be struck between practicality and prioritising COH's whole scope. This meant that some compromises had to be made.

Another potential option that was not taken forward was the idea of introducing a weighting scheme at this point. It might be argued that of the five priority setting projects

undertaken in the information gathering phase and the stakeholder consultation phase to establish the priority topics for ranking, some were more important than others. For example, a scheme could have been established so that the topics highlighted in the stakeholder feedback survey carried more weight than the topics identified as important by looking at the metrics for downloaded and cited reviews. Or the gaps highlighted by guideline developers might be considered more important than whether there were likely to be clinical trials for inclusion. This is not unprecedented in priority setting. For example, the process undertaken by CADTH involved giving more weight to priority topics which impacted on burden of disease and clinical impact (Husereau *et al*, 2010, p. 344). Again, this would introduce more subjectivity into the process, as the question of which criteria are the most important in setting priorities would be a decision that would have to be made. For this reason, a weighting was not given to the priority topics before they were ranked by the panel.

Mapping the topics against COH reviews was an essential part of the research presented in this thesis, but different methods could have been utilised. However, the decisions taken were pragmatic and resulted in a manageable number of topics for the panel to rank.

5.4.2 Ranking the priorities: discussion

Priority setting often involves some form of ranking process, gathering data and ranking it in terms of importance. There are numerous examples in the literature (Rudan, *et al*, 2007, Rudan *et al*, 2008, Okello and Chongtrakul, 2000, Bryant, *et al,* 2014, Youngkong, Kapiriri and Baltussen, 2009), and it is an important part of the JLA PSPs (Crowe, *et al*, 2015). COH's priority setting made use of this method in order to establish a manageable portfolio of priority titles, by convening a panel to rank the priority topics.

Approaches to undertaking ranking have varied; but in many cases the Delphi method is preferred (Nyanchoka *et al,* 2019, p. 107). The Delphi is an attempt to reach consensus following two or more rounds of answering questions and discussion, which classically consists of an open series of questions in round one, followed by a more structured questionnaire in later rounds (Powell, 2002, p. 377). They are characterised by the involvement of subject experts, and are conducted anonymously to avoid issues with peer pressure, and bias in the process (Powell, 2002, p. 378). However, the 'classic' Delphi, as described above, does not seem to be a feature of most priority setting processes. For

example, the JLA PSPs often describe the final stage of the process as a Delphi (Cochrane Community Blog, 2017), when it does not follow many of the classic features described above. Although there is an attempt to reach consensus in the final ranking workshop, these are undertaken face-to-face, without the anonymity required by the 'classic' model. Unless carefully facilitated, there is a risk therefore that the final ranking may be influenced by the 'loudest voices in the room' rather than a true consensus.

Elliott *et al* (2016) attempted to reintroduce the required anonymity by conducting their priority setting as an entirely online exercise. This is the approach taken in the research documented in this thesis. The ranking exercise could therefore be entirely anonymous, and could also involve an international panel at low cost. However, the ranking exercise was limited by the software available and mandated by University of Manchester policies, and the resources of COH, which did not allow the purchase of expensive software packages. It was therefore not possible to conduct a 'consensus' style Delphi, and keep anonymity and an international element by conducting it entirely online. A balance had to be struck between keeping the classic elements of the Delphi and ensuring that the needs of an international stakeholder group were met. The process therefore became more of a metrics-based, ranking exercise than a true Delphi, as it was important to make sure that the resulting rankings reflected the nature of Cochrane's global audience, which would be difficult and expensive to achieve in a face-to-face meeting.

There are advantages and disadvantages to conducting a ranking exercise online. As Elliott *et al* (2016) found, an online only exercise can be less satisfying for the participants and may lead to very different results than a face-to-face meeting. It also affords less opportunity to build rapport with the panellists, and to educate them on the nature of a systematic review. Madden and Morley (2016) have highlighted the importance of educating participants in priority setting, particularly in terms of what constitutes an uncertainty, and commented that the outputs can often be questions which are not suitable for research. In COH's context, this could mean questions which are not suitable for a Cochrane review were suggested. For example, the panel were asked if they had questions to put forward that were not addressed elsewhere, and the following was suggested: "Bridging the gaps between medicine and dentistry. Why are these two segregated the way they are right now? For purely historical reasons? Are patients, particularly complex cases with interdisciplinary conditions being harmed by this necessary divide?". These are interesting questions for research, however, they are not the kind of question that COH

systematic reviews are designed to address. Providing more opportunity to educate the panel on the nature of COH reviews may have led to different results, both in the ranking and the suggested questions.

The other important feature of the 'classic' Delphi is that the participants are able to discuss, with anonymity intact, the issues before they are ranked. Participants have access to one another's answers and feedback is given to them between rounds. Panellists are able to change their minds about their conclusions at any point (Powell, 2002, p. 379). This is how the true consensus of "aggregate[d] expert opinions on future developments and incidents" (von der Gracht, 2012, p. 1525) is reached. As a series of rounds was not possible to facilitate in COH's priority setting due to constraints imposed by the software, this "true consensus" was not attempted. Instead, the rankings were aggregated and given a numerical value. This was a compromise, and it would have been interesting to explore the process of the decision making more fully in a 'classic' Delphi scenario.

The final issue that must be addressed is the non-progression of some potential priority topics. These were either not progressed because they did not feature in enough of the priority setting projects, or because they were not ranked highly enough by the panel members. Although not progressed for this priority setting process, they are still questions of importance that should be addressed in future research. It may be possible to preserve and publish these questions so that they can be accessed by other researchers who are looking to undertake non-Cochrane systematic reviews. These questions should also be carefully considered the next time COH undergoes a priority setting exercise, in five years' time.

The ranking part of the priority setting process was therefore pragmatic, and had some methodological and resource barriers which were difficult to overcome. However, it achieved the twin aims of involving an international panel which included both consumer representation and representation from lower and middle income countries, and producing a manageable number of priority new topics and Cochrane review updates.

5.5 Conclusion

The mapping of the priority topics established in other phases of this study against COH's reviews provided a valuable starting point for looking for the gaps in COH's portfolio, and

signposted which reviews it was important to update during the next funding cycle. A manageable number of topics was established for ranking purposes. An international panel was convened with both consumer representation, and represented from lower / middle income countries. This panel produced the final set of priority topics. Although the methodologies for both parts of this process could have been more robust, compromises had to be made to suit both the resources available and the involvement of stakeholders across the world. The end result was fifteen priority topics for new COH reviews, and thirty priority updates. These must now be implemented by COH, and the process for implementation is discussed in Chapter Six.

Chapter Six: Implementation phase

6.1 Introduction

The prioritisation process undertaken for this research project has supplied COH with thirty existing review titles to be updated over the next three years, and fifteen potential new topics to be explored. These must now be implemented within the group's workflow in order to ensure that the priority topics are undertaken over the next three years. The importance of implementing the results of priority setting processes has been emphasised both in Viergever *et al*'s (2010) best practice guidance, and in the guidance provided by Cochrane (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019). Viergever *et al* (2010) say that "translating priorities to actual research should be planned. Who will implement the results of the prioritisation, and how?". The Cochrane guidance makes clear that implementation should be documented: "Document the implementation of the priority-setting process and make it available on the individual Group, Network or Field website" (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019).

Despite this emphasis, the implementation and evaluation of priority setting is rarely reported in the literature (Angell *et al*, 2016, p. 1389) and the risk of this is that priority setting becomes a process where the end result is a set of priority research projects that never get to completion. Hall *et al* (2018, p. 451) surveyed 100 researchers working in priority-setting and found that their greatest concern was addressing the issue of whether priority-setting frameworks lead to actual change. Angell *et al* (2016, p. 1390) undertook a similar survey of 18 leading researchers in the field. They found that priority setting exercises were roughly split between those where the recommendations were acted upon, those where they were not acted upon and those where it was unclear. They comment: "Features identified as facilitating successful implementation of priority-setting recommendations included having a climate ready to accept priority-setting, good leadership or a 'champion' for the priority-setting process and having a health economist to guide the process" (Angell, *et al*, p. 1389). Their conclusion was that there is often no transparency in the implementation process and no clear methodology for achieving success (Angell *et al*, 2016, pp. 1392-1393). It was therefore important to have a clear and transparent process for implementing the priorities established and to build this into the priority-setting process at COH. This was done by creating an implementation plan based on decisions guided by information supplied by an existing tool, to ensure that there was a

clear decision on what action to take for each priority topic. The tool used was the SPARK checklist, developed by the Center for Systematic Reviews on Health Policy and Systems Research (SPARK) (Akl *et al*, 2017a).

6.2 Methods

The priority-setting implementation plan was developed over the course of meetings involving the core staff of COH's editorial base: the Co-ordinating Editors, the Deputy Co-ordinating Editor, the Emeritus Co-ordinating Editor, the Managing Editors, the Information Specialist (the author of this thesis) and the Senior Statistical Editor. In order to ensure that the implementation mechanisms were robust, information was provided to the editorial team in two reports created with reference to the SPARK tool, developed by Akl *et al* (2017a). Both reports were developed by the author of this research project, and all of the data analysis in the reports from the application of the SPARK tool was undertaken by her working alone. The purpose of the reports was to provide a guide to decision-making on how to implement the priority topics. The SPARK tool is an instrument developed particularly for use in priority setting for systematic reviews, designed to optimise the allocation of resources. The tool was constructed using a standard approach (Akl, *et al*, 2017a), and was tested for validity. The full tool consists of 22 items, divided into two modules. The first module is relevant only to policy makers and stakeholders and was not used in this research project, however the second module is particularly pertinent for implementing priorities in a Cochrane setting as it is "relevant to systematic review teams" (Akl, *et al*, 2017a). There are nine items in the second module, and these have been used when forming the reports to guide implementation planning.

Given the challenges to dentistry posed by the Covid-19 pandemic, one question was added to the SPARK tool, to consider whether the question was still a relevant question in the post-pandemic era. For example, if the intervention in the question could contribute to aerosol-generation within a dental practice, this was noted. If the question was more pertinent as a result of the pandemic (for example, it involved an intervention that could be applied in a home environment rather than a dental clinic) this was also noted.

The two reports were produced and shared with the COH editorial base team prior to the implementation meetings. The reports were based on the elements in the SPARK tool (see Appendix B). The nine elements of the SPARK tool, plus the extra element taking into

account the Covid-19 pandemic, are now considered in more detail, along with how they specifically relate to this project and how they informed the implementation plan.

6.2.1 The question can be translated into an answerable systematic review question

In order to undertake a systematic review, the question has to be clearly defined and follow a specified format (Akl, *et al*, 2017b). For Cochrane intervention reviews, this is normally the PICO format, outlined in Chapter Three, Section 3.2.3. Akl *et al* (2017b) recommend that in order for the question to be viable, the population of interest should be able to be identified, and that target outcomes can be identified. For any existing Cochrane reviews that are highlighted as priority areas, this work has already been undertaken. However, this is a consideration for potential new systematic reviews, and the priority topics must be able to be presented in PICO format, or similar. The viability of each of the fifteen new review topics was therefore examined in turn to determine if they could be an answerable question for a systematic review.

6.2.2 There are no available or adequate systematic reviews on this question

As part of priority setting is to ensure that duplication of effort and research waste are minimised (Chalmers *et al*, 2014, p. 158), Akl *et al* (2017b) advocate that a search for existing reviews should be undertaken "to identify existing systematic reviews that are relevant, of good quality and current." If there is an existing adequate review that is up-to-date, a Cochrane review may not be needed in the near future. Instead, COH could promote the non-Cochrane review as an alternative.

For both new and existing review topics, a search was undertaken on the MEDLINE database in July 2020 to identify any systematic reviews conducted in the last three years which cover the same ground and answer the same question as the priority topic. At this stage, a search of PROSPERO, a database for registering protocols for systematic reviews in progress was also considered. PROSPERO is based at the University of York in the UK, and exists primarily to prevent research waste by keeping a searchable record of systematic reviews, rapid reviews and umbrella reviews so that researchers can check that a review in a particular topic area is not already underway before starting their own (PROSPERO, 2021). However, it is difficult to determine the quality of a systematic review from a protocol, and so assessing the adequacy of the review was not feasible. The search was therefore restricted to MEDLINE only.

For Cochrane reviews that already exist but may be priority updates, the MEDLINE search was limited to the last time the review was published, if it was within the last three years. The three year cut-off was chosen because the JLA use this to determine whether there is uncertainty in a question: "An uncertainty is judged to exist when "no up-to-date (three years), relevant and reliable systematic reviews of research evidence addressing the uncertainty about the effects of treatment exist" (Crowe, *et al*, 2015). It is important at this stage to also address the question of "adequate" reviews. The availability of a review does not mean that the review is high quality and that a Cochrane review cannot add value. Any reviews found were therefore assessed for quality using the A MeaSurement Tool to Assess systematic Reviews (AMSTAR) checklist (Shea, *et al*, 2017). The purpose of AMSTAR is to "assist decision makers in the identification of high quality systematic reviews, including those based on non-randomised studies of healthcare interventions" (Shea, *et al*, 2017). The checklist can be applied to any systematic reviews of interventions, and consists of 16 domains examining whether appropriate statistical methods have been applied for pooling data, whether risk of bias of included studies has been assessed, the comprehensiveness of the literature search, and issues in the reporting of the review such as the establishment of a protocol and the declaration of conflicts of interest.

The checklist was applied to each of the systematic reviews found by the search to determine whether a Cochrane review could add value to the priority topic, or whether the existing non-Cochrane review was of sufficient quality. If the existing non-Cochrane review was high quality, conducting a Cochrane review could be seen as research waste, and it was important to share that information with the COH editorial base team.

6.2.3 Primary studies are available for inclusion in the systematic review

Establishing whether the team are aware of primary studies that may be relevant, or whether a search has revealed that there may be a study for inclusion is Akl *et al*'s (2017b) third signal that a priority review may or may not be a priority. This work has already been undertaken as part of the priority setting process (see Chapter Three, Section 3.3.3). However, it is possible that some new or existing review titles have made it this far in the process without a clear indication that there are clinical trials to include, since topics did not have to feature in all of the priority setting projects in order to go to the final ranking stage (see Chapter Five, Section 5.3). Therefore any titles (new or existing) which did not

feature in the review of developments in the evidence base underwent a more robust search for clinical trials that may be eligible for inclusion via the MEDLINE database. If there were no trials or primary studies suitable to include, then COH's editorial base team may still decide that the topic has merit to be included as a priority as an "empty" review. Empty systematic reviews contain no studies, however they may still carry some importance as indicators that there is a need for high quality research and act as a driver for funding to carry out clinical trials (Schlosser and Sigafoos, 2009, p. 3). The results of these searches were shared with COH's editorial base team.

6.2.4 There is adequate human capacity to undertake the systematic review

Akl *et al*'s (2017b) recommendation is that the types of expertise needed for the review should be considered. If the review requires skill in particular areas, such as specialist statistical help, is there personnel available to undertake it? If it is not available, can it be "built, recruited or commissioned?" (Akl *et al*, 2017b). This is a particular issue for Cochrane review groups, as there is a general reliance on volunteers, with only selected roles within the editorial team being salaried. The availability of review teams with capacity, time and skills is an ongoing problem. How the review group might recruit teams to undertake new or existing titles is an important consideration.

6.2.5 There is adequate operational/management capacity to undertake the systematic review

Adequate operational and managerial capacity before undertaking systematic reviews is advocated by Akl *et al* (2017b). This may not be a significant issue for COH, as the group has secured funding from the National Institute of Health Research for at least three years. This ensures operational capacity. Limits have been set out in COH's report to the funding body to make sure that the group does not overreach and the priority setting process has operated within these limits. The group has committed to undertake 15 new reviews and 30 updates under the period covered by this priority setting process. However, there are some topics that may require more managerial input than others, for example, if the topic requires more work to scope out particular aspects of the question. This was considered important to factor into the process of implementing the priority topics.

6.2.6 The systematic review is feasible within the expected timeframe

Akl *et al* (2017b) have emphasised the importance of a clear and well-defined timeframe, with the capacity for the team to meet that timeframe. According to the *Cochrane Handbook of Systematic Reviews of Interventions* (Cochrane Community, 2021c), the timeframe for completion and submission varies from review to review. Current practice at COH is to aim to publish the protocol for a review within 6-9 months, and complete the review 12-18 months after the protocol is published. The identified topic areas should be examined to ensure that this is feasible. If the topic covers new ground for COH, or is clinically or methodologically complex, then it may take longer to complete.

6.2.7 Conducting the systematic review contributes to sustainable capacity to conduct future reviews

Capacity building is an important part of Cochrane's remit, and this is recognised by Akl *et al* (2017b) in point seven, in which they ask whether the review requires training in new specific skills that the team needs for future work? In terms of COH, this is important to establish for new topic areas identified through this priority setting process. The new titles in particular were considered with this in mind at the implementation stage.

6.2.8 Conducting the systematic review does not raise any ethical concerns

The questions "Are there any ethical implications for conducting this review?" and "Does conducting this review comply with social norms and ethical principles?" are highlighted by Akl *et al* (2017b) as crucial in signalling the concerns that might be raised by conducting a systematic review. Ethical concerns could be around the topic itself, or around the review team undertaking the review. Addressing ethical concerns has been a key part of Cochrane's work in the last few years, culminating in a new Cochrane *Conflict of Interest Policy* in 2020 (Cochrane Training, 2020b). The four key elements to the new policy are independence, freedom from interference, reassurance and transparency. Cochrane reviews should be independent from commercial sponsorship, and produced by those who are free from conflicts arising from such sponsorship. Users of Cochrane evidence need to be able to trust the evidence, and any conflicts of interest arising need to be declared (Cochrane Training, 2020b). The priority titles were examined to see if there was potential for ethical concerns. Was the topic area likely to engage interest from commercial sponsors, meaning that COH would need to be more careful that the author team were free of conflicts of interest? At this stage, the questions were also examined to

see if the topic area was likely to attract controversy, and whether non-financial conflicts of interest might be an issue. In terms of non-financial conflicts, Cochrane states that: "All those involved in the production of Cochrane Library content should think critically about how their perspectives, experiences, and positions have shaped their contribution to the development of the content" (Cochrane Training, 2020b). This could include "any affiliation to an organisation (including not-for-profit) that has declared an ideological or political opinion relevant to the topic of the Cochrane Library content" (Cochrane Training, 2020b).

6.2.9 The question is relevant to lower and middle income country contexts

One of the questions posed by Akl *et al* (2017b) is whether undertaking the review is a social responsibility. All of COH reviews are designed to improve oral health by summarising the evidence on diagnosing, preventing or treating oral disease, so in that sense, all the reviews represent a responsibility to the health and well-being of society. However, in terms of Cochrane reviews, an important aspect of social responsibility is the impact of the work done by Cochrane in lower and middle income countries. This is a key part of Cochrane's strategic plan (Cochrane, 2015). Nasser *et al* (2013b, p. 514) have emphasised the need to turn on an 'equity lens' to focus priority setting on contexts which may be resource-poor. The question around social responsibility was therefore adapted to ensure that the question was relevant to lower and middle income country contexts so that this aspect of social responsibility was not neglected in considering implementation.

The focus in coming to a decision on a priority topic's relevance to lower and lower middle income countries was on an estimation of the potential economic cost of the interventions explored in the review, and whether the intervention required access to primary dental care. An article in *The Lancet* claimed that: "In middle-income countries the burden of oral diseases is considerable, but oral care systems are often underdeveloped and unaffordable to the majority. In low-income countries the current situation is most bleak, with even basic dental care unavailable and most disease remaining untreated." (Anonymous, The India saga¸ 2019). Masood *et al* (2015) analysed data from the WHO World Health Survey, and found that 7% of households in low or lower middle income countries had faced a catastrophic dental health expenditure (CDHE) within the previous four weeks. A CDHE is classified as an expense which costs over 40% of household income, meaning that the household is not able to afford basic necessities if it is to meet the cost (Masood *et*

al, 2015). Aside from costs, access to dental services is an ongoing issue. There is one dentist per 150,000 people on average in low-income countries, and 1 per 13,000 in middle income countries (Rohde-Copenhagen, 2020). Interventions which concentrate on preventive measures or oral health education and health promotion may therefore be more important in this context. There are also differences between higher and lower income countries in terms of the burden of disease, and which conditions might be more prevalent in some parts of the world. For example, oral cancer is more prevalent in Asia-Pacific countries, where it ranks in the top three types of cancer in terms of incidence (World Health Organisation, 2020c). The three issues considered for this checklist item were therefore: is the intervention affordable; does it require access to professional dental services which may not be available; or does it pertain to a condition that has high incidence in lower and middle income countries? Each priority topic was examined with these questions in mind.

6.2.10 The question is still timely post-Covid-19 pandemic

An additional question was added to the SPARK tool, and was 'asked of' the priority topics, primarily to understand whether the review was more or less important as a result of restrictions on access to primary care services and the limitations imposed by the need to reduce aerosol generating procedures caused by the Covid-19 pandemic. If the question was around an intervention that may no longer be possible, or possible only with caveats, this was noted. If a question looked at an intervention in the home setting with no contact with professional dental care, this could be more of priority than in previous years.

These nine items from the SPARK checklist were considered for each of the new fifteen priority topics, and seven of them were considered for the thirty existing priority reviews which may need updating. The two items: *The question can be translated into an answerable systematic review question* and *Conducting the systematic review contributes to sustainable capacity to conduct future reviews* were only looked at for new reviews, as work on both these items had already been undertaken for existing reviews when they were originally registered with COH. The question of relevancy post-Covid-19 was asked as the final checklist item for all forty-five priority topics.

6.3 Results

The results of the application of the SPARK tool to COH's ranked priorities are presented below. This information was provided to COH's editorial base team to guide their decision making on how to implement the priority topics. Two reports were produced (see Appendix B), one on new topics and one on existing reviews. The meetings with the COH's editorial base team were held in Autumn 2020 to discuss the priority setting outcomes, and to plan the workload over the next three years.

6.3.1 The question can be translated into an answerable systematic review question

The question of whether the priority topic could be translated into an answerable question for a Cochrane systematic review was only considered for new review topics, as existing reviews were already established. Of the fifteen new priority titles, four were already registered titles with COH, which would become new reviews on publication*: Interventions for managing root caries, Topical silver diamine fluoride for managing dental caries in children and adults, Psychological interventions for improving adherence to oral hygiene instructions in adults with periodontal diseases* and *Adjunctive systemic antimicrobials for the non-surgical treatment of chronic and aggressive periodontitis*. No further action was needed on these titles to turn them into priority questions.

Four topic areas had much overlap with existing COH reviews. *At what stage of tooth decay should a dentist use a drill?, What are the best ways to prevent tooth decay and oral disease in the elderly?, How can oral cancer be prevented?* and *What is the best way to promote better oral health?* are all broad topics, and many of COH's existing reviews already partially answer these questions. In the case of oral care for the elderly for instance, there are many Cochrane reviews covering prevention of tooth decay in adults that do not exclude elderly patients, and some which specifically address the concerns of elderly patients. Some of the remaining topic areas had less overlap but were still very broad, and lacked the focus necessary to turn them into an answerable systematic review question. The questions included here were: *By changing parental, or primary care-giver behaviours, can tooth decay in children be prevented?, Does a better diet or diet supplements improve oral health? If so what are the best foods/nutrients/supplements?* and *What role does technology play in providing dental care?*. More work was needed on these titles to scope them out and understand which elements of the question had already

been considered in COH's existing reviews before they could be registered as a new systematic review.

The final three were easier to implement as answerable questions, as they were narrower and more straightforward questions: *What is the best way to measure the risk of tooth decay?, How should I brush my teeth? For how long, and how often?* and *Can taking probiotics (live bacteria and yeasts) prevent and control chronic gum disease (periodontitis)?* were all judged to be viable systematic review titles.

6.3.2 There are no available or adequate systematic reviews on this question

A search was undertaken for each of the 45 priority topics, to see if there was an adequate systematic review available, that had been either published in the last three years, or since the last time the Cochrane review was published, whichever was sooner. In the case of the fifteen new priority topics, only six of the fifteen had been published as an up-to-date non-Cochrane review. This is partly because the very broad nature of some of the new topics areas meant that it was not possible to frame a research question without further work. More scoping out of the topic areas was necessary before looking at whether an adequate systematic review was available. In addition, some of the systematic reviews identified only covered part of the question, for example, the priority new topic *What are the best ways to prevent oral diseases in the elderly living in nursing homes or other institutions?*. There were no available, up-to-date reviews looking at the whole of this question, but there were some looking at individual interventions such as mouthrinses, or tooth cleaning by a dental professional.

In the case of the following new topics: *What is the best way to promote better oral health?*, *Can "silver diamine fluoride" prevent or treat tooth decay?*, *Can antibiotics be used, instead of surgery, to treat chronic gum disease (periodontitis)?* and *Can changing dental health habits or behaviour help people with gum disease?*, there was at least one up-to-date systematic review to take into consideration. *Can taking probiotics (live bacteria and yeasts) prevent and control chronic gum disease (periodontitis)?* and *What is the best way to measure the risk of tooth decay?* both had two available reviews.

Nine out of thirty of the existing review topics had an available non-Cochrane review on the same topic, published either since the last time the Cochrane review was published, or

within the last three years. *Oral hygiene interventions for people with intellectual disabilities*, and *Interventions for the treatment of oral and oropharyngeal cancers: surgical treatment* both had two available up-to-date reviews. *Interventions with pregnant women and new mothers for preventing caries in children*, *Enamel matrix derivative (Emdogain®) for periodontal tissue regeneration in intrabony defects, School dental screening programmes for oral health*, *Systemic antibiotics for symptomatic apical periodontitis and acute apical abscess in adults*, *Autologous platelet concentrates for treating periodontal infrabony defects* and *Primary school-based behavioural interventions for preventing caries* all had one available review.

A total of 18 available, up-to-date non-Cochrane systematic reviews were found overall across the 45 new or existing priority questions. These were then assessed for quality using the AMSTAR checklist. The checklist has either sixteen or thirteen domains, depending on whether a meta-analysis was conducted during the review process. Thirteen of the available reviews included a meta-analysis and were scored out of sixteen on the AMSTAR checklist, the other five were scored out of thirteen. All of the 18 reviews were scored as low quality, with twelve of these assessed as critically low quality, because of issues in their conduct or reporting. The most common issues with the conduct of the reviews which included a meta-analysis was the failure to assess the impact of risk of bias on the results of the meta-analysis, and the lack of reporting of funding sources of the included studies. Other issues included the lack of a protocol establishing the review methods prior to undertaking the review, lack of clarity over excluded studies and the reasons for excluding them, and not using appropriate methods for meta-analysis. Where the studies included in the review contained heterogeneity, this was often not explained or examined adequately. Full details of the AMSTAR analysis can be found in Table 22 and Table 23. An X was placed in the corresponding column if the systematic review met the AMSTAR checklist criteria.

Table 22: AMSTAR assessment of identified priority reviews including a meta-analysis

Question (N=new title, E=existing title, no.=priority rank)	N4	N12	N14	N15	E7	E11	E11	E15	E18	E18	E19	E20	E26	
Systematic reviews*	Kirthiga, *et al*, 2019	Oliveira, *et al*, 2019	McGowan, *et al*, 2018	Ikram, *et al*, 2018	Xiao, *et al*, 2019	Zhou, *et al*, 2019	McGrath, *et al*, 2019	Zhou, *et al*, 2018	Best, *et al*, 2019	Ding, *et al*, 2019	Sanjeevan, *et al*, 2019	Tampi, *et al*, 2019	Panda, *et al*, 2019	
1. Did the research questions and inclusion criteria for the review include the components of PICO?	X	X		X	X	X	X		X			X	X	9
2. Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?	X	X	X			X							X	5
3. Did the review authors explain their selection of the study designs for inclusion in the review?	X													1
4. Did the review authors use a comprehensive literature search strategy?		X						X	X			X	X	5
5. Did the review authors perform study selection in duplicate?	X	X	X	X	X	X	X		X		X	X	X	11
6. Did the review authors perform data extraction in duplicate?	X		X	X				X	X	X	X	X	X	9
7. Did the review authors provide a list of excluded studies and justify the exclusions?			X		X							X	X	4
8. Did the review authors describe the included studies in adequate detail?				X	X	X		X	X		X	X		7

9. Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?	X	X	X	X	X	X	X	X	X	X	X	X	X	13
10. Did the review authors report on the sources of funding for the studies included in the review?												X		1
11. If meta-analysis was performed did the review authors use appropriate methods for statistical combination of results?							X		X					2
12. If meta-analysis was performed, did the review authors assess the potential impact of RoB in individual studies on the results of the meta-analysis or other evidence synthesis?								X						1
13. Did the review authors account for RoB in individual studies when interpreting/ discussing the results of the review?				X		X	X	X				X		5
14. Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?								X	X	X				3
15. If they performed quantitative synthesis did the review authors carry out an adequate investigation of publication bias (small study bias) and discuss its likely impact on the results of the review?			X					X		X	X	X		5
16. Did the review authors report any potential sources of conflict of interest, including any funding they received for conducting the review?		X	X		X	X	X	X		X	X	X	X	10
	6	6	7	6	6	7	6	9	8	5	6	11	8	
	Critically low quality	Critically low quality	Critically low quality	Critically low quality	Critically low quality	Critically low quality	Critically low quality	Low quality	Low quality	Critically low quality	Critically low quality	Low quality	Low quality	

KEY:

QUESTIONS:	
N4	What is the best way to measure the risk of tooth decay?
N12	Topical silver diamine fluoride for managing dental caries in children and adults
N14	Adjunctive systemic antimicrobials for the non-surgical treatment of chronic and aggressive periodontitis
N15	Can taking probiotics (live bacteria and yeasts) prevent and control chronic gum disease (periodontitis)?
E7	Interventions with pregnant women and new mothers for preventing caries in children
E11	Oral hygiene interventions for people with intellectual disabilities
E15	Enamel matrix derivative (Emdogain®) for periodontal tissue regeneration in intrabony defects
E18	Interventions for the treatment of oral and oropharyngeal cancers: surgical treatment
E19	School dental screening programmes for oral health
E20	Systemic antibiotics for symptomatic apical periodontitis and acute apical abscess in adults
E26	Autologous platelet concentrates for treating periodontal infrabony defects
*Full references to the systematic reviews that were analysed are available in Appendix G.	

Table 23: AMSTAR assessment of identified priority reviews with no meta-analysis

Question (N=new title, E=existing title, no.=priority rank)	N3	N4	N13	N15	E10	
Systematic review	Ghaffri, *et al*, 2018	Cagetti, *et al*, 2018	Jarvinen, *et al*, 2018	Vives- Solar, *et al*, 2020	Geetha Priya, *et al*, 2019	
1. Did the research questions and inclusion criteria for the review include the components of PICO?	X					1
2. Did the report of the review contain an explicit statement that the review methods were established prior to the conduct of the review and did the report justify any significant deviations from the protocol?		X				1
3. Did the review authors explain their selection of the study designs for inclusion in the review?		X				1
4. Did the review authors use a comprehensive literature search strategy?		X				1
5. Did the review authors perform study selection in duplicate?	X	X	X	X	X	5
6. Did the review authors perform data extraction in duplicate?		X		X	X	3
7. Did the review authors provide a list of excluded studies and justify the exclusions?		X				1

8. Did the review authors describe the included studies in adequate detail?			X	X		2
9. Did the review authors use a satisfactory technique for assessing the risk of bias (RoB) in individual studies that were included in the review?		X	X	X	X	4
10. Did the review authors report on the sources of funding for the studies included in the review?				X		1
11. Did the review authors account for RoB in individual studies when interpreting/ discussing the results of the review?					X	1
12. Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?						0
13. Did the review authors report any potential sources of conflict of interest, including any funding they received for conducting the review?	X		X	X	X	4
	3	7	4	6	5	
	Critically low quality	Low quality	Critically low quality	Critically low quality	Low quality	

KEY:

QUESTIONS:	
N3	What is the best way to promote better oral health?
N4	What is the best way to measure the risk of tooth decay?
N13	Psychological interventions for improving adherence to oral hygiene instructions in adults with periodontal diseases
N15	Can taking probiotics (live bacteria and yeasts) prevent and control chronic gum disease (periodontitis)?
E10	Primary school-based behavioural interventions for preventing caries
*Full references to the systematic reviews that were analysed are available in Appendix G.	

The conclusion was that the non-Cochrane reviews identified had omissions and shortcomings with both reporting and conduct, and a new Cochrane review or update could be justified for each priority topic.

6.3.3 Primary studies are available for inclusion in the systematic review

In all but one case in terms of new topic areas, there were primary studies to include in the review. However, again these primary studies often only covered one defined aspect of the question because of the broad nature of the topic area. Until the topics are scoped out more thoroughly, it is difficult to say whether or not there are primary studies available. However, the existence of primary studies may help to guide this work. For example, in terms of the top ranked question: *What are the best ways to prevent tooth decay and oral disease in the elderly?*, the randomized controlled trials that exist are primarily around oral health programmes (sometimes in specific populations, eg elderly people with dementia, or elderly people recovering from stroke). It may be that a review directed towards assessing the effectiveness of programmes such as these would be more likely to have included studies and a volume of research than one on a specific pharmacological intervention (such as mouthrinses).

No existing primary studies were identified for only one of the new topics (*At what stage of tooth decay should a dentist use a drill?*). However, there are elements of this question which feature in other Cochrane reviews, looking at micro-invasive dentistry, for example. It may be that a more thorough search, with a rephrased question, could yield some studies.

In terms of existing titles, highlighted as priorities for updating, there were no new primary studies to include in five of the reviews: *Surgical removal versus retention for the management of asymptomatic disease-free impacted wisdom teeth*, *Screening programmes for the early detection and prevention of oral cancer*, *School dental screening programmes for oral health*, *Systemic antibiotics for symptomatic apical periodontitis and acute apical abscess in adults* and *Fluoride toothpastes of different concentrations for preventing dental caries*. In four of these cases, the review had been last published within two years so it may be too soon to update these reviews. These reviews may be pushed back to the tail-end of the funding cycle for updating, to allow a longer period for any ongoing studies to report results. In one case, (*Screening programmes for the early detection and prevention of oral*

cancer) the review was much older, a seven year old review at the time of the search for this research project. However, the review currently includes only one study, and so is clearly an underserved area in terms of primary research. *Surgical removal versus retention for the management of asymptomatic disease-free impacted wisdom teeth* and *Systemic antibiotics for symptomatic apical periodontitis and acute apical abscess in adults* each only include two primary studies, suggesting that these priority areas may also not be receiving enough attention from research funders.

6.3.4 There is adequate human capacity to undertake the systematic review

COH reviews are generally undertaken by volunteers, although the editorial base team also act as authors on some of the group's portfolio of reviews. Finding out if there is adequate human capacity to conduct the review is therefore about whether there is a team of volunteer authors already in place with the capability of conducting the reviews, or whether a new team would have to be recruited.

In the case of the fifteen new titles, four of these were already registered with the group and teams were recruited and working on the reviews. For the other eleven priority areas, new teams would need to be recruited. All of the existing thirty titles had previously had teams working on them, but some of these reviews were published some time ago and it was not clear that the existing teams would want to update the reviews. In one third of cases, there was a team in place either already working on an update, or the review had been published recently enough that the team would probably want to continue. For the other twenty existing titles, the teams would have to be contacted to see if they were interested in working on an update, or whether a new team would have to be recruited to complete the work. Recruitment of experienced author teams remains an ongoing issue.

6.3.5 There is adequate operation/management capacity to undertake the systematic review

Four of the fifteen new titles, and twenty-five of the thirty updates were fairly standard reviews which had no features that might require more operational or managerial resources. The other eleven would need more resource primarily in terms of recruiting author teams and scoping out the exact interventions under study. One of the topics (What is the best way to measure the risk of tooth decay?) would also be a new type of review for

COH, so may require sourcing and undertaking training both of the author team and the editorial team in a different type of study design.

For the priority titles that already existed as Cochrane reviews and need updating, all but five did not present any issues in terms of operational capacity. *Clinical assessment to screen for the detection of oral cavity cancer and potentially malignant disorders in apparently healthy adults* is a diagnostic test accuracy review, and this type of review involves more complex methods. It also involves further processing by Cochrane's central diagnostic test accuracy methods team, making it more complex to put through the editorial process than the standard intervention review. This review may require more managerial capacity as a result. *Water fluoridation for the prevention of dental caries* is another topic that may require more management. This review is broader than a standard Cochrane intervention review, as it contains study types other than randomised controlled trials. It is also an extremely controversial topic and may need further operational capacity to both process and promote this review. The other three titles which may require more managerial capacity were: *One topical fluoride versus another for preventing dental caries in children and adolescents*, *Combinations of topical fluoride (toothpastes, mouthrinses, gels, varnishes) versus single topical fluoride for preventing dental caries in children and adolescents* and *Topical fluoride (toothpastes, mouthrinses, gels or varnishes) for preventing dental caries in children and adolescents*. This is primarily because these three reviews are now significantly out-of-date. Cochrane methods continue to change and evolve, and older reviews often need substantial changes in order to bring them into line with current quality standards. It is often more appropriate to start a review from scratch, rather than attempt to update an existing review. This would involve considerably more management than updating an existing high quality review.

6.3.6 The systematic review is feasible within the expected timeframe

Thirty-six of the forty-five priority topic areas were judged to be feasible in the 12-24 month timeframe specified by COH. In terms of the existing titles for updating, the reviews which may take longer exactly mirrored those which would need more organisational capacity, as the reasons these reviews need more managing are the same as the reasons they may take longer to complete (the reviews are older and need starting again from scratch, the reviews encompass more types of study than randomised controlled trials or

the reviews were a different type of review than the standard intervention review, such as a diagnostic test accuracy review).

In terms of the new priority topics, three would need more scoping out to decide on specific questions before a decision can be made on whether it is possible to complete the review in the timeframe: *What are the best ways to prevent tooth decay and oral disease in the elderly?*, *How can oral cancer be prevented?* and *What role does technology play in providing dental care?. What is the best way to measure the risk of tooth decay?* is a different type of review for COH, and so would probably need more time to complete, including training members of the author and editorial team in new methods. The other eleven priority new topics were judged to be feasible in the standard timeframe of 12-24 months, once a review team was recruited and in place.

6.3.7 Conducting the systematic review contributes to sustainable capacity to conduct future reviews

Akl *et al* (2017b) frame this statement around whether the review requires training in new specific skills that the team needs for future work. This was established only in the case of one of the fifteen new titles: *What is the best way to measure the risk of tooth decay?*. COH has not undertaken a review on risk assessment tools before, and this may require some training for the team. This checklist item was not "asked of" the existing titles, as updating them would not require the team to acquire any new specific skills.

6.3.8 Conducting the systematic review does not raise any ethical concerns

Potential ethical concerns, either financial or non-financial, were identified in twenty of the forty-five priority topic areas. These were mainly concerns around interest from commercial sponsors, where reviews involved marketable products or pharmacological interventions. These included those topic areas looking at dietary supplements, different types of fluoride treatment, interdental cleaning products, types of toothpaste, electric toothbrushes, and specialist products used for the regeneration of tissue in the mouth. Fifteen of the priority topics fell into this category, four new topics and eleven title updates.

In five cases, the potential conflicts of interest were less obviously financial and the topic may be considered ethically complex because of non-financial conflict of interest, or

because the topic has specific features which may be contentious and lead to extra scrutiny in the review process. Three of the priority topics concerned antibiotics. Antibiotic resistance has been described by the World Health Organisation as “one of the biggest threats to global health, food security, and development today”, as over-exposure to antibiotics in medical treatments and in the food chain has led to some strains of infection becoming resistant to treatment (World Health Organisation, 2020b). Any reviews involving antibiotics as treatments therefore need a careful approach, balancing the benefits of potential effectiveness against the wider concerns with antibiotic resistance.

Two other very controversial topics in dentistry are the safety of dental amalgam used for filling teeth in many parts of the world, and the effectiveness of adding fluoride to the water supply to prevent dental caries. Both of these issues involve competing groups with strong views and so the reviews *Water fluoridation for the prevention of dental caries* and *Direct composite resin fillings versus amalgam fillings for permanent or adult posterior teeth* are likely to attract much interest. It is particularly important that the author teams undertaking these two reviews are free from conflict of interest, both financial and non-financial, and that adverse events and harms are thoroughly explored.

6.3.9 The question is relevant to lower and lower middle income country contexts

Thirty five of the forty five priority topics were judged to be still relevant if the lower and middle income country context was taken into account. Prevention of oral disease was emphasised throughout the priority setting process, and a high number of the topics concerned prevention rather than treatment of disease or diagnosis. For some questions, it was not a clear decision. For example, for the question: *What role does technology play in providing dental care?*, this could be relevant to lower and lower middle income country settings, depending on the aspect of the question explored. Expensive technology to treat or diagnose oral conditions may not be relevant here, but in places where access to primary health services is limited due to provision or geography, teledentistry may be very important to these communities. More work is needed to scope out the broader question before a definitive conclusion can be reached.

Some of the questions also involved expensive treatments which were not readily available in all parts of the world. For example*, Autologous platelet concentrates for treating periodontal infrabony defects* is a priority for updating, but it is unclear whether this

treatment is available in resource-poor settings. However, the majority of priority topics did still have relevance. Some of the topics, such as *Clinical assessment to screen for the detection of oral cavity cancer and potentially malignant disorders in apparently healthy adults* and *How can oral cancer be prevented?* have more relevance due to the high prevalence of this type of cancer in lower and lower middle income country contexts.

6.3.10 The question is still timely post-Covid-19 pandemic

Thirty-seven of the forty-five priority topics were still relevant, despite the Covid-19 pandemic and its impact on dental services. Again, this is because a high number were concerned with preventive measures, many of which could be administered at home (for example, *Home use of interdental cleaning devices, in addition to toothbrushing, for preventing and controlling periodontal diseases and dental caries*, or *Fluoride toothpastes of different concentrations for preventing dental caries*). Some reviews were more important to undertake as a result of the pandemic, for example, the priority update: *Oral hygiene care for critically ill patients to prevent ventilator-associated pneumonia*, which could potentially influence the protocols for patients in intensive care receiving mechanical ventilation.

The questions which did pose issues were those which involved access to primary dental services, or involved aerosol generating procedures. As scaling and polishing and drilling teeth involve aerosol generation, the reviews most impacted are those which look at periodontal therapies or caries treatment. *At what stage of tooth decay should a dentist use a drill?*, *Direct composite resin fillings versus amalgam fillings for permanent or adult posterior teeth*, and *Antibiotics for the prophylaxis of bacterial endocarditis in dentistry* are all priority questions concerned with invasive dental treatment or preparation for dental treatment, which may not be feasible until dental services resume fully. There were also five titles which concerned periodontal treatment, and access to treatment services which may not be as much of a priority as a result of the pandemic.

Using the SPARK tool as part of the implementation phase of the research documented in this thesis gave a neat summary of the feasibility of the priority topics for either new systematic reviews, or systematic review updates. A visualisation of the SPARK results is presented below in Table 24 and Table 25. Some of the topics appeared to be more viable than others, and the application of the tool revealed that some of the topics needed more work to scope out the exact questions to be addressed by the systematic review. The most

straightforward new priority topics were those that were concentrated on a particular condition or intervention, such as *Interventions for managing root caries* or *Topical silver diamine fluoride for managing dental caries in children and adults.* Of the new topics, the areas which required more work were the highest ranking topics, about preventing oral disease in the elderly, preventing oral cancer, promoting oral health and measuring the risk of tooth decay.

All but one of the new topics scored poorly on the SPARK tool on the question of contributing to sustainable capacity, as only one of the topics was in a significantly new area for COH's team. However, it is questionable whether this should be an important consideration for undertaking a priority topic. The new topic areas also scored less well in terms of having adequate human capacity to undertake the review, as new review teams would have to be recruited and it is increasingly difficult to find volunteers with the methodological skills to undertake complex systematic reviews. As a result, these new topics may also take up managerial and operational resource to recruit and train author teams, meaning that they also scored less well in terms of features that require more operational resource.

For the priority reviews for updating, the majority seem to be feasible according to the SPARK tool. Three of the questions received a perfect score (*Pit and fissure sealants versus fluoride varnishes for preventing dental decay in the permanent teeth of children and adolescents*, *Sedation of children undergoing dental treatment* and *Full-mouth treatment modalities (within 24 hours) for chronic periodontitis in adults*). Only one topic scored in less than half of the SPARK tool's categories (*Enamel matrix derivative (Emdogain®) for periodontal tissue regeneration in intrabony defects*). Questions remained around the ethical feasibility of this topic since Emdogain is a commercial product, and whether it is applicable in lower and middle income country contexts, and post-Covid-19. Again, the question of human capacity to undertake the reviews was an area of concern, only ten of the thirty updates had review teams in place that had published a review fairly recently. There were ethical concerns over either commercial products or controversial topics that may involve conflict of interest in just under half (13) of the priority review titles for updating**.**

Table 24: A visualisation of SPARK implementation checklist for Cochrane Oral Health priority new reviews

	Is this an answerable systematic review question?	There has been no systematic review published in the last three years	Primary studies are available for inclusion in the systematic review	There is adequate human capacity to undertake the systematic review	There are no features that may require extra operational / managerial resource	The systematic review is feasible within the expected timeframe	Conducting the systematic review contributes to sustainable capacity	Conducting the systematic review raises no ethical concerns	The question is relevant to LMIC contexts	The question is still timely post-Covid-19 pandemic	SCORE/10
What are the best ways to prevent tooth decay and oral disease in the elderly?		X	X					X	X	X	5
How can oral cancer be prevented?		X	X					X	X	X	5
What is the best way to promote better oral health?	X					X		X	X	X	5
What is the best way to measure the risk of tooth decay?	X		X				X	X	X	X	6
At what stage of tooth decay should a dentist use a drill?	X	X				X		X			4
How should I brush my teeth? For how long, and how often?	X	X	X			X		X	X	X	7

What are the best ways to prevent oral diseases in the elderly living in nursing homes or other institutions?	X	X	X			X		X	X	X	7
By changing parental, or primary care-giver behaviours, can tooth decay in children be prevented?	X	X	X			X		X	X	X	7
Interventions for managing root caries	X	X	X	X	X	X		X	X	X	9
Does a better diet or diet supplements improve oral health? If so what are the best foods/nutrients/supplements?		X	X			X			X	X	5
What role does technology play in providing dental care?		X	X							X	3
Topical silver diamine fluoride for managing dental caries in children and adults	X		X	X	X	X			X	X	7
Psychological interventions for improving adherence to oral hygiene instructions in adults with periodontal diseases	X		X	X	X	X		X	X	X	8
Adjunctive systemic antimicrobials for the non-surgical treatment of chronic and aggressive periodontitis	X		X	X	X	X			X	X	7
Can taking probiotics (live bacteria and yeasts) prevent and control chronic gum disease (periodontitis)?	X		X			X				X	4

Table 25: A visualisation of SPARK implementation checklist for Cochrane Oral Health priority updates

	There has been no systematic review published in the last three years	Primary studies are available for inclusion in the systematic review	There is adequate human capacity to undertake the systematic review	There are no features that may require extra operational / managerial resource	The systematic review is feasible within the expected timeframe	Conducting the systematic review raises no ethical concerns	The question is relevant to LMIC contexts	The question is still timely post-Covid-19 pandemic	SCORE/8
Clinical assessment to screen for the detection of oral cavity cancer and potentially malignant disorders in apparently healthy adults		X	X			X	X	X	5
Periodontal therapy for the management of cardiovascular disease in patients with chronic periodontitis	X	X		X	X	X			5
Recall intervals for oral health in primary care patients	X			X	X	X		X	5
Home use of interdental cleaning devices, in addition to toothbrushing, for preventing and controlling periodontal diseases and dental caries	X	X		X	X		X	X	6
Water fluoridation for the prevention of dental caries	X	X					X	X	4

Oral hygiene care for critically ill patients to prevent ventilator-associated pneumonia	X	X	X	X	X	X		X	7
Interventions with pregnant women and new mothers for preventing caries in children		X		X	X	X	X	X	6
Surgical removal versus retention for the management of asymptomatic disease-free impacted wisdom teeth	X			X	X	X		X	5
Direct composite resin fillings versus amalgam fillings for permanent or adult posterior teeth	X	X		X	X		X		5
Primary school-based behavioural interventions for preventing caries		X		X	X	X	X	X	6
Oral hygiene interventions for people with intellectual disabilities		X		X	X			X	4
Oral health educational interventions for nursing home staff and residents	X	X	X	X	X	X		X	7
One topical fluoride versus another for preventing dental caries in children and adolescents	X	X					X	X	4
Screening programmes for the early detection and prevention of oral cancer	X			X	X	X	X	X	6
Enamel matrix derivative (Emdogain®) for periodontal tissue regeneration in intrabony defects		X		X	X				3
Treating periodontal disease for preventing adverse birth outcomes in pregnant women	X	X		X	X	X	X		6
Antibacterial toothpastes for oral health	X	X		X	X		X	X	6
Interventions for the treatment of oral and oropharyngeal cancers: surgical treatment		X		X	X	X	X	X	6
School dental screening programmes for oral health			X	X	X	X	X	X	6

Systemic antibiotics for symptomatic apical periodontitis and acute apical abscess in adults			X	X	X		X	X	5
Full-mouth treatment modalities (within 24 hours) for chronic periodontitis in adults	X	X	X	X	X	X	X	X	8
Antibiotics for the prophylaxis of bacterial endocarditis in dentistry	X	X		X	X	X	X		6
One-to-one dietary interventions undertaken in a dental setting to change dietary behaviour	X	X		X	X	X	X	X	7
Root coverage procedures for treating localised and multiple recession-type defects	X	X		X	X				4
Combinations of topical fluoride (toothpastes, mouthrinses, gels, varnishes) versus single topical fluoride for preventing dental caries in children and adolescents	X	X					X	X	4
Autologous platelet concentrates for treating periodontal infrabony defects		X	X	X	X				4
Pit and fissure sealants versus fluoride varnishes for preventing dental decay in the permanent teeth of children and adolescents	X	X	X	X	X	X	X	X	8
Sedation of children undergoing dental treatment	X	X	X	X	X	X	X	X	8
Fluoride toothpastes of different concentrations for preventing dental caries	X		X	X	X		X	X	6
Topical fluoride (toothpastes, mouthrinses, gels or varnishes) for preventing dental caries in children and adolescents	X	X					X	X	4

This information was presented to COH's editorial base team in September 2020 in two reports (see Appendix B), and two meetings were held to discuss how to progress each priority topic. Both new and existing topic areas were deliberated in turn, and a series of actions for implementation of the priority setting process was set out. The topics highlighted as priorities for dissemination (see Chapter Five, Section 5.3) were also considered at the meetings. The decisions made will now be presented here.

6.4 Implementation decisions made by the Cochrane Oral Health editorial base team

The implementation decisions made by COH's core team can be categorised in seven different groups, each of these will now be explored.

6.4.1 Development of special collections

Some of the priority topics were very broad, and partially already covered by some of COH's portfolio. A decision was made to turn these priority topics into 'Special Collections' on COH's website. Special collections are a feature of the *Cochrane Library*, curated evidence on specific topics from different reviews is drawn together and linked with an editorial. A similar model may be appropriate for some of the broader priority topics. The purpose of doing this is two-fold, to bring together existing evidence from Cochrane reviews on the priority topic and package and present it differently; doing also allows gaps to be identified in the current review portfolio and may pinpoint where new reviews may be required.

Four of the priority topics came into this category. *What are the best ways to prevent tooth decay and oral disease in the elderly?* was the highest ranked new priority topic. However, COH already has a suite of oral disease prevention reviews which include adults as a population, and although older adults are not the focus, they are not excluded from these reviews. These include reviews on mouthrinses, interdental cleaning, fluoride and managing root caries. There are also reviews which do focus on the oral care of older adults, for example, a specific review on oral health education of nursing home staff and residents. It was decided to use this priority topic area as a pilot project, to package the evidence in these reviews to provide a summary of the evidence for preventing oral disease in older adults. Completing this project would also test the viability of another priority new topic: *What are the best ways to prevent oral diseases in the elderly living in nursing*

homes or other institutions? Although COH currently has a review on oral health education in nursing homes, a new review could look at specific interventions such as adapted toothbrushes, which may help elderly people with motor impairment to clean their teeth. The Special Collection may highlight which aspects of the question are most useful to consider.

The topics *At what stage of tooth decay should a dentist use a drill?, What is the best way to promote better oral health* and *How can oral cancer be prevented?* are also broad topics with overlap with the current portfolio. If the pilot project to create a special collection looking at oral disease in the elderly is a success, then similar special collections will be developed on these three topic areas. *How can oral cancer be prevented?* is a topic area which cuts across several Cochrane review groups (such as Tobacco Addiction, Drug and Alcohol Addiction, and possibly Gynaecological and Orphan Cancers) so it may be possible to link COH evidence with reviews from other Cochrane groups.

6.4.2 New reviews to be progressed

Some of the new priority topics were relatively straightforward to undertake, and these will be progressed, with new review teams recruited. *By changing parental, or primary care-giver behaviours, can tooth decay in children be prevented?* is a review question that could be registered, with some further scoping to ensure the question is framed correctly with PICO elements. The team decided to seek some help from experts in this area for the scoping work, and recruit a team to undertake the review.

Does a better diet or diet supplements improve oral health? If so what are the best foods/nutrients/supplements? was also a question which is not covered by COH's current portfolio. The team decided to advertise this topic on their website and in the COH newsletter to try and progress this priority. The priority question *What role does technology play in providing dental care?* was more problematic, as it is a very broad topic, encompassing all aspects of dental care: prevention, diagnosis, treatment etc. COH's co-ordinating editors were keen to progress a particular aspect of this question, namely the effectiveness of teledentistry, the practice of providing dental services remotely. This aspect of technology use had grown in importance due to the Covid-19 pandemic. The team decided to advertise a title on COH's website, and invite applications from interested author teams for a Cochrane review on teledentistry.

Four of the "new" topics had in fact already been registered, teams were recruited and reviews were underway. *Interventions for managing root caries*, *Psychological interventions for improving adherence to oral hygiene instructions in adults with periodontal diseases*, *Topical silver diamine fluoride for managing dental caries in children and adults*, and *Adjunctive systemic antimicrobials for the non-surgical treatment of chronic and aggressive periodontitis* were due to be published as new COH reviews during the three year funding cycle. However, it was agreed that the author teams working on these reviews would be contacted to inform them that their reviews were now priority for COH.

6.4.3 Priority updates to undertake

Again, some of the existing reviews that were priorities for updating were also relatively straightforward to undertake, and timelines were added to these to confirm when in the funding cycle the update might be published.

Table 26 shows the reviews that will be updated, alongside the rough timelines.

Table 26: Reviews to be updated by Cochrane Oral Health, with publication targets	
Review title	**Publication target**
Clinical assessment to screen for the detection of oral cavity cancer and potentially malignant disorders in apparently healthy adults	2021/2
Recall intervals for oral health in primary care patients	2021/2
Pit and fissure sealants versus fluoride varnishes for preventing dental decay in the permanent teeth of children and adolescents	2021/2
Oral hygiene care for critically ill patients to prevent ventilator-associated pneumonia	2021/2
Direct composite resin fillings versus amalgam fillings for permanent or adult posterior teeth	2021/2
Interventions with pregnant women and new mothers for preventing caries in children	2022/3
Antibiotics for the prophylaxis of bacterial endocarditis in dentistry	2022/3

Periodontal therapy for the management of cardiovascular disease in patients with chronic periodontitis	2022/3
Home use of interdental cleaning devices, in addition to toothbrushing, for preventing and controlling periodontal diseases and dental caries	2022/3
Water fluoridation for the prevention of dental caries	2022/3
Primary school-based behavioural interventions for preventing caries	2022/3
Oral hygiene interventions for people with intellectual disabilities	2022/3
Oral health educational interventions for nursing home staff and residents	2022/3
Treating periodontal disease for preventing adverse birth outcomes in pregnant women	2022/3
Interventions for the treatment of oral and oropharyngeal cancers: surgical treatment	2022/3
Full-mouth treatment modalities (within 24 hours) for chronic periodontitis in adults	2022/3
Sedation of children undergoing dental treatment	2022/3
One-to-one dietary interventions undertaken in a dental setting to change dietary behaviour	2023/4
Systemic antibiotics for symptomatic apical periodontitis and acute apical abscess in adults	2023/4
School dental screening programmes for oral health	2023/4
Surgical removal versus retention for the management of asymptomatic disease-free impacted wisdom teeth	2023/4
Fluoride toothpastes of different concentrations for preventing dental caries	2023/4
Powered versus manual toothbrushing for oral health	2023/4
Pit and fissure sealants for preventing dental decay in permanent teeth	2023/4
Micro-invasive interventions for managing proximal dental decay in primary and permanent teeth	2023/4

One of the priority updates was *Triclosan/copolymer containing toothpastes for oral health.* However, the withdrawal of triclosan from toothpastes in 2019 due to concerns over safety (American Dental Association, 2019) has led to this review being withdrawn from the *Cochrane Library*. The question was therefore reconfigured and broadened to include all antibacterial toothpastes. As a result, the review team will have to scope out and undertake a new review, rather than updating the previous review.

6.4.4 Priority reviews to be made stable

The Cochrane Library has a feature where existing reviews can be made 'stable' if it is expected that the evidence base is unlikely to change in the near future, or if new evidence is unlikely to change the results of the review. Some of the existing priority reviews were identified as reviews that should be made stable, and should not be updated in the near future as doing so may contribute to research waste. A surveillance search for new evidence can nevertheless be completed before the reviews are made stable to ensure that there is no new evidence, and then periodically after that to check if new evidence emerges in future.

The five reviews in this category were: *Routine scale and polish for periodontal health in adults, Screening programmes for the early detection and prevention of oral cancer*, *Chlorhexidine mouthrinse as an adjunctive treatment for gingival health*, *Fluoride mouthrinses for preventing caries in children and adolescents* and *Fluoride gels for preventing dental caries in children and adolescents.*

6.4.5 Priority reviews needing more clinical discussion

It was decided that some priority reviews needed more input from clinical experts before deciding how to proceed, and that COH should convene meetings with these experts to discuss these reviews. Three of the reviews on the topic of fluoride were very out-of-date, and would probably need to be re-examined from scratch rather than just updated. These reviews looked at different types of topical fluoride versus each other, or used in combination. As these reviews were last completed and published more than fifteen years ago, fluoride treatments have developed and moved on. Some are obsolete. It was decided to try to think about these reviews differently, and take a more considered approach to the issue of preventing dental caries using topical fluoride. As outlined in Chapter Four, Section 4.1, COH is part of a network of evidence producers in oral health, the Global Evidence Ecosystem in Oral Health (GEEOH), which attempts to link evidence producers such as guideline developers and systematic review commissioners with both each other, policy-makers and research funders. It was decided that this issue of how to approach topical fluoride reviews in future should be tabled at the next meeting of this network for discussion, so that the reviews that COH produce on this topic are useful for the oral health research community and for guideline development. The three reviews in this category were: *One topical fluoride versus another for preventing dental caries in children and*

adolescents, Combinations of topical fluoride (toothpastes, mouthrinses, gels, varnishes) versus single topical fluoride for preventing dental caries in children and adolescents and *Topical fluoride (toothpastes, mouthrinses, gels or varnishes) for preventing dental caries in children and adolescents*.

There were a further four reviews that the team felt merited further discussion with clinicians, as there was not the expertise on the editorial team to take these titles further. Periodontics is an area where COH has had some difficulty in engaging with guideline producers, and so more discussion with clinicians in this area, particularly concentrating on how to make the reviews more useful for clinical practice, was warranted. It was also unclear to the editorial team just how current some of the interventions were that were included in these reviews, and which parts of the world still used them. The four reviews slated for further discussion with periodontal experts were: *Can taking probiotics (live bacteria and yeasts) prevent and control chronic gum disease (periodontitis)?, Enamel matrix derivative (Emdogain®) for periodontal tissue regeneration in intrabony defects*, *Root coverage procedures for treating localised and multiple recession-type defects* and *Autologous platelet concentrates for treating periodontal infrabony defects*.

6.4.6 Additional priorities

There were some reviews which did not emerge as priorities during the priority setting process, but COH's team felt that they could not be considered in isolation from other related priority reviews and should therefore be considered additional priorities. *Interventions for the treatment of oral and oropharyngeal cancers: surgical treatment* is a priority topic and one of four COH reviews on oral cancer. The four reviews are designed to complement one another, by considering the various treatment options for oral and oropharyngeal cancer. As oral cancer is a life threatening disease, with particular prevalence in lower and lower middle income countries, the editorial base team felt that all four reviews should be considered priority reviews. Therefore, *Interventions for the treatment of oral and oropharyngeal cancers: chemotherapy*, *Interventions for the treatment of oral and oropharyngeal cancers: radiotherapy* and *Interventions for the treatment of oral and oropharyngeal cancers: targeted therapy and immunotherapy* were all added to COH's priority list. A commitment was made to update these reviews by 2024.

6.4.7 Priorities not progressed

Two of the priority topics were not progressed after further discussion with the editorial team. *What is the best way to measure the risk of tooth decay?* would be a different type of review for COH to undertake, and does not fit the pattern of the standard systematic review of interventions. It was felt that there was not the capacity or expertise to undertake this review without substantial investment of time and resource. Furthermore, the editorial base team were aware of work currently underway with the Scottish Dental Clinical Effectiveness Programme, a guideline development group based in Scotland to produce a review of the evidence on risk measurement in dental caries. Starting a new review on this topic may therefore count as research waste. This title will therefore not be undertaken by the group.

The new title: *How should I brush my teeth? For how long, and how often?* was discussed at length. Surveillance of clinical trials on the topic by one of COH's co-ordinating editors had suggested that there was not a great deal of evidence to include in a new review. However, the topic of toothbrushing and the use of toothpaste is part of several COH reviews of interventions. Rather than commissioning a separate review, the COH team decided instead to incorporate what evidence there is into existing reviews on toothbrushing and toothpastes. It was felt that the questions *How should I brush my teeth? For how long, and how often?* did not merit their own review.

In the ranking phase, the 40 member panel were asked if they had any further questions that they thought were priorities, and whether there were any reviews that COH should undertake as part of the response to the Covid-19 pandemic. The editorial base team decided not to progress any of the resulting priority topics (see Chapter Five, Table 19 for the full list of questions). In some cases, these were simply not suitable for a Cochrane style review (for example, the question: *Bridging the gaps between medicine and dentistry. Why are these two segregated the way they are right now? For purely historical reasons? Are patients, particularly complex cases with interdisciplinary conditions being harmed by this necessary divide?*). In some other cases, the question was already covered by existing reviews, for example the uncertainty: "I would like to know adverse effects of whitening [teeth] and the best way to do it" is included in two existing Cochrane reviews on tooth whitening. The panel did not feel that any of the other questions were important enough to displace any of the other identified priorities.

In terms of the Covid-19 priority topics, it was felt that most of the questions were covered by existing Cochrane reviews on personal protective equipment, aerosol reduction, infection control and mouthrinsing. The editorial base team thought that further reviews on these topics may constitute research waste. Again, others were not suitable for a Cochrane review, for example: "Numbers of oral health practitioners infected with Covid worldwide and how many died". None of these reviews were progressed.

6.4.8 Appeals process

A part of implementing priority setting is instigating an appeals process, so that those who believe their priorities have not been considered adequately can communicate and feed back to those responsible for delivering the priority research. Viergever *et al* (2010), Tomlinson *et al* (2011) and Tong *et al* (2019) all believe that the appeals process is vital. Appeals mechanisms allow "room for change and improvement" (Tomlinson *et al*, 2011). The contact details for the lead researcher were made available both on the COH website (https://oralhealth.cochrane.org/about-us/cochrane-oral-healths-priority-setting-process) and on each priority setting bulletin so that people could get in touch with questions or objections. The editorial base team also agreed a strategy for any changes to the priorities over the next five years, with parameters set for consideration of priority titles not already identified by the priority setting process. The following announcement was posted on COH's website:

> "Cochrane Oral Health is focusing on delivering our priority titles, find them here.
>
> However, we will consider registering other new titles if:
>
> - A title is needed to support a guideline; or
> - The new title is on an emerging treatment or intervention.
>
> If you think you have a high priority topic that we need to consider, contact us at CochraneOralHealth@manchester.ac.uk, stating the reasons why you think it is of high priority. Please check our list of registered titles, published reviews and protocols to make sure the proposed title does not overlap with our current portfolio."
>
> (Cochrane Oral Health, 2020e)

The purpose of the announcement was twofold. Firstly, it manages the expectations of those who want to register a review title with the group, in that it clarifies that new reviews must be considered to be high priority and would only be accepted in certain circumstances. Secondly, it does not close the door for those who wish for their topic to be considered as a priority. If the intervention is novel, or is needed urgently to support guidance in practice, the title will be considered by the editorial base team. The priority setting will also be repeated in five years, so people would also have a chance at that stage to change the priorities of the group.

The decisions made by the editorial base team were set out in an implementation plan, which was subsequently posted on COH's website. The implementation plan can be found in Appendix H.

6.5 Discussion

Effective implementation is one of the crucial steps to successful priority setting (Viergever *et al*, 2010), but as Angell *et al* (2016, p. 1389) have commented, this part of the priority setting process is rarely clearly reported in the literature. The research presented here attempts to remedy that by setting out a clear implementation plan, based on information calculated via the SPARK tool and discussions held with the COH editorial team. These aspects of implementation will now be examined, to see how useful the SPARK tool was in practice, and how well it guided the decision-making.

The SPARK tool consists of a number of checklist items, applied to each priority topic to test their viability as a systematic review. It formed a useful basis for gathering data about the priorities to share with COH's editorial team. However, it is true to say that some of the SPARK checklist items were less relevant than others to this case study. For example, the checklist item "Conducting the systematic review contributes to sustainable capacity to conduct future reviews" was difficult to answer positively in the sense that it relates to the editorial team developing "new" skills. This would only be possible if a different type of Cochrane review was undertaken other than the type of intervention review normally done by COH. However, the priority setting process had a remit to consider titles that COH had either already registered as existing titles, or that the group had the capacity to undertake, so it was always going to be unlikely that the reviews could contribute to sustainable

capacity in the sense of skills development for the editorial team. This checklist item could have been considered differently, to look at whether the review might contribute to sustainable capacity in terms of training of new author teams to do the reviews, rather than editorial teams. However, training up a new author team to contribute to sustainable capacity would be something that could be potentially done for all of the COH priority reviews. This checklist item is therefore very context specific, and in retrospect did not add much value to the process for the purposes of this case study.

The checklist item "Conducting the review is a social responsibility" was also not helpful in this context as presented in the SPARK tool. Arguably, a case could be made for any systematic review on a health or social care topic being a "social responsibility". Akl *et al*'s (2017a) guiding questions on this checklist item are: "Does conducting this review align with society's needs, interests, or priorities? Is conducting this review expected to have a positive effect on the safety, health or welfare of the society?" (Akl *et al*, 2017a). It would be very difficult to answer "no" to these questions for any of COH's reviews. The question was therefore reframed to take into account the "equity lens" (Nasser *et al*, 2013b, p. 514) that is considered essential by Cochrane's Priority Setting Methods Group. Noting whether each review topic was relevant in lower-and-lower middle income country contexts was more important to answer in terms of COH's international remit than whether the reviews overall represented a contribution to social responsibility.

A further question that should be examined with regards to the SPARK tool is whether it is conducive to creativity or not. The checklist items seem more to be geared towards caution rather than exploring new avenues of research. Whilst this is pragmatic, it does mean that those priority topics which are novel and require more resourcefulness and inventiveness would score less well on the checklist than those topics which cover similar ground to previous work. It is arguable whether Cochrane groups should be dissuaded from considering some priority topics which have emerged as important just because they require more operational resource, or a longer timeframe to complete.

However, the effectiveness of the SPARK tool does lie in its pragmatism and ability to clearly crystallise issues around resourcing, personnel and research waste. It was also particularly useful in highlighting those priority topics which need more thought and refinement before a systematic review is commissioned. There are opportunities to make the tool more pragmatic however. For example, the checklist item: "There are no available

or adequate systematic reviews on this question" (Akl, *et al*, 2017a) comes with the signalling question: "Did a search for reviews identify existing systematic reviews that are relevant, of good quality, and current?" (Akl, *et al*, 2017a). However, the tool does not give any further information on how a conclusion on this should be reached. What counts as "current" and how does the priority setting team come to a judgement on whether an existing review is of "good quality"? The SPARK tool offers no guidance on these points. For this case study, the guidance from the JLA on currency was used, and the AMSTAR checklist to decide whether or not the reviews were of good quality. But there are other measures that could be used to determine these points, and further direction on this might be a useful addition to the tool.

A further issue with this aspect of the priority setting process was that both the SPARK assessment and the AMSTAR assessment were conducted by one person, rather than in duplicate. This is a limitation of the research. The user manual for the SPARK tool is not clear on how many people should conduct the process of testing for the feasibility of systematic reviews using Module 2 (Akl, *et al*, 2017b). However, it does suggest that the module is applied by a "systematic review team" (Akl, *et al*, 2017b). Similarly, there is no clear guidance from the developers of AMSTAR on whether appraising systematic reviews using the tool should be done in duplicate (Shea, *et al*, 2017), although to test the methodology the team who developed the tool used "pairs of raters" (Shea, *et al*, 2017). Adding at least one other person to the project to assess both the AMSTAR ratings for existing reviews and to independently assess the feasibility of each review using the SPARK tool may have made the decision-making on implementation more objective. If this aspect of the research is repeated in future, it would be important to include at least one other researcher, working independently, to reduce the potential bias of having a single assessor.

It should also be noted that this case study did not fully utilise the tool. The full SPARK process involves subjecting each priority topic to the checklist items and scoring each checklist item out of five on a Likert scale. Instead, this study used a binary yes/no approach to the checklist items, as it was unclear what purpose the Likert scores might serve. There is no further guidance within the SPARK tool as to how the Likert scores may be interpreted, and what the thresholds should be for determining the viability of a systematic review.

Overall, the SPARK tool was an effective approach for preparing to implement the priority reviews. It allowed a considered response to each topic; taking into account whether the topic was viable, whether it contributed to research waste, whether it was ethical and whether the topic served COH's global audience. It also pinpointed the topics which were not refined enough, and needed more work to turn them into answerable, scaled down, systematic review questions.

The information gathered via the SPARK tool was made available to the COH editorial base team, whose decisions formed the basis of the implementation plan (see Appendix H). It proved to be a useful tool to guide decision making. Almost all of the reviews which scored highly as viable reviews using the checklist criteria were slated for either producing new systematic reviews or to be updated in the near future. There were some exceptions. One high scoring review did not have enough new primary research to update and was to be made stable instead: *Screening programmes for the early detection and prevention of oral cancer*. The reason for making this review stable was that it was unlikely that there would be new studies to include in an updated systematic review, and this was one area where the review did not score on the SPARK checklist items. Another exception was *How should I brush my teeth? For how long, and how often?*. Although this review scored highly using the SPARK checklist items and there were a few primary studies to include, expert knowledge of the topic area from one of the editorial base team led to this title not being progressed as a review in its own right. It was felt that the primary studies that might be included did not provide enough robust evidence to merit a separate systematic review. These two exceptions aside, the evidence of systematic review viability from the SPARK checklist largely matched the decisions taken by the editorial base team. Decisions were generally guided by the evidence.

The group who made the implementation decisions was small and comprised only of the core editorial team. However, some of the titles required more discussion, which poses the question of whether a wider group should have been included in the decision-making process. The reviews which concerned specific interventions in periodontal disease were a particular issue, as there was not enough expertise in the core editorial team to decide whether interventions were still current, or how to frame priority questions to make them as useful as possible to clinicians, guideline developers and policymakers. COH has a wider team of editors and advisors with clinical knowledge (including those with expertise in periodontal diseases) and it may have been possible to involve them at this stage.

However, there are both positive and negative aspects to involving a wider group. Drawing on more clinical expertise and possible knowledge of the literature and evidence base is an obvious advantage. But the core team has more understanding of the capacity of the group to undertake research and of the operational issues that may arise in commissioning priority topics, of which this wider group may not be aware. The wider group would consist of 32 individuals rather than eight, which would make it more difficult to make timely decisions and reach a consensus. The decision-making may also be less objective and less guided by the evidence supplied by the SPARK tool if such a wide group of editors is involved. Instead, the decision was made to convene clinical experts in certain fields to further more focussed discussions, concentrating on more specific questions in periodontics and on fluoride use. These discussions will include the editors and advisors with detailed knowledge but will also include others who may be able to assist with expertise on the topic. This is a more pragmatic approach to implementation decision-making.

Angell *et al* (2016, p. 1389) stated that the requirements for success in implementing priority setting were "having a climate ready to accept priority-setting, good leadership or a 'champion' for the priority-setting process and having a health economist to guide the process." The commissioning of a priority-setting process in and of itself is not necessarily enough to suggest a "climate ready to accept priority-setting", however the involvement of the co-ordinating editors as members of the priority-setting steering group, and the willingness of the core editorial team to get involved in the meetings and establish a plan and timeline for publishing the priority reviews is a positive sign. A subsequent follow-up meeting involved a health economist, who agreed to consider economic evidence for each priority topic as they are undertaken or updated.

The implementation process has also once again revealed some issues with the quality of research in the oral health field, and also with the alignment of research and the priorities explored in the research documented in this thesis. A search on MEDLINE Ovid demonstrates that over 1,500 systematic reviews have been published in the three years to 2021 which have been indexed with a Medical Subject Heading related to dentistry. However, only eighteen were found to cover the same priority topics established in this project. This poses the question as to how systematic reviews in dentistry are commissioned and whose priorities they serve. All of the eighteen were also judged to be of low or critically low quality when subjected to the AMSTAR checklist. This suggests

that there may be many low-quality systematic reviews on non-priority oral health topics in circulation.

In addition, the process has uncovered some issues with primary studies in oral health, which to add to those discussed in Chapter Five, Section 5.4. For example, there were no new primary studies found to include in the review *Screening programmes for the early detection and prevention of oral cancer.* This review was ranked 14th out of thirty existing Cochrane review titles to update by COH's panel. The review has not been updated since 2013, and yet no new clinical trials have been undertaken in this important area. This suggests that gold-standard research on the efficacy of screening programmes for detecting oral cancer is not being undertaken or commissioned by research funders. In fact, of the thirty COH priority reviews for updating, over one third (12 in total) include less than ten primary studies, and six of these include only one or two studies. All thirty titles have no moderate or high quality evidence to support a conclusion, and so this lack of ongoing robust primary research to include in COH reviews is a concern. It suggests that those involved in the evidence chain, commissioning primary research to include in high priority reviews to inform clinical practice need to work more closely together.

6.6 Conclusion

The implementation process resulted in a plan for integrating the priorities established in the research documented in this thesis with COH's workflow. It pinpointed those topics which need more work for their scoping and development, and identified those which may need more resource to bring to completion. It also clarified which topics would not be progressed and revealed issues with the current state of research in the field, particularly in terms of available non-Cochrane systematic reviews of high quality, and the lack of primary research in some priority areas. Time will tell if the implementation process is a success, but the SPARK tool was a useful, pragmatic approach to developing an implementation plan. It may prove to be what Angell *et al* (2016, p. 1393) believe to be lacking in priority setting implementation: a clear methodology for achieving success.

Chapter Seven: Evaluation

7.1 Introduction

Evaluating the priority-setting method is an important part of the process, according to Viergever *et al* (2010). It was therefore essential to assess the priority setting framework developed in the research presented here against some form of criteria. The framework consists of five phases: the information gathering phase (see Chapter Three), the stakeholder consultation phase (see Chapter Four), the mapping and ranking phase (see Chapter Five), the implementation phase (see Chapter Six), and the evaluation phase. The evaluation phase is explored in this chapter.

The main test of the effectiveness of the framework will of course be whether or not the priorities set by the research are incorporated in high-quality, timely reviews over the course of COH's current funding cycle. However, this will not be established for some time after the priorities have been set, when it will be possible to evaluate the framework according to whether priority reviews have been delivered or not. Nevertheless, it is possible to evaluate the process before the priority research is undertaken by using existing good practice and the mandatory standards prescribed by Cochrane (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019). The evaluation was undertaken by the author of this research, using set criteria. Viergever *et al*'s (2010) nine themes of good practice have been formulated into a checklist, which was used to evaluate this priority-setting exercise, and the extent to which the priority topics meet Cochrane's mandatory requirements is also explored. Towards the end of this research project, the *REporting guideline for PRIority SEtting of health research* (REPRISE) was published by Tong *et al* (2019). As this guideline relates to reporting the priority setting process, rather than the conduct of the process, it was not used in this evaluation. However, it will be used as guidance for subsequent publications.

7.2 Methods

Viergever *et al*'s (2010) nine common themes of good practice in priority setting have been discussed in Chapter One, Section 1.5. These nine themes form a checklist, which can be used for evaluation purposes. In addition, Cochrane has established mandatory standards for priority setting, which must be met if the resulting publication is to be considered a priority review. A set of "highly desirable" standards is also available (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019).

This has implications for Cochrane groups, because unless Cochrane review titles can demonstrably be shown to have met the mandatory standards, they will not be eligible for Cochrane's centrally-held list of priority titles. The editors and authors of Cochrane reviews on this list can access Cochrane's fast-track programme, the Central Editorial Service, which gives review groups extra support and resource (Cochrane Community, 2018), with the aim of completing priority reviews more quickly. There are also implications for funding, as only high priority titles on the review list are eligible for financial support through Cochrane's review support programme, which awards up to £5,000 to Cochrane groups to complete high priority reviews (Cochrane Library, 2019). It is therefore important to establish whether the framework developed in the research documented in this thesis meets these mandatory standards.

The relevant stages of the priority-setting process are examined against themes drawn from both Viergever *et al*'s (2010) checklist and Cochrane's priority setting standards (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019). These themes are explored in more detail below, and an analysis of how well this priority setting process performed against each theme is explored in Section 7.3.

7.2.1 Context

The first theme in Viergever *et al*'s (2010) checklist relates to setting the context of the research. They have said that a clear focus and scope is essential to priority setting. This should take into account the resources available, the values of stakeholders and the research, health and political environment. The scope can include consideration of the target disease burden, the geographical application of the research (i.e. is it intended to be national, international, regional?), the timeframe, the needs of the intended beneficiaries of the research and the target audience of the research priorities. More specifically, in terms of context and resource, Cochrane has outlined how the process should be managed, and transparency in setting out the context and leadership is essential. Cochrane's guidance note on priority setting (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019) recommends a clear leadership structure for taking the priority setting process forward. It is mandatory to establish a team for this purpose, and that team can be drawn from the editorial base team. A governance structure of this type gives clarity and ownership to the priority setting process. The guidance note also mandates the production of a priority setting plan detailing all aspects of the process, including resource, leadership,

plans for engagement and methods to be used (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019). This must clearly set out the context for the process.

7.2.2 Comprehensiveness

Viergever *et al* (2010) have said that the approach taken to priority setting is very important, and it is up to those conducting the exercise to decide whether to use a 'comprehensive' approach, subject to resource constraints. The use of a comprehensive approach is the second theme on their priority setting checklist. They advocate using one of the four commonly used approaches to priority-setting: the Essential National Health Research (ENHR) approach (Rudan *et al*, 2007), the Council on Health Research and Development (COHRED) (2013) approach, the Combined Matrix Approach (Global Forum for Health Research, 2009) or the Child Health and Nutrition Research Initiative (CHNRI) approach (Viergever *et al*, 2010). However, they concede that in some circumstances, it may be necessary for groups undertaking priority setting to develop their own to suit their own context: "Approaches can be tailored to match a specific exercise, retaining the advantages of their comprehensive and detailed methodology, while accommodating existing wishes and needs for the exercise" (Viergever *et al,* 2010). Whichever approach is taken, Viergever *et al* (2010) recommend that it provides "structured, detailed, step-by-step guidance."

7.2.3 Inclusiveness

Viergever *et al*'s (2010) research found that stakeholder involvement in priority setting was "indispensable". They recommend identifying which stakeholders need to be involved and what role they should place in the process. Similarly, Cochrane mandates that at least one stakeholder group external to Cochrane should be engaged in the priority setting process. Examples given of possible stakeholders to engage with include guideline developers, funders, consumers or professional organizations (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019). It is highly desirable for groups to consult with more than one. A further mandatory requirement in terms of stakeholder engagement is to publish an intent to undertake priority setting via "relevant Cochrane channels", to ensure that interested parties are aware and can take part if appropriate.

7.2.4 Information gathering

Viergever *et al* (2010) argue that priority setting should be well-informed and recommend that the information to be gathered should be chosen with care. They propose that technical data might be gathered (eg burden of disease information, cost-effectiveness, or determinants of disease) but also recommend an investigation of gaps in the literature.

7.2.5 Planning for implementation

Viergever *et al* (2010) recognise that planning for implementation is an often neglected but crucial aspect of priority setting, with a major issue being that "priorities are set by those who are not directly responsible for their implementation" (Viergever *et al*, 2010). They recommend that plans be established for the translation of priorities to actual research. Implementation must be both "feasible and sustainable", and Viergever *et al* (2010) recommend encouraging "buy-in" from stakeholders as part of the priority setting to assist with implementation: "For example, the involvement of policymakers and funding organizations from the beginning means that support for the priorities is more likely and increases the opportunity for research priorities to be translated into actual research." (Viergever *et al*, 2010). Planning for implementation was therefore considered to be a very important part of this priority setting process.

7.2.6 Criteria for priority setting

The criteria that will be used for setting priorities should be established, and this forms the sixth theme of good practice on Viergever *et al*'s (2010) checklist. Criteria is defined in this context as that which is "used to focus discussion around research priorities and to ensure that important considerations are not overlooked" (Viergever *et al*, 2010). Examples given include: "magnitude of a health problem, the likelihood of reducing disease burden, cost-effectiveness, the present level of knowledge, current resource flows, the degree of equitability, sustainability, ethical aspects and local research capacity.", but they acknowledge that there are "many more possibilities" (Viergever *et al*, 2010). They recommend that participants in the priority setting should decide on the criteria by consensus (Viergever *et al*, 2010).

7.2.7 Methods to decide on priorities

The seventh common theme of good practice in priority setting according to Viergever *et al* (2010) is deciding on the methods that will be used to set the final priorities. They state that most priority setting methodologies fall into two categories, consensus-based and metrics-based: "The former lead priorities to be decided by group consensus, the latter involve metrics or an algorithm that results in pooling of individual rankings of research options." (Viergever *et al*, 2010). They recommend consensus-based approaches in particular because "[consensus-based approaches] improve the acceptability of the exercise" (Viergever *et al*, 2010). However, they also state that methods which combine both approaches, with options being discussed and then ranked using a metrics approach, are common (Viergever *et al*, 2010).

7.2.8 Evaluation of the priority setting process

Viergever *et al* (2010) recommend a period of evaluation for the priority process to determine what went well and what could be improved. This includes periodically reviewing the priorities to ensure that they are up-to-date (Viergever, *et al* 2020), along with "other methods of evaluation". The framework developed in this study has been evaluated via Viergever *et al*'s (2010) work on best practice in priority setting, but there are other ways that the project could have been evaluated, although Tong *et al* (2019) have stated that there is no gold standard for evaluating priority setting. They do however give surveys and workshops as examples of ways a priority setting process might be evaluated, although it is not clear who would be surveyed or included in a workshop (Tong *et al*, 2019). Would it be the participants in the priority setting process, so that their opinions on how well the process went are taken into account for the evaluation? Or would it be stakeholders not involved in the priority setting process, who might want to comment on the final priorities and their relevance? It may be a mix of both, but Tong *et al* (2019) do recommend that an appeals mechanism is available to stakeholders, so that they can make their views known if they do not agree with the conduct of the priority setting process or the final priorities.

Cochrane have been more specific with regards to reviewing the priorities, giving groups a time-limit by which to repeat the prioritisation process: "The priority-setting exercise should be repeated at regular intervals, according to emerging treatment and intervention options within the Group, Network or Field scope and changing stakeholder needs. At a

minimum, the exercise should be repeated within five years." (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019). A highly desirable standard is that the priority setting should be repeated every three years (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019).

7.2.9 The transparency of the process

Viergever *et al*'s (2010) final checklist item concerns transparency, with a recommendation that "a clear report should be written that discusses the approach used." They argue that "Potential implementers of health research priorities are unlikely to adopt or use priorities unless they are fully informed of all aspects of the priority setting process; transparency increases the credibility and thus the acceptability of the final result." Cochrane recommends transparency from the very beginning of the process. Cochrane's priority setting guidance note states that it is mandatory for a priority setting plan "detailing stakeholder engagement, methods and criteria that will be used for the priority setting process" (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019) to be developed and published by the review group.

Cochrane also mandates transparency during the implementation of the priorities, with a requirement to: "document the implementation of the priority-setting process and make it available on the individual Group, Network or Field website. In the case of Cochrane review groups this should also include a link to the relevant network portal. The documentation must include a summary of the exercise undertaken, and contain enough information for stakeholders to get a clear idea of the process used." (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019). The guidance note also states that the list of priority topics resulting from the priority setting process should be published on the review group's website.

Dissemination and knowledge translation are areas which have become increasingly important to Cochrane, who have established a Knowledge Translation team in recent years (Cochrane Community, 2021a). The knowledge translation dissemination brief is seen as key to transparency post-priority setting. The dissemination brief provides a framework for 'packaging and push', determining the format used to present the results of a Cochrane review to its intended audience. It is meant to aid people in using Cochrane evidence to inform clinical decision making (Cochrane Community, 2021b). The brief

provides a template for Cochrane review groups and author teams to fill out on publication of a priority review (Cochrane Community, 2021b), where the review must be clearly summarised and consideration given to who the audience is and why they should read the review. It should include implications for clinical practice and implications for research, and whether the conclusions of the review are controversial or likely to change practice. The knowledge translation team will then use this information to "push" the review via Cochrane's communication channels and email distribution lists. The use of the knowledge translation dissemination brief is mandatory for all priority reviews that will be published in the future (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019). Providing feedback on the priority setting process to the stakeholders involved is also a mandatory requirement.

The priority setting process used in the research documented by this thesis was examined using these nine themes, to establish the effectiveness of the process. The results are presented below.

7.3 Results

7.3.1 Context

Although context is clearly very important to establish at the outset of the priority setting, the framework developed in the research documented in this thesis does not concentrate on developing focus and scope as it is intended for use in contexts where this is already established. The focus and scope of this priority setting process was pre-determined by the fact that COH had commissioned the research and the group's work is specific in terms of remit. The group's scope and mission is: to produce high-quality, relevant systematic reviews in the area of prevention, diagnosis, treatment and rehabilitation of oral, dental and craniofacial diseases and disorders (Cochrane Oral Health, 2016a). The process was only concerned with systematic reviews, and only concerned with the topic area of oral health; and it was a global context because of Cochrane's international sphere of activity. The timeframe was to set priorities over the next 3-5 years, as this is the length of the funding cycle. The mandatory guidance from Cochrane also recommends that priority setting needs to be repeated at a minimum of 5 yearly intervals (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019).

However, setting out the context could have been approached differently by narrowing the terms of reference for this study. The context could have been further focused by either concentrating on just one aspect of oral health (such as prevention of oral disease) or by only concentrating on which new systematic review titles to register, rather than also looking at which existing reviews should be updated. However, this priority setting process sought to be comprehensive across the scope of the review group, to gain a complete picture for the first time of the priority areas for evidence synthesis. This is time consuming, and may not be appropriate for research groups undertaking evidence synthesis with limited resources. Cochrane recommends that the process be repeated at intervals (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019), and it may be that in future it is approached in a topic-by-topic method, or by repeating only particular aspects of the process. There are examples of other Cochrane groups which have prioritised only part of their scope for reviews at any one time, for example, the Cochrane Bone, Joint and Muscle Trauma Group looked only at the topic of hip fractures for their first prioritisation exercise, with the intention of examining other areas of their scope in subsequent exercises (Handoll, *et al*, 2013, p. 491).

One aspect of context and focus not considered in the research presented here but recommended by Viergever *et al* (2010) was disease-burden. As established in Chapter Two, Section 2.3, disease-burden data in oral health may not be reliable, especially in the context of developing countries. However, it is true to say that the top three areas of oral health concern highlighted by the World Health Organization are congruent with the priorities identified by COH in this research project (World Health Organization, 2019). Caries, periodontal diseases and oral cancers were highlighted as areas of high burden of disease, and of COH's forty-eight new priorities, twenty-seven were about managing caries or periodontal disease or both; and seven were related to the diagnosis, prevention or treatment of oral cancer. Without basing the priority-setting process on burden of disease, it seems the priorities established still address these putative areas of high burden. This may be very different for other topic areas however, and so burden of disease may well be a factor to take into account if the framework is to be adapted for use in other evidence-synthesis contexts.

In line with Cochrane's mandatory guidance on priority setting (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019), COH documented the context, focus and management of the project by establishing a steering group at the

beginning of the process, and compiling a priority setting plan. COH's priority setting plan was published on their priority setting website in 2018 (see Appendix A) and it did have details of all the methods, criteria and stakeholders with whom the group wished to engage. The steering group consisted of the two Co-ordinating Editors of the group, the group's Senior Statistical Editor and the group's Information Specialist. Cochrane also state that it is highly desirable for groups to engage an external stakeholder on the priority setting steering group (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019). This could improve the priority setting process next time it is due to be undertaken.

7.3.2 Comprehensiveness

As with the recommendations around setting the context, Viergever *et al*'s (2010) best practice standard on comprehensiveness is not necessarily applicable to the framework developed in this study. They recommend choosing between one of the four commonly used approaches to priority setting: the Essential National Health Research (ENHR) approach (Rudan *et al*, 2007), the Council on Health Research and Development (COHRED) (2013) approach, the Combined Matrix Approach (Global Forum for Health Research, 2009) or the Child Health and Nutrition Research Initiative (CHNRI) approach (Viergever *et al*, 2010). The framework developed in the research presented in this thesis proposes a methodology to use, rather than guidance on how to choose one. It is worth reiterating though why it was necessary to develop a new framework for the evidence synthesis context rather than using one of the approaches recommended by Viergever *et al* (2010). As this study has explored in Chapter 2, Section 2.3, although the recommended approaches are thorough in the sense that a large amount of data is gathered and analysed on different aspects of health care, they have been criticised for lacking 'real-world' applicability (Hacking and Cleary, 2016) and lack of transparency (Tromp and Baltussen, 2012). As the prioritisation process undertaken in this research project applied to a real world setting with a specific health care topic and context, and with a mandatory requirement for transparency (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019), these approaches were not the best fit. All four approaches also crucially lack the input of those most likely to be affected by the research: consumers or patients. As examined in Chapter 2, Section 2.3, there are moral and ethical arguments for involving healthcare consumers in priority setting, but it may also improve the relevancy of the research and the legitimacy of the process (Madden and Morley,

2016). A new framework was therefore developed, with the intention of combining an information gathering approach as in the four commonly used approaches and a stakeholder involvement approach. Viergever *et al* (2010) comment that "it depends entirely on the context of the priority setting exercise in question whether use of [the four commonly used approaches] is appropriate, or whether development of own methods is the preferred choice". Evidence synthesis in a particular topic area is a very specific context, and so the framework was developed with this in mind.

7.3.3 Inclusiveness

Viergever *et al*'s (2010) recommendation on inclusiveness centres around identifying the stakeholders and their role in the process. COH identified their stakeholders as part of the priority setting plan (see Appendix A). These were:

- The editorial base team;
- COH editors and clinical advisors;
- COH's Global Alliance: consisting of clinical experts, funders and representatives from international oral health organisations;
- The Global Evidence Ecosystem for Oral Health (GEEOH) partnership group, which includes representatives from guideline developers in oral health;
- Clinicians, professionals and researchers working in the field of oral health;
- Consumers, including patients, carers and the general public;
- Colleagues from the Cochrane Musculoskeletal, Oral, Sensory and Skin Network (formerly known as the Long-Term Conditions and Ageing 2 Network);
- Colleagues from Cochrane Centres and Fields.

The stakeholders included those internal to Cochrane and COH, but also leveraged links with guideline developers, policymakers and clinicians and health professionals working in oral care. Most importantly, COH engaged with consumers, who are ultimately the end beneficiary of a Cochrane review. Consumers are patients, carers and members of the public, who undergo interventions to improve their health, and it is vital that interventions are based on the best available evidence. Therefore including consumers in the priority setting process was essential.

The stakeholder consultation phase included a survey which was online and open for anyone to take part (see Chapter 4, Section 4.2.2), and stakeholders (including consumers) were also involved with ranking the final priority list (see Chapter Five, Section 5.2.2). The priorities identified by the JLA Oral Health PSP were also incorporated, and this PSP involved stakeholders which included lay persons, carers, patients and clinicians (James Lind Alliance, 2019). However, analysis of the data from the JLA Oral Health PSP did reveal some issues in adapting the findings of the PSP, intended to inform topics for priority primary research, to evidence synthesis (see Chapter 4, Section 4.4.1). The priority research topics produced by the JLA Oral Health PSP were very broad, possibly too broad to be turned into answerable systematic review questions without considerable effort. The PSP in Oral Health also missed out the topic of oral cancer completely, and placed some caveats on the collection of data in the field of orthodontics (James Lind Alliance, 2017).

As Cochrane is a global network which aims to address health concerns internationally, a balance had to be struck in terms of inclusivity. An online survey ensures that voices can be heard from different countries, but it does exclude those people who are not online or lack information literacy. However, the priority setting process was as inclusive as possible within the restraints of time and budget for the research. COH did engage with multiple stakeholders both in the stakeholder engagement phase and the ranking phase of the process. Guideline developers, policymakers, clinicians, researchers and consumers were all engaged where possible via links with the Cochrane Oral Health Global Alliance and the Global Evidence Ecosystem for Oral Health network.

COH contacted Cochrane's Knowledge Translation team at an early stage to signal the intention to undertake priority setting, and this was subsequently advertised in Cochrane's "Reviews and Methods Digest" and Cochrane's "Centres and Fields Digest". In addition, the stakeholder engagement survey undertaken by COH was also submitted to Cochrane's Knowledge Translation team, who then advertised the survey on Cochrane's social media channels. This fulfilled the mandatory requirement to "publish (through relevant Cochrane channels) the intention to conduct a priority setting process, to give external and internal stakeholders (Groups, Networks and Fields) an opportunity to be involved" (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019).

7.3.4 Information gathering

Viergever *et al* (2010) suggest collecting technical data to inform priority setting, which may include burden of disease data and cost-effectiveness data. The suggested technical data was not gathered for this research. Instead, the information gathering phase concentrated on examining the evidence base and the current usage of COH reviews (see Chapter Three). The usage of the systematic reviews produced by COH are one measure of how valuable a topic may be, and collection of this data focuses attention on those reviews which may be updated in the future. The data collected measured how often reviews were accessed, cited and mentioned on social media and news websites (via Altmetric score). Cochrane's position as not only a producer of systematic review evidence, but also as a publisher (via their publishing deal with Wiley) makes available data that is not always available to those setting priorities in health research. Although the data gathered in itself is not enough for setting priorities, it importantly highlights those reviews which are of interest and may be updated, but also identifies those reviews which may not be worth the investment of time and resources in the future.

Burden of disease and cost-effectiveness data could have been collected at this stage to improve the process, but as previously noted in this chapter, burden of disease data may not be reliable in an oral health context (Petersen, 2005, p. 72; Janakiram *et al*, 2017). It is also difficult to set priorities using burden of disease data without context or an understanding of patient experience. Caries is the most common disease in the world, affecting 2.3 billion people (World Health Organization, 2020c), so in terms of numbers of people affected, it would rate highly in terms of burden of disease. However, it is not life-threatening, and does not have the same impact on quality of life as a disease like oral cancer. If priority setting is undertaken using burden of disease data in the future, it should therefore not be used in isolation, it is crucial to understand the context when prioritising topics for research. Cost-effectiveness data on oral health interventions tends to be limited to high-income countries (Hettiarachchi *et al*, 2017, p. 122), and so lacks the global perspective necessary for a Cochrane priority-setting process.

Viergever *et al* (2010) recommend undertaking a literature review to find gaps in the evidence base. This study took a different approach from the standard literature review. As systematic review evidence is the "bridge" between primary research and clinical guidelines, evidence "gaps" may constitute either those areas where there is primary

research but no well-conducted systematic reviews, or where guideline developers consider that there is a need for more evidence. However, the review of the evidence base conducted in Chapter Three revealed that there were only a few defined areas where there might be scope for new systematic reviews, as much of the clinical trials that were ongoing or recently conducted were on interventions that would already fit within the scope of COH's existing reviews. The examination of clinical guidelines generated the opposite problem: there were many evidence gaps discovered but the extent to which these gaps represented genuine uncertainty was unclear, due to both the quality of the guidance documents, the opportunities for bias and the fact that guidelines may not be developed systematically (see Chapter Three, Section 3.4.3). Nevertheless, the data gathered was useful in that it revealed that there was still potentially scope for systematic review evidence in new topic areas, and also exposed the complexity of dealing with uncertainties when the evidence base is not robust. The framework performed well in terms of gathering information, but the data needed to be supplemented with stakeholder views and consumer input.

7.3.5 Planning for implementation

Planning for implementation was done by COH's editorial base team, who are directly responsible for delivering on the priority research, something which Viergever *et al* (2010) argue is vital. Implementation was a part of the priority setting plan, which was instigated before the priority setting research was undertaken (see Appendix A), and signalled the intention to put strategies in place for recruiting authors teams and mapping priority areas against existing reviews so there was knowledge of which priority reviews would be new and which would need updating. At the end of the priority setting process, an implementation plan was developed (see Appendix H), with a strategy for each of the forty-eight priority topics, some with timeframes. These strategies included details on which reviews would be updated and by when, which new topics might be viable, and included alternative strategies where the priority setting was more complex; for example, with those topics where the priority title was very broad and involved overlap with existing reviews.

The implementation phase could have been improved by including at least one other researcher in the preparation for implementation. Although it was COH's editorial base team who made the ultimate decision on how each priority topic should be handled, they were provided with information developed using the SPARK tool (Akl *et al*, 2017a) to

guide their decision making (see Chapter Six). Part of this process was investigating the robustness of non-Cochrane systematic reviews that may already exist on the priority topic using the AMSTAR checklist (see Chapter Six, Section 6.2.2). Undertaking the assessments both for AMSTAR and SPARK in duplicate may have improved the process and reduced bias by ensuring that the decisions made were more objective. A second researcher, working independently, would have helped to ensure the reliability of the results.

Including implementation in the framework developed for this research project to ensure that priorities are acted upon was important, and attempts to remedy the issue of non-completion of priority setting projects, which has been reported in the literature (Angell *et al*, 2016, p. 1389).

7.3.6 Criteria for priority setting

Viergever *et al* (2010) see the setting of criteria to focus discussion among stakeholders as important in the priority setting process, but this is perhaps one area where the framework used in this research project could be improved. The only part of the process which used set criteria for focusing a discussion was the implementation phase examined in Chapter Six, where the SPARK tool developed by Akl *et al* (2017a) was utilised to inform the discussions around how to implement the priorities. This outlined set criteria for consideration of each priority topic which might be undertaken to ensure that a plan of action could be agreed in context. The criteria were whether the question was answerable, whether there was already a high quality existing review, whether there were primary studies available for inclusion and consideration of operational resources such as time, personnel and management capacity. Criteria around ethics and relevance to lower and middle income country contexts were also considered in this phase, as was the relevancy of the priority topic during and after the Covid-19 pandemic.

Other phases of the framework could also have benefited from having set criteria for discussion. The stakeholder consultation phase was an open survey, with no guidance given to participants on either what constituted a priority question, or on how to make the decision about which questions might be evidence gaps. Madden and Morley (2016) have previously commented on the need for "education" of participants in priority setting, demonstrating that there is sometimes a lack of understanding of what constitutes "uncertainty" and questions which are not answerable being put forward by participants.

This might be particularly the case for participants in priority setting where there is a tight focus, as in this case, where the only priority questions that were considered were those which fitted into COH's scope and were applicable topics for systematic reviews. The participants may have had a poor understanding of evidence synthesis or the work of COH. This again raises an issue discussed in Chapter Four, Section 4.4.2, as to whether increasing the complexity of the survey, as producing set criteria and providing more information on which to base decisions would do, might deter potential participants from engaging in the process. Keeping the survey open and "light touch" might have improved the response rate and encouraged global participation, but the data collected was not as rich as might have been produced had another methodology been used to collect the data, such as a focus group. A focus group setting would also have allowed for educating participants and talking them through set criteria. However, even if an online survey model was repeated for future priority setting projects, it might be possible to produce more guidance for participants and set more specific questions for them to answer.

The ranking phase of the research, where an expert panel ranked the priority topics from least to most important to produce the final priority list for implementation, could also possibly have benefitted from more set criteria on how to decide on the ranking. Although this phase of stakeholder consultation was more focused than the open survey in that the panel were only presented with the priority topics and asked to rank them as a top ten (for new topics) and a top fifteen (for existing topics), the panel were not given any criteria around how to make their decision on how to rank, aside from how important they felt the topic was. The follow-up questions which asked why the panel chose to rank their top three topics as they did showed that the panel used varying criteria for their choices, and that this was not consistent across panel members (see Chapter Five, Section 5.3). For example, clinical relevance, lack of current guidance, the prevalence of a condition, personal experience, cost-effectiveness and lack of evidence to support policy were all given as reasons for making the decision on which topics to rank highly. If criteria had been specified beforehand, for example, which topics did the panel believe were lacking in evidence, this could have directed their choices differently and the priority topics may have been ranked differently, and this is true of any of the criteria that might have been chosen. It would be up to COH's editorial team to decide which criteria are most important if the priority setting framework is developed in this way and utilised in the next priority setting exercise.

7.3.7 Methods to decide on priorities

According to Viergever *et al* (2010), the methods for ultimately deciding on the priorities divide into consensus-based approaches and metrics-based approaches. The original intention of the framework used in this study was to take a consensus approach, where a Delphi-style process with a panel of stakeholders would be used to decide on the final priorities. However, limited resources and lack of access to appropriate software meant that a metrics approach had to be used to rank the priorities, where individuals ranked the priority topics, and these were then scored and pooled (see Chapter Five, Section 5.2.2). This metrics-based approach does have some advantages: it could be performed entirely online which meant that an international panel could be convened at low-cost and the process could be undertaken quickly. As all the participants had an equal chance to rank the priorities, it meant that any one individual could not dominate the process.

However, a consensus-based approach would also have advantages. As with a 'focus group' method, a consensus-based approach would allow some opportunities to educate the panel on evidence synthesis and the work of COH. Any ambiguities in the research questions could also be clarified and it would make it possible to refine the questions so that they are answerable and within scope. There is also no reason why a consensus-based approach would have to be face-to-face, as it could be carefully managed with online meetings or software that preserves anonymity. The downside of this (as Elliott *et al*, 2007, found) is that there may be less rapport between participants and they may find it a less satisfying process. Nevertheless, the framework could be improved by some investment in facilitating a more consensus-based approach to the ranking phase, and stimulating some discussions amongst stakeholders around their knowledge and experience of the priority topics.

7.3.8 Evaluation of the priority setting process

A period of evaluation is recommended, as is periodic review of the final priorities (Viergever *et al,* 2010; Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019). The final evaluation of this priority setting process will take place after the current funding cycle has elapsed, to see whether the priority topics have been converted into Cochrane reviews. At this stage, it might also be appropriate to conduct a survey with stakeholders, to find out whether or not the resulting reviews met their needs and supplied the evidence required. In addition, it may be useful to track the citations of

the priority reviews, to understand whether they are cited in international clinical guidelines. The publication of highly cited, clinically relevant reviews which meet the needs of patients and clinicians will be the ultimate test of the priority setting process. However, COH's ability to deliver on the priority setting is to some extent, out of the group's control. Much depends on the availability, capacity and willingness to engage of researchers with the skills to do systematic reviews. The vast majority of COH's reviews are produced by volunteers, undertaking the work in their own time, their only recompense being a publication in *The Cochrane Library*. Recruitment of author teams is increasingly problematic, and may also limit the ability of the group to move into areas where even more complex methods are required, such as network meta-analysis. This poses a dilemma for COH, in that the narrow scope of the current portfolio of intervention reviews may no longer be appropriate when it seems that stakeholders are more interested in overall strategies to manage their oral health rather than the effectiveness of single interventions (see Chapter Four, Section 4.3.2). However, it is difficult to move to more complex review types, or new types of reviews for the group such as prognostic reviews, without being able to recruit author teams with the skills to do them. This is an issue that will need to be carefully considered in future prioritisation exercises.

COH's previous priority setting process concluded in 2014, before Cochrane's mandatory standards were published, and the new process was concluded in 2020. The repetition of the process was therefore slightly outside the mandatory guidance, which specifies a five year review of priorities (three years is desirable) (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019). However, in future, the next set of priority reviews will be produced at five year intervals. As has been demonstrated by Chapter Three, Section 3.3.2, where trials registered on new or upcoming interventions were explored, oral health does not seem to be a particularly fast moving field in terms of research, with a few exceptions. This may be partly due to the longer follow-up time needed to test interventions for some dental conditions. For example, trials on dental caries typically have at least a two or three year follow-up period, as it can take years for caries to develop in the mouth (Featherstone, 2008, p. 286). COH has therefore not committed to the highly desirable standard of updating the priority setting every three years, every five years is sufficient. The next priority setting process will therefore have to be concluded in 2025, and it is undetermined how these priorities will be set, however recommendations can be made based on this research project (see Chapter Eight).

Viergever *et al*'s (2010) best practice checklist has proved to be a useful tool for evaluating the process, as it focuses on the main aspects and ensures that attention is drawn to the areas which provide value to the process. It emphasises planning and gives careful consideration to context and stakeholder groups, without being too prescriptive on which methodologies to use. This is important for those groups setting priorities without a large pool of resources, as they can determine which methodology best suits the context and time available. The key areas to priority setting of inclusion (i.e. stakeholder consultation), the importance of supporting information and what information to gather, and implementing the final priority list are all given due emphasis in the checklist. It also allows a consideration of what could be improved in terms of planning and conducting the priority setting, so that a more robust process can be conducted when priorities are updated in the future.

7.3.9 The transparency of the process

There is a strong emphasis in both Cochrane's mandatory guidance and Viergever *et al*'s (2010) best practice standards on transparency (Viergever *et al,* 2010; Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019). COH has attempted to implement a transparent process from the start of the priority setting process. A webpage on COH's website was established in 2018 (https://oralhealth.cochrane.org/about-us/cochrane-oral-healths-priority-setting-process), and it contained both the priority setting plan (see Appendix A) and brief details on each stage of the priority setting process. As the stages were completed, a report was published on each one and shared on the website, and the final implementation plan was also published on the website. In June 2019, COH also started to send out priority setting bulletins, offering the chance for any interested parties to sign up to a mailing list to receive a regular progress report on how the priority setting was going, the archive of bulletins is available via the same website: https://oralhealth.cochrane.org/about-us/priority-setting/cochrane-oral-health-priority-setting-bulletins. This mailing list will also be used to update people on the publication of priority reviews. In addition to the implementation plan, a webpage has been published containing a list of all the priority titles, along with information on how each will be progressed: https://oralhealth.cochrane.org/our-evidence/priority-reviews.

However, now that the priority setting has been completed, it may be useful to write one single report on the process and how it worked, as currently people would have to find that information across several documents. The REPRISE guidance has been published recently, offering guidance for the writing of a final report on priority setting (Tong *et al*, 2019). REPRISE consists of 31 reporting items over ten domains, and was generated from a review of "frameworks, guidelines and models for conducting, appraising, reporting and evaluating health research priority setting, reviews (including systematic reviews) of research priority setting studies, and primary research priority setting studies" (Tong *et al*, 2019). The domains are context and scope, governance and team, framework for priority setting, stakeholders or participants, identification of research priorities, prioritization of research topics or questions, output, evaluation and feedback, implementation and funding and conflict of interest (Tong *et al*, 2019). All of these aspects of priority setting should be clearly described in the final report. Writing a report with the REPRISE guidance and publishing this on COH's website would improve the transparency in the priority setting process.

One of Cochrane's mandatory standards for setting priorities is to document the implementation of the process and make it available to stakeholders, including the Cochrane Network to which the group is linked (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019). The priority setting implementation plan produced by COH after the process of setting priorities was complete was designed to fulfil this requirement (see Appendix H). COH is part of the Musculoskeletal, Oral, Sensory and Skin (MOSS) Network, a network of eight Cochrane review groups, with common reporting mechanisms and a strategic plan, whose oversight includes priority setting. The implementation plan does include a link to the MOSS Network's webpage, and a brief summary of the priority setting process. It also includes a plan of action for each priority topic. The implementation plan has been published on COH's priority setting website and also shared with the MOSS Network editorial team.

COH have also improved the documentation and transparency of the process by publishing a list of priority titles both in their implementation plan, and on the website: https://oralhealth.cochrane.org/our-evidence/priority-reviews. Any reviews that are to be updated include a link to the current review on *The Cochrane Library*, and for all priority topics the action to be taken for each is also available on the website. A further highly desirable standard in terms of documentation is to publish a more detailed report, either on

the group website or in a journal. Although there is a report available on each stage in the priority setting process on the website,, it may be better to create one final report according to the REPRISE guidance, so that interested parties do not need to consult several documents to understand how the priority setting was conducted.

A further mandatory requirement is around promoting the priority reviews with a dissemination brief, which includes implications for clinical practice and future research (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019). Both of COH's Managing Editors have been informed of the need to produce a dissemination brief for all priority reviews in future. They share responsibility for ensuring that the dissemination brief is filled out for all Cochrane priority reviews, and that there is transparency around the messaging for each priority topic.

Cochrane also mandates a feedback mechanism to inform those stakeholders who took part in the priority setting of the final outcome (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019). COH provided both a link to the priority setting website with details of the priority topics and priority setting process to the stakeholders who were involved. Again, this included reports on each stage in the process. Stakeholders were also given the chance to sign up to COH's mailing list for receiving priority setting bulletins, so that they could be alerted when a priority review is published. Giving stakeholders notice of publication of priority reviews is another highly desirable standard for priority setting in Cochrane, and this is a mechanism for doing this.

7.4 Discussion and conclusion

Evaluating the priority setting framework and process used in this research project using the Viergever *et al* (2010) checklist of good practice and by using Cochrane's mandatory standards (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019) has been of value. The framework has directed a priority setting process that does meet all of Cochrane's mandatory standards, and it has generally performed well against seven of the nine common themes of good practice, the first two themes (context and comprehensiveness) were less applicable because of the focused nature of this priority setting process. Areas where the framework has performed well have been highlighted in this evaluation, but it has also identified areas where there could be improvements for the next priority setting process.

Strengths of the framework have included stakeholder engagement and implementation, the thorough exploration of the evidence base, and the transparency of the process. Stakeholders had two opportunities to become involved in COH's priority setting, both through the online open survey, and the process to rank the final priority topics. An implementation plan provided a clear path to converting the priority topics into high-quality systematic reviews or review updates, with each priority topic considered in turn with a plan of action. The information gathering phase both revealed scope for new systematic reviews in oral health, but also exposed complexity in the evidence base, and a mismatch between high quality primary research and the needs of guideline developers. It undoubtedly contributed to a more informed priority setting process. Transparency was emphasised throughout, with a website dedicated to the priority setting process and reports published as each stage was completed.

Part of the benefit of the framework which has not been explored in the evaluation so far is the adaptability of the framework to circumstance and context. As discussed in Chapter One, Section 1.6, the Covid-19 pandemic coincided with the final stages of this study. Although much of the priority setting had been concluded by March 2020 when the pandemic was declared (Cucinotta and Vanelli 2020, p. 157), the ranking and implementation stages were both adapted to ensure that the effects of the pandemic were reflected in the decisions made on whether to pursue priority topics. A question on which topics might be undertaken by COH as a result of the pandemic was added to the ranking phase of the process (see Chapter Five, Section 5.2.2), and the implementation phase also contained an evaluation of each priority topic, to see if it was still relevant in dentistry (see Chapter Six, Section 6.2.10). The flexibility of the framework meant that this could be achieved without major changes to the process.

The value of the framework developed in the study for adapting to different contexts was also demonstrated by the adoption of part of the methodology by Cochrane Skin, who completed their priority setting project in 2020 (Cochrane Skin, 2020). Cochrane Skin's remit is to undertake systematic reviews in "prevention of skin disease, the treatment and management of established skin disease, and the prevention of complications of skin diseases" (Cochrane Skin, 2021). Like COH, Cochrane Skin were presented with the challenge of how to prioritise their review titles and updates and contacted COH to discuss the framework and the methodology undertaken for COH's priority setting project.

Cochrane Skin ultimately followed a very similar process, involving a stakeholder consultation, and information gathering. Stakeholders from professional societies, guideline development groups, Cochrane Skin membership and patient representatives were contacted and asked to provide review title suggestions (Cochrane Skin, 2020). The information gathered by the Cochrane Skin team was broadly similar to that of COH, looking at the data on how current reviews were being downloaded, cited and their Altmetric scores, and where new trials were being registered (Cochrane Skin, 2020). Text mining was also used to suggest themes in the identified trials. JLA prioritisation exercises were incorporated. The process differed in that Cochrane Skin used global burden of disease data to rank and organise their priorities. The priorities were then mapped against Cochrane Skin's portfolio to see which reviews might need updating, and what new titles might be identified (Cochrane Skin 2020). Cochrane Skin's experience with the framework is a valuable addition to this evaluation, as it demonstrates that the framework can be adapted to different contexts within evidence synthesis.

There were changes that could be made to the priority setting process, which were underlined by undertaking the evaluation. More set criteria could have been offered to both the survey participants who submitted questions and the panel who ranked the final priorities, to assist them in their decision-making. It may also have been more interesting to conduct a Delphi study to rank the priorities, rather than using a metrics-based approach. The guidance provided for implementation could have been improved by assessing the priority topics in duplicate using the SPARK tool, rather than a single researcher doing these assessments alone. Different decisions could have been made at all the stages in this process, including the information gathering phase. More context could have been supplied by considering burden of disease data or cost-effectiveness data. However, it is arguable whether this would have improved the process, or just led to a different focus. Some of the identified improvements still need to be actioned, for example, writing a final report and an impact assessment of whether the priority titles have been turned into high-quality systematic reviews that meet the needs of stakeholders.

The process must be repeated in five years' time, and COH needs to decide how this will be actioned. Decisions should be made as to whether this framework should be followed again, or whether a different approach is needed. This study does allow for recommendations to be made for if and when the process is repeated, and these are

presented in full in Chapter Eight, Section 8.5. Some aspects of this priority setting process were resource intensive, such as examining guidelines for evidence gaps, and undertaking an online open survey. Changes could be made to both the context and methodology to account for this, however. Contextually, COH might narrow the focus of the priority setting even further by concentrating on one area of the group's portfolio or looking only at the scope for new priority reviews. In terms of methodology, the group might set more strict criteria on the data collected in the information gathering phase, for example, not including guidelines where there is no grading of evidence. It may also be useful to explore whether text mining could be utilised in analysis of the guidelines, as it was in the exploration of clinical trials (see Chapter Three, Section 3.2.2). The group might also consider alternative forms of stakeholder consultation, rather than conducting an open survey. For example, focus groups or interviews with individuals may be less time consuming in terms of analysing the data, although there are risks inherent in not engaging with a broad group of stakeholders. It would also be beneficial to include at least one consumer on the priority setting steering group in order to ensure that the process represents stakeholders adequately.

Finally, this priority setting process has demonstrated that Cochrane's approach of not wholly relying on a set of priority topics established by an external process is correct. While the JLA Oral Health PSP was successful in engaging stakeholders and producing a set of priority areas for further research, these generally proved too broad to be useful as questions for answerable systematic reviews.

Chapter Eight: Discussion and Conclusion

8.1 Introduction

This final chapter summarises and discusses the main achievements and findings of this research project. The aim of this research, outlined in Chapter One, and reiterated here, was to present and test a framework for priority setting in evidence synthesis, using COH as a case study. The objectives were:

1. To examine the existing literature for themes to develop a new framework for priority setting in evidence synthesis;

2. To gather information and data relevant to Cochrane Oral Health to support priority setting from existing sources and stakeholders;

3. To apply the priority setting framework to COH's work, and develop a plan with COH for implementing the results;

4. To evaluate the strengths and weaknesses of the framework, and make recommendations for adapting the framework for other groups involved in evidence synthesis.

The framework was developed from the literature and consisted of five phases: information gathering, stakeholder consultation, mapping and ranking, implementation, and evaluation. A priority setting plan was developed at the outset of the research project (see Appendix A) and whether the final research project diverged significantly from the original conception outlined in the plan is considered, along with strengths and weaknesses of the framework developed in this priority setting project. The main themes emerging from this priority setting process in oral health and some recommendations for future priority setting activities are also explored. As well as considering how well the priority setting framework worked in practice, this discussion also considers some of the other issues which have materialised from the study, and reflects on some limitations and directions for future research in priority setting.

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8.2 Did the research project follow the priority setting plan?

The production of a priority setting plan is a mandatory requirement for priority setting within Cochrane (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019), and COH produced a plan in 2018 (see Appendix A), which was subsequently published on the group's website. The aims of the priority setting project were encapsulated in the plan; namely, to find out which questions were most important in taking care of the mouth, teeth and gums. An important point to consider in assessing the strength of this research is to look at how well the final project matched with the original priority setting plan. The priority setting plan had the following sections: steering group, stakeholders, scope, methods, timescale, implementation and communication.

The steering group section set out the group of people who would be responsible for the project: the group's two co-ordinating editors, statistical editor and information specialist. The steering group was unchanged throughout, which allowed for continuity and leadership of the process. The stakeholder section set out who COH believed were the main stakeholders for the project: the editorial base team, COH editors and clinical advisors, COH's Global Alliance (a funding arm consisting of representatives from international oral health organisations), the Global Evidence Ecosystem in Oral Health partnership (GEEOH), clinicians, professionals and researchers working in the field, consumers and members of the public, and colleagues from Cochrane's wider collaboration of networks, fields and centres. A stated aim within the priority setting plan was to engage with all of these stakeholders. This aim was largely met. The editorial base team were involved with the development of the implementation plan (see Chapter Six). COH editors, clinical advisors, Global Alliance members, GEEOH members, clinicians and consumers and members of the public were all involved in the ranking phase to rank the priority topics in terms of importance (see Chapter Five) and all had the opportunity to submit questions to COH's open call for priority questions (see Chapter Four).

However, there could have been some wider engagement with other colleagues within Cochrane. Cochrane's Knowledge Translation Team were involved in the promotion of COH's priority setting survey (see Chapter Four), but that was the extent of the involvement of Cochrane's international network. One Cochrane field (the Child Health Field) was approached to also help to promote the survey but they did not respond. It may have been helpful to leverage Cochrane's international links, particularly through

Cochrane Centres, which exist to promote Cochrane's work in their respective countries, to help promote the priority setting project more widely. There was a lack of clarity around who to contact and how to make this happen. Channels of communication within Cochrane need to be clearer and opportunities to engage internationally need to be promoted.

The scope of the research project was well-defined in the priority setting plan. COH would consider their whole portfolio, including priority topics which may be part of those reviews already published and those which were new to the group. The research did not diverge from the priority setting plan in terms of scope. The priority setting plan also set out the methods to be used, and there were some differences between the planned methods and the methods used in the final project. The information gathering phase conformed with the methodology laid out in the plan, in that the information gathered followed the plan: data on how existing Cochrane reviews were being used and by whom; looking at in which areas new clinical trials had been registered; and examining guidelines to find out what guideline developers needed in terms of evidence to support their work. However, there were changes in the methodology both in terms of the stakeholder consultation phase and the ranking phase. The JLA PSP in Oral Health had concluded and published findings a few months after the priority setting plan was developed, and it was decided to incorporate their top twenty-five priority questions, arrived at in consultation with a group of stakeholders in oral health management, into the stakeholder consultation phase of COH's priority setting project. It was intended that the data should complement COH's own priority setting survey. There was also a change in the methodology used to rank and refine the final priority topics. It was originally intended to do this work as a Delphi study, over several rounds, where stakeholders (including patients and members of the public) could come to a consensus over which topics were the most important. Due to Cochrane's international remit, this Delphi study would have been conducted online, so that stakeholders in different parts of the world could take part. Limitations driven by software and resource meant that it was not possible to undertake a Delphi in the time available. Therefore, the final prioritisation was done as a simple ranking exercise, with priority topics ranked and scored by stakeholders, with no opportunity for discussion. This is a limitation of the research.

The other aspects of the priority setting plan were adhered to in the final research project. A Gantt chart was developed in the priority setting plan, with a stated intention of completing the priority setting project by December 2020. This was achieved, although

some of the stages in the process took longer than anticipated, in particular the analysis of the data from the information gathering phase. More guidelines were found than expected, and it took longer to read and analyse these than the time allowed in the Gantt chart. It was also the intention to produce an implementation plan, to ensure that each priority topic could be addressed in either a new Cochrane review or an existing Cochrane review update. This was also achieved (see Appendix H). Finally, the priority setting plan set out strategies for communication around the priority setting process and promotion of the final list of priority topics. This included a website that would be set up to report on each stage of the process, and to list the priority topics when published, and also the establishment of a mailing list, where interested parties could sign up for updates. The website was produced (see https://oralhealth.cochrane.org/about-us/cochrane-oral-healths-priority-setting-process) and kept up-to-date throughout, with a list of priority topics and the plans for each now available (see https://oralhealth.cochrane.org/our-evidence/priority-reviews). A series of priority setting bulletins was promoted via COH's newsletter, website and social media channels; it was then produced and sent out to those who had signed up to a mailing list.

The research documented in this thesis therefore followed the priority setting plan closely apart from the two divergences in methods: the inclusion of the priorities from the JLA PSP and the adoption of a simple ranking scheme to rank the priority topics rather than a Delphi. The aims of the research project were met, in that priority topics have been agreed via the framework and an implementation plan produced. However, it is important to examine how well the framework performed in the context of this case study, and what changes might be made to ensure that priority setting continues to be robust and inclusive. Strengths and lessons learned will therefore be examined.

8.3 Strengths of Cochrane Oral Health's priority setting framework

The evaluation of COH's priority setting process revealed some clear strengths of the framework used in this study (see Chapter Seven). A clear focus and scope was established early in the priority setting project, with a very defined concept (priority topics which were appropriate for evidence synthesis) and topic area ("the prevention, treatment and rehabilitation of oral, dental and craniofacial diseases and disorders" (Cochrane Oral Health, 2016b)). It was also clear that this whole scope was to be examined, whether a Cochrane review existed in the topic area already or not. Starting with clarity on these

points was important, as this helped to form the data gathered to support the priority setting process.

Stakeholder consultation was a further strength, with stakeholders having two opportunities to become actively involved with the priority setting process. They were able to contribute to the stakeholder consultation, in which any question that they felt was a priority could be submitted. Stakeholders were also involved with ranking the final priority topics, and refining them into 30 review updates and 15 possible new topic areas. The fact that the stakeholder consultation happened online meant that the priority setting process had global reach, with participants coming from 19 countries, and the largest proportion coming from India, a lower-middle income country according to the World Bank (2019). 211 questions were submitted by 168 participants, and all questions were considered as part of the priority setting process. It can therefore be concluded that the final priority topics truly reflect the interests of the stakeholders who took part.

The evaluation of the priority setting process outlined in Chapter Seven, also highlights the data used to underpin the priority setting in the information gathering phase as a particular strength of the framework. Examining areas where new clinical trials were being registered revealed that there was some limited scope for new systematic reviews, and allowed for experimentation with text mining to uncover the main themes of the trials and to ease the burden of screening the records (see Chapter Three, Section 3.3.2). This is a novel method in this context, previous priority setting projects reported in the literature have not utilised text mining. Looking at the gaps in the evidence according to guideline developers also highlighted more areas for new systematic reviews (see Chapter Three). Consideration of the performance of COH's previous reviews in terms of downloads, citations and Altmetric scores was also helpful, as it pinpointed areas where systematic reviews may need to be updated and allowed the group to disinvest resources on topics where there was little interest. It also gave valuable insights into COH's audience, it was clear that those citing reviews in their own research had different needs to those downloading the reviews or talking about them on social media (see Chapter Three). Although this data was not enough on its own to set priorities, it did provide a detailed look at the evidence base in terms of primary research and clinical guidelines in oral health.

As discussed in Chapters Two and Six, implementation of priority setting is poorly reported in the literature, and remains an under-researched area. One strength of this

framework was the emphasis on implementation and the production of a clear implementation plan, with actions set out for each priority topic. The actions were agreed with those responsible for directing the research on the priority topics, which will help "buy-in" to getting the priority titles turned into systematic reviews. The SPARK tool developed by Akl *et al* (2017a) was used to inform the creation of the implementation plan (see Appendices B, G and H), the first time that practical application of the tool has been reported in the literature since it was developed. The tool proved to be pragmatic and useful, drawing attention to issues around resourcing, personnel and research waste. It was also valuable for highlighting the priority topics which needed more refinement and scoping before they could become systematic review titles. Although a true picture of the success or otherwise of the implementation phase of the project will only be obtained after the current funding cycle, having an implementation plan and actions agreed by the Editorial Base team gives confidence that the priority reviews will be undertaken. To some extent however, this is beyond the control of the review group, as much depends on the availability and skills of volunteer review teams who can undertake the reviews. This is an ongoing issue with the production of high-quality systematic reviews.

A further advantage of the framework was the evaluation (see Chapter Seven), particularly the use of Viergever *et al*'s (2010) checklist derived from best practice in priority setting as reported in the literature. The best practice checklist allowed focus to be drawn to those areas which are most critical to the success of priority setting. It revealed areas where the priority setting process could be improved, and ensured that stakeholder consultation and the context of the priority setting process were carefully considered. The checklist also allowed for a degree of flexibility, as it was not prescriptive in terms of the methods used for the priority setting. It could be argued however, that the best practice checklist should be used at the start of the process as well as to evaluate the process at the end. There is a strong emphasis on planning in the checklist, and it may be a useful tool for creating a priority setting plan at the outset.

Finally, although transparency was not an overt part of the framework, the communication of each stage of the process was written into the priority setting plan (see Appendix A), and was an key strength of this research project. The importance of transparency is emphasised again and again in the literature (Viergever *et al*, 2010; Tromp and Baltussen, 2012; Sibbald *et al*, 2009; Bryant *et al*, 2014; Nasser *et al*, 2013a), as this is a mechanism to promote acceptance of the priority topics by stakeholders (Sibbald *et al*, 2009). If

stakeholders can understand how decisions have been made and by whom, there may be more "buy-in" of the results of priority setting (Sibbald *et al*, 2009). Publication of reports on each part of the process on a publicly accessible website, along with regular bulletins to interested parties meant that the priority setting process was communicated throughout, and opportunities for stakeholders to get involved were advertised via Cochrane's social media channels. The final list of priority topics and implementation plan is also publicly available.

The framework utilised a combination of methods, collecting both hard data on the usage of reviews, and more subjective opinions. Combining stakeholder views with usage statistics and analysis of the evidence base gave a different perspective than using just one of these methods alone. The value of the framework was demonstrated by the fact that another Cochrane group, Cochrane Skin, has also adopted some of the framework for its own priority setting project (see Chapter Seven, Section 7.4), and the flexibility of the framework was demonstrated by the changes made as a result of the Covid-19 pandemic (see Chapter Seven, Section 7.4). The adaptability of the framework to circumstance and context is a major strength. The framework proved to be successful, however, there were some areas that could be improved.

8.4 Lessons learned from Cochrane Oral Health's priority setting framework

The evaluation outlined in Chapter Seven revealed some areas of the framework that could have been improved, particularly related to the work with stakeholders. The open survey, conducted to elicit questions from stakeholders and members of the public collected no data other than the questions and the participant's country of origin. It would have been useful to collect other data from participants including age, ethnicity, gender and job role. This would have helped to build a picture of the representativeness of the participants. It may also have indicated how successful the survey was in including people from hard-to-reach communities. This is important because of the generalisability of the resulting priority topics. For example, the open survey presented some intriguing data on whether the participants from lower and lower middle income countries had significantly different needs in terms of oral health research, however it is difficult to know whether the respondents were a representative enough sample to make this data meaningful. Data may also have been gathered on the reasons why people felt their submitted questions should be a high priority, as this would have given valuable context. Had participants submitted questions that matched their own personal experiences of a condition, or had they

submitted the questions for some other reason? The stakeholders ranking the priorities were asked the reasons for their choices of priorities in the later ranking phase, and this revealed a range of possibilities: personal experience, clinical importance, lack of evidence, cost-effectiveness and the potential for improving overall health by improving oral health were some of the reasons given. It would have been useful to collect similar data during the stakeholder consultation.

The reasons why this data may be important leads on to another lesson learned from this priority setting process: the need to set criteria and boundaries for the stakeholders taking part. Data on why participants felt that a topic was a priority might feed into the next priority setting process, and help to set criteria for the decision-making. For example, participants might be asked to prioritise topics that they felt were most lacking in evidence, or had the best chance of improving their overall health. Set criteria was used in the implementation phase, where the Editorial Base team were given reports based on the SPARK tool to help to guide their decision making (see Chapter Six). However, no guidance was given to participants in either the open survey or to the stakeholders involved in the ranking phase on how to prioritise, or what information should be taken into account. More set criteria could have led to a more focussed process, and an opportunity to educate participants on what constitutes evidence synthesis and systematic reviews. Of all the topics submitted in the open survey, 87 were not covered by an existing Cochrane review but 26 of these (29%) were not suitable for a Cochrane review and would never have been turned into an answerable systematic review question (see Chapter Five, Section 5.3.2). The priority setting process would be more efficient if some education around what systematic reviews are, which topic areas are covered and what criteria to use to set priorities was given to the participants. This may also help participants who might feel that their input is not worthwhile if their priorities are not implemented as research projects.

Stakeholder recruitment was another area where lessons were learned. Recruitment to the online stakeholder survey was largely done via social media, which has limitations in terms of reach and risks excluding certain demographic groups who may not access social media, and those with limited literacy (including information literacy). The sample recruited to take part is less likely to be representative of Cochrane's global audience. If repeated, then the stakeholder consultation recruitment should be undertaken by more than one recruitment method. Emails to individual patient groups and dental organisations might have been attempted, and the link might have been shared more widely with Cochrane

fields and geographic centres who could have been contacted individually. This also may have produced a broader representation on the panel in terms of experience of the whole scope of COH's reviews. It is possible that some topic areas were under-represented throughout the process, and this could have been rectified by leveraging links with patient groups and other relevant organisations.

A further lesson learned was the difficulty of including the priorities established by an external priority-setting process, not tailored to systematic review production or to COH's scope. The priorities established by the JLA PSP in Oral Health were included (see Chapter Four), however there were some issues with this. Firstly, the PSP left out the topic of oral cancer, which proved to be a highly important topic area for COH, with diagnosis, prevention and treatment all rated as priority topics by stakeholders. Secondly, many of the priorities established by the PSP were too broad to be useful in setting out an answerable systematic review question. The priority topics needed more work and scoping out before the research could be undertaken. Finally, at the time of writing, there was no final report available on how the priorities were reached, making the process less transparent than other JLA PSPs. It was therefore unclear who exactly was involved in the priority setting process, and how the priorities were reached.

It is also the case that some areas of COH's priority setting framework proved to be time consuming, in particular the analysis of guidelines undertaken in the information gathering phase (see Chapter Three, Section 3.4.3). This is partly because of the number of guidelines that were found and had to be analysed for gaps in the evidence. It was time consuming to read, analyse and document uncertainties from 525 available guidelines. However, many of these guidelines did not involve a thorough examination of the evidence base, an analysis of the 75 guidelines found on dental caries revealed that the majority (53) made no attempt to grade or classify the evidence on which they were based (see Chapter Three, Section 3.4.3). This could therefore be made less time-consuming in the next priority setting process by only analysing those guidelines that were of higher quality, and graded evidence appropriately. There may also be the possibility of utilising similar text-mining techniques as used in the survey of clinical trials (see Chapter Three, Section 3.2.2) although this may be challenging as guidelines vary in their presentation and may provide less structured text for analysis.

A final lesson learned was that subjectivity is inevitable in priority setting, whichever method is chosen. Stakeholders make decisions on which topics are important to them, and often these decisions are not based on objective data. Even if priority setting were done without involving stakeholders at all and just relied on setting priorities through the use of existing information, which information is chosen to set priorities and why is also subjective and heavily dependent on context. Different decisions could have been made throughout this priority setting process: different data could have been gathered, different stakeholders engaged, a different methodology could have been used. The priority setting literature, and Cochrane's own guidance, points to the conclusion that a standard general methodology for priority setting is neither achievable or desirable. Unless a consensus could be reached on which data to gather and how, and which stakeholders to involve and how, the emergence of a standard methodology seems unlikely. Since priority setting is so dependent on context and resources, it is questionable that such a consensus could ever be reached. There were some opportunities to improve the process to make it less subjective however. For example, in the implementation phase, only one researcher assessed the priority topics for viability against the criteria set out in the SPARK tool (see Chapter Six, Section 6.5). Undertaking this process with at least one other person, working independently, would have reduced the amount of subjectivity and counteracted potential biases.

The framework explored in this priority setting project was still successful in achieving its aims, and could be utilised by other groups working in evidence synthesis with a defined scope. Some recommendations have emerged from this study to aid future priority setting.

8.5 Recommendations for future priority setting processes

The following recommendations can be made as a result of this study, if the framework is to be used in practice by other evidence synthesis practitioners:

- It is helpful to begin with a clear focus, both on the research topics and type of studies that are being prioritised. If resources are stretched, narrow the focus further to one topic area within the wider scope. For example, with less time and resource, COH may have looked at one defined area, such as prioritising topics in caries prevention, rather than the whole scope at one time. Global burden of disease data, if available and reliable, might help to decide where to focus efforts.

- A priority setting plan should be developed and a steering group established. The priority setting plan could be developed in tandem with an evaluation tool such as Viergever *et al*'s (2010) best practice in priority setting checklist. This will ensure that important areas of the priority setting process are not neglected, and it will help the process be more transparent if the priority setting plan is published. Establishing a steering group gives clear leadership and accountability. It may also been helpful to engage an external stakeholder to sit on the steering group, to provide a stakeholder voice throughout the process.

- Choose information for the information gathering phase with care, particularly considering what kind of information is important in context and most valued by stakeholders. Examining the evidence base for gaps is essential for developing new topic areas. Consider using text mining approaches if there is a substantial amount of data to analyse in the information gathering phase.

- Ensure that stakeholder involvement is obtained, and give some thought to identifying stakeholders as part of the priority setting plan.

- If a survey is conducted online, make clear information available to the participants as to the type of research product that will be produced after the prioritisation. Ask participants for some contextual data about themselves and their choices. Consider giving participants some criteria to help them make their decisions. If resources allow, try to recruit stakeholders and consumers via an alternative method to social media alone.

- If resources are available, consider supplementing an online survey with other ways of gathering priorities from stakeholders. For example, focus groups may be a useful way of reaching patients, carers and members of the public. Interviews may be another way of supplementing stakeholder data, and these could be conducted online. Data gathered this way allows more detailed information and opportunities to discuss the purpose of the prioritisation. The resulting priorities may be more meaningful as a result.

- Priorities established by external organisations should not be included unless there was significant involvement by those involved in the priority setting process.

- A clear implementation plan should be developed with the team responsible for delivering on the research, to ensure that priority topics become manageable research projects. The SPARK tool developed by Akl *et al* (2017a) can be useful for gathering pragmatic information to guide the discussion.

- Once the methodology to be used is established, examine whether areas of the process which involve decision-making could be made less subjective by undertaking them at least in duplicate, so that more than one researcher is involved. For example, in evaluating the quality of the evidence-base, it is useful to have more than one researcher making the assessments.

- The process should be evaluated, and Viergever *et al*'s (2010) best practice checklist is a tool for doing this. Also consider creating an impact report at the end of the funding cycle, as the true test of the priority setting will be whether and how well the priority topics have been converted into viable research projects.

- Transparency should be maintained throughout the process, with regular updates to stakeholders and other interested parties, and full publication of the final priority topics. A website for publishing reports, plans and updates is essential.

The priority setting framework developed in this study could be adapted for other groups to use in evidence synthesis, and can be adjusted to suit resources and subject area. Testing the success of the framework was the main aim of this research, however, undertaking the priority setting with COH also revealed some issues that were unique to this process. These included the oral health priorities which emerged, and other issues with the evidence base in the topic area.

8.6 Oral health priorities established in this research

It was clear from the research undertaken with COH that stakeholders who ranked the priorities had very particular concerns, and that perceived vulnerable populations were high on the list of priorities (see Chapter Five for the full list of final priorities). Of the 15 new topic areas, oral care for elderly people came out as the top priority, and another review on preventing oral disease in elderly people living in institutions or nursing homes

was also in the top fifteen, a further review on educational interventions for elderly people living in nursing homes was a priority for updating. COH's review on interventions for people with intellectual disabilities was also placed highly on the list of priority updates. Health promotion, changing people's oral health behaviours and early interventions were also prioritised, with the priority topics heavily skewed towards prevention of disease. Thirty-four of the forty-eight final priorities were about prevention or screening for disease, rather than treating it. Of the fifteen new topic areas, two were specifically about changing the behaviour of people through psychological interventions but six others were also indirectly about changing behaviours: either by promoting oral health more effectively or changing dietary habits.

Throughout all phases of this priority setting project, oral cancer was an important topic area for COH, both in terms of prevention and treatment. *Interventions for preventing oral cancer* was the second most highly ranked priority new topic area, and the top ranked COH review to update was *Clinical assessment to screen for the detection of oral cavity cancer and potentially malignant disorders in apparently healthy adults*. All of COH's current reviews on oral cancer were prioritised in the final analysis, this reflects the serious impact of the condition, especially in lower income countries. Perhaps unsurprisingly given its high disease burden (World Health Organisation, 2019), the prevention and treatment of caries in children was another area of high priority, with over one quarter of the final priority topics dedicated to this. Those topic areas which affect people's everyday health choices were also of high priority: which toothpaste to buy, whether to use a powered toothbrush, how long and how often to brush, how often to attend the dentist for a check-up, and whether to undergo a routine scale and polish. Treatment and prevention of periodontal disease was a further area of interest, with gum health and treating periodontitis accounting for sixteen of the forty-eight priority topics. The prevalence of caries, periodontal disease and oral cancer as priority topics was consistent throughout the project, with these being the topic areas most likely to be identified as those with evidence gaps in the information gathering phase, most likely to be identified as important by stakeholders, and most likely to be ranked highly by the stakeholder panel in the ranking phase. The interventions identified to prevent or treat these conditions were not particularly new or novel, attention seems to have shifted to whether existing interventions work for vulnerable people who are at high risk of poor oral health, or to whether existing interventions could be applied differently (e.g. the best way of applying fluoride to teeth, rather than the question of whether fluoride itself is effective). This in turn leads to

questions about whether COH's current portfolio of reviews is too narrowly focused on single interventions to improve oral health and whether it would be more useful to conduct reviews which are more complex, such as network meta-analysis. If focus is moving away from whether X intervention works for Y condition, then more difficult questions which compare interventions to each other and how these fit in an overall strategy to improve oral health in vulnerable or high-risk populations become more important. However, this in itself brings the challenge of finding resource and personnel to undertake more methodologically demanding reviews.

Some conditions which come under COH's scope were not prioritised, for example, temporomandibular disorders, oral mucositis in cancer patients, and cleft lip and palate. This may be because they are less prevalent generally, or because the stakeholders involved in the priority setting had less experience of these conditions. Malocclusion and the effectiveness of orthodontic treatment was another area which was not highlighted as a priority topic, and this is a significant proportion of COH's current portfolio. It may be worth treating these areas separately in future priority setting exercises, so that groups of patients, carers and clinicians are not neglected. It may be the case that there are reviews in these areas which still need progressing and may help significant numbers of people. The topic areas of oral cancer, caries in children and periodontal disease are well-established as priorities, it is difficult to see that this will change by the time the next priority setting process is undertaken in 3 to 5 years' time. This may mean that more attention can be given to other topics in COH's scope, although this may be controversial in terms of using resource to research conditions which have less of a burden of disease.

There was clarity over the priority topics in oral health in terms of which topic areas and overall themes were important, and this has implications beyond Cochrane reviews. The priorities established in this research are important to note in other oral health research contexts as they proved remarkably consistent across the different phases of the study. However, there was perhaps less clarity around which interventions might be investigated. Many of the priority topics were broad and needed further discussion with clinical experts to understand how to frame the systematic review questions that might be undertaken. It is also true that the information gathering phase demonstrated that there may be significant issues with the evidence base, which may compromise priority setting and identifying evidence gaps. These issues which emerged from the study will now be explored.

8.7 Issues emerging from the priority setting process

Undertaking priority setting across COH's complete scope revealed some significant weaknesses in the oral health evidence base, which added complexity to any attempt to scope out gaps in the evidence. Understanding where the gaps in the evidence might be is essential to priority setting and reducing research waste. Examination of COH's current portfolio of reviews revealed high levels of uncertainty in oral health evidence. Of the 96 systematic reviews published by COH in the last five years, only 10 (10%) had high or moderate certainty evidence to support their conclusions. 90% had only low or very low-certainty evidence (see Chapter Five). This suggests that there may be significant issues with the primary studies that are included in Cochrane reviews. Either the evidence is poor quality, or not aligned with the outcomes included in the Cochrane reviews, or the trials that are needed to provide the evidence are not being registered in those topics covered by COH's portfolio. The review of the evidence base conducted in the information gathering phase suggested that trials were being registered in the general areas covered by Cochrane reviews (see Chapter Three, Section 3.3.2), which may mean that there are some issues with the quality of primary studies. However, this must be caveated by the fact that the evidence in Cochrane reviews may be downgraded to low certainty or very low certainty for reasons other than bias, for example inconsistency or indirectness (for example, if the study does not directly compare interventions of interest in the population of interest) (Siemieniuk and Guyatt, 2020). But if there are issues with the conduct and reporting of primary research, then COH's reviews will not be able to draw conclusions based on robust evidence. It is also the case however that not all of the priority topics had trials registered for inclusion. Consideration of COH's new priorities for updating in the implementation phase contradicted the review of the evidence base for some key topics. Five of the thirty-three priorities for updating had no new studies for inclusion (see Chapter Six, Section 6.3.3), although four of these reviews were published fairly recently, and any trials identified in the review of the evidence base may not have been concluded and published in the literature yet.

As well as potential issues with the primary studies, there may also be some issues in terms of non-Cochrane systematic reviews published in the oral health literature. During the implementation phase, a search was undertaken for other systematic reviews on the priority topic areas to ensure that undertaking a Cochrane review would not result in research waste (see Chapter Six, Section 6.3.2). Of the new topic areas, six of the fifteen had at least one

recent non-Cochrane systematic review available, eighteen were found overall on the priority topic areas. All of the eighteen reviews assessed by the AMSTAR checklist were low quality, with twelve of these at critically low quality (see Chapter Six, Section 6.3.2). Some of the priority topics may also have reviews in progress, a search of PROSPERO would have determined this. However as it was difficult to assess the quality of reviews that were not yet published, this search was not undertaken. Checking PROSPERO before starting work on the priority reviews resulting from this priority setting process may however be worthwhile. A preliminary search of MEDLINE, looking at those topics that were tagged with a medical subject heading related to dentistry and with the publication type "systematic review", retrieved over 1,500 results from 2018 to 2021 (see Chapter Six, Section 6.5). However, the vast majority of these do not seem to be aligned with the priorities established in the research presented in this thesis. More research is needed on whether systematic reviews undertaken in oral health strengthen the evidence base and address the priorities of patients, clinicians and the public, or whether they add to the volume of research without contributing to its quality. The question of how to raise the quality of the systematic reviews published in oral health is also something that should be addressed in future work.

As mentioned previously in this chapter, published guidelines, intended for use by clinicians in practice, proved to be a further problematic area in oral health. Over six hundred guidelines have been developed in oral health topics over the last fifteen years (see Chapter Three, Section 3.3.3). Seventy-five of these alone were on the topic of treating and preventing dental caries, and thirty of these were produced by one country: the United States of America. This in itself risks adding to the amount of uncertainty. How does a clinician choose which guidelines to follow, and what happens if the conclusions of different guidelines are contradictory? Many of the guidelines examined in this study did not attempt to grade the evidence or examine the quality of the studies that were included. Their recommendations are therefore open to question: are they based on high quality evidence, or is there a risk that they are based on subjective opinion? Although there was a plethora of guidelines in some areas, in others there were few or no clinical guidelines for topics in oral health's scope, such as orthodontics or cleft lip and palate (see Chapter Three, Section 3.3.3). The guidelines were also developed in and for higher income countries, mostly in Europe and North America. Adapting recommendations for low and lower middle income countries may be a challenge.

There are therefore significant issues with the evidence base in oral health. The evidence needs of guideline developers seem to be many, with 685 evidence uncertainties identified from guidelines in this research alone. However, unless there is improvement in the rigor of guideline development, it is difficult to know to what extent these represent genuine uncertainties. Nevertheless, the potential issues found by this priority setting project with both systematic reviews and the primary research which underpins these reviews would suggest that it is highly likely that uncertainty exists in the evidence base. It is clear that there needs to be dialogue within the specialty groups covered by COH's scope to improve the quality at all levels of research. The funders of and those conducting primary studies need to ensure that their studies are rigorous and of high quality, the systematic reviews conducted need to follow robust methodologies, as do the clinical guidelines.

The information gathering phase also found that new there were few clinical trials being registered for new and innovative interventions in oral health. Many of the interventions were essentially "tried and tested", however there was interest in the detail of the intervention, for example, not whether fluoride itself is effective for preventing caries, but the most effective methods for getting the fluoride to the teeth (see Chapter Three, Section 3.4.3). Continuing the example of fluoride, the trials were also considering the effectiveness of fluoride in different populations, particularly those at high risk of developing caries. Details around existing interventions are important questions to address, but those conducting the primary research need to ensure that the clinical trials are high quality and robust.

A further issue raised by this priority setting project was the different needs of stakeholders, and how to ensure that these needs are met by future projects. The information gathering phase of this study suggested that the needs of those doing research in oral health were somewhat different from clinicians and the public. The COH reviews which tended to get highly cited by other researchers were not those used by clinicians and members of the public (see Chapter Three, Section 3.4.1). The question of whose priorities should take precedent when there are competing interests is an interesting one, not addressed in this research project. The priority topics established in the final analysis in this study were not wholly aligned with the reviews highly cited by other researchers. This will mean that COH are underserving one set of stakeholders in favour of another, which may be an inevitable consequence of setting priorities when resources are scarce.

The question of whose priorities take precedence could also influence the prioritisation of topics for those in lower and lower middle income countries. However, the stakeholder consultation phase revealed a great deal of commonality between the priorities of those in one lower middle income country (India) and those based in higher income countries (see Chapter Four, Section 4.3.2). Over half of the questions submitted from India were on the topics of periodontal disease or dental caries, although there were four conditions mentioned that did not appear in the concerns of those in higher income countries (oral submucous fibrosis, herpes labialis, premalignant oral conditions and vesicullobullous diseases). However, although a sizable sample was recruited from India (38% of all respondents to the stakeholder survey), this was the only lower middle income country represented in the stakeholder consultation. More research should be done to understand whether priorities in oral health are consistent across other lower and lower middle income countries, and how they might align with priorities in higher income countries.

A final issue which should be examined is how much research waste could be combatted by more effective dissemination of research results. During the mapping phase of the project, priorities were identified which already have high or moderate quality evidence to answer the research question. Seven existing COH reviews fell into this category: *Routine scale and polish for periodontal health in adults, Powered versus manual toothbrushing for oral health, Pit and fissure sealants for preventing dental decay in permanent teeth, Fluoride gels for preventing dental caries in children and adolescents, Micro-invasive interventions for managing proximal dental decay in primary and permanent teeth, Chlorhexidine mouthrinse as an adjunctive treatment for gingival health* and *Fluoride mouthrinses for preventing caries in children and adolescent.* The questions addressed in these reviews were all areas identified as evidence gaps or questions that stakeholders would like to be answered. However, putting further resource into updating these reviews when the evidence is already of a good quality and unlikely to change adds to research waste, and may encourage further primary studies to be registered in areas where there is already some robust data. This is both a waste of resources and unethical, as testing interventions on people that are already proven to work (or not work) is problematic. The question for topics like these should be reframed as to why people feel uncertain still about the answer, and whether the evidence has been communicated with clarity and authority. It is also crucial to engage people with the evidence in a global context, by translating the evidence that results from these systematic reviews into languages other than English, perhaps starting with the languages recommended by the WHO (Arabic, Chinese, English,

French, Russian, and Spanish) (World Health Organization, 2018).

Considering the issues raised in the research and the effectiveness of the framework has highlighted some limitations of this priority setting project, and some possible directions for future research. These will now be examined.

8.8 Limitations of the research and directions for future study

One major limitation of this research project has been highlighted in the previous section, and that is the fact that only one group of stakeholders based in a lower middle income or lower income country was involved in this priority setting project (see Chapter Four, Section 4.3). Although over a third of participants in the stakeholder consultation came from India, no participants were recruited from any other lower middle or lower income country context. This risks compromising the priority setting project as the needs and concerns of those in lower middle income or lower income countries may not be universal or consistent. There is no way of knowing this from this research project. This could be rectified in future priority setting exercises within Cochrane by making use of Cochrane's global reach. Networking with those groups based in parts of the world which have more lower income countries, such as Africa, might be beneficial. Cochrane has a Cochrane Africa geographic group which might be willing to promote priority setting projects through the region. It may also be possible to leverage connections like these to have priority setting surveys translated into languages other than English, although this may depend on the resources available. As discussed in Section 8.7, an intriguing avenue for further research is the question of how different the priorities are in different income and health contexts. This study would suggest that in oral health the priority questions are similar across contexts, however due to the limitations of the study, more in-depth research is needed to confirm or refute this theory.

The research project was further limited by technical issues, and the inability to source affordable software to enable a classic Delphi process, which could have been conducted online to ensure international participation. The ranking phase of the process may have benefitted from this, with participants anonymised and able to discuss their top priority topics and reach a true consensus. Undertaking priority setting with more resource and more flexibility on which software packages were available for use would have rectified this issue. Conducting a classic Delphi may have led to different outcomes and different

priorities being highlighted, and potentially could have inspired some useful discussions between those taking part. It would have been a chance for clinicians, policy makers, guideline developers and consumers to come together and discuss their priorities, and learn from one another. It may have also helped to address the issue identified previously in this chapter of how to reconcile the competing needs of stakeholders. The question of whether consensus amongst COH's different stakeholders is possible remains an open question.

The study was also somewhat limited by the subjective nature of some of the decisions taken at various points in the process, however it must be acknowledged that pragmatism was involved in these decisions. Examples include the data gathered in the information gathering phase, which was suitable for the context but could have been supplemented with data on burden of disease and economics data. Another example is the rejection of topics for inclusion if they did not meet a certain threshold, in the mapping phase, topics were not included for the ranking phase if they did not come out as top priorities in two or three of the priority setting projects (see Chapter Five, Section 5.3). This decision was taken in order to make the number of final priorities for ranking more manageable for those taking part. Different decisions over how these thresholds were set could have led to markedly different outcomes.

A further option for identifying priorities, unexplored in this priority setting project, is the creation of gap maps (see Chapter 2, Section 2.5). It may have been useful to produce an evidence gap map covering the topics in COH's scope. The only mapping process utilised for the research documented in this thesis was to map the priority topics identified by information gathering and stakeholder consultation against COH's current portfolio, to find out where the gaps may be across the group's work (see Chapter Five). A more extensive gap map may have provided visual evidence of where primary studies and systematic reviews are required for guideline development. However, this must be caveated by the issues found in the evidence base and the question of to what extent these "evidence gaps" are genuinely gaps in the evidence. Before this work is undertaken, one avenue for further study might be a quality appraisal of recent guidelines and systematic reviews to test the evidence base, and to provide guidance on how to improve the quality of primary research.

In the short term, there are also some opportunities to test the impact of this priority setting process in the future. As the priority reviews are published, it will be valuable to track the citations and interest of different stakeholders in the priority reviews. This can be done on

an ongoing basis and recorded in an impact report. It may also be useful to conduct a stakeholder survey at a later date, to find out whether the priority reviews have met the needs of the various stakeholder groups. A final report will also be written up, and the priority topics not progressed will be catalogued and made available on COH's website. Finally, the priority setting process must be repeated every three to five years according to Cochrane's mandatory guidance (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019), and so COH must decide how to proceed with the next iteration of priority setting. The information gathering phase (see Chapter Three) found that the field of oral health did not seem to be moving quickly with new interventions or novel methods, and so it may not be necessary to set priorities across COH's whole scope given the time period. Instead, the group might look at a single healthcare condition, perhaps one that did not feature in the overall priorities in this priority setting exercise. The recommendations made in this research should be followed however, as should the mandatory guidance produced by Cochrane (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019).

8.9 Conclusion

The aim of this research project was to present and test a framework for priority setting in evidence synthesis, using COH as a case study. The framework was developed from the existing literature, and gathered data, involved stakeholder consultation and mapping and ranking the resulting priorities. The end result was an implementation plan, with a manageable number of priority topics for COH to work on over the next three to five years.

The framework was flexible, so when challenges to the topic area emerged (i.e. the Covid-19 pandemic) the priorities could be adjusted accordingly. Recommendations for future priority setting, based on the framework, have been made and these can help and support groups involved in evidence synthesis. Although the framework involved some subjective decision-making around setting thresholds for what constituted a priority, and was limited by available time and resource, it proved to be pragmatic and strong in the areas of transparency, implementation, stakeholder consultation and evaluation.

However, any framework developed for priority setting can only be as robust as the data which underpins it. The research presented here revealed some potentially serious issues with the evidence base in oral health, and lack of clarity as to whether the evidence

uncertainties explored represent genuine uncertainty or lack of robustness in the available evidence. It is clear that guideline developers and those producing the evidence that goes into guidelines need to work more closely together to improve the quality of evidence in oral health. Evidence needs to be trustworthy to support decision-making, and dialogue needs to take place between policy makers, guideline developers, researchers, clinicians and patients to ensure that the information and knowledge needed to address priority questions in healthcare is accessible, timely and reliable.

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Yaffe, J., Montgomery, P., Hopewell, S. and Shepard, L.D. (2012). Empty reviews: a description and consideration of Cochrane systematic reviews with no included studies. *PLoS ONE*. Available at: http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0036626, (accessed 13 December 2017).

Youngkong, S., Kapiriri, L. and Baltussen, R. (2009). Setting priorities for health interventions in developing countries: a review of empirical studies. *Tropical medicine and international health*, 14(8), pp. 930-939.

Appendix A: Cochrane Oral Health's priority setting plan, 2018-2020

A1: Introduction to Cochrane Oral Health

Cochrane Oral Health publishes summaries of the best quality research available to help people make better informed decisions about oral healthcare choices. These summaries are known as systematic reviews. Oral health is defined as the **prevention, treatment and rehabilitation of oral, dental and craniofacial diseases and disorders**. Cochrane Oral Health's systematic reviews are published on the Cochrane Library.

Cochrane Oral Health is one of over 50 Cochrane Review Groups across the world, and our research is internationally recognised as the benchmark for high-quality information about the effectiveness of healthcare. The National Institute for Health Research (NIHR) is the largest single funder of this Cochrane Review Group. The Group are also supported by a Global Alliance of oral health partner organisations and individuals.

Cochrane Oral Health's activities are co-ordinated and supported by the Editorial Team located at the editorial base at the Division of Dentistry, The University of Manchester, United Kingdom.

A2: Priority setting in Cochrane

Over the next two years, Cochrane Oral Health will be conducting a priority setting exercise, to find out which questions are most important to focus on in terms of taking care of the mouth, teeth and gums. Priority setting is being undertaken so that our research concentrates on topics that are important to people, and on research that hasn't yet been done. The aim is to complete the process in 2020.

Priority setting is an important part of Cochrane's strategic plan, and you can read more about priority setting on Cochrane's knowledge translation pages.

Cochrane Oral Health's last priority setting exercise was completed in 2014, and the results were made available on our website: https://oralhealth.cochrane.org/priority-reviews. The aim of the new priority setting exercise is to bring this up-to-date, and provide Cochrane Oral Health with a more focused portfolio of priority titles.

The priority setting exercise will be undertaken in accordance with Cochrane's Guidance Note for Cochrane Groups to define systematic review priorities, which sets out mandatory and highly desirable criteria for priority setting.

A3: Cochrane Oral Health's priority setting process

A3.1 Governance

The Cochrane Oral Health Priority Setting Steering Group consists of:

Anne Littlewood: Information Specialist
Professor Jan Clarkson: Co-ordinating Editor
Professor Anne-Marie Glenny: Deputy Co-ordinating Editor
Professor Tanya Walsh: Editor

Anne Littlewood is undertaking the priority setting exercise as part of a PhD at the University of Manchester, and is supervised by Professors Clarkson, Glenny and Walsh.

A3.2 Stakeholders

Cochrane Oral Health has a number of stakeholders, with whom the Steering Group will engage during the priority setting process. These include:

- The Editorial Base team;
- Cochrane Oral Health editors and clinical advisors (full list available here);
- Cochrane Oral Health's Global Alliance: consisting of clinical experts, funders and representatives from international oral health organisations;
- The Global Evidence Ecosystem for Oral Health (GEEOH) partnership group, which includes representatives from guideline developers in oral health;
- Clinicians, professionals and researchers working in the field of oral health;
- Consumers, including patients, carers and the general public;
- Colleagues from the Cochrane Long-Term Conditions and Ageing 2 Network;
- Colleagues from Cochrane Centres and Fields.

The form of the engagement of these groups is set out in the methods and implementation sections below.

A3.3 Scope

During the course of the priority setting exercise, the whole portfolio of the Group will be considered. The systematic reviews that have already been published by the Group over the last 20 years or more will be examined to see which should be prioritised for updating, but potential new topics for systematic review titles will also be identified.

A3.4 Methods

There are five data gathering stages in our new priority setting process, with an implementation stage as a sixth stage, detailed below:

1. Examining data on how our existing reviews are being used: how often have they been cited, downloaded and discussed on social media? Metrics on usage will be collected from various sources. This data will form part of the evidence on which Cochrane Oral Health reviews should be updated, and which are less of a priority.

2. Looking at areas where new trials have been registered - what are the up-and-coming research areas in oral health, which might have scope for a new systematic review? This data will be used to consider new areas of research where a new systematic could be commissioned by the Group.

3. Looking at the guidelines that have been developed to inform dentists and healthcare workers how to prevent oral diseases, and the best treatments for keeping the mouth, teeth and gums healthy. In which areas do guideline developers need more research evidence, and would a new systematic review help them to deliver better guidance? This data can be used both for updating and producing new systematic review titles.

4. Seeking feedback from consumers on their priorities. What questions do people have about their oral health? At this stage, consumers, patients, carers and members of the public will be involved, and the process will be promoted by liaising Cochrane's Knowledge Translation Team and Cochrane Oral Health's editors.

5. The data gathered in stages 1-4 will be presented to our stakeholders, who will help us to decide which topics are the most important, and where there are systematic reviews to update or undertake. The intention is to complete a Delphi study, involving members of Cochrane Oral Health's Global Alliance, the GEEOH partners, consumer representatives and the Group's editors.

A3.5 Timescale

The priority setting process will be undertaken during 2018-2020, the aim is to have priority titles available from 2020. These will then be registered and undertaken, or updated, during Cochrane Oral Health's next funding period (2020-2025).

Figure 6: A Gantt chart of the main stages

	Jan-Jun 2018	Jul-Dec 2018	Jan-Jun 2019	Jul-Dec 2019	Jan-Jun 2020	Jul-Dec 2020
1. Data gathering (stages 1-3)	■	■				
2. Feedback from consumers (stage 4)		■	■			
3. Delphi Study (stage 5)				■		
4. Analysis and Implementation (stage 6)					■	■
5. Evaluation (ongoing)					■	■

A3.6 Implementation

An implementation plan will be produced with the Cochrane Oral Health Editorial Base team, ensuring that the priority questions are developed, and answered where possible by a new or existing Cochrane Oral Health systematic review. The existing reviews will be mapped against emerging priorities, so that it is clear what the new topics will be, and what is already covered and may need to be updated.

The new priority list will be shared with the Group's Network colleagues, and will be available on the Group's website.

The Group will endeavour to establish author teams to work on new priority titles; and liaise with existing author teams to make sure that priority updates are completed.

The Group will promote priority titles on publication by using social media channels, blog, website and mailing lists, but will also contribute to dissemination briefs for wider circulation through Cochrane's Knowledge Translation initiative.

The process will also undergo an evaluation, to understand the strengths and weaknesses of this approach, and the lessons learned for future prioritisation exercises.

A3.7 Communication

A website (https://oralhealth.cochrane.org/cochrane-oral-healths-priority-setting-exercise-ongoing) has been set up, and will be updated through the priority setting process, with documentation and more details of methods used at each stage. Results from each stage will be published there, to ensure that the exercise is as transparent as possible.

The priority titles will be listed as soon as they are available

A mailing list will be established, and any people interested in receiving feedback on the priority setting will be encouraged to sign up. The list will also be used to alert interested parties when the priority reviews are published.

A3.8 Contact

Any questions about the priority setting exercise should be sent to Anne Littlewood (a.littlewood@manchester.ac.uk).

Appendix B: Cochrane Oral Health priority setting implementation reports

B1 Report on prioritised suggested new titles

B1.1. Introduction

Cochrane Oral Health has indicated capacity to publish 15 new titles over the next three years. The top 15 areas that have been prioritised by the latest priority setting project are presented here.

PLEASE NOTE: This includes titles/protocols which are registered but have not yet been published as full reviews, as they would count as "new" titles in our metrics.

The new titles have been prioritised in the following ways:

1. Looking at trials registries to see which areas currently have trials registered, and whether there are new conditions/interventions/populations that need to be considered by Cochrane Oral Health.

2. Looking at what guideline developers need from systematic reviews, by examining oral health guidance and considering where further research is needed and / or where evidence is lacking.

3. An open survey which generated 211 questions from 168 people.

4. The questions prioritised by the James Lind Alliance Oral Health Priority Setting Partnership.

More information and reports on the first three of these projects can be found on our website here. For more on the James Lind Priority Setting Partnerships, see here.

Titles or topic areas that appeared in at least two of these four priority setting processes went through to the next stage. 26 of the topics met this criteria.

40 people were recruited to rank the 26 topics in order to produce the top 15. They included members of the Global Evidence Ecosystem for Oral Health (GEEOH), consumers, practicing dentists, oral surgeons, hygienists and researchers.

The final ranking is presented in this report, along with some preliminary thoughts on each topic and some basic underpinning search results.

Questions to consider:

1. Do you agree with the comments set out on each topic area?

2. For those topics without teams already recruited, how might we go about recruiting author teams?

3. For those topics which are still very broad, how do we narrow them further?

4. Are any of the topics listed on pages 31-32 (suggestions from the Panel that fall outside the priority setting process) viable systematic reviews that we might want to do?

5. The eleven topics that went forward to the Panel but were not ranked by them in the top fifteen are presented on page 33. Some of these (in red) are already registered with the group, should we continue with them, and if so, should we still consider them priority topics? Would we consider undertaking any of the others?

B1.2. New titles prioritised in the top fifteen by the Panel

Rank 1st : What are the best ways to prevent tooth decay and oral disease in the elderly?

Comments from the Panel:

"A key focus of our Office is evidence-based care for vulnerable populations."

"Guidance for clinicians on the best preventive measure would be valuable - particularly from a cost-effective point of view."

"The oral health of older populations, given their extended life span and retention of teeth, is important."

Is this an answerable systematic review question?	**Yes**	**No / Unclear X**

Comment: May be too big a questions as it stands. Perhaps needs a scoping review to look at possible topics?

There has been no systematic review published in the last three years on this question	**Yes X**	**No / Unclear**

Comment: None on this exact question, but there are some on specific interventions. There are some related Cochrane reviews already registered:

Oral health educational interventions for nursing home staff and residents

Oral care measures for preventing nursing home-acquired pneumonia

Interventions for managing root caries

Interventions for managing denture stomatitis
Dental implant reviews

Primary studies are available for inclusion in the systematic review **Yes X** **No / Unclear**

Comment:

81 RCTs are on MEDLINE (search July 2020) tagged as “Aged”, “randomised controlled trial” and either “oral health” or “dental caries”. In terms of prevention, these roughly break down (in order of number of potential included studies) as:

Oral care programmes in nursing homes

Dry mouth

Nutritional status and oral health status

Oral care programmes in people recovering from stroke

Use of chewing gum

Professional dental care for elderly patients

Oral health programmes

General caries prevention

Cost effectiveness

Fluoride programmes

Mouthwash

Oral health programmes in dementia patient

Many of the above topics are covered by existing reviews.

There is adequate human capacity to undertake the systematic review	**Yes**	**No / Unclear X**

Comment: Unless topic is one of the ones registered as above, we would have to recruit a new team.

There are no features that may require extra operational / managerial resource to complete this review	**Yes**	**No / Unclear X**

Comment: Not straightforward, as we would have to look at which topics are feasible – not covered by another Cochrane review.

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes**	**No / Unclear X**

Comment: Unclear until the topic is narrowed

Conducting the systematic review contributes to sustainable capacity to conduct future reviews (eg allows the team to develop new skills/competencies)	**Yes**	**No / Unclear X**

Comment: Would not necessarily be a new direction for the team

Conducting the systematic review raises no ethical concerns	**Yes X**	**No / Unclear**

Comment: No ethical concerns identified

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Relevant to all contexts with an elderly population

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: May be more timely post-Covid-19, with a lack of professional dental care available.

Rank 2nd: How can oral cancer be prevented?

Comments from the Panel:

"Oral cancer is the most dangerous disease related to the oral health. Its prevention should be a priority"

"The top two (preventing oral cancer & promoting OH) are big questions that we will continually need to provide answers for."
"Oral cancer is still one of the most common types of cancer and we have to understand the reason and also how to intercept the first stage of the tumor."

Is this an answerable systematic review question?	**Yes**	**No / Unclear X**

Comment: Maybe too big as it stands?

There has been no systematic review published in the last three years on this question	**Yes X**	**No / Unclear**

Comment: The topic may be too broad for one review. However, there are reviews on:

Screening programmes (including a Cochrane Oral Health review)

Chemoprevention of oral cancer in people with premalignant lesions (this may be similar to the Cochrane Oral Health review on oral leukoplakia)

Nutritional strategies to prevent oral cancer

Vaccines to prevent human papilloma virus (there is already a Cochrane review on this topic, not Oral Health).

Primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: 42 studies were indexed as either “Mouth neoplasms” or “oropharyngeal neoplasms”, “prevention and control” and “randomised controlled trial” (search July 2020, MEDLINE)

Three were animal studies, four were not invention studies but about the presence of biomarkers and one was not indexed correctly (lung neoplasm study). Of the remaining 34

1 was on awareness counselling

1 was on case management programmes
15 were on chemoprevention (ie treatment of premalignant lesions)
4 on health promotion (oral cancer leaflets)
2 on the HPV vaccine
1 on laser resection of premalignant lesions
2 on oral cancer screening
3 on tea/green tea as a preventive agent
3 on tobacco reduction (one in a dental setting)
2 were on training of staff

Some of these topics are covered by existing reviews.

There is adequate human capacity to undertake the systematic review	**Yes**	**No / Unclear X**

Comment: Apart from already registered titles (such as screening of oral cancer or the oral leukoplakia title) we would have to recruit teams for any new topics.

There are no features that may require extra operational / managerial resource to complete this review (above and beyond a standard Cochrane review)	**Yes**	**No / Unclear X**

Comment: Not straightforward, as we would have to look at which topics are feasible – not covered by another Cochrane review.

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes**	**No / Unclear X**

Comment: Unclear until topic is narrowed

Conducting the systematic review contributes to sustainable capacity to conduct future reviews (eg allows the team to develop new skills/competencies)	**Yes**	**No / Unclear X**

Comment: Would not necessarily go beyond a standard Cochrane intervention review.

Conducting the systematic review raises no ethical concerns	**Yes X**	**No / Unclear**

Comment: No ethical concerns identified

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Oral cancer is prevalent in LMIC contexts.

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: May be more important as people not having dental check-ups.

Rank 3rd: What is the best way to promote better oral health

Comments from the Panel:

"I feel the top three important issues pertaining to oral health begin with the patient's perception of oral health and disease. Without informed patients, many people still do not know how often they should brush or floss, what kind of toothbrush is better. Public knowledge in oral health is vital."

"As dentistry moves into a prevention focussed era, it is important to have evidence to support preventive approaches"

Is this an answerable systematic review question?	**Yes X**	**No / Unclear**

Comment: May be too broad, but there are some reviews on the topic.

There has been no systematic review published in the last three years on this question	**Yes**	**No / Unclear X**

Comment:

Several systematic reviews have been identified, however only one was conducted within the last three years:

Ghaffari, M., Rakhshanderou, S., Ramezankhani, A., Buunk-Werkhoven, Y., Noroozi, M. and Armoon, B. (2018). Are educating and promoting interventions effective in oral health? A systematic review. *International journal of dental hygiene*, 16(1), pp. 48–58.

AMSTAR assessment: Critically low quality review, score: 3/13

Primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: 35 studies were indexed on MEDLINE with the terms “Oral health”, “Health promotion” and “randomised controlled trial” (search July 2020).

2 were on general methods of oral health promotion, but most looked at oral health promotion in specific groups:

3 in adolescents

6 in children

5 in infants/preschool children

2 in people with diabetes

4 in socially disadvantaged groups
2 in the elderly living in institutions

1 in people with mental health disorders
2 in parents

3 in pregnant women

2 in smokers

2 in people who had had strokes

1 on oral health promotion in the workplace

There is adequate human capacity to undertake the systematic review	**Yes**	**No / Unclear X**

Comment: No existing team available, but may be able to leverage links with Public Health Group.

There are no features that may require extra operational / managerial resource to complete this review (above and beyond a standard Cochrane review)	**Yes X**	**No / Unclear**

Comment: Would be a standard intervention review

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: There doesn't seem to be any reason why this topic would take significantly longer than standard.

Conducting the systematic review contributes to sustainable capacity to conduct future reviews (eg allows the team to develop new skills/competencies)	**Yes**	**No / Unclear X**

Comment: Standard intervention review.

Conducting the systematic review raises no ethical concerns	**Yes X**	**No / Unclear**

Comment: No ethical concerns identified

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Some of the primary studies take place in socially disadvantaged groups, which may allow for translation into LMIC contexts.

The question is still timely post-Covid-19 pandemic **Yes X** **No / Unclear**

Comment: Oral health promotion is more important when contact with professional dental services may be limited.

Rank 4th: What is the best way to measure the risk of tooth decay?

Comments from the Panel:

"Most risk factors/indicators are assumed but not proven. Relying on proven measures would be a game changer."

"Dental caries remains a significant global health problem understanding how best to measure risk and at what point dentists should intervene invasively is important."

Is this an answerable systematic review question? **Yes X** **No / Unclear**

Comment: It may be too broad for one review, but could break down into other questions (eg in specific populations, or for specific risk factors)

There has been no systematic review published in the last three years on this question **Yes** **No / Unclear X**

Comment:

Two identified from last three years:

Kirthiga, M., Murugan, M., Saikia, A. and Kirubakaran, R. (2019). Risk factors for early childhood caries: a systematic review and meta-analysis of case control and cohort studies. *Pediatric dentistry*, 41(2), pp. 95–112.

AMSTAR assessment: Critically low quality review, score: 6/16

Cagetti, M.G., Bontà, G., Cocco, F., Lingstrom, P., Strohmenger, L. and Campus, G. (2018). Are standardized caries risk assessment models effective in assessing actual

caries status and future caries increment? A systematic review. *BMC oral health*, 18(1), Article no.: 123.

AMSTAR assessment: Low quality review, score: 7/13

Also there are some on specific risk factors – eg obesity, asthma

Primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: Wouldn't be RCTs?

There are around 2,000 studies on MEDLINE tagged as Risk factors/ and dental caries/ (July 2020). 1,300 are on children.

There is adequate human capacity to undertake the systematic review	**Yes**	**No / Unclear X**

Comment: We have no existing reviews of this nature, we would have to recruit an author team, potentially a very experienced team.

There are no features that may require extra operational / managerial resource to complete this review (above and beyond a standard Cochrane review)	**Yes**	**No / Unclear X**

Comment: This would not be a standard intervention review.

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes**	**No / Unclear X**

Comment: Could take longer for several reasons (types of study included, need to scope the topic), need to recruit and possibly train a team.

Conducting the systematic review contributes to sustainable capacity to conduct future reviews (eg allows the team to develop new skills/competencies)	**Yes X**	**No / Unclear**

Comment: Yes, this would not be a standard intervention review – there may be an opportunity to develop new skills/competencies.

Conducting the systematic review raises no ethical concerns	**Yes X**	**No / Unclear**

Comment: None identified.

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Caries is still high in terms of burden of disease in LMIC contexts.

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Still an important topic, and identifying those at high risk may be more crucial when access to professional dental services is limited.

Rank 5th: At what stage of tooth decay should a dentist use a drill?

Comments from the Panel:

"Dentists have historically focused on drilling and restoring caries lesions, and it would be very interesting to see when restorations are and are not necessary in treating caries lesions. This question has the potential to inform changes to the current paradigm in the treatment of caries"

Is this an answerable systematic review question?	**Yes X**	**No / Unclear**

Comment: Yes

There has been no systematic review published in the last three years on this question	**Yes X**	**No / Unclear**

Comment: None have been identified

Primary studies are available for inclusion in the systematic review	**Yes**	**No / Unclear X**

Comment: Initial exploratory search in July 2020 did not reveal any studies on this question. But it may be a more comprehensive search strategy is needed

There is adequate human capacity to undertake the systematic review	**Yes**	**No / Unclear X**

Comment: This would be a new title starting from scratch and would need a new team.

There are no features that may require extra operational / managerial resource to complete this review (above and beyond a standard Cochrane review)	**Yes X**	**No / Unclear**

Comment: Seems to be a straightforward intervention review, but may need some initial scoping and we would need to recruit a team.

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: No anticipated issues with delays.

Conducting the systematic review contributes to sustainable capacity to conduct future reviews (eg allows the team to develop new skills/competencies)	**Yes**	**No / Unclear X**

Comment: This would not allow the team to develop new skills.

Conducting the systematic review raises no ethical concerns	**Yes X**	**No / Unclear**

Comment: No ethical concerns identified.

The question is relevant to LMIC contexts	**Yes**	**No / Unclear X**

Comment: Uncertain. It may depend on the PICO elements once the question is scoped.

The question is still timely post-Covid-19 pandemic	**Yes**	**No / Unclear X**

Comment: Uncertain due to aerosol generation.

Rank 6th: How should I brush my teeth? For how long, and how often?

Comments from the Panel:

"There is a lack of consensus on this topic and it is important for patients"

"Brushing is one of the best oral disease prevention, but times and methods need to be updated."

"The most common questions I get from my patients for which I don't have a definite answer. I think at least we should be able to answer these common questions with evidence."

Is this an answerable systematic review question?	**Yes X**	**No / Unclear**

Comment: Answerable question, but there may be three questions rather than one.

There has been no systematic review published in the last three years on this question	**Yes X**	**No / Unclear**

Comment: None identified from the last three years.

Primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: A very basic scoping search did not reveal many studies, but there are some. Some examples:

Ausenda, F., Jeong, N., Arsenault, P., Gyurko, R., Finkelman, M., Dragan, I.F., & Levi, P.A., Jr (2019). The effect of the Bass intrasulcular toothbrushing technique on the reduction of gingival inflammation: a randomized clinical trial. *Journal of evidence-based dental practice*, 19(2), pp. 106–114

Harnacke, D., Stein, K., Stein, P., Margraf-Stiksrud, J. and Deinzer, R. (2016). Training in different brushing techniques in relation to efficacy of oral hygiene in young adults: a randomized controlled trial. *Journal of clinical periodontology*, 43(1), pp. 46–52.

Schlueter, N., Klimek, J., Saleschke, G. and Ganss, C. (2010). Adoption of a toothbrushing technique: a controlled, randomised clinical trial. *Clinical oral investigations*, 14(1), pp. 99–106.

Battaglia A. (2008). The Bass technique using a specially designed toothbrush. *International journal of dental hygiene*, 6(3), pp. 183–187.

There is adequate human capacity to undertake the systematic review	**Yes**	**No / Unclear X**

Comment: We would have to recruit teams to do these reviews.

There are no features that may require extra operational / managerial resource to complete this review (above and beyond a standard Cochrane review)	**Yes**	**No / Unclear X**

Comment: This may be three separate reviews, and so may require more editorial time.

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: Provided a team can be recruited, the reviews should be straightforward intervention reviews.

Conducting the systematic review contributes to sustainable capacity to conduct future reviews (eg allows the team to develop new skills/competencies)	**Yes**	**No / Unclear X**

Comment: The reviews seem to be straightforward intervention reviews, so would not allow for development of new skills.

Conducting the systematic review raises no ethical concerns	**Yes X**	**No / Unclear**

Comment: No ethical concerns identified.

The question is relevant to LMIC contexts **Yes X** **No / Unclear**

Comment: Prevention of decay through more frequent brushing / different technique or brushing for longer may be highly relevant to resource-poor contexts.

The question is still timely post-Covid-19 pandemic **Yes X** **No / Unclear**

Comment: Prevention of caries is more important when contact with professional dental services may be limited.

Rank 7th: What are the best ways to prevent oral diseases in the elderly living in nursing homes or other institutions?

Comments from the Panel:

"In modern western countries there is a growing concern on the poor oral health of the elderly population. This is not only in the case in the nursing homes but also in the frail elderly individuals who are living in their private homes. And in most of the cases is not subjected any more to routine dental checks and surveillance The oral care needed for this population differs substantially from the current clinical care provided in most dental practices. Best practices and evidence how to manage oral care of this growing population have to be developed by appropriate research. "

"Potentially reduces burden of decay for elderly which national survey shows to be higher for those in nursing homes etc."

Is this an answerable systematic review question? **Yes X** **No / Unclear**

Comment: Yes. We have covered some of this ground before.

Elements of this question may overlap with Oral health educational interventions for nursing home staff and residents and Oral care measures for preventing nursing home-acquired pneumonia.

There has been no systematic review published in the last three years on this question	**Yes X**	**No / Unclear**

Comment: There are some systematic reviews on the topic, but they don't necessarily cover all elements of the question. None on this exact question were published in the last three years.

Primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: There are a few trials available (basic exploratory search conducted July 2020 for RCTs tagged as "Aged", "Oral Health" and "Nursing Homes"). Potentially more with a much more thorough search.

Examples:

Barbe, A.G., Kottmann, H.E., Derman, S. and Noack, M.J. (2019). Efficacy of regular professional brushing by a dental nurse for 3 months in nursing home residents-A randomized, controlled clinical trial. *International journal of dental hygiene*, 17(4), pp. 327–335.

Jablonski, R.A., Kolanowski, A.M., Azuero, A., Winstead, V., Jones-Townsend, C. and Geisinger, M.L. (2018). Randomised clinical trial: efficacy of strategies to provide oral hygiene activities to nursing home residents with dementia who resist mouth care. *Gerodontology*, 35(4), pp. 365–375.

Kobayashi, K., Ryu, M., Izumi, S., Ueda, T. and Sakurai, K. (2017). Effect of oral cleaning using mouthwash and a mouth moisturizing gel on bacterial number and moisture level of the tongue surface of older adults requiring nursing care. *Geriatrics & gerontology international*, 17(1), pp. 116–121.

There is adequate human capacity to undertake the systematic review	**Yes**	**No / Unclear**	**X**

Comment: This would be a new review, it would require a new author team.

There are no features that may require extra operational / managerial resource	**Yes X**	**No / Unclear**

to complete this review (above and beyond a standard Cochrane review)		

Comment: None beyond the recruitment of an author team.

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: Does not seem to be any special features that would slow the review process down.

Conducting the systematic review contributes to sustainable capacity to conduct future reviews (eg allows the team to develop new skills/competencies)	**Yes**	**No / Unclear X**

Comment: Standard intervention review, no opportunity to develop new skills/processes.

Conducting the systematic review raises no ethical concerns	**Yes X**	**No / Unclear**

Comment: No ethical concerns identified.

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Relevant to all contexts with nursing care for the elderly.

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Prevention of oral disease in care homes is highly relevant, especially as there is evidence to suggest that there could be an impact on development of respiratory disease.

Rank 8th: By changing parental, or primary care-giver behaviours, can tooth decay in children be prevented?

Comments from the Panel:

"It seems that dentistry has failed and mostly focused on fluoride and restorative-related means to manage dental caries. Novel approaches will further inform the impact of parents' behaviour (a family approach) to caries prevention."

"We rely on parents to teach children the importance of brushing and flossing daily. But in many cases, this may require a change in belief or attitude of the parent. To many parents "milk teeth" are simply "Baby teeth.""

Is this an answerable systematic review question?	**Yes X**	**No / Unclear**

Comment: May translate as "Behavioural interventions for primary caregivers to prevent tooth decay in children".

There has been no systematic review published in the last three years on this question	**Yes X**	**No / Unclear**

Comment: None identified from the last three years.

Primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: At least two studies on the topic (there may be more with a much more comprehensive search):

Lepore, L.M., Yoon, R.K., Chinn, C.H. and Chussid, S. (2011). Evaluation of behavior change goal-setting action plan on oral health activity and status. *New York state dental journal*, 77(6), pp. 43–47.

Pine, C.M., McGoldrick, P.M., Burnside, G., Curnow, M.M., Chesters, R.K., Nicholson, J. and Huntington, E. (2000). An intervention programme to establish regular toothbrushing: understanding parents' beliefs and motivating children. *International dental journal*, Suppl, pp. 312–323.

There is adequate human capacity to undertake the systematic review	**Yes**	**No / Unclear X**

Comment: No team in place – author team would need to be recruited

There are no features that may require extra operational / managerial resource to complete this review (above and beyond a standard Cochrane review)	**Yes X**	**No / Unclear**

Comment: No features that would require extra resource

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: There do not appear to be any special features to delay completion once author team is in place.

Conducting the systematic review contributes to sustainable capacity to conduct future reviews (eg allows the team to develop new skills/competencies)	**Yes**	**No / Unclear X**

Comment: Standard intervention review, no opportunity for team to develop new skills.

Conducting the systematic review raises no ethical concerns	**Yes X**	**No / Unclear**

Comment: No ethical concerns identified

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Parental/primary care giver behaviours in the home may have significant influence on outcomes for children, no matter what the context.

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: With access to primary services limited, preventive measures are important.

Rank 9th: What is the best way to deal with cavities on the tooth root (root caries)? (REGISTERED PROTOCOL)

Comments from the Panel:

"Caries is a core issue that oral health professionals deal with and while we have evolved in treating it in the 32 years I am practicing, there is still much we don't know."

"Dental decay in elderly is the major cause of tooth loss."

Is this an answerable systematic review question?	**Yes X**	**No / Unclear**

Comment: Answerable question, currently underway.

There has been no systematic review published in the last three years on this question	**Yes X**	**No / Unclear**

Comment: None identified on this exact question from last three years.

Primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: 24 included studies currently included in the Cochrane review that has not yet been published (last search, June 2020)

There is adequate human capacity to undertake the systematic review	**Yes X**	**No / Unclear**

Comment: Review team in place

There are no features that may require extra operational / managerial resource to complete this review (above and beyond a standard Cochrane review)	**Yes X**	**No / Unclear**

Comment: Intervention review with no novel features

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: Broad question but feasible if author team have capacity.

Conducting the systematic review contributes to sustainable capacity to conduct future reviews (eg allows the team to develop new skills/competencies)	**Yes**	**No / Unclear X**

Comment: No opportunity to develop new skills

Conducting the systematic review raises no ethical concerns	**Yes X**	**No / Unclear**

Comment: No ethical concerns identified

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Relevant to all contexts where root caries is prevalent.

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Some aspects may not be due to aerosol generation.

Rank 10th: Does a better diet or diet supplements improve oral health? If so what are the best foods/nutrients/supplements?

Comments from the Panel:

"Could contribute to better public health and clinical decision making."

"A preventive alternative which is highly required to control oral diseases in the near future."

Is this an answerable systematic review question?	**Yes**	**No / Unclear X**

Comment: Possibly too broad as it stands.

There has been no systematic review published in the last three years on this question	**Yes X**	**No / Unclear**

Comment: None on this exact question, which is probably too broad for a Cochrane review – it would need to be scoped out.

Primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: There are not many tagged as "Diet" or "nutritional status" and oral health. There may be more with a more thorough search (eg looking at specific conditions like caries/periodontitis rather than general oral health). Some examples:

Woelber, J.P., Bremer, K., Vach, K., König, D., Hellwig, E., Ratka-Krüger, P., Al-Ahmad, A. and Tennert, C. (2016). An oral health optimized diet can reduce gingival and periodontal inflammation in humans - a randomized controlled pilot study. *BMC oral health*, 17(1), Article no.: 28.

Krall, E.A., Wehler, C., Garcia, R.I., Harris, S.S. and Dawson-Hughes, B. (2001). Calcium and vitamin D supplements reduce tooth loss in the elderly. *American journal of medicine*, 111(6), pp. 452–456

There is adequate human capacity to undertake the systematic review	**Yes**	**No / Unclear X**

Comment: This would be a new topic requiring recruitment of a new team.

There are no features that may require extra operational / managerial resource to complete this review (above and beyond a standard Cochrane review)	**Yes**	**No / Unclear X**

Comment: Would probably be a standard review

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: No delays anticipated

Conducting the systematic review contributes to sustainable capacity to conduct future reviews (eg allows the team to develop new skills/competencies)	**Yes**	**No / Unclear X**

Comment: Likely to be a standard review with no opportunity to develop skills.

Conducting the systematic review raises no ethical concerns	**Yes**	**No / Unclear X**

Comment: May have to be aware of industry funding / author conflicts, depending on team.

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Highly relevant to resource poor contexts, prevention is key.

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Maintenance of dental health vital when access to primary dental services may be limited.

<u>Rank 11th: What role does technology play in providing dental care?</u>

Comments from the Panel:

"I think it is relevant because technology is part of dentistry. It is also expensive. So, it would be great if we know which really works and is it worth the investment?"

"Technology and digital dentistry is where dentistry will be for everyone in the future. Must have an open mind as to what is available and how to best use this in our practices."

Is this an answerable systematic review question?	**Yes**	**No / Unclear X**

Comment: Very broad question, will need breaking down into specific questions.

There has been no systematic review published in the last three years on this question	**Yes X**	**No / Unclear**

Comment: 147 systematic reviews are on MEDLINE tagged as “Telemedicine” or “Computing methodologies” or “technology” AND dentistry. The question is too broad as it stands and would need to be scoped out to see which reviews are feasible on which aspect of technology.

Primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: 953 randomized controlled trials on MEDLINE tagged as “Telemedicine” or “Computing methodologies” or “technology” AND dentistry.

Open to interpretation as a topic area, technological interventions are available in prevention, treatment and diagnosis. Needs narrowing further before we can answer this question in detail.

There is adequate human capacity to undertake the systematic review	**Yes**	**No / Unclear X**

Comment: This may be a series of new titles, author teams would have to be recruited.

There are no features that may require extra operational / managerial resource to complete this review (above and beyond a standard Cochrane review)	**Yes**	**No / Unclear X**

Comment: Unclear, but there is nothing to suggest that any title registered would go beyond a standard intervention review.

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes**	**No / Unclear X**

Comment: Unclear, depending on title. Standard intervention reviews are feasible.

Conducting the systematic review contributes to sustainable capacity to conduct future reviews (eg allows the team to develop new skills/competencies)	**Yes**	**No / Unclear X**

Comment: Doubtful that any registered title would go beyond a standard intervention review and offer opportunity to develop new skills

Conducting the systematic review raises no ethical concerns	**Yes**	**No / Unclear X**

Comment: May have to be aware of industry funding / author conflicts, depending on team and title. For example, apps or technologies developed for commercial purposes may be interventions in these reviews.

The question is relevant to LMIC contexts	**Yes**	**No / Unclear X**

Comment: Unclear, depending on topic. Mobile technologies have potential to widen access to health services in resource poor settings, however, technology is expensive.

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Some aspects of this question (eg teledentistry and it's effectiveness) are highly relevant in a post-Covid 19 scenario.

Rank 12th: Can "silver diamine fluoride" prevent or treat tooth decay? (REGISTERED PROTOCOL)

Comments from the Panel:

"Early childhood caries disproportionately affects minority populations and people of lower socioeconomic status. It also predisposes people to a lifetime of caries experience. By addressing parental/caregiver behaviors and potential therapies to reduce untreated decay rates using silver ion antimicrobials such as silver diamine fluoride, ECC would be prioritized by Cochrane reviews."

Is this an answerable systematic review question?	**Yes X**	**No / Unclear**

Comment: Answerable question, currently underway

There has been no systematic review published in the last three years on this question	**Yes**	**No / Unclear X**

Comment: One identified from the last three years:

Oliveira, B.H., Rajendra, A., Veitz-Keenan, A. and Niederman, R. (2019). The effect of silver diamine fluoride in preventing caries in the primary dentition: a systematic review and meta-analysis. *Caries research*, 53(1), pp. 24–32.

AMSTAR assessment: Critically low quality review, score: 6/16

Primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: Unclear how many are to be included in the Cochrane review (the team have been working outside of RevMan?) however there are 20 RCTs on MEDLINE, which may or may not fit the inclusion criteria.

There is adequate human capacity to undertake the systematic review	**Yes X**	**No / Unclear**

Comment: Review is underway, team recruited

There are no features that may require extra operational / managerial resource to complete this review (above and beyond a standard Cochrane review)	**Yes X**	**No / Unclear**

Comment: Standard intervention review

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: Theoretically, a standard review but the review has taken longer than this

Conducting the systematic review contributes to sustainable capacity to conduct future reviews (eg allows the team to develop new skills/competencies)	**Yes**	**No / Unclear X**

Comment: No opportunity to develop new skills / techniques

Conducting the systematic review raises no ethical concerns	**Yes**	**No / Unclear X**

Comment: Possibility of conflicts of interest / industry funded trials.

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Could be a relatively cheap way to treat caries if effective.

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Non-invasive methods of caries prevention are highly relevant post-Covid19.

Rank 13th: Can changing dental health habits or behaviour help people with gum disease? (REGISTERED PROTOCOL)

Comments from the Panel:

"There is a gap between technological advancement in dentistry and behavioral change in people."

"Plaque is necessary for the onset and progression of gum disease and the best way to prevent plaque build-up is to improve our oral habits with the correct oral hygiene procedures."

Is this an answerable systematic review question?	**Yes X**	**No / Unclear**

Comment: Registered protocol, review underway.

There has been no systematic review published in the last three years on this question	**Yes**	**No / Unclear X**

Comment: One identified from the last three years:

Järvinen, M., Stolt, M., Honkala, E., Leino-Kilpi, H. and Pöllänen, M. (2018). Behavioural interventions that have the potential to improve self-care in adults with periodontitis: a systematic review**. Acta odontologica Scandinavica**, 76(8), pp. 612–620.

AMSTAR assessment: Critically low quality review, score: 4/13

Primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: No indication from current review version on Archie, but there are at least 19 RCTs on MEDLINE tagged as exp oral hygiene and behaviour therapy. Examples:

Wide, U., Hagman, J., Werner, H. and Hakeberg, M. (2018). Can a brief psychological intervention improve oral health behaviour? A randomised controlled trial. *BMC oral health*, 18(1), Article no.: 163.

López-Jornet, P., Fabio, C.A., Consuelo, R.A. and Paz, A.M. (2014). Effectiveness of a motivational-behavioural skills protocol for oral hygiene among patients with hyposalivation. *Gerodontology*, 31(4), pp. 288–295.

Jönsson, B., Baker, S.R., Lindberg, P., Oscarson, N. and Ohrn, K. (2012). Factors influencing oral hygiene behaviour and gingival outcomes 3 and 12 months after initial periodontal treatment: an exploratory test of an extended Theory of Reasoned Action. *Journal of clinical periodontology*, 39(2), pp. 138–144.

Lepore, L.M., Yoon, R.K., Chinn, C.H. and Chussid, S. (2011). Evaluation of behavior change goal-setting action plan on oral health activity and status. *The New York state dental journal*, 77(6), pp. 43–47.

There is adequate human capacity to undertake the systematic review	**Yes X**	**No / Unclear**

Comment: Review team in place

There are no features that may require extra operational / managerial resource to complete this review (above and beyond a standard Cochrane review)	**Yes X**	**No / Unclear**

Comment: No special features reported

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: Theoretically, a standard review but the review has taken longer than this

Conducting the systematic review contributes to sustainable capacity to conduct future reviews (eg allows the team to develop new skills/competencies)	**Yes**	**No / Unclear X**

Comment: No opportunity to develop new skills / techniques

Conducting the systematic review raises no ethical concerns	**Yes X**	**No / Unclear**

Comment: No ethical concerns identified

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Changing health behaviour may be very relevant in resource-poor settings

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Changing health behaviour is relevant to oral hygiene maintenance and prevention of oral disease.

Rank 14th: Can antibiotics be used, instead of surgery, to treat chronic gum disease (periodontitis)? (REGISTERED PROTOCOL)

Comments from the Panel:

"Chronic gum disease is extremely prevalent (at least I perceive it to be). Prioritising this would benefit the most people."

Is this an answerable systematic review question?	**Yes X**	**No / Unclear**

Comment: Registered protocol, review underway.

There has been no systematic review published in the last three years on this question	**Yes**	**No / Unclear X**

Comment:

One identified from the last three years:

McGowan, K., McGowan, T. and Ivanovski, S. (2018). Optimal dose and duration of amoxicillin-plus-metronidazole as an adjunct to non-surgical periodontal therapy: a systematic review and meta-analysis of randomized, placebo-controlled trials. *Journal of clinical periodontology*, 45(1), pp. 56–67.

AMSTAR assessment: Critically low quality review, score: 7/16

Primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: 36 studies are currently included in unpublished review.

There is adequate human capacity to undertake the systematic review	**Yes X**	**No / Unclear**

Comment: Review team in place and review underway

There are no features that may require extra operational / managerial resource	**Yes X**	**No / Unclear**

to complete this review (above and beyond a standard Cochrane review)		

Comment: Standard intervention review

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: Review is in good shape.

Conducting the systematic review contributes to sustainable capacity to conduct future reviews (eg allows the team to develop new skills/competencies)	**Yes**	**No / Unclear X**

Comment: No opportunity to develop new skills

Conducting the systematic review raises no ethical concerns	**Yes**	**No / Unclear X**

Comment: Possibility of industry funded trials. Need to be careful to factor in the global issue of antibiotic resistance.

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Could be relevant if effective alternative to surgery, but could exacerbate issue of antibiotic resistance.

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Again, could be relevant if effective alternative to surgery, but this needs to be balanced with concerns over antibiotic resistance.

Rank 15th: Can taking probiotics (live bacteria and yeasts) prevent and control chronic gum disease (periodontitis)?

Comments from the Panel:

"It is important to research alternative non invasive therapies."
"Periodontitis is a widespread disease. Less invasive alternative treatment procedures if found to be successful could be used instead."

Is this an answerable systematic review question?	**Yes X**	**No / Unclear**

Comment: In all probability, a straightforward intervention review.

There has been no systematic review published in the last three years on this question	**Yes**	**No / Unclear X**

Comment: Two identified on this question:
Vives-Soler, A. and Chimenos-Küstner, E. (2020). Effect of probiotics as a complement to non-surgical periodontal therapy in chronic periodontitis: a systematic review. *Medicina oral, patologia oral y cirugia bucal*, 25(2), pp. e161–e167.

AMSTAR assessment: Critically low quality review, score: 6/13

Ikram, S., Hassan, N., Raffat, M.A., Mirza, S. and Akram, Z. (2018). Systematic review and meta-analysis of double-blind, placebo-controlled, randomized clinical trials using probiotics in chronic periodontitis. *Journal of investigative and clinical dentistry*, 9(3), Article no.: e12338.

AMSTAR assessment: Critically low quality review, score: 6/16

Primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: 20 studies on MEDLINE tagged as "Oral health" or periodontitis, AND probiotics

There is adequate human capacity to undertake the systematic review	**Yes**	**No / Unclear X**

Comment: This is a new topic and would require recruitment of a new team

There are no features that may require extra operational / managerial resource to complete this review (above and beyond a standard Cochrane review)	**Yes X**	**No / Unclear**

Comment: Over and above recruitment of a new team, there does not seem to be any issues that may require more resource.

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: Looks like a standard intervention review with a manageable number of studies.

Conducting the systematic review contributes to sustainable capacity to conduct future reviews (eg allows the team to develop new skills/competencies)	**Yes**	**No / Unclear X**

Comment: Standard intervention review, no real opportunity to develop new skills beyond an intervention review.

Conducting the systematic review raises no ethical concerns	**Yes**	**No / Unclear X**

Comment: Commercial product so may have to be aware of industry funding / author conflicts, depending on team.

The question is relevant to LMIC contexts	**Yes**	**No / Unclear X**

Comment: Probably not relevant to LMIC contexts

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Maintenance of dental health vital when access to primary dental services may be limited.

B1.3. Additional topics suggested by the Panel

The Panel were asked if there were any topics that they would like to see Cochrane Oral Health undertake that had not been mentioned in the priority setting survey. The topics were then screened for duplication, and to remove any that are covered by existing Cochrane reviews. The following general topics were suggested.

- What is the effect of prophylactic antibiotic use prior to dental treatment for the prevention of prosthetic joint infection?
- How useful are the different radiographic techniques for diagnosing dental conditions in children and adults? (diagnostic test accuracy and link evidence)
- General Note: Cochrane Reviews typically consider healthy patient populations in their review questions. Inclusion or focus on special patient populations (ex: comorbidites such as diabetes, cancer, cardiovascular disease, immunocompromised).
- How does simply accessing dental care improve population oral health?
- What effect does oral health literacy have on access to care and patient compliance?
- How does cultural competency of oral health professionals affect oral health serviced delivery in minority/indigenous populations?
- Bridging the gaps between medicine and dentistry. Why are these two segregated the way they are right now? For purely historical reasons? Are patients, particularly complex cases with interdisciplinary conditions being harmed by this necessary divide?
- Training of dentists occurs in a silo isolated from other body systems. Does this affect dentists' appreciation of more systemic body problems? Does this blind doctors to aspects of oral health that may implicate the rest of the body?
- Use of mouthguards in children and athletes in preventing orofacial, dental injuries, and concussion
- Interventions to treat oral decubitus ulcers
- Diagnostic criteria for temporomandibular joint disorders

- Dental fluorosis is an endemic problem in many LMICs. It would be good to know the best methods to prevent and treat such cases.
- There is hardly an effort to know what is the best method to stop people from chewing betel quid.
- The effectiveness of treatment results of clear aligners compared to fixed orthodontic appliances
- Comparison among different orthodontic appliances treatment regarding biosafety;
- Autogenous dental transplant effectiveness.
- The risk factors of orthodontically induced white spot lesions (a review following the template of Cochrane Prognosis)
- Oral diseases with associations to other NCD's (diabetes, CVDs, overweight) ask for preventive cooperation of dental and medical professionals. Research on the the prevelance of NCDs and prevention focussing on life style from a common risk factor approach should be on the agenda of the Oral health group.
- Effects of dental restorative materials (amalgam & composite) on health
- When are CBCT images indicated for routine dental procedures?
- Good risk assessment model in children that is applicable in a school dental service
- Best endodontic materials to use in root canals (irrigation, root preparation, and root filling)
- Long term outcomes after implant placement in the anterior region
- I would like to know adverse effects of whitening and the best way to do it

B1.4. Covid-19 topics suggested by the panel

The Panel were asked if there were any topics that they would like to see Cochrane Oral Health undertake that were linked to the Covid-19 pandemic. The topics were then screened for duplication. The following Covid-19 topics were suggested:

- What is the effect of interventions for reducing the production of aerosols in dental settings?
- How is removable dental prosthesis cleaned in a Covid patient?
- Is an airborne infection isolation room (negative pressure room) effective in eliminating risk to oral health professionals?
- What is the effectiveness of extraoral high volume evacuation devices?
- What is the effectiveness of N95, KN95, and different levels of surgical masks in protecting patients and providers?

- Lessons learned from Covid-19 pandemics related to oral health services? How to build on this for better preparedness and response?
- Which safety precautions are necessary / reasonable for the dental team? Not only to guard the dental team but also patients.
- Is there a link between good oral health practices and a reduced risk of contagion/severity with a Covid-19 infection?
- Which is the best virucidal pre-procedural rinse that can be used in dental patients during this Covid-19 pandemic?
- The effectiveness and use of technology – teledentistry.
- Numbers of oral health practitioners infected with Covid worldwide and how many died.
- How to manage oral lesions in Covid-19 patients.
- Sterilization procedures and patient management to avoid the spread of Covid-19 and other future threats.
- Which procedures cause the greatest risk of infection and how can this be reduced.
- The question here is how to treat the patient we don`t know if is an asymptomatic carrier of the virus.

B1.5. Priority topics not ranked in the top fifteen by the Panel

Titles that were suggested and put forward but that were not ranked by the panel in the top fifteen are below, in order of ranking. Some titles are already registered with the group:

- Occlusal interventions for managing temporomandibular disorders (REGISTERED PROTCOL, 0321)
- Dental filling materials for managing carious lesions in the primary dentition (REGISTERED PROTOCOL, 0336)
- Mouthrinses for the prevention of oral mucositis in patients being treated for cancer
- Are breastfed babies more likely to get tooth decay?
- Adjunctive antimicrobial photodynamic therapy for treating periodontal and peri-implant diseases (REGISTERED PROTOCOL, 0275)
- What is the strongest material for making long-lasting root canal fillings?
- Can complementary or alternative therapies stop people getting mouth soreness and ulcers (oral mucositis) when they are being treated for cancer?

- Interventions for preventing oral mucositis in people receiving treatment for cancer: lasers (REGISTERED TITLE, 0010e)
- Sealants for preventing dental caries in primary teeth (REGISTERED PROTOCOL, 0329)
- Chlorhexidine mouthrinse versus other potentially active mouthrinses as an adjunctive treatment for gingival health (REGISTERED PROTOCOL, 0236b)
- Can complementary or alternative therapies relieve pain in the jaw or face (temporomandibular disorders)?

B2 Report on priority reviews for updating

B2.1. Introduction

Cochrane Oral Health has indicated capacity to publish 30 updates over the next three years. The top 30 updates that have been prioritised by the latest priority setting project are presented here.

Please note – updates that may already be underway, or close to publication, are included for a full picture of which Cochrane Oral Health reviews are priority titles. Note also that reviews where there is moderate or high quality evidence were not included as we can potentially consider these questions answered. These questions have become priorities for dissemination rather than updating.

These titles are:

- Routine scale and polish for periodontal health in adults
- Powered versus manual toothbrushing for oral health
- Pit and fissure sealants for preventing dental decay in permanent teeth
- Fluoride gels for preventing dental caries in children and adolescents
- Micro-invasive interventions for managing proximal dental decay in primary and permanent teeth
- Chlorhexidine mouthrinse as an adjunctive treatment for gingival health
- Fluoride mouthrinses for preventing caries in children and adolescents.

Cochrane Oral Health's updates have been prioritised in the following ways:

1. Looking at existing data on the use of Cochrane Oral Health's published systematic reviews. These metrics include: average numbers of downloads on the Cochrane Library

since 2014, average number of citations since 2014, average number of citations in guidelines since 2014, the review's Altmetric score.

2. Looking at trials registries to see which areas currently have trials registered, and whether there are new interventions on existing topics that need to be considered by Cochrane Oral Health.

3. Looking at what guideline developers need from systematic reviews, by examining oral health guidance and considering where further research is needed and / or where evidence is lacking.

4. An open survey which generated 211 questions from 168 people.

5. The questions prioritised by the James Lind Alliance Oral Health Priority Setting Partnership.

More information and reports on the first four of these projects can be found on our website here. For more on the James Lind Priority Setting Partnerships, see here.

Titles or topic areas that appeared as important in at least three of these five priority setting processes went through to the next stage. 50 of the review questions met this criteria.

40 people were recruited to rank the 50 review questions in order to produce the top 30. They included members of the Global Evidence Ecosystem for Oral Health (GEEOH), consumers, practicing dentists, oral surgeons, hygienists and researchers.

The final ranking is presented in this report, along with some preliminary thoughts on each topic and some basic underpinning searches.

Questions to consider:

1. Do you agree with the conclusions set out on each topic area?

2. Do you agree that the titles listed above on page one should be made stable rather than updated? Although priorities, they already have moderate/high quality evidence.

B2.2. Top thirty updates ranked and prioritised by the Panel

Rank 1st : Clinical assessment to screen for the detection of oral cavity cancer and potentially malignant disorders in apparently healthy adults (Review no: 0264, last published 2013, 13 included studies)

Comments from the Panel:

" Existing clinical practice guidelines and policy have been informed by the review on the early detection of oral cancer, thus an update to this evidence base will be useful." "Oral cancer is one of the most common cancers in the world and detection is still a crucial problem to be solved."

There has been no systematic review published either in the last three years or since the last review was updated (whichever is sooner)	**Yes X**	**No / Unclear**

Comment: Some on specific interventions identified, but none covering the whole question, none are as comprehensive as the Cochrane review.

New primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: Potentially. Examples:

Christensen, A., Juhl, K., Kiss, K., Lelkaitis, G., Charabi, B.W., Mortensen, J., Kjær, A. and von Buchwald, C. (2019). Near-infrared fluorescence imaging improves the nodal yield in neck dissection in oral cavity cancer - a randomized study. *European journal of surgical oncology*, 45(11), pp. 2151–2158.

Saini, R., Cantore, S., Saini, S.R., Mastrangelo, F., Ballini, A. and Santacroce, L. (2019). Efficacy of fluorescence technology vs conventional oral examination for the early detection of oral pre-malignant lesions. a clinical comparative study. *Endocrine, metabolic & immune disorders drug targets*, 19(6), pp. 852–858.

There is adequate human capacity to undertake the systematic review	**Yes X**	**No / Unclear**

Comment: Update is underway

There are no features that may require extra operational / managerial resource to complete this review	**Yes**	**No / Unclear X**

Comment: Diagnostic test accuracy reviews are more labour intensive than straightforward intervention reviews.

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes**	**No / Unclear X**

Comment: Currently given some leeway by DTA Methods group because of recognition that DTA reviews are more labour intensive

Conducting the systematic review raises no ethical concerns	**Yes X**	**No / Unclear**

Comment: No ethical concerns identified

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Evidence that oral cancer is more prevalent in LMIC contexts

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Yes, still important post-Covid-19

Rank 2nd: Periodontal therapy for the management of cardiovascular disease in patients with chronic periodontitis (Review no: 0252, last published 2019, 2 included studies)

Comments from the Panel:

“Heart attacks and strokes are major debilitating illnesses, and many are also unaware of the potential link to gum disease. This could benefit a large number of people significantly”

“ Guidance on interventions to manage periodontal disease would be extremely valuable to clinicians, particularly given the conclusions of the recently updated scale and polish review and dental recall review. “

There has been no systematic review published either in the last three years or since the last review was updated (whichever is sooner)	**Yes X**	**No / Unclear**

Comment: Review last published 2019, no new reviews identified since then.

New primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: Potentially. Examples:

Montenegro, M.M., Ribeiro, I., Kampits, C., Saffi, M., Furtado, M.V., Polanczyk, C.A., Haas, A.N. and Rösing, C.K. (2019). Randomized controlled trial of the effect of periodontal treatment on cardiovascular risk biomarkers in patients with stable coronary artery disease: preliminary findings of 3 months. *Journal of clinical periodontology*, 46(3), pp. 321–331.

Saffi, M., Rabelo-Silva, E.R., Polanczyk, C.A., Furtado, M.V., Montenegro, M.M., Ribeiro, I., Kampits, C., Rösing, C.K. and Haas, A.N. (2018). Periodontal therapy and endothelial function in coronary artery disease: a randomized controlled trial. *Oral diseases*, 24(7), pp. 1349–1357.

There is adequate human capacity to undertake the systematic review	**Yes**	**No / Unclear X**

Comment: Unclear if current team would update? (Team = Chunjie Li, Wei Liu, Yubin Cao, Li Dong, Ye Zhu, Yafei Wu, Zongkai Lv, Zipporah Iheozor-Ejiofor).

There are no features that may require extra operational / managerial resource to complete this review	**Yes X**	**No / Unclear**

Comment: Straightforward intervention review, not likely to be many new studies

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: Not likely to be many new studies.

Conducting the systematic review raises no ethical concerns	**Yes X**	**No / Unclear**

Comment: No ethical concerns identified

The question is relevant to LMIC contexts	**Yes**	**No / Unclear X**

Comment: Unclear if particularly relevant in LMIC contexts.

The question is still timely post-Covid-19 pandemic	**Yes**	**No / Unclear X**

Comment: Unclear – AGPs involved in periodontal therapy.

<u>Rank 3rd: Recall intervals for oral health in primary care patients (Review no: 0100, last published 2013, 1 included study)</u>

Comments from the Panel:
"The routine standard procedure in dental practice (every individual two times or more a year) is not evidence based."

" The effect of screening (i.e.dental checks) of oral diseases is important and risk assessment is an essential part."

There has been no systematic review published either in the last three years	**Yes X**	**No / Unclear**

or since the last review was updated (whichever is sooner)

Comment: Review last published 2013, no new reviews identified since then.

New primary studies are available for inclusion in the systematic review **Yes X** **No / Unclear**

Comment: The INTERVAL trial:

Clarkson, J.E., Pitts, N.B., Bonetti, D., Boyers, D., Braid, H., Elford, R., Fee, P.A., Floate, R., Goulão, B., Humphris, G., Needleman, I., Norrie, J., Ord, F., van der Pol, M., Ramsay, C.R., Ricketts, D., Worthington, H.V., Young, L. and INTERVAL Trial Collaboration (2018). INTERVAL (investigation of NICE technologies for enabling risk-variable-adjusted-length) dental recalls trial: a multicentre randomised controlled trial investigating the best dental recall interval for optimum, cost-effective maintenance of oral health in dentate adults attending dental primary care. *BMC oral health*, 18(1), Article no.: 135.

There is adequate human capacity to undertake the systematic review **Yes X** **No / Unclear**

Comment: Team in place, review update almost complete

There are no features that may require extra operational / managerial resource to complete this review **Yes X** **No / Unclear**

Comment: Straightforward intervention review, almost complete. Note that the evidence may now warrant making the review stable, i.e. it may not be a priority for future updates.

The systematic review is feasible within the expected timeframe (12mths to 24 mths) **Yes X** **No / Unclear**

Comment: About to be published.

Conducting the systematic review raises no ethical concerns **Yes X** **No / Unclear**

Comment: No ethical concerns identified

The question is relevant to LMIC contexts	**Yes**	**No / Unclear X**

Comment: Unclear – may not be important in contexts where access to primary dental care is limited.

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Could be important to understand necessity and frequency of dental appointments

Rank 4th: Home use of interdental cleaning devices, in addition to toothbrushing, for preventing and controlling periodontal diseases and dental caries (Review no: 0312, last published 2019, 35 included studies)

Comments from the Panel:

"The advice in relation to interdental cleaning forms part of our regular advice to patients, yet there is a lack of evidence behind this advice."

"Prevention is key going forward and therefore a strong evidence-base on which to base preventive strategies that are suited to the individual patient is needed."

"The dental hygienist says it works but the evidence is not on their side when last I looked."

There has been no systematic review published either in the last three years or since the last review was updated (whichever is sooner)	**Yes X**	**No / Unclear**

Comment: Review last published 2019, no new reviews identified since then.

New primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: There are some. Examples:

Lyle, D.M., Qaqish, J.G., Goyal, C.R. and Schuller, R. (2020). Efficacy of the use of a water flosser in addition to an electric toothbrush on clinical signs of inflammation: 4-week randomized controlled trial. *Compendium of continuing education in dentistry*, 41(3), pp. 170–177.

Moretti, A.J., Zhang, S., Phillips, S.T., Williams, K., Moss, K.L. and Offenbacher, S. (2020). Evaluation of a curved design rubber bristle interdental cleaner on patients with gingivitis. *Journal of dental hygiene*, 94(1), pp. 6–13.

Gomes, A.F., Rekhi, A., Meru, S. and Chahal, G. (2019). Efficacy, safety and patient preference of knotted floss technique in type I gingival embrasures. *Journal of dental hygiene*, 93(1), pp. 52–62.

There is adequate human capacity to undertake the systematic review	**Yes**	**No / Unclear X**

Comment: Only recently published, team may be able to update in a year or two? (Team = Helen V Worthington, Laura MacDonald, Tina Poklepovic Pericic, Dario Sambunjak, Trevor M Johnson, Pauline Imai, Janet E Clarkson)

There are no features that may require extra operational / managerial resource to complete this review	**Yes X**	**No / Unclear**

Comment: Straightforward intervention review.

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: No reason why it should take longer than expected

Conducting the systematic review raises no ethical concerns	**Yes**	**No / Unclear X**

Comment: May be some concerns around conflicts of interest / industry funded trials around commercial products (eg water flossers)

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Preventive, cheap measure – could be relevant in resource-poor settings

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Preventive measures important if access to primary dental services is limited.

Rank 5th: Water fluoridation for the prevention of dental caries (Review no: 0284, last published 2015, 155 included studies)

Comments from the Panel:

"The U.S. is celebrating the 75th anniversary of community water fluoridation this year, and new research outside of the U.S. could show what we already know - that this is the single most cost effective way of preventing dental caries."

"Water fluoridation is still a major issue, as caries is so prevalent."

There has been no systematic review published either in the last three years or since the last review was updated (whichever is sooner)	**Yes X**	**No / Unclear**

Comment: None covering this exact question, two identified that are related but none in last three years.

New primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: No RCTs identified, but the following may be included as the review is not a straightforward intervention review:

Kim, H.N., Kong, W.S., Lee, J.H. and Kim, J.B. (2019). Reduction of dental caries among children and adolescents from a 15-year community water fluoridation program in a township area, Korea. *International journal of environmental research and public health*, 16(7), Article no.: 1306.

Goodwin, M., Emsley, R., Kelly, M., Rooney, E., Sutton, M., Tickle, M., Wagstaff, R., Walsh, T., Whittaker, W. and Pretty, I.A. (2016). The CATFISH study protocol: an evaluation of a water fluoridation scheme. *BMC oral health*, 16, Article no.: 8.

Blinkhorn, A.S., Byun, R., Mehta, P. and Kay, M. (2015). A 4-year assessment of a new water-fluoridation scheme in New South Wales, Australia. *International dental journal*, 65(3), pp. 156–163.

Kim, H.N., Kim, J.H., Kim, S.Y. and Kim, J. B. (2017). Associations of community water fluoridation with caries prevalence and oral health inequality in children. *International journal of environmental research and public health*, 14(6), Article no.: 631.

Ramezani, G., Valaie, N. and Rakhshan, V. (2015). The effect of water fluoride concentration on dental caries and fluorosis in five Iran provinces: a multi-center two-phase study. *Dental research journal*, 12(1), pp. 31–37.

There is adequate human capacity to undertake the systematic review	**Yes**	**No / Unclear X**

Comment: Update not yet started, unclear if team are willing / able to update (Team = Zipporah Iheozor-Ejiofor, Helen V Worthington, Tanya Walsh, Lucy O'Malley, Jan E Clarkson, Richard Macey, Rahul Alam, Peter Tugwell, Vivian Welch, Anne-Marie Glenny)

There are no features that may require extra operational / managerial resource to complete this review	**Yes**	**No / Unclear X**

Comment: Not a straightforward intervention review, controversial topic.

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes**	**No / Unclear X**

Comment: Unclear – generally a large search and unclear how many studies would be included

Conducting the systematic review raises no ethical concerns	**Yes**	**No / Unclear X**

Comment: Controversial topic – may need to be careful of conflicts of interest.

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Preventive measure – could be highly relevant in resource-poor settings

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Preventive measures important if access to primary dental services is limited.

Rank 6th: Oral hygiene care for critically ill patients to prevent ventilator-associated pneumonia (Review no: 0142, last published 2016, 38 included studies)

Comments from the Panel:

"Important to patients and clinicians"
"The Covid 19 problem reminds us how oral health is important to prevent severe lung inflammation."

There has been no systematic review published either in the last three years or since the last review was updated (whichever is sooner)	**Yes X**	**No / Unclear**

Comment: None identified which cover whole question, but there are some on aspects of the intervention.

New primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: Several identified:

Khaky, B., Yazdannik, A. and Mahjobipoor, H. (2018). Evaluating the efficacy of Nanosil mouthwash on the preventing pulmonary infection in intensive care unit: a randomized clinical trial. *Medical archives*, 72(3), pp. 206–209.

Da Collina, G.A., Tempestini-Horliana, A., da Silva, D., Longo, P.L., Makabe, M. and Pavani, C. (2017). Oral hygiene in intensive care unit patients with photodynamic therapy: study protocol for randomised controlled trial. *Trials*, 18(1), Article no.: 385.

Chacko, R., Rajan, A., Lionel, P., Thilagavathi, M., Yadav, B. and Premkumar, J. (2017). Oral decontamination techniques and ventilator-associated pneumonia. *British journal of nursing*, 26(11), pp. 594–599.

Zand, F., Zahed, L., Mansouri, P., Dehghanrad, F., Bahrani, M. and Ghorbani, M. (2017). The effects of oral rinse with 0.2% and 2% chlorhexidine on oropharyngeal colonization and ventilator associated pneumonia in adults' intensive care units. *Journal of critical care*, 40, pp. 318–322.

Tuon, F.F., Gavrilko, O., Almeida, S., Sumi, E.R., Alberto, T., Rocha, J.L. and Rosa, E.A. (2017). Prospective, randomised, controlled study evaluating early modification of oral microbiota following admission to the intensive care unit and oral hygiene with chlorhexidine. *Journal of global antimicrobial resistance*, 8, pp. 159–163.

There is adequate human capacity to undertake the systematic review	**Yes X**	**No / Unclear**

Comment: Update underway.

There are no features that may require extra operational / managerial resource to complete this review	**Yes X**	**No / Unclear**

Comment: No special features identified

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: Update underway

Conducting the systematic review raises no ethical concerns	**Yes X**	**No / Unclear**

Comment: No ethical concerns identified

The question is relevant to LMIC contexts	**Yes**	**No / Unclear X**

Comment: Unclear

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Could be relevant to patients on ventilators who are at risk from Covid-19 related pneumonia

Rank 7th: Interventions with pregnant women and new mothers for preventing caries in children (Review no: 0306, last published 2019, 17 included studies)

Comments from the Panel:

" The cost effectiveness of educating carers about oral health and developing early positive oral health habits is important."
" We need to better understand how to encourage child patients and their carers to take responsibility for their own oral health."
" A lot of effort and resources go into prenatal education programs. Knowing if they are effective may lead to better outcomes."

There has been no systematic review published either in the last three years or since the last review was updated (whichever is sooner)	**Yes**	**No / Unclear X**

Comment: One identified:
Xiao, J., Alkhers, N., Kopycka-Kedzierawski, D.T., Billings, R.J., Wu, T.T., Castillo, D.A., Rasubala, L., Malmstrom, H., Ren, Y. and Eliav, E. (2019). Prenatal oral health care and early childhood caries prevention: a systematic review and meta-analysis. *Caries research*, 53(4), pp. 411–421.

AMSTAR assessment: critically low quality review, score: 6/16

New primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: Two possibles have been found:

Villena, R.S., Pesaressi, E. and Frencken, J.E. (2019). Reducing carious lesions during the first 4 years of life: an interprofessional approach. *Journal of the American Dental Association*, 150(12), pp. 1004–1014.

Cardoso, C., Santos, N.M., Fracasso, M., Provenzano, M., Oliveira, T.M. and Rios, D. (2018). Dental plaque disclosure as an auxiliary method for infants' oral hygiene. *European archives of paediatric dentistry*, 19(3), pp. 139–145.

There is adequate human capacity to undertake the systematic review	**Yes**	**No / Unclear X**

Comment: Update not yet started, unclear if team are willing to update (Team = Elisha Riggs, Nicky Kilpatrick, Linda Slack-Smith, Barbara Chadwick, Jane Yelland, M S Muthu and Judith C Gomersall)

There are no features that may require extra operational / managerial resource to complete this review	**Yes X**	**No / Unclear**

Comment: No special features identified

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: Unlikely to be a large number of studies

Conducting the systematic review raises no ethical concerns	**Yes X**	**No / Unclear**

Comment: No ethical concerns identified

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Could be highly relevant to preventing childhood caries in a resource-poor setting

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Preventive reviews are still timely and relevant

Rank 8th: Surgical removal versus retention for the management of asymptomatic disease-free impacted wisdom teeth (Review no: 0039, last published 2020, 2 included studies)

Comments from the Panel:

"Interventions on a regular basis performed in dental practice should be subjected to evidence to prevent overtreatment."

There has been no systematic review published either in the last three years or since the last review was updated (whichever is sooner)	**Yes X**	**No / Unclear**

Comment: Review published 2020, no reviews identified since publication

New primary studies are available for inclusion in the systematic review	**Yes**	**No / Unclear**	**X**

Comment: None identified since last search.

There is adequate human capacity to undertake the systematic review	**Yes**	**No / Unclear**	**X**

Comment: Update not due, unclear if team would willing to update in future (Team = Hossein Ghaeminia, Marloes EL Nienhuijs, Verena Toedtling, John Perry, Marcia Tummers, Theo JM Hoppenreijs, Wil JM Van der Sanden)

There are no features that may require extra operational / managerial resource to complete this review	**Yes X**	**No / Unclear**

Comment: No special features identified

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: Unlikely to be a large number of studies

Conducting the systematic review raises no ethical concerns	**Yes X**	**No / Unclear**

Comment: No ethical concerns identified

The question is relevant to LMIC contexts	**Yes**	**No / Unclear**	**X**

Comment: Not especially relevant to LMIC settings

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: If not extracting asymptomatic teeth is an option, this minimises need for dental treatment

Rank 9th: Direct composite resin fillings versus amalgam fillings for permanent or adult posterior teeth (review no: 0089, last published 2014, 7 included studies)

Comments from the Panel:

"Personally, I favour amalgam restorations over composites. Also, I have witnessed many of my patients from low socioeconomic status who cannot afford composite restorations are happy with amalgam. I have also seen more secondary caries cases with composite restorations."

There has been no systematic review published either in the last three years or since the last review was updated (whichever is sooner)	**Yes X**	**No / Unclear**

Comment: None identified on this exact topic in last three years, three on some aspect of question undertaken in last five years

New primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: One identified:

Kemaloglu, H., Pamir, T. and Tezel, H. (2016). A 3-year randomized clinical trial evaluating two different bonded posterior restorations: Amalgam versus resin composite. *European journal of dentistry*, 10(1), pp. 16–22.

There is adequate human capacity to undertake the systematic review	**Yes**	**No / Unclear**	**X**

Comment: Unclear if team would willing to update in future (Team = M Graciela Rasines Alcaraz, Analia Veitz-Keenan, Philipp Sahrmann, Patrick Roger Schmidlin, Dell Davis, Zipporah Iheozor-Ejiofor)

There are no features that may require extra operational / managerial resource to complete this review	**Yes X**	**No / Unclear**

Comment: No special features identified

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: Unlikely to be a large number of studies

Conducting the systematic review raises no ethical concerns	**Yes**	**No / Unclear**	**X**

Comment: Controversial topic – issues over amalgam safety.

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Resin fillings more expensive than amalgam.

The question is still timely post-Covid-19 pandemic	**Yes**	**No / Unclear X**

Comment: Unclear as yet if tooth restoration methods will be affected long term.

Rank 10th: Primary school-based behavioural interventions for preventing caries (review no: 0246, last published 2013, 4 included studies)

Comments from the Panel:

"Knowledge transfer to the public is more effective to prevent diseases than treatment."
"Prevention is the best way to limit the progression and spread of caries, especially in children. In addition, the school is the place where children can be easily checked and the right place to share the correct oral hygiene procedures."
"Many different societies, cultures have various belief systems about oral healthcare for children and adults. Through education we can help dispel any outdated beliefs."

There has been no systematic review published either in the last three years or since the last review was updated (whichever is sooner)	**Yes**	**No / Unclear X**

Comment: One review has been identified:
Geetha Priya, P.R., Asokan, S., Janani, R.G. and Kandaswamy, D. (2019). Effectiveness of school dental health education on the oral health status and knowledge of children: a systematic review. *Indian journal of dental research*, 30(3), pp. 437–449.

AMSTAR assessment: Low quality review, score: 5/13

New primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: Some possible inclusions available:

Samuel, S.R., Acharya, S and & Rao, J.C. (2020). School interventions-based prevention of early-childhood caries among 3-5-year-old children from very low socioeconomic status: two-year randomized trial. *Journal of public health dentistry*, 80(1), pp. 51–60.

Qadri, G., Alkilzy, M., Franze, M., Hoffmann, W. and Splieth, C. (2018). School-based oral health education increases caries inequalities. *Community dental health*, 35(3), pp. 153–159.

Pine, C., Adair, P., Robinson, L., Burnside, G., Moynihan, P., Wade, W., Kistler, J., Curnow, M. and Henderson, M. (2016). The BBaRTS Healthy Teeth Behaviour Change Programme for preventing dental caries in primary school children: study protocol for a cluster randomised controlled trial. *Trials*, 17(1), Article no.: 103.

Petersen, P.E., Hunsrisakhun, J., Thearmontree, A., Pithpornchaiyakul, S., Hintao, J., Jürgensen, N. and Ellwood, R.P. (2015). School-based intervention for improving the oral health of children in southern Thailand. *Community dental health*, 32(1), pp. 44–50.

Yekaninejad, M.S., Eshraghian, M.R., Nourijelyani, K., Mohammad, K., Foroushani, A. R., Zayeri, F., Pakpour, A.H., Moscowchi, A. and Tarashi, M. (2012). Effect of a school-based oral health-education program on Iranian children: results from a group randomized trial. *European journal of oral sciences*, 120(5), pp. 429–437.

There is adequate human capacity to undertake the systematic review	**Yes**	**No / Unclear X**

Comment: Unclear if team would willing to update in future (Team = Anna M Cooper, Lucy A O'Malley, Sarah N Elison, Rosemary Armstrong, Girvan Burnside, Pauline Adair, Lindsey Dugdill, Cynthia Pine)

There are no features that may require extra operational / managerial resource to complete this review	**Yes X**	**No / Unclear**

Comment: No special features identified

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: No special features that may cause delay

Conducting the systematic review raises no ethical concerns	**Yes X**	**No / Unclear**

Comment: No ethical concerns identified

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Highly relevant to LMIC contexts

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Preventive measures important when access to primary dental care may be limited, however schools not currently fully operational in some parts of the world.

Rank 11th: Oral hygiene interventions for people with intellectual disabilities (review no: 0319, last published 2019, 19 RCTs, 15 NRSs)

Comments from the Panel:

"The evidence in relation to the care of vulnerable populations (learning disabilities and older adults to start with) in relation to their oral health is lacking."

"Supporting people with learning disabilities helps to decrease their problems."

"Updating this systematic review might provide clearer evidence."

There has been no systematic review published either in the last three years or since the last review was updated (whichever is sooner)	**Yes**	**No / Unclear X**

Comment: Two identified, despite review being published one year ago:

Zhou, N., Wong, H.M., Wen, Y.F. and McGrath, C. (2019). Efficacy of caries and gingivitis prevention strategies among children and adolescents with intellectual disabilities: a systematic review and meta-analysis. *Journal of intellectual disability research*, 63(6), pp. 507–518

AMSTAR assessment: Critically low quality review, score: 7/16

McGrath, C., Zhou, N. and Wong, H.M. (2019). A systematic review and meta-analysis of dental plaque control among children and adolescents with intellectual disabilities. *Journal of applied research in intellectual disabilities*, 32(3), pp. 522–532.

AMSTAR assessment: Critically low quality review, score: 6/16

New primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: One identified since the search was last run:

Silva, A.M., Miranda, L., Araujo, A., Prado Junior, R.R. and Mendes, R.F. (2020). Electric toothbrush for biofilm control in individuals with Down syndrome: a crossover randomized clinical trial. *Brazilian oral research*, 34, Article no.: e057.

There is adequate human capacity to undertake the systematic review	**Yes**	**No / Unclear**	**X**

Comment: Unclear if team would willing to update in future (Team = Catherine Waldron, June Nunn, Caoimhin Mac Giolla Phadraig, Catherine Comiskey, Suzanne Guerin, Maria Theresa van Harten, Erica Donnelly-Swift, Mike J Clarke)

There are no features that may require extra operational / managerial resource to complete this review	**Yes X**	**No / Unclear**

Comment: No special features identified

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: No special features that may cause delay

Conducting the systematic review raises no ethical concerns	**Yes**	**No / Unclear**	**X**

Comment: May be some interventions with industry funding (eg electric toothbrushes). May have to be cautious around conflict of interest as a result.

The question is relevant to LMIC contexts	**Yes**	**No / Unclear X**

Comment: Unclear if especially relevant to LMIC contexts.

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Preventive measures important when access to primary dental care may be limited.

Rank 12th: Oral health educational interventions for nursing home staff and residents (review no: 0265, last published 2016, 9 included studies)

Comments from Panel:

"This relates to development and maintenance of at-home oral health care habits, which is arguably more critical for disease prevention and maintenance than professional interventions."

There has been no systematic review published either in the last three years or since the last review was updated (whichever is sooner)	**Yes X**	**No / Unclear**

Comment: None identified since review last published.

New primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: Four possibles identified:

Weintraub, J.A., Zimmerman, S., Ward, K., Wretman, C.J., Sloane, P.D., Stearns, S.C., Poole, P. and Preisser, J.S. (2018). Improving nursing home residents' oral hygiene: results of a cluster randomized intervention trial. *Journal of the American Medical Directors Association*, 19(12), pp. 1086–1091.

Li, X. L., Liu, M. Y., Cheng, L., Zhu, H. F., & Cui, D. (2018). [Impact of oral health promotion project on periodontal condition and life quality of the elderly in long-term care institutions]. *Shanghai journal of stomatology*, 27(3), pp. 285–288.

Marchini, L., Recker, E., Hartshorn, J., Cowen, H., Lynch, D., Drake, D., Blanchette, D. R., Dawson, D.V., Kanellis, M. and Caplan, D. (2018). Iowa nursing facility oral hygiene (INFOH) intervention: a clinical and microbiological pilot randomized trial. *Special care in dentistry*, 38(6), pp. 345–355.

Janssens, B., De Visschere, L., van der Putten, G.J., de Lugt-Lustig, K., Schols, J.M. and Vanobbergen, J. (2016). Effect of an oral healthcare protocol in nursing homes on care staffs' knowledge and attitude towards oral health care: a cluster-randomised controlled trial. *Gerodontology*, 33(2), pp. 275–286.

There is adequate human capacity to undertake the systematic review	**Yes X**	**No / Unclear**

Comment: Update underway

There are no features that may require extra operational / managerial resource to complete this review	**Yes X**	**No / Unclear**

Comment: No special features identified

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: No special features that may cause delay

Conducting the systematic review raises no ethical concerns	**Yes X**	**No / Unclear**

Comment: No ethical concerns identified

The question is relevant to LMIC contexts	**Yes**	**No / Unclear X**

Comment: Unclear if especially relevant to LMIC contexts.

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Preventive measures important when access to primary dental care may be limited.

Rank 13th: One topical fluoride versus another for preventing dental caries in children and adolescents (review no: 0007f, last published 2004, 17 included studies)

Comments from Panel:

"I think a new review to show the effectiveness of different fluoride regimens - varnish, gels, toothpastes, school rinses, etc. - would be very useful."

"Given the numerous ways of fluoride application, it would be beneficial to understand if there is any one particular method that is better than the others."

There has been no systematic review published either in the last three years or since the last review was updated (whichever is sooner)	**Yes X**	**No / Unclear**

Comment: None identified in last three years.

New primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: There are some. A more thorough search may reveal more:

Al Dehailan, L. and Martinez-Mier, E.A. (2019). Prevention program including fluoride varnish and 1450-ppm fluoride toothpaste targeting young children in clinical setting in uk did not stop sental caries from developing but slowed lesion progression. *Journal of evidence-based dental practice*, 19(2), pp. 207–209.

Keller, M.K., Klausen, B.J. and Twetman, S. (2016). Fluoride varnish or fluoride mouth rinse? A comparative study of two school-based programs. *Community dental health*, 33(1), pp. 23–26.

Ersin, N.K., Eden, E., Eronat, N., Totu, F.I. and Ates, M. (2008). Effectiveness of 2-year application of school-based chlorhexidine varnish, sodium fluoride gel, and dental health education programs in high-risk adolescents. *Quintessence international*, 39(2), pp. e45–e51.

There is adequate human capacity to undertake the systematic review	**Yes**	**No / Unclear X**

Comment: The review is old and the team no longer available (Team = Valeria CC Marinho, Julian PT Higgins, Aubrey Sheiham, Stuart Logan)

There are no features that may require extra operational / managerial resource to complete this review	**Yes**	**No / Unclear X**

Comment: This review is old – will probably require a new team and protocol.

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes**	**No / Unclear X**

Comment: May not be feasible to update as it stands, new protocol may be needed

Conducting the systematic review raises no ethical concerns	**Yes**	**No / Unclear X**

Comment: May have to be wary of commercial products, industry funded trials and conflicts of interest.

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Prevention is important in LMIC contexts.

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Preventive measures important when access to primary dental care may be limited.

Rank 14th: Screening programmes for the early detection and prevention of oral cancer (review no: 0083, last published 2013, 1 included study)

Comments from Panel:

" Early detection of disease is important."

" Research should focus on where there is more uncertainty."
" The frequency of dental check up remains a subject of debate despite recent evidence. One argument for maintaining the frequency in the UK is the increase in mouth cancer. Consequently the potential for early diagnosis of oral cancer and screening have a linkage."

There has been no systematic review published either in the last three years or since the last review was updated (whichever is sooner)	**Yes X**	**No / Unclear**

Comment: None identified from last three years.

New primary studies are available for inclusion in the systematic review	**Yes**	**No / Unclear**	**X**

Comment: None identified. A more thorough search may reveal some.

There is adequate human capacity to undertake the systematic review	**Yes**	**No / Unclear**	**X**

Comment: Lead author unlikely to update, may need new team. (Team = Paul Brocklehurst, Omar Kujan, Lucy A O'Malley, Graham Ogden, Simon Shepherd, Anne-Marie Glenny)

There are no features that may require extra operational / managerial resource to complete this review	**Yes X**	**No / Unclear**

Comment: Unlikely to be significant numbers of new studies to add (if any).

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: Limited number of studies, probably not a great deal of work in the update.

Conducting the systematic review raises no ethical concerns	**Yes X**	**No / Unclear**

Comment: None identified

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Very important to LMIC contexts, as oral cancer is more prevalent in LMIC.

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Question of whether screening is effective is relevant at a time when access to screening is limited.

Rank 15th: Enamel matrix derivative (Emdogain®) for periodontal tissue regeneration in intrabony defects (review no: 0076, last published 2009, 13 included studies)

Comments from Panel:
"Gum problems are quite common and very annoying!"

There has been no systematic review published either in the last three years or since the last review was updated (whichever is sooner)	**Yes**	**No / Unclear X**

Comment: Only one identified from last three years:

Zhou, S., Sun, C., Huang, S., Wu, X., Zhao, Y., Pan, C., Wang, H., Liu, J., Li, Q. and Kou, Y. (2018). Efficacy of adjunctive bioactive materials in the treatment of

periodontal intrabony defects: a systematic review and meta-analysis. *BioMed research international*, 2018, Article no.: 8670832.

AMSTAR assessment: Low quality review, score: 9/16

New primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: There are a number. Examples:

Aydemir Turkal, H., Demirer, S., Dolgun, A. and Keceli, H.G. (2016). Evaluation of the adjunctive effect of platelet-rich fibrin to enamel matrix derivative in the treatment of intrabony defects. Six-month results of a randomized, split-mouth, controlled clinical study. *Journal of clinical periodontology*, 43(11), pp. 955–964.

Gupta, S. J., Jhingran, R., Gupta, V., Bains, V. K., Madan, R. and Rizvi, I. (2014). Efficacy of platelet-rich fibrin vs. enamel matrix derivative in the treatment of periodontal intrabony defects: a clinical and cone beam computed tomography study. *Journal of the International Academy of Periodontology*, 16(3), pp. 86–96.

Al Machot, E., Hoffmann, T., Lorenz, K., Khalili, I. and Noack, B. (2014). Clinical outcomes after treatment of periodontal intrabony defects with nanocrystalline hydroxyapatite (Ostim) or enamel matrix derivatives (Emdogain): a randomized controlled clinical trial. *BioMed research international*, 2014, Article no.: 786353.

Bhutda, G. and Deo, V. (2013). Five years clinical results following treatment of human intra-bony defects with an enamel matrix derivative: a randomized controlled trial. *Acta odontologica Scandinavica*, 71(3-4), pp. 764–770.

There is adequate human capacity to undertake the systematic review	**Yes**	**No / Unclear X**

Comment: Review is very old. Lead author not able to undertake it due to conflict of interests. (Team = Marco Esposito, Maria Gabriella Grusovin, Nikolaos Papanikolaou, Paul Coulthard, Helen V Worthington)

There are no features that may require extra operational / managerial resource to complete this review	**Yes**	**No / Unclear X**

Comment: No special features identified, but a new review team would certainly need to be recruited

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes**	**No / Unclear X**

Comment: Unclear – it may depend on whether the review needs a new protocol.

Conducting the systematic review raises no ethical concerns	**Yes**	**No / Unclear X**

Comment: Emdogain is a commercial product, there may be issues recruiting a team without conflict of interest.

The question is relevant to LMIC contexts	**Yes**	**No / Unclear X**

Comment: Not important in LMIC contexts.

The question is still timely post-Covid-19 pandemic	**Yes**	**No / Unclear X**

Comment: Unclear as yet how much regenerative procedures will be taking place.

Rank 16th: Treating periodontal disease for preventing adverse birth outcomes in pregnant women (review no: 0124, last published 2017, 15 included studies)

Comments from Panel:
"Studies as to the correlation of the body and births and how these can also be affected by gum disease would be great studies to further educate to patients how the oral health doesn't just pertain to the mouth. Oral health and body health are one and the same. "

There has been no systematic review published either in the last three years or since the last review was updated (whichever is sooner)	**Yes X**	**No / Unclear**

Comment: No intervention reviews identified from last three years. There is an umbrella review, which contains 18 systematic reviews, but does not include the Cochrane review, even though they have searched the Cochrane Library.

Rangel-Rincón, L.J., Vivares-Builes, A.M., Botero, J.E and Agudelo-Suárez, A.A. (2018). An umbrella review exploring the effect of periodontal treatment in pregnant women on the frequency of adverse obstetric outcomes. *Journal of evidence-based dental practice*, 18(3), pp. 218–239.

New primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: At least three have been identified:

Caneiro-Queija, L., López-Carral, J., Martin-Lancharro, P., Limeres-Posse, J., Diz-Dios, P. and Blanco-Carrion, J. (2019). Non-surgical treatment of periodontal disease in a pregnant Caucasian women population: adverse pregnancy outcomes of a randomized clinical trial. *International journal of environmental research and public health*, 16(19), Article no.: 3638.

Novák, T., Radnai, M., Kozinszky, Z., Práger, N., Hodoniczki, L., Gorzó, I. and Németh, G. (2018). Fogágybetegség kezelésének hatása a terhesség kimenetelére [Effect of the treatment of periodontal disease on the outcome of pregnancy]. *Orvosi hetilap*, 159(24), pp. 978–984.

Musskopf, M.L., Milanesi, F.C., Rocha, J., Fiorini, T., Moreira, C., Susin, C., Rösing, C. K., Weidlich, P. and Oppermann, R.V. (2018). Oral health related quality of life among pregnant women: a randomized controlled trial. *Brazilian oral research*, 32, Article no.: e002.

There is adequate human capacity to undertake the systematic review	**Yes**	**No / Unclear**	**X**

Comment: Unclear if the current team could update. (Team = Zipporah Iheozor-Ejiofor, Philippa Middleton, Marco Esposito, Anne-Marie Glenny)

There are no features that may require extra operational / managerial resource to complete this review	**Yes X**	**No / Unclear**

Comment: Last review is fairly recent so may be straightforward

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: There doesn't seem to be any special features to suggest it may take longer

Conducting the systematic review raises no ethical concerns	**Yes X**	**No / Unclear**

Comment: No ethical concerns identified

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Possibly -if there is access to dental services and the therapy is relatively low cost.

The question is still timely post-Covid-19 pandemic	**Yes**	**No / Unclear X**

Comment: Scale and polish is an AGP. Other types of periodontal treatment may be possible?

Rank 17th: Triclosan/copolymer containing toothpastes for oral health (review no: 0296, last published 2013, 30 included studies)**

****NB Due to the FDA ruling removing triclosan from toothpastes, this title was presented to the panel as antibacterial toothpastes for oral health – a wider topic.**

There were no comments on this specific question from the Panel.

There has been no systematic review published either in the last three years or since the last review was updated (whichever is sooner)	**Yes X**	**No / Unclear**

Comment: None identified from last three years.

New primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: At least two have been identified:

Hagenfeld, D., Prior, K., Harks, I., Jockel-Schneider, Y., May, T. W., Harmsen, D., Schlagenhauf, U. and Ehmke, B. (2019). No differences in microbiome changes between anti-adhesive and antibacterial ingredients in toothpastes during periodontal therapy. *Journal of periodontal research,* 54(4), pp. 435–443.

Prasad, K.V., Therathil, S.G., Agnihotri, A., Sreenivasan, P.K., Mateo, L.R and Cummins, D. (2018). The effects of two new dual zinc plus arginine dentifrices in reducing oral bacteria in multiple locations in the mouth: 12-hour whole mouth antibacterial protection for whole mouth health. *Journal of clinical dentistry*, 29(Spec No A), pp. A25–A32.

There is adequate human capacity to undertake the systematic review	**Yes**	**No / Unclear X**

Comment: Only two people on current team, may need to expand. (Team = Phil Riley, Thomas Lamont)

There are no features that may require extra operational / managerial resource to complete this review	**Yes X**	**No / Unclear**

Comment: No special features identified

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: There doesn't seem to be any special features to suggest it may take longer

Conducting the systematic review raises no ethical concerns	**Yes**	**No / Unclear X**

Comment: All interventions would be commercial products. May have to be cautious of conflicts of interest / industry funding.

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Possibly – if the toothpastes are effective and low cost.

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Prevention question – may be very relevant if primary dental services are restricted.

Rank 18th: Interventions for the treatment of oral and oropharyngeal cancers: surgical treatment (review no: 0178, last published 2018, 12 included)

Comments from the Panel:

"I would rank the three treatments for cancer as joint second after water fluoridation."

"Oral cancer is a major public health issue in some parts of the world."

There has been no systematic review published either in the last three years or since the last review was updated (whichever is sooner)	**Yes**	**No / Unclear X**

Comment: Two identified from last three years:

Best, C., Quimby, A.E., Best, B., Fergusson, D. and Alsaffar, H. (2019). Evaluating the effectiveness of adjuvant radiotherapy in addition to surgery versus surgery alone at improving oncologic outcomes for early stage buccal carcinoma: a systematic review. *Journal of otolaryngology - head & neck surgery*, 48(1), Article no.: 73.

AMSTAR assessment: Low quality review, score: 8/16

Liu, J.Y., Chen, C.F. and Bai, C.H. (2019). Elective neck dissection versus observation in early-stage (cT1/T2N0) oral squamous cell carcinoma. *Laryngoscope investigative otolaryngology*, 4(5), pp. 554–561.

AMSTAR assessment: Critically low quality review, score: 5/16

New primary studies are available for inclusion in the systematic review **Yes X** **No / Unclear**

Comment: Several possibles available, including:

Nichols, A.C., Theurer, J., Prisman, E., Read, N., Berthelet, E., Tran, E., Fung, K., de Almeida, J.R., Bayley, A., Goldstein, D.P., Hier, M., Sultanem, K., Richardson, K., Mlynarek, A., Krishnan, S., Le, H., Yoo, J., MacNeil, S.D., Winquist, E., Hammond, J.A., Venkatesan, V., Kuruvilla, S., Warner, A., Mitchell, S., Chen, J., Corsten, M., Johnson-Obaseki, S., Eapen, L., Odell, M., Parker, C., Wehrli, B., Kwan, K. and Palma, D.A. (2019). Radiotherapy versus transoral robotic surgery and neck dissection for oropharyngeal squamous cell carcinoma (ORATOR): an open-label, phase 2, randomised trial. *The lancet oncology*, 20(10), pp. 1349–1359.

Hutchison, I.L., Ridout, F., Cheung, S., Shah, N., Hardee, P., Surwald, C., Thiruchelvam, J., Cheng, L., Mellor, T.K., Brennan, P.A., Baldwin, A.J., Shaw, R.J., Halfpenny, W., Danford, M., Whitley, S., Smith, G., Bailey, M.W., Woodwards, B., Patel, M., McManners, J., Chan, C.H., Burns, A., Praveen, P., Camilleri, A.C., Avery, C., Putnam, G., Jones, K., Webster, K., Smith, W.P., Edge, C., McVicar, I., Grew, N., Hislop, S., Kalavrezos, N., Martin, I.C. and Hackshaw, A. (2019). Nationwide randomised trial evaluating elective neck dissection for early stage oral cancer (SEND study) with meta-analysis and concurrent real-world cohort. *British journal of cancer*, 121(10), pp. 827–836.

Pandey, M., Karthikeyan, S., Joshi, D., Kumar, M. and Shukla, M. (2018). Results of a randomized controlled trial of level IIb preserving neck dissection in clinically node-negative squamous carcinoma of the oral cavity. *World journal of surgical oncology*, 16(1), 219.

There is adequate human capacity to undertake the systematic review **Yes** **No / Unclear X**

Comment: Possibly – we may be able to use the existing team updating the other oral cancer reviews (current team on this review = Vishal M Bulsara, Helen V Worthington, Anne-Marie Glenny, Janet E Clarkson, David I Conway, Michaelina Macluskey)

There are no features that may require extra operational / managerial resource to complete this review	**Yes X**	**No / Unclear**

Comment: No special features identified

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: There doesn't seem to be any special features to suggest it may take longer

Conducting the systematic review raises no ethical concerns	**Yes X**	**No / Unclear**

Comment: No ethical concerns identified.

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: This is a condition that is more prevalent in LMIC contexts.

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Yes, cancer treatment is still ongoing.

Rank 19th: School dental screening programmes for oral health (review no: 0324, last published 2019, 7 included studies)

Comments from the Panel:

"There is a lack of consensus on this"
"Prevention is the best way to limit the progression and spread of caries, especially in children. In addition, the school is the place where children can be easily checked and the right place to share the correct oral hygiene procedures."

"This topic is more relevant to underserved populations (the majority of people from a global perspective) in order to prevent tooth decay and oral diseases."

There has been no systematic review published either in the last three years or since the last review was updated (whichever is sooner)	**Yes**	**No / Unclear X**

Comment: Only one, but review was only updated in 2019:
Sanjeevan, V., Janakiram, C. and Joseph, J. (2019). Effectiveness of school-based dental screening in increasing dental care utilization: a systematic review and meta-analysis. *Indian journal of dental research*, 30(1), pp. 117–124.

AMSTAR assessment: Critically low quality review, score: 6/16

New primary studies are available for inclusion in the systematic review	**Yes**	**No / Unclear X**

Comment: None identified – but the review was only updated in 2019.

There is adequate human capacity to undertake the systematic review	**Yes X**	**No / Unclear**

Comment: The review was updated recently, current team may be willing in a year or two. (Team = Ankita Arora, Shivi Khattri, Noorliza Mastura Ismail, Sumanth Kumbargere Nagraj, Prashanti Eachempati)

There are no features that may require extra operational / managerial resource to complete this review	**Yes X**	**No / Unclear**

Comment: No special features identified

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: There doesn't seem to be any special features to suggest it may take longer

Conducting the systematic review raises no ethical concerns	**Yes X**	**No / Unclear**

Comment: No ethical concerns identified.

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Important in LMIC contexts, as there may be a lack of access to paediatric dental services.

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Preventive dentistry increases in importance, however, schools currently not operational in many parts of the world.

Rank 20th: Systemic antibiotics for symptomatic apical periodontitis and acute apical abscess in adults (review no: 0272, last published 2018, 2 included studies)

Comments from the Panel:

"Guidance on interventions to manage periodontal disease would be extremely valuable to clinicians, particularly given the conclusions of the recently updated scale and polish review and dental recall review"
"Antibiotics need to be carefully stewarded to slow down the development of resistance. If antibiotics are not found to be of net benefit, this could reduce usage. It could also help us evaluate the uses of antibiotics in general."

There has been no systematic review published either in the last three years or since the last review was updated (whichever is sooner)	**Yes**	**No / Unclear X**

Comment: Only one, but review was only updated in 2018:
Tampi, M.P., Pilcher, L., Urquhart, O., Kennedy, E., O'Brien, K.K., Lockhart, P.B., Abt, E., Aminoshariae, A., Durkin, M.J., Fouad, A.F., Gopal, P., Hatten, B.W., Lang, M.S., Patton, L.L., Paumier, T., Suda, K.J., Cho, H. and Carrasco-Labra, A. (2019). Antibiotics for the urgent management of symptomatic irreversible pulpitis, symptomatic apical periodontitis, and localized acute apical abscess: systematic review and meta-analysis-a report of the American Dental Association. *Journal of the American Dental Association*, 150(12), pp. e179–e216.

AMSTAR assessment: Low quality review, score: 11/16

New primary studies are available for inclusion in the systematic review	**Yes**	**No / Unclear**	**X**

Comment: None identified – but the review was only updated in 2018. There are some on topical antibacterials, but none on systemic.

There is adequate human capacity to undertake the systematic review	**Yes X**	**No / Unclear**

Comment: The review was updated recently, current team may be willing in a year or two. (Team = Anwen L Cope, Nick Francis, Fiona Wood, Ivor G Chestnutt)

There are no features that may require extra operational / managerial resource to complete this review	**Yes X**	**No / Unclear**

Comment: No special features identified

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: There doesn't seem to be any special features to suggest it may take longer

Conducting the systematic review raises no ethical concerns	**Yes**	**No / Unclear**	**X**

Comment: Antibiotic resistance is a major issue, and so the topic may be controversial. There may be industry-funded trials.

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Possibly of importance in LMIC contexts.

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Not an AGP intervention.

Rank 21st: Full-mouth treatment modalities (within 24 hours) for chronic periodontitis in adults (review no: 0084, last published 2015, 12 included studies)

Comments from the Panel:

"Often patients or offices want to rush through to satisfy a patient with quickness of treatment. But for patients with severe gum or periodontal disease or for those we want to prevent from developing severe periodontal disease, a true study with the statistics of sessions and delivery would be useful to further educate patients."
"I think we all would like to see how we can improve non-surgical management of periodontal disease, including prevention of the disease in the first place."

There has been no systematic review published either in the last three years or since the last review was updated (whichever is sooner)	**Yes X**	**No / Unclear**

Comment: None identified from last three years.

New primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: Several possibles identified. Examples:

Oliveira, A., Costa, F.O., Nogueira, L., Cortelli, S.C., Oliveira, P., Aquino, D.R., Miranda, T.B. and Cortelli, J.R. (2019). Azithromycin and full-mouth scaling for the treatment of generalized stage III and IV periodontitis: a 6-month randomized comparative clinical trial. *Brazilian dental journal*, 30(5), pp. 429–436.

Preus, H.R., Gjermo, P. and Baelum, V. (2017). A double-masked randomized clinical trial (RCT) comparing four periodontitis treatment strategies: 5-year clinical results. *Journal of clinical periodontology,* 44(10), pp. 1029-1038.

Santuchi, C.C., Cortelli, J.R., Cortelli, S.C., Cota, L.O., Fonseca, D.C., Alencar, C.O. and Costa, F.O. (2016). Scaling and root planing per quadrant versus one-stage full-mouth disinfection: assessment of the impact of chronic periodontitis treatment on quality of life--a clinical randomized, controlled trial. *Journal of periodontology*, 87(2), pp. 114–123.

Fonseca, D.C., Cortelli, J.R., Cortelli, S.C., Miranda Cota, L.O., Machado Costa, L.C., Moreira Castro, M.V., Oliveira Azevedo, A.M. and Costa, F.O. (2015). Clinical and microbiologic evaluation of scaling and root planing per quadrant and one-stage full-mouth disinfection associated with azithromycin or chlorhexidine: a clinical randomized controlled trial. *Journal of periodontology*, 86(12), pp. 1340–1351.

There is adequate human capacity to undertake the systematic review	**Yes X**	**No / Unclear**

Comment: Update currently underway (Team = Joerg Eberhard, Sören Jepsen, Pia-Merete Jervøe-Storm, Ian Needleman, Helen V Worthington)

There are no features that may require extra operational / managerial resource to complete this review	**Yes X**	**No / Unclear**

Comment: No special features identified

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: There doesn't seem to be any special features to suggest it may take longer

Conducting the systematic review raises no ethical concerns	**Yes X**	**No / Unclear**

Comment: No ethical concerns identified.

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Possibly of importance in LMIC contexts.

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: May be of importance in terms of limiting AGPs?

Rank 22nd : Antibiotics for the prophylaxis of bacterial endocarditis in dentistry (review no: 0053, last published 2013, one case-control study included)

No specific comments from the Panel.

There has been no systematic review published either in the last three years or since the last review was updated (whichever is sooner)	**Yes X**	**No / Unclear**

Comment: None identified in past three years on this exact question, there is a related review looking at incidence of bacteremia

New primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: One possible identified:

Limeres Posse, J., Álvarez Fernández, M., Fernández Feijoo, J., Medina Henríquez, J., Lockhart, P. B., Chu, V. H. and Diz Dios, P. (2016). Intravenous amoxicillin/clavulanate for the prevention of bacteraemia following dental procedures: a randomized clinical trial. *The journal of antimicrobial chemotherapy*, 71(7), pp. 2022–2030.

There is adequate human capacity to undertake the systematic review	**Yes**	**No / Unclear**	**X**

Comment: Unclear if team have capacity to complete (Team = Anne-Marie Glenny, Richard Oliver, Graham J Roberts, Lee Hooper, Helen V Worthington)

There are no features that may require extra operational / managerial resource to complete this review	**Yes X**	**No / Unclear**

Comment: No special features identified

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: Unlikely to be many studies to add

Conducting the systematic review raises no ethical concerns	**Yes**	**No / Unclear X**

Comment: Antibiotic resistance is a major issue, and so the topic may be controversial.

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Possibly of importance in LMIC contexts.

The question is still timely post-Covid-19 pandemic	**Yes**	**No / Unclear X**

Comment: Unclear – maybe less relevant if dental procedures limited

Rank 23rd: One-to-one dietary interventions undertaken in a dental setting to change dietary behaviour (review no: 0166, last published 2012, 5 included studies)

Comments from Panel:

"Prevention is the key to good oral health. Without prevention the patient will require extensive and expensive dental treatment."

There has been no systematic review published either in the last three years or since the last review was updated (whichever is sooner)	**Yes X**	**No / Unclear**

Comment: None identified

New primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: One possible identified, there may be more with a more thorough search:

Zare Javid, A., Seal, C.J., Heasman, P. and Moynihan, P.J. (2014). Impact of a customised dietary intervention on antioxidant status, dietary intakes and periodontal indices in patients with adult periodontitis. *Journal of human nutrition and dietetics*, 27(6), pp. 523-32.

There is adequate human capacity to undertake the systematic review	**Yes**	**No / Unclear**	**X**

Comment: Unclear if team would complete, review now eight years old (Team = Rebecca Harris, Ana Gamboa, Yvonne Dailey, Angela Ashcroft)

There are no features that may require extra operational / managerial resource to complete this review	**Yes X**	**No / Unclear**

Comment: No special features identified

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: Nothing seems to suggest it might take longer.

Conducting the systematic review raises no ethical concerns	**Yes X**	**No / Unclear**

Comment: No ethical concerns identified

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Important in LMIC contexts

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Preventive measures are important to limit necessity of dental treatment

Rank 24th: Root coverage procedures for treating localised and multiple recession-type defects (review no: 0202, last published 2018, 48 included studies)

Comments from Panel:

"Difficult to prioritise but I have chosen elderly care and root exposure which I think will increasingly will become an issue for the next 5-10 years."

"Root coverage procedures are the primary way to cover exposed roots, but it is unclear which technique can improve the outcome during a long follow-up period."

There has been no systematic review published either in the last three years or since the last review was updated (whichever is sooner)	**Yes X**	**No / Unclear**

Comment: None on this exact question identified in last three years, but there are others looking at individual interventions (eg root coverage using platelet rich fibrin, tissue grafts, tunnel techniques, collagen matrix etc). One looks at single recession defects, not multiple.

New primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: Several. Examples include:

Gurlek, O., Gumus, P., Nizam, N. and Buduneli, N. (2020). Coronally advanced flap with connective tissue graft or xenogeneic acellular dermal matrix in the treatment of multiple gingival recessions: A split-mouth randomized clinical trial. *Journal of esthetic and restorative dentistry*, 32(4), pp. 380-388.

Akcan, S.K. and Unsal, B. (2020). Gingival recession treatment with concentrated growth factor membrane: a comparative clinical trial. *Journal of applied oral sciences*, 28, Article no.: e20190236.

de Santana, R.B., de Mello Fonseca, E., Furtado, M.B., de Santana, C.M.M. and Dibart, S. (2019). Single-stage advanced versus rotated flaps in the treatment of gingival recessions: a 5-year longitudinal randomized clinical trial. *Journal of periodontology*, 90(9), pp. 941-947.

Moisa, D.H., Connolly, J.A., Cheng, B. and Lalla, E. (2019). Impact of connective tissue graft thickness on surgical outcomes: a pilot randomized clinical trial. *Journal of periodontology,* 90(9), pp. 966-972.

There is adequate human capacity to undertake the systematic review	**Yes**	**No / Unclear**	**X**

Comment: Unclear if team would complete (Team = Leandro Chambrone, Maria Aparecida Salinas Ortega, Flávia Sukekava, Roberto Rotundo, Zamira Kalemaj, Jacopo Buti, Giovan Paolo Pini Prato)

There are no features that may require extra operational / managerial resource to complete this review	**Yes X**	**No / Unclear**

Comment: Straightforward, however review may be getting too large, may need to be split.

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: No special features, although may need splitting into smaller reviews, if so then this may be a larger undertaking and may take longer

Conducting the systematic review raises no ethical concerns	**Yes**	**No / Unclear X**

Comment: Some interventions may be commercial products. May have to be wary of industry funding

The question is relevant to LMIC contexts	**Yes**	**No / Unclear X**

Comment: Unclear how important this might be in LMIC.

The question is still timely post-Covid-19 pandemic	**Yes**	**No / Unclear X**

Comment: Unclear how much of this treatment is feasible post-Covid-19

Rank 25th : Combinations of topical fluoride (toothpastes, mouthrinses, gels, varnishes) versus single topical fluoride for preventing dental caries in children and adolescents (review no: 0007g, last published 2004, 12 included studies)

Comments from Panel:

"Fluoride debate is ongoing. Anti-fluoride groups are always finding ways to influence the community. we need to have strong evidence to support our fluoride campaigns."

There has been no systematic review published either in the last three years or since the last review was updated (whichever is sooner)	**Yes X**	**No / Unclear**

Comment: None identified from last three years.

New primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: Two found, a more thorough search may reveal more (also not clear that caries is an outcome in the first study).

Paraskevas, S., Versteeg, P.A., Timmerman, M.F., Van der Velden, U. and Van der Weijden, G.A. (2005). The effect of a dentifrice and mouth rinse combination containing amine fluoride/stannous fluoride on plaque and gingivitis: a 6-month field study. *Journal of clinical periodontology*, 32(7), pp.757-64.

Sarner, B., Birkhed, D. and Lingstrom, P. (2008). Approximal fluoride concentration using different fluoridated products alone or in combination. *Caries research*, 42(1), pp. 73-8.

There is adequate human capacity to undertake the systematic review	**Yes**	**No / Unclear**	**X**

Comment: Current team no longer available – new team required (Team = Valeria CC Marinho, Julian Higgins, Aubrey Sheiham, Stuart Logan)

There are no features that may require extra operational / managerial resource to complete this review	**Yes**	**No / Unclear**	**X**

Comment: Review is very old and would need a new protocol.

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes**	**No / Unclear**	**X**

Comment: Review is old, may need longer to get it done.

Conducting the systematic review raises no ethical concerns	**Yes**	**No / Unclear X**

Comment: Interventions will be commercial products. May have to be wary of industry funding, conflicts of interest.

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Preventive measure so relevant in LMIC context

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Preventive measure – still valuable post-Covid-19.

Rank 26th: Autologous platelet concentrates for treating periodontal infrabony defects (review no: 0303, last published 2018, 38 included studies)

Comments from Panel:

"Autologous platelet concentrates (APC) were first introduced for wound healing treatment but in recent years the outcome, extracted from various systematic reviews and clinical studies, has shown excellent results in the use of this biomaterial in periodontal and bone regeneration; as regards the regeneration of the gingival tissue the effect is not yet clear."

There has been no systematic review published either in the last three years or since the last review was updated (whichever is sooner)	**Yes**	**No / Unclear X**

Comment: One identified on this question in last three years:

Panda, S., Karanxha, L., Goker, F., Satpathy, A., Taschieri, S., Francetti, L., Das, A.C., Kumar, M., Panda, S. and Fabbro M.D. (2019). Autologous platelet concentrates in

treatment of furcation defects - a systematic review and meta-analysis. *International journal of molecular sciences*, 20(6), Article no.: 1347

AMSTAR assessment: Low quality review, score: 8/16

New primary studies are available for inclusion in the systematic review **Yes X** **No / Unclear**

Comment: Several published, including:

Panda, S., Purkayastha, A., Mohanty, R., Nayak, R., Satpathy, A., Das A.C., Kumar, M., Mohanty, G., Panda, S. and Fabbro, M.D. (2020). Plasma rich in growth factors (PRGF) in non-surgical periodontal therapy: a randomized clinical trial. *Brazilian oral research*, 34, Article no.: e034.

Ustaoglu, G., Ugur Aydin, Z. and Ozelci, F. (2020) Comparison of GTR, T-PRF and open-flap debridement in the treatment of intrabony defects with endo-perio lesions: a randomized controlled trial. *Medicina oral, patología oral y cirugía buccal*, 25(1), pp. e117-e123.

Culhaoglu, R., Taner, L. and Guler, B. (2018). Evaluation of the effect of dose-dependent platelet-rich fibrin membrane on treatment of gingival recession: a randomized, controlled clinical trial. *Journal of applied oral science*, 26, Article no.: e20170278.

There is adequate human capacity to undertake the systematic review **Yes X** **No / Unclear**

Comment: Review completed two years ago, existing team may be willing to complete (Team = Massimo Del Fabbro, Lorena Karanxha, Saurav Panda, Cristina Bucchi, Jayakumar Nadathur Doraiswamy, Malaiappan Sankari, Surendar Ramamoorthi, Sheeja Varghese, Silvio Taschieri)

There are no features that may require extra operational / managerial resource to complete this review **Yes X** **No / Unclear**

Comment: Recently completed, and no special features.

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: Nothing to suggest it may take longer than a standard review

Conducting the systematic review raises no ethical concerns	**Yes**	**No / Unclear X**

Comment: Interventions may be commercial products. May have to be wary of industry funding, conflicts of interest.

The question is relevant to LMIC contexts	**Yes**	**No / Unclear X**

Comment: Unclear that this is of relevance in LMIC contexts

The question is still timely post-Covid-19 pandemic	**Yes**	**No / Unclear X**

Comment: Unclear how much periodontal treatment is happening post-Covid-19.

Rank 27th : Pit and fissure sealants versus fluoride varnishes for preventing dental decay in the permanent teeth of children and adolescents (review no: 0021, last published 2016, 8 included studies)

Comments from Panel:

"Many public oral health programs in the U.S. are focused primarily on prevention. As such, I think comparing sealants and topical fluorides would be valuable so that oral health professionals can determine how to allocate scarce resources"

"Decay in children is still a major problem (commonest reason why children have a GA in the UK) so prevention is important. "

There has been no systematic review published either in the last three years or since the last review was updated (whichever is sooner)	**Yes X**	**No / Unclear**

Comment: None identified from last three years.

New primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: At least two articles identified, they may be the same study:

Morgan-Trimmer, S., Chadwick, B.L., Hutchings, S., Scoble, C., Lisles, C., Drew, C.J., Murphy, S., Pickles, T., Hood, K. and Chestnutt, I.G. (2019). The acceptability of fluoride varnish and fissure sealant treatments in children aged 6-9 delivered in a school setting. *Community dental health*, 36(1), pp. 33-38.

Chestnutt, I.G., Hutchings, S., Playle, R., Morgan-Trimmer, S., Fitzsimmons, D., Aawar, N., Angel, L., Derrick, S., Drew, C., Hoddell, C., Hood, K., Humphreys, I., Kirby, N., Lau, T.M.M., Lisles, C., Morgan, M.Z., Murphy, S., Nuttall, J., Onishchenko, K., Phillips, C., Pickles, T., Scoble, C., Townson, J., Withers, B. and Chadwick B.L. (2017). Seal or varnish? A randomised controlled trial to determine the relative cost and effectiveness of pit and fissure sealant and fluoride varnish in preventing dental decay. *Health technology assessments*, 21(21), pp. 1-256.

There is adequate human capacity to undertake the systematic review	**Yes X**	**No / Unclear**

Comment: Update nearly complete? (Team = Wafa Kashbour, Puneet Gupta, Helen V Worthington, Dwayne Boyers)

There are no features that may require extra operational / managerial resource to complete this review	**Yes X**	**No / Unclear**

Comment: No special features identified

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: Update almost complete

Conducting the systematic review raises no ethical concerns	**Yes X**	**No / Unclear**

Comment: No ethical concerns identified

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Preventive dentistry important in LMIC contexts.

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Preventive dental treatments important, although access to primary professional services may be limited.

Rank 28th: Sedation of children undergoing dental treatment (review no: 0048, last published 2018, 50 included studies)

Comments from Panel:

"Very few, if any, policy documents addressing the use of mild/moderate sedation in children to manage dental anxiety present the underlying evidence for their recommendations/options."

There has been no systematic review published either in the last three years or since the last review was updated (whichever is sooner)	**Yes X**	**No / Unclear**

Comment: None on this exact question in the last three years, there are some on individual interventions.

New primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: Several identified, including:

Kawai, M., Kurata, S., Sanuki, T., Mishima, G., Kiriishi, K., Watanabe, T., Ozaki-Honda, Y., Yoshida, M., Okayasu, I., Ayuse, T., Tanoue, N. and Ayuse, T. (2019). The effect of midazolam administration for the prevention of emergence agitation in pediatric patients with extreme fear and non-cooperation undergoing dental treatment under

sevoflurane anesthesia, a double-blind, randomized study. *Drug design, development and therapy*, 13, pp.1729-1737.

Sado-Filho, J., Viana, K.A., Correa-Faria, P., Costa, L.R. and Costa, P.S. (2019). Randomized clinical trial on the efficacy of intranasal or oral ketamine-midazolam combinations compared to oral midazolam for outpatient pediatric sedation. *PLoS ONE*, 14(3), Article no.: e0213074.

Kip, G., Atabek, D. and Bani, M. (2018). Comparison of three different ketofol proportions in children undergoing dental treatment. *Nigerian journal of clinical practice*, 21(11), pp. 1501-1507.

Subramaniam, P., Girish Babu, K.L. and Lakhotia, D. (2017). Evaluation of nitrous oxide-oxygen and triclofos sodium as conscious sedative agents. *Journal of the Indian Society of Pedodontics and Preventive Dentistry*, 35(2), pp. 156-161.

There is adequate human capacity to undertake the systematic review	**Yes X**	**No / Unclear**

Comment: Review completed two years ago, existing team may be willing to complete (Team = Paul F Ashley, Mohsin Chaudhary, Liege Lourenço-Matharu)

There are no features that may require extra operational / managerial resource to complete this review	**Yes X**	**No / Unclear**

Comment: No special features identified

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: No special features to suggest it may take longer

Conducting the systematic review raises no ethical concerns	**Yes X**	**No / Unclear**

Comment: No ethical concerns identified

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Paediatric dental sedation important in terms of tooth extraction and other services that may be provided in LMIC contexts.

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Dental extractions still happening in emergency situations despite Covid-19 closures of primary dental services.

Rank 29th: Fluoride toothpastes of different concentrations for preventing dental caries (review no: 0222, last published 2019, 96 included studies)

Comments from Panel:

"In New Zealand, we have had agreement from Colgate (already actioned) and GSK (end June 2020)to pull their low fluoride pastes from the NZ market. Need to keep on top of ensuring the right strengths are used to prevent decay but reducing fluorosis."

There has been no systematic review published either in the last three years or since the last review was updated (whichever is sooner)	**Yes X**	**No / Unclear**

Comment: None identified, but the review was only updated in 2019

New primary studies are available for inclusion in the systematic review	**Yes**	**No / Unclear X**

Comment: None identified, but the review was only published in 2019

There is adequate human capacity to undertake the systematic review	**Yes X**	**No / Unclear**

Comment: Review only updated in 2019, existing team may be willing to complete in a year or two (Team = Tanya Walsh, Helen V Worthington, Anne-Marie Glenny, Valeria CC Marinho, Ana Jeroncic)

There are no features that may require extra operational / managerial resource to complete this review	**Yes X**	**No / Unclear**

Comment: No special features identified

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes X**	**No / Unclear**

Comment: This is already a big review (96 included studies) so may take longer to complete if even more studies are identified.

Conducting the systematic review raises no ethical concerns	**Yes**	**No / Unclear X**

Comment: Interventions may be commercial products. May have to be wary of industry funding, conflicts of interest.

The question is relevant to LMIC contexts	**Yes X**	**No / Unclear**

Comment: Prevention questions are important in LMIC contexts.

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Prevention question so still very timely.

Rank 30th: Topical fluoride (toothpastes, mouthrinses, gels or varnishes) for preventing dental caries in children and adolescents (review no: 0007e, last published 2003, 144 included studies)

No comments from the Panel on this question.

There has been no systematic review published either in the last three years or since the last review was updated (whichever is sooner)	**Yes X**	**No / Unclear**

Comment: Only one on topic published in last three years (but is a slightly narrower question, pre-schoolers only)

New primary studies are available for inclusion in the systematic review	**Yes X**	**No / Unclear**

Comment: The search strategy for the original review retrieves 837 records classified as the randomized controlled trial publication type.

There is adequate human capacity to undertake the systematic review	**Yes**	**No / Unclear**	**X**

Comment: Review very old – would need to be re-thought. (Team = Valeria CC Marinho, Julian Higgins, Stuart Logan, Aubrey Sheiham)

There are no features that may require extra operational / managerial resource to complete this review	**Yes**	**No / Unclear**	**X**

Comment: This is already a big review and would be unfeasible in current form.

The systematic review is feasible within the expected timeframe (12mths to 24 mths)	**Yes**	**No / Unclear**	**X**

Comment: Team would have to start with a new protocol

Conducting the systematic review raises no ethical concerns	**Yes**	**No / Unclear**	**X**

Comment: Interventions may be commercial products. May have to be wary of industry funding, conflicts

The question is relevant to LMIC contexts	**Yes X**	**No/Unclear**

Comment: Prevention questions are important in LMIC contexts.

The question is still timely post-Covid-19 pandemic	**Yes X**	**No / Unclear**

Comment: Prevention question so still very timely.

B2.3. Priority updates not ranked in the top thirty by the Panel

- Titles that were suggested as priority updates and put forward, but that were not ranked by the panel in the top thirty are below, in order of ranking.
- One-to-one oral hygiene advice provided in a dental setting for oral health
- Xylitol-containing products for preventing dental caries in children and adults
- Pharmacological interventions for pain in patients with temporomandibular disorders
- Interventions for the treatment of oral cavity and oropharyngeal cancer: chemotherapy
- Interventions for the management of dry mouth: non-pharmacological interventions
- Interventions for preventing oral mucositis in patients with cancer receiving treatment: cytokines and growth factors
- Interventions for treating oral lichen planus
- Interventions for replacing missing teeth: different times for loading dental implants
- Interventions for the management of dry mouth: topical therapies
- Fluoride toothpastes for preventing dental caries in children and adolescents
- Interventions for replacing missing teeth: alveolar ridge preservation techniques for dental implant site development
- Chlorhexidine treatment for the prevention of dental caries in children and adolescents
- Interventions for the treatment of oral cavity and oropharyngeal cancer: radiotherapy
- Interventions for replacing missing teeth: augmentation procedures of the maxillary sinus
- Fluoridated milk for preventing dental caries
- Fluoride supplementation in pregnant women for preventing dental caries in the primary teeth of their children
- Fluoride supplements (tablets, drops, lozenges or chewing gums) for preventing dental caries in children

- Interventions for replacing missing teeth: dental implants in zygomatic bone for the rehabilitation of the severely deficient edentulous maxilla
- Interventions for replacing missing teeth: different types of dental implants
- Fluoride varnishes for preventing dental caries in children and adolescents

Appendix C: Review of the evidence base: results of text mining experiment for 12 topic areas

This Appendix presents the results discussed in Chapter Three, Section 3.3.2. Visualisations have been produced using three text mining packages: Voyant, VOSViewer and TerMine.

The results from Voyant are presented in a word cloud, the bigger the word, the more occurrences of the word in the interventions in the text of the clinical trials records analysed.

The results from VOSViewer are presented in a heat map. Red and orange areas show the most popular terms in the analysed text, the less popular are in the green and blue areas.

The TerMine results are in tabulated form. The most common phrases are presented in order of the frequency of which they are used.

The visualisations show the most commonly used words and phrases in clinical trials registered or published between 2014 and 2017, in twelve topic areas. The results are all screenshots from each piece of software.

C1: Periodontal disease

Figure 7: Interventions for periodontal disease: screenshot of the results from Voyant

Figure 8: Interventions for periodontal disease: screenshot of the results from VOSViewer

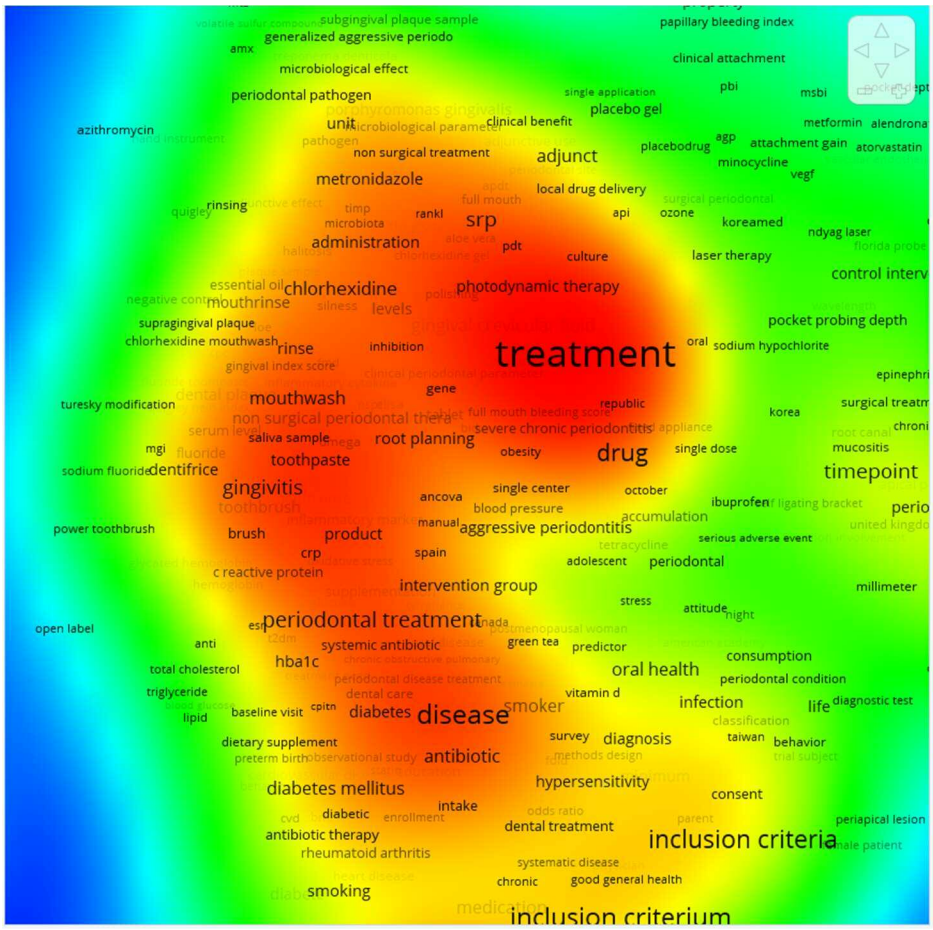


Figure 9: Interventions for periodontal disease: screenshot of the results from TerMine

Rank	Term	Score
1	control group	1178.467285
2	chronic periodontitis	1062.826538
3	clinical attachment	998.080688
4	clinical trial	907.897339
5	inclusion criterion	848.77179
6	plaque index	825.033264
7	exclusion criterion	809.159485
8	periodontal treatment	781.374268
9	pocket depth	775.895264
10	periodontal disease	734.812317
11	periodontal therapy	682.049561
12	test group	637.450562
13	root planing	632.075256
14	inclusion criteria	590.874023
15	oral hygiene	563.861023
16	gingival index	552.487183
17	gingival crevicular fluid	466.498749
18	clinical parameter	410.733337
19	results available	391.454529
20	oral health	373.259857
21	randomized|intervention model	371
22	gingival recession	369.362854
23	parallel assignment|masking	345
24	crevicular fluid	338.198639
25	bone loss	325.798126
26	periodontal pocket	305.826813
27	soft tissue	278.236298
28	attachment loss	269.878265
29	probing depth	267.241272
30	|primary purpose	256
31	intrabony defect	253.884842
32	non-surgical periodontal treatment	246.197495
33	clinical attachment loss	239.725571
34	implant placement	236.402298
35	treatment group	232.818176

C2: Oral cancer

Figure 10: Interventions for oral cancer: screenshot of the results from Voyant

Figure 11: Interventions for oral cancer: screenshot of the results from VOSViewer

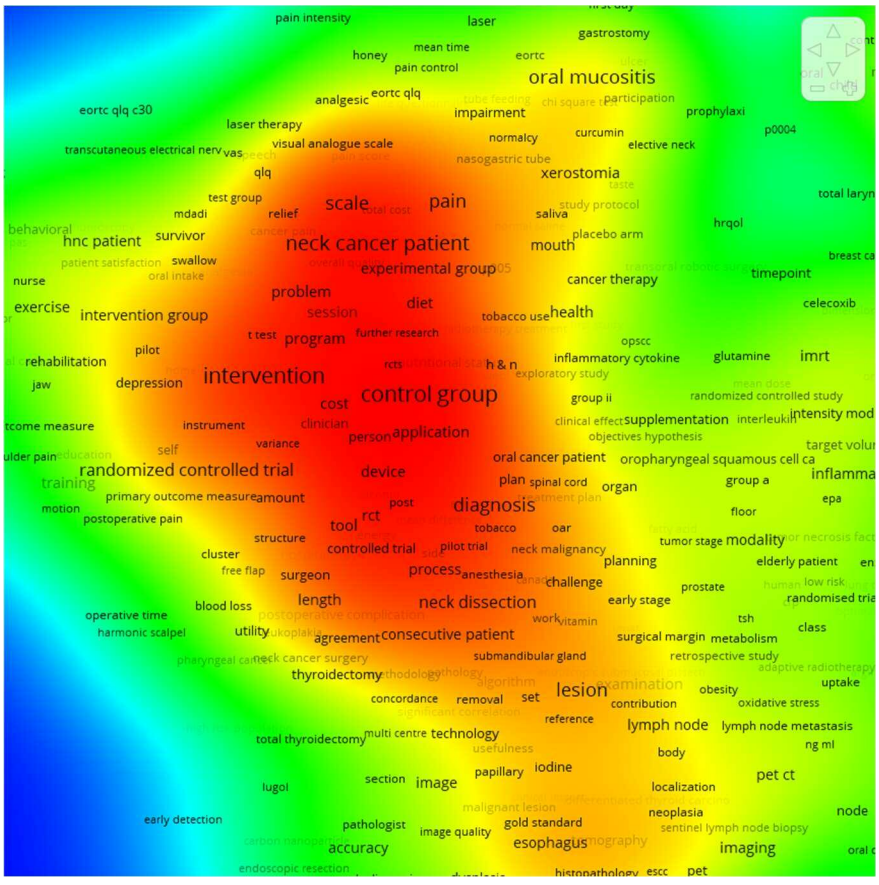


Figure 12: Interventions for oral cancer: screenshot of the results from TerMine

Rank	Term	Score
1	neck cancer	1517.27478
2	squamous cell carcinoma	1344.301758
3	squamous cell	986.42572
4	cancer patient	780
5	control group	731.565247
6	neck squamous cell carcinoma	573
7	neck squamous cell	522.749451
8	neck cancer patient	494.303802
9	oral mucositis	453.795044
10	radiation therapy	451.780884
11	clinical trial	428.192993
12	oral cancer	394.157318
13	lymph node	321.971527
14	oral cavity	299.058838
15	esophageal cancer	268.567566
16	response rate	268.180847
17	primary endpoint	261.615387
18	neck dissection	241.209152
19	advanced head	237.052628
20	arm a	217.846161
21	induction chemotherapy	202.903839
22	progression-free survival	199.296875
23	arm b	193.782608
24	end point	191.298508
25	nasopharyngeal carcinoma	178.263153
26	survival rate	176.179779
27	primary end point	169.485321
28	treatment group	164.794113
29	oral squamous cell carcinoma	163.854553
30	weight loss	159.379303
31	inclusion criterion	157.952759
32	group a	151.888885
33	group b	142.538467
34	hazard ratio	135.899994

C3: Caries management

Figure 13: Interventions for managing caries: screenshot of the results from Voyant

Figure 14: Interventions for managing caries: screenshot of the results from VOSViewer

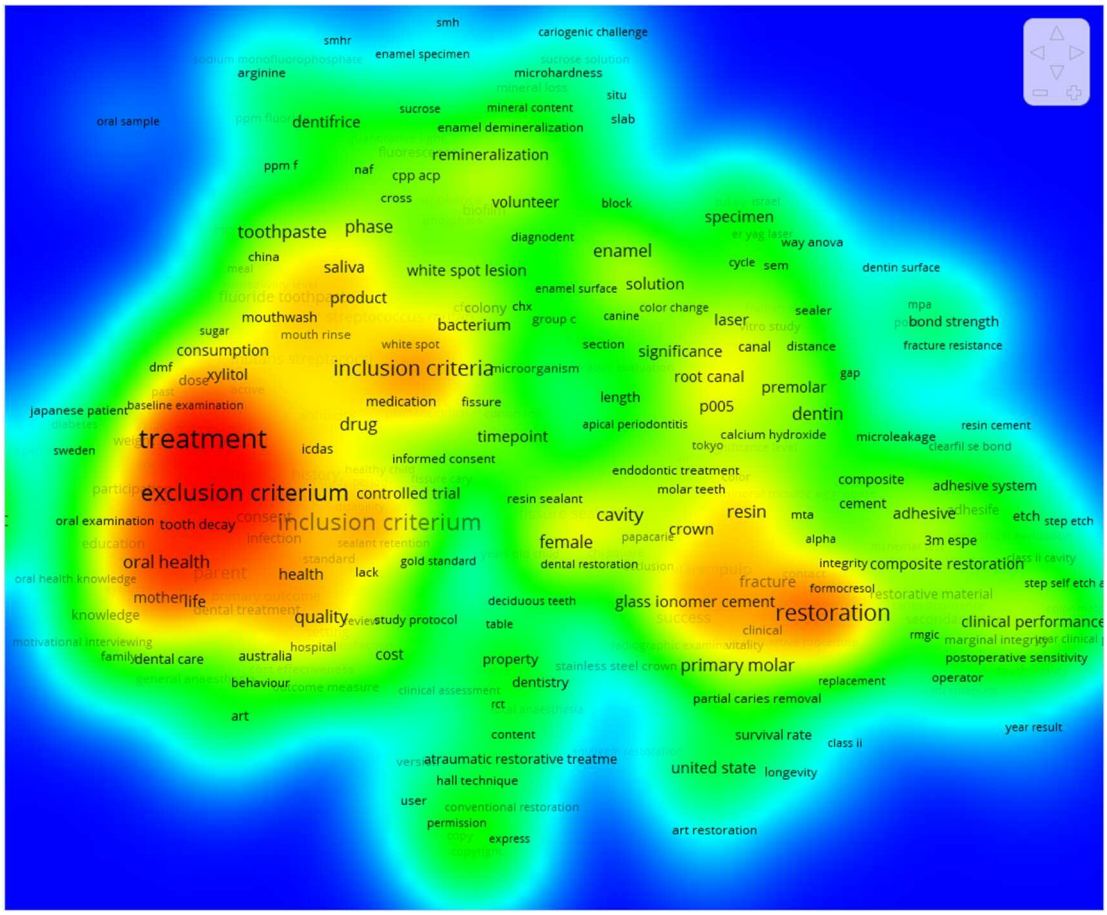


Figure 15: Interventions for managing caries: screenshot of the results from TerMine

Rank	Term	Score
1	oral health	536.219116
2	control group	527.58197
3	dental cary	507.37616
4	inclusion criterion	448.401093
5	exclusion criterion	422.490631
6	clinical trial	368.01416
7	inclusion criteria	278.619049
8	cary lesion	234.907806
9	oral hygiene	233.363632
10	root canal	212.556335
11	fluoride varnish	208.421692
12	carious lesion	207.194916
13	primary molar	175.050842
14	glass ionomer	171.780487
15	cary removal	165.675003
16	experimental group	154.526321
17	composite resin	152.632004
18	white spot lesion	150.280319
19	fissure sealant	139.674698
20	glass ionomer cement	138.531815
21	primary tooth	137.615387
22	dental plaque	124.524475
23	test group	122.772728
24	mutan streptococci	122.428574
25	results available	120.285713
26	sodium fluoride	120.220337
27	intervention group	119.6875
28	bond strength	119.229729
29	white spot	118.082756
30	randomized|intervention model	118
31	united state	113.069763
32	streptococcus mutan	108.207794
33	ppm fluoride	107.599998
34	clinical performance	107.578949

C4: Partial / full edentulousness

Figure 16: Interventions for managing partial / full edentulousness: screenshot of the results from Voyant

Figure 17: Interventions for managing partial / full edentulousness: screenshot of the results from VOSViewer

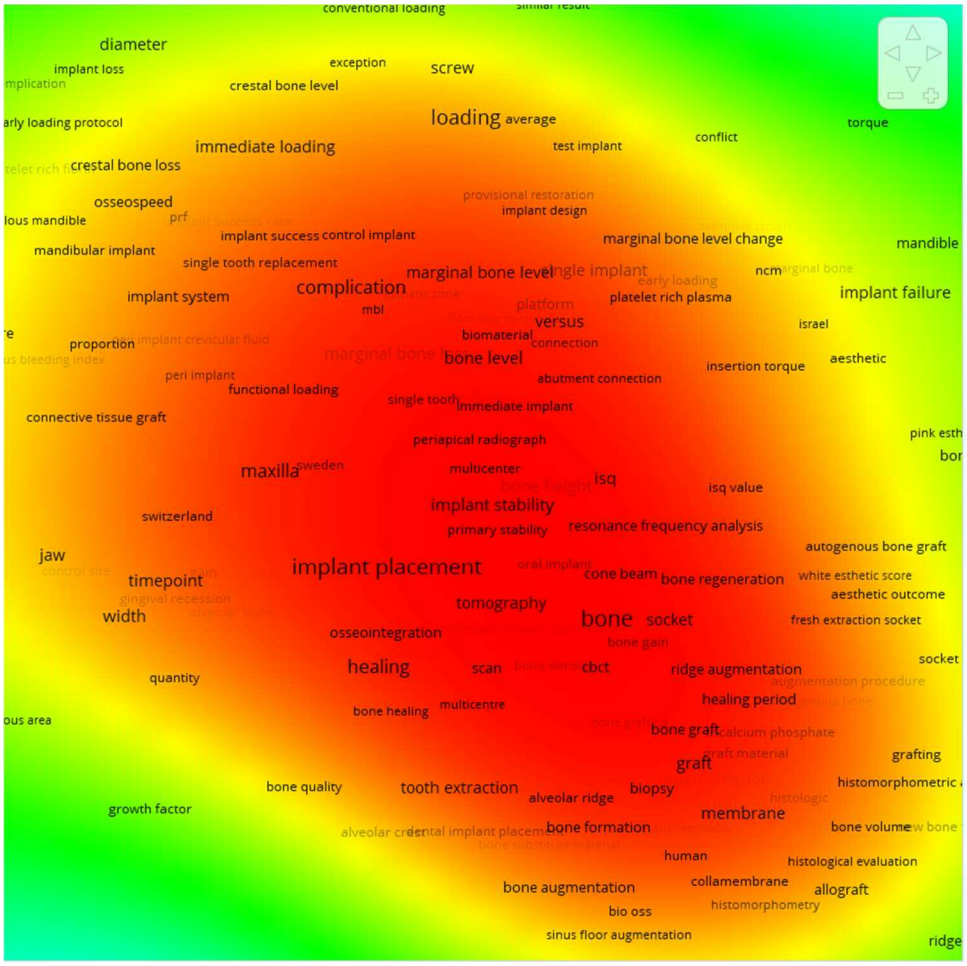


Figure 18: Interventions for managing partial / full edentulousness: screenshot of the results from TerMine

Rank	Term	Score
1	control group	592.55072
2	dental implant	590.268372
3	clinical trial	481.427216
4	implant placement	420.077362
5	bone loss	348.008728
6	marginal bone	344.630768
7	inclusion criterion	332.916199
8	soft tissue	320.311584
9	exclusion criterion	303.400848
10	inclusion criteria	299.841827
11	test group	263.894745
12	survival rate	255.295837
13	edentulous patient	215.411758
14	oral health	200.848312
15	implant stability	197.179016
16	patient satisfaction	196.549759
17	marginal bone loss	186.02684
18	success rate	185.503448
19	implant survival	173.464828
20	partial denture	169.660263
21	crestal bone	156.239365
22	experimental group	152.428574
23	clinical performance	151.333328
24	composite resin	150.054688
25	bond strength	147.086426
26	oral hygiene	145.041672
27	mandibular overdenture	141.896103
28	removable partial denture	133.825058
29	bone height	131.792084
30	implant surgery	125.052635
31	bone graft	120.455559
32	maxillary sinus	113.099236
33	implant survival rate	112.070061
34	peri-implant bone	111.536583

C5: Malocclusion

Figure 19: Interventions for managing malocclusion: screenshot of the results from Voyant

Figure 20: Interventions for managing malocclusion: screenshot of the results from VOSViewer

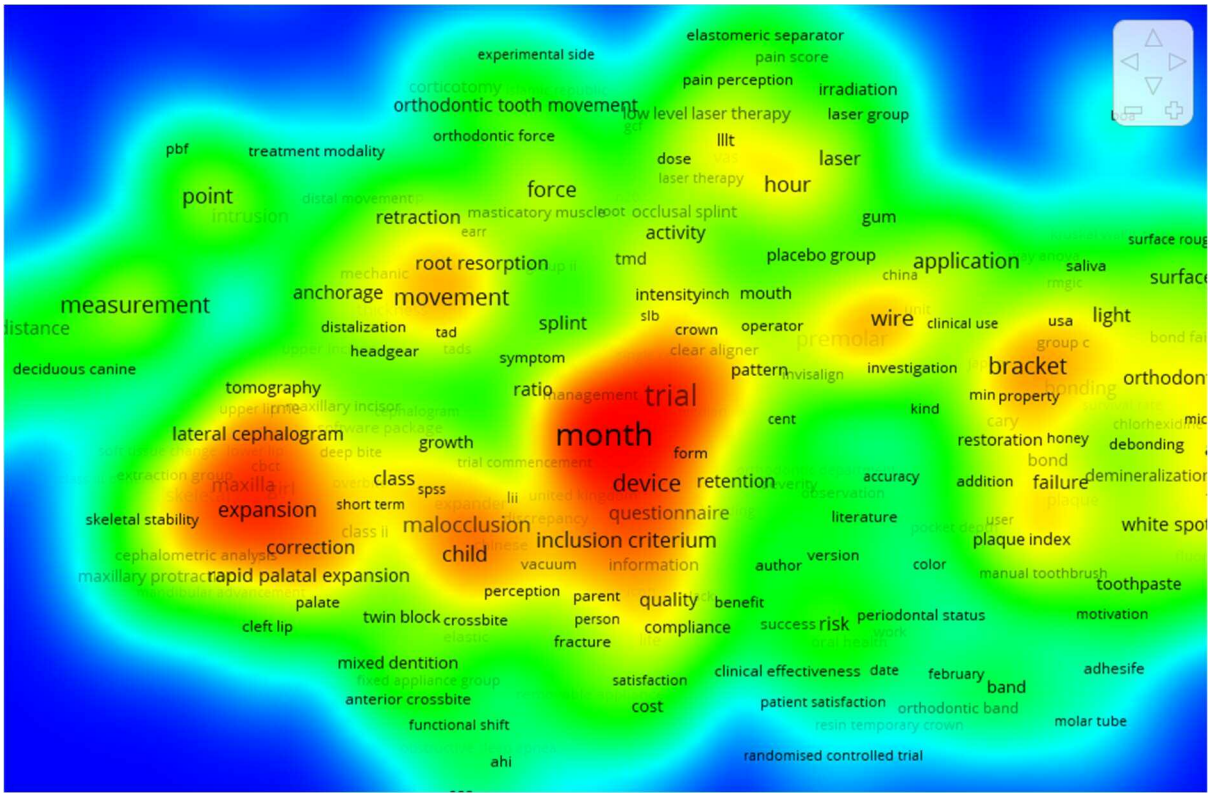


Figure 21: Interventions for managing malocclusion: screenshot of the results from TerMine

Rank	Term	Score
1	orthodontic treatment	413.523285
2	control group	286.657532
3	clinical trial	191.874252
4	orthodontic patient	135.125
5	inclusion criterion	118.702377
6	orthodontic appliance	108.067795
7	exclusion criterion	107.171638
8	oral hygiene	105.3125
9	tooth movement	104.523254
10	white spot lesion	94.051674
11	bond strength	89.466667
12	shear bond strength	81.765419
13	group a	81.192307
14	root resorption	79.34314
15	orthodontic bracket	79.284317
16	white spot	74.375
17	maxillary expansion	72.386139
18	treatment group	70.400002
19	group b	69.652176
20	experimental group	67.689651
21	rapid palatal expansion	64.488159
22	rapid maxillary expansion	63.891598
23	spot lesion	63.275364
24	shear bond	62.294117

C6: Gingivitis

Figure 22: Interventions for managing gingivitis: screenshot of the results from Voyant

Figure 23: Interventions for managing gingivitis: screenshot of the results from VOSViewer

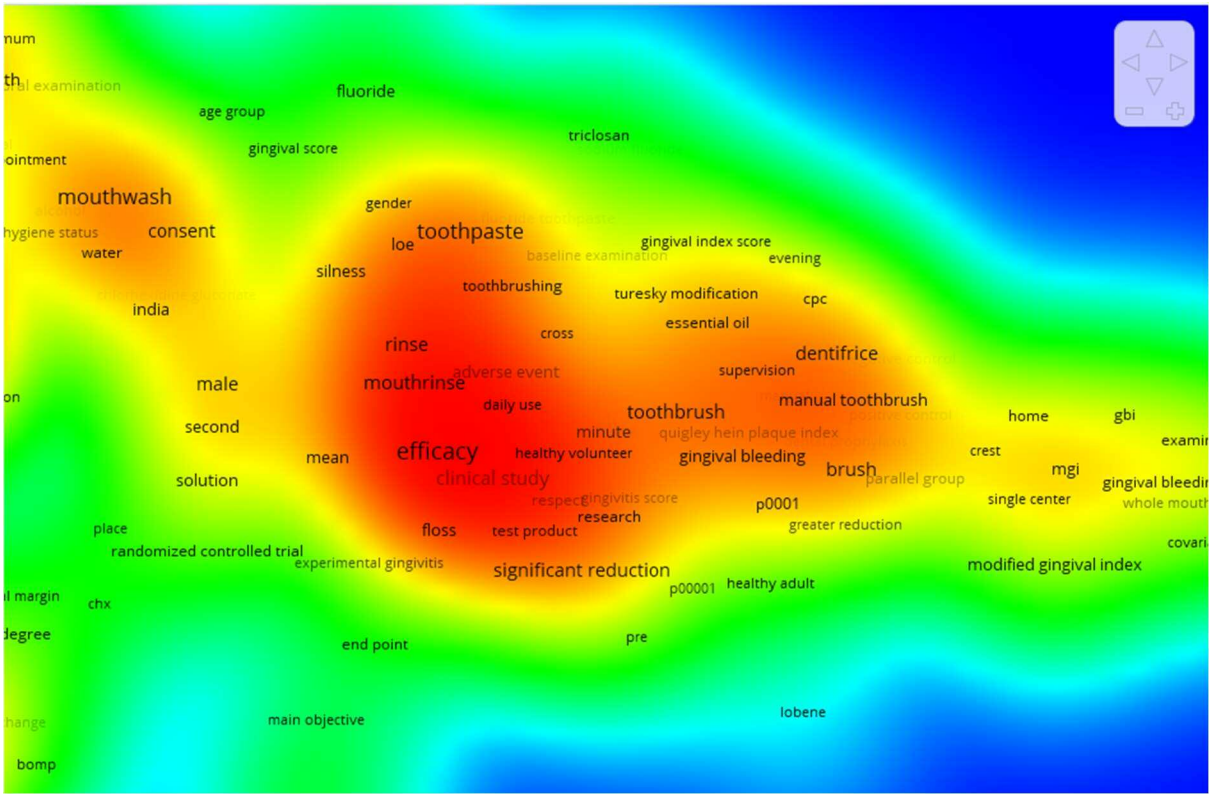


Figure 24: Interventions for managing gingivitis: screenshot of the results from TerMine

Rank	Term	Score
1	plaque index	361.523804
2	gingival index	318.094727
3	oral hygiene	303.295868
4	inclusion criterion	258.321747
5	exclusion criterion	251.524597
6	control group	246.520004
7	clinical trial	212.077515
8	inclusion criteria	187.936172
9	gingival inflammation	159.157898
10	root coverage	156.382431
11	dental plaque	155.52272
12	gingival recession	152.109482
13	gingival crevicular fluid	151.900009
14	oral health	132.61972
15	periodontal disease	127.61039
16	clinical attachment	109.729729
17	crevicular fluid	106.612244
18	connective tissue graft	100.74176
19	gingival bleeding	89.800003
20	chronic periodontitis	89.055557
21	manual toothbrush	88.463417
22	test group	87
23	index score	85.447762
24	connective tissue	84.008194
25	pocket depth	81.666664
26	mouth rinse	81.557892
27	modified gingival index	76.89801
28	stannous fluoride	67.833336
29	periodontal treatment	67.333336
30	tissue graft	66
31	treatment group	64.75
32	clinical parameter	62.916668
33	systemic disease	62.666668
34	bleeding index	61.722221

C7: Temporomandibular joint disorders

Figure 25: Interventions for managing temporomandibular joint disorders: screenshot of the results from Voyant

Figure 26: Interventions for managing temporomandibular joint disorders: screenshot of the results from VOSViewer

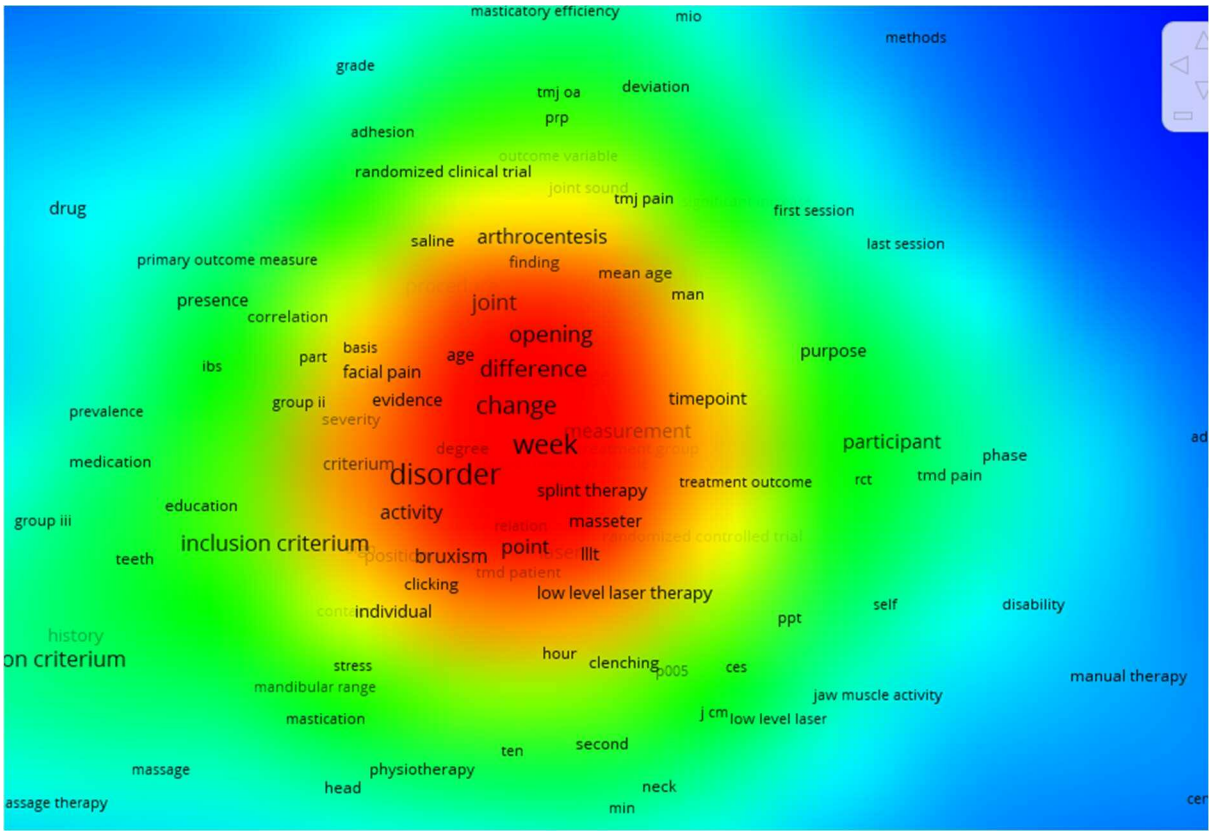


Figure 27: Interventions for managing temporomandibular joint disorders: screenshot of the results from TerMine

Rank	Term	Score
1	temporomandibular disorder	288.795685
2	temporomandibular joint	211.795456
3	mouth opening	140.255096
4	control group	138.823532
5	inclusion criterion	132.24324
6	pain intensity	129.625
7	exclusion criterion	121.652634
8	visual analogue scale	107.489281
9	occlusal splint	86.272728
10	masticatory muscle	86.171425
11	clinical trial	85.28125
12	myofascial pain	81.948715
13	laser therapy	76.094337
14	visual analogue	71.260872
15	visual analog scale	69.104362
16	temporomandibular joint disorder	67.519402
17	inclusion criteria	64.466667
18	masseter muscle	59.799999
19	pressure pain threshold	59.79631
20	splint therapy	59.666668
21	research diagnostic criteria	58.247372
22	facial pain	51.098362
23	physical therapy	50.758064
24	orofacial pain	50.040001

C8: Root canal therapy

Figure 28: Interventions for root canal treatment: screenshot of the results from Voyant

Figure 29: Interventions for root canal treatment: screenshot of the results from VOSViewer

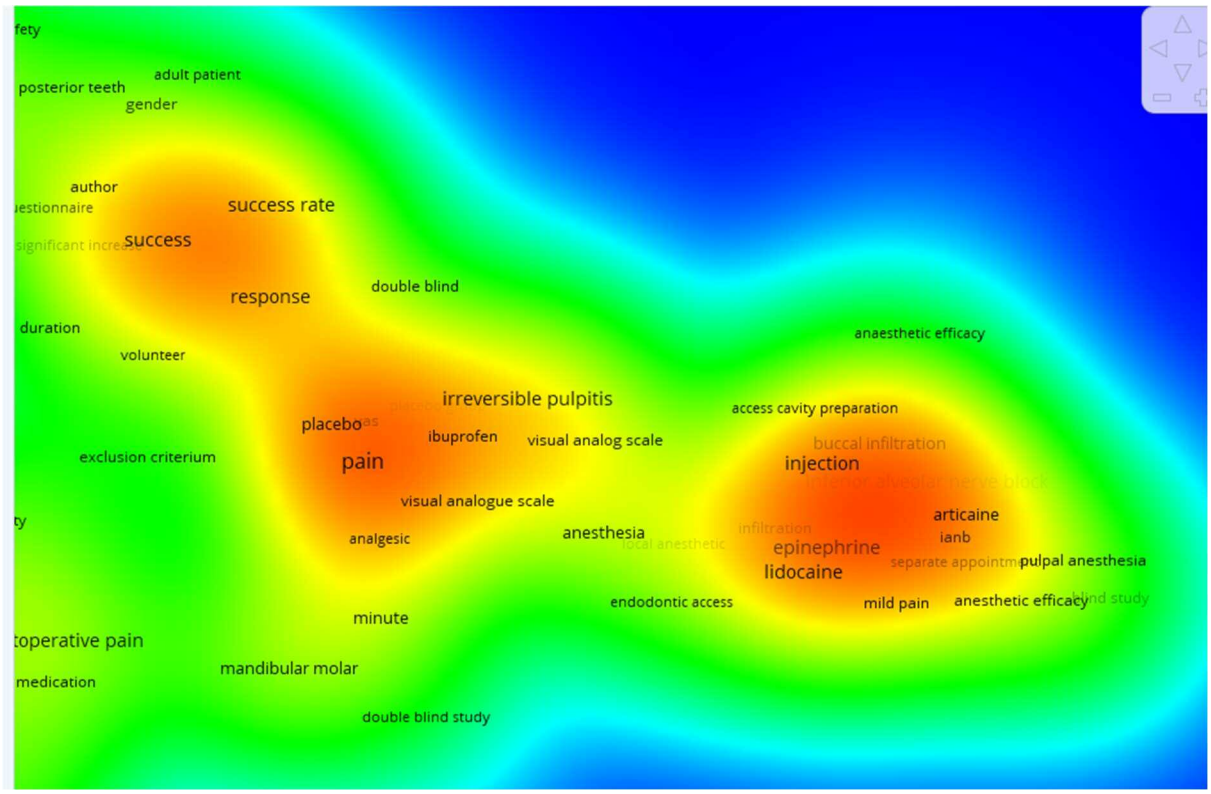


Figure 30: Interventions for root canal treatment: screenshot of the results from VOSViewer (continued)

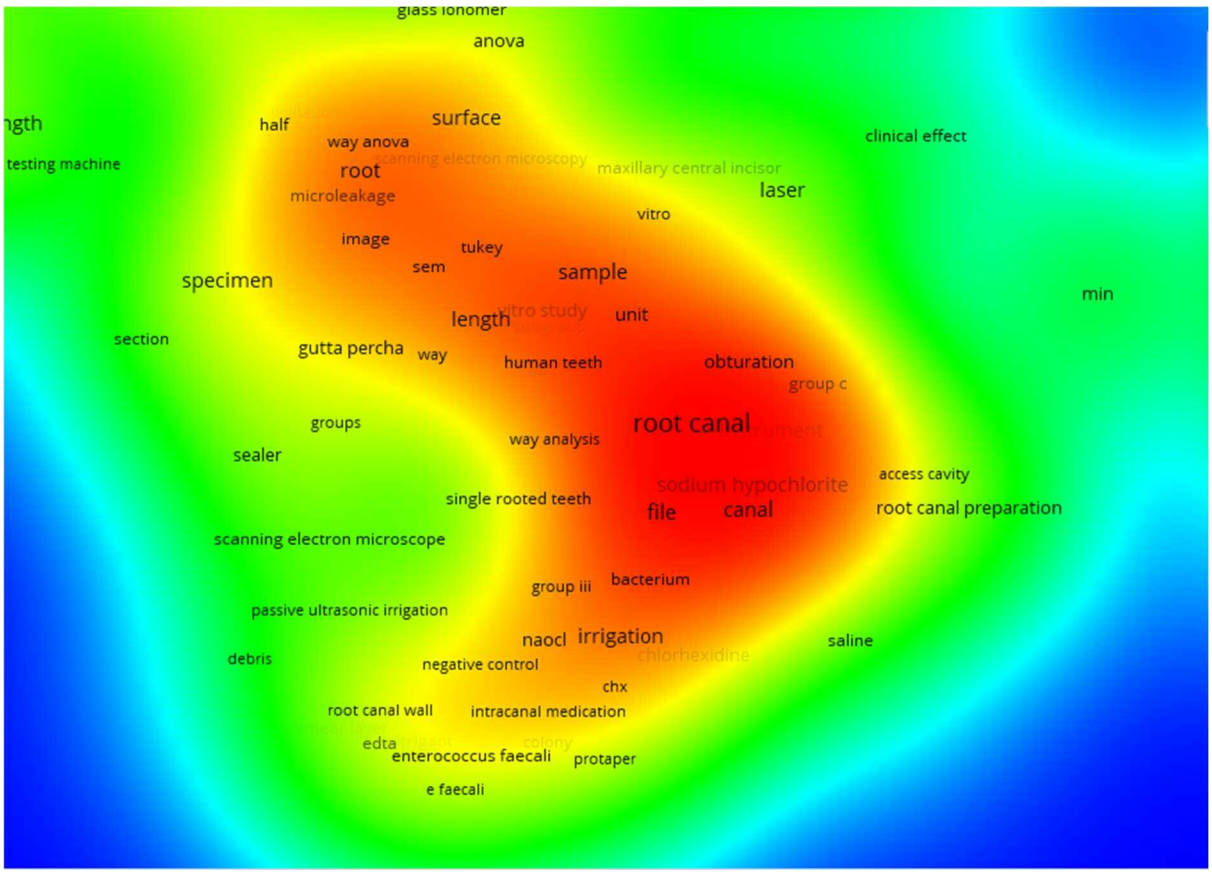


Figure 31: Interventions for root canal treatment: screenshot of the results from TerMine

Rank	Term	Score
1	root canal	546.520264
2	control group	186.769226
3	root canal treatment	186.388321
4	success rate	157.181824
5	clinical trial	143.827164
6	irreversible pulpitis	142.815796
7	bond strength	135.193542
8	endodontic treatment	129.578308
9	canal treatment	121.64122
10	calcium hydroxide	116.176468
11	experimental group	113.823532
12	inferior alveolar nerve block	103.230766
13	postoperative pain	100.561646
14	root canal preparation	100.328125
15	inferior alveolar nerve	96.682709
16	mineral trioxide aggregate	87.852203
17	alveolar nerve block	84.700394
18	root canal therapy	78.801086
19	canal preparation	78.094337
20	sodium hypochlorite	77.625
21	fiber post	75.888885
22	group a	74.53846
23	composite resin	69.348839
24	resin cement	67.199997
25	apical periodontitis	66.021736
26	symptomatic irreversible pulpitis	65.271637
27	group b	62.875
28	smear layer	60.190475
29	statistical analysis	58.701756
30	mineral trioxide	58.564514
31	nerve block	58.529411
32	trioxide aggregate	57.574074
33	clinical performance	57.545456
34	primary molar	57.030304

C9: Oral mucositis

Figure 32: Interventions for oral mucositis: screenshot of the results from Voyant

Figure 33: Interventions for oral mucositis: screenshot of the results from VOSViewer

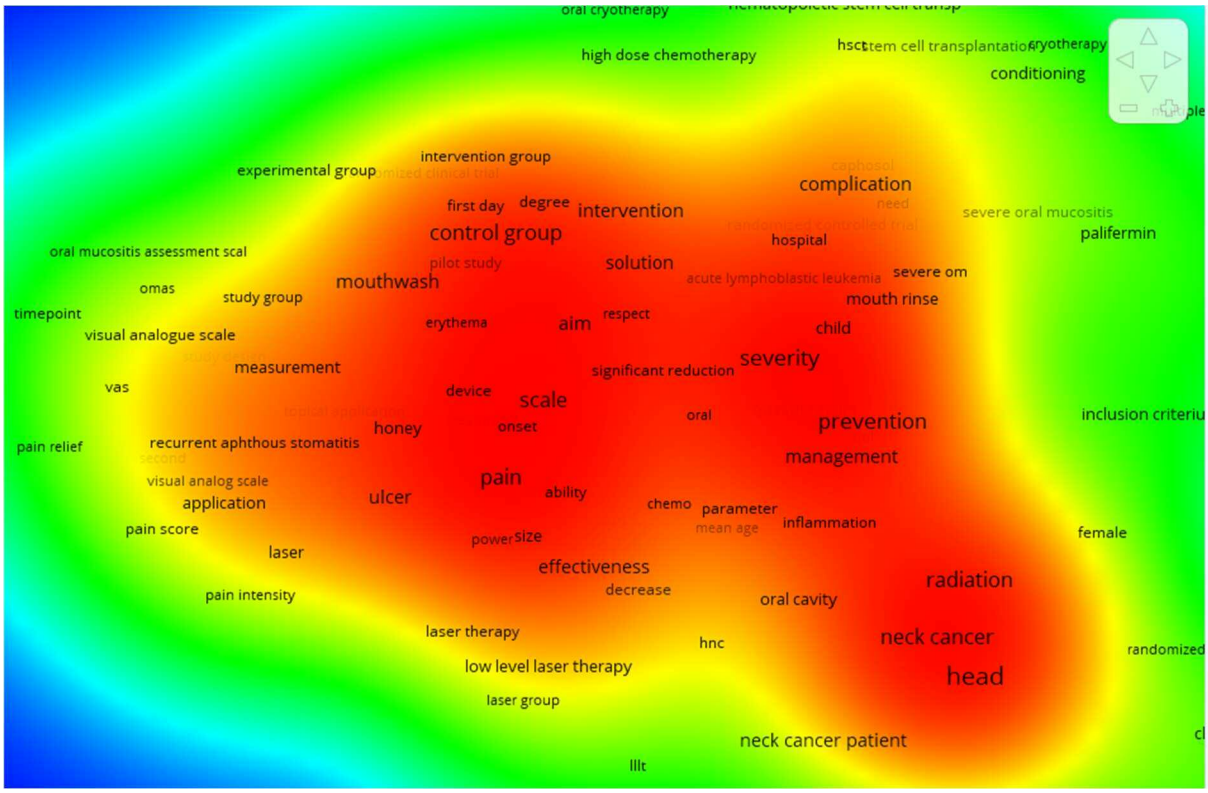


Figure 34: Interventions for oral mucositis: screenshot of the results from TerMine

Rank	Term	Score
1	oral mucositis	776.774597
2	control group	237.740005
3	neck cancer	207.380005
4	cancer patient	149.139236
5	clinical trial	125.35849
6	stem cell transplantation	110.11319
7	results available	106.241989
8	neck cancer patient	101.437599
9	hematopoietic stem cell transplantation	86.92308
10	radiation therapy	79.305557
11	laser therapy	74.090912
12	recurrent aphthous stomatitis	70.354721
13	placebo group	67.909088
14	radiation-induced oral mucositis	66.885422
15	progression-free survival	65.157898
16	primary endpoint	65
17	aphthous stomatitis	64.909088
18	chemotherapy-induced oral mucositis	64.824966
19	treatment group	62.799999
20	breast cancer	62.253334
21	oral cavity	60.676472
22	world health organization	57.779083
23	low-level laser therapy	56.794487
24	intervention group	48.900002
25	inclusion criterion	48.755554
26	exclusion criterion	48.35849
27	mouth rinse	48.31818
28	experimental group	46
29	severe oral mucositis	45.171432
30	oral care	44.363636
31	squamous cell carcinoma	44.246868
32	response rate	43.5
33	growth factor	41.546875
34	nasopharyngeal carcinoma	39.533333

C10: Impacted / unerupted teeth

Figure 35: Interventions for impacted / unerupted teeth: screenshot of the results from Voyant

Figure 36: Interventions for impacted / unerupted teeth: screenshot of the results from VOSViewer

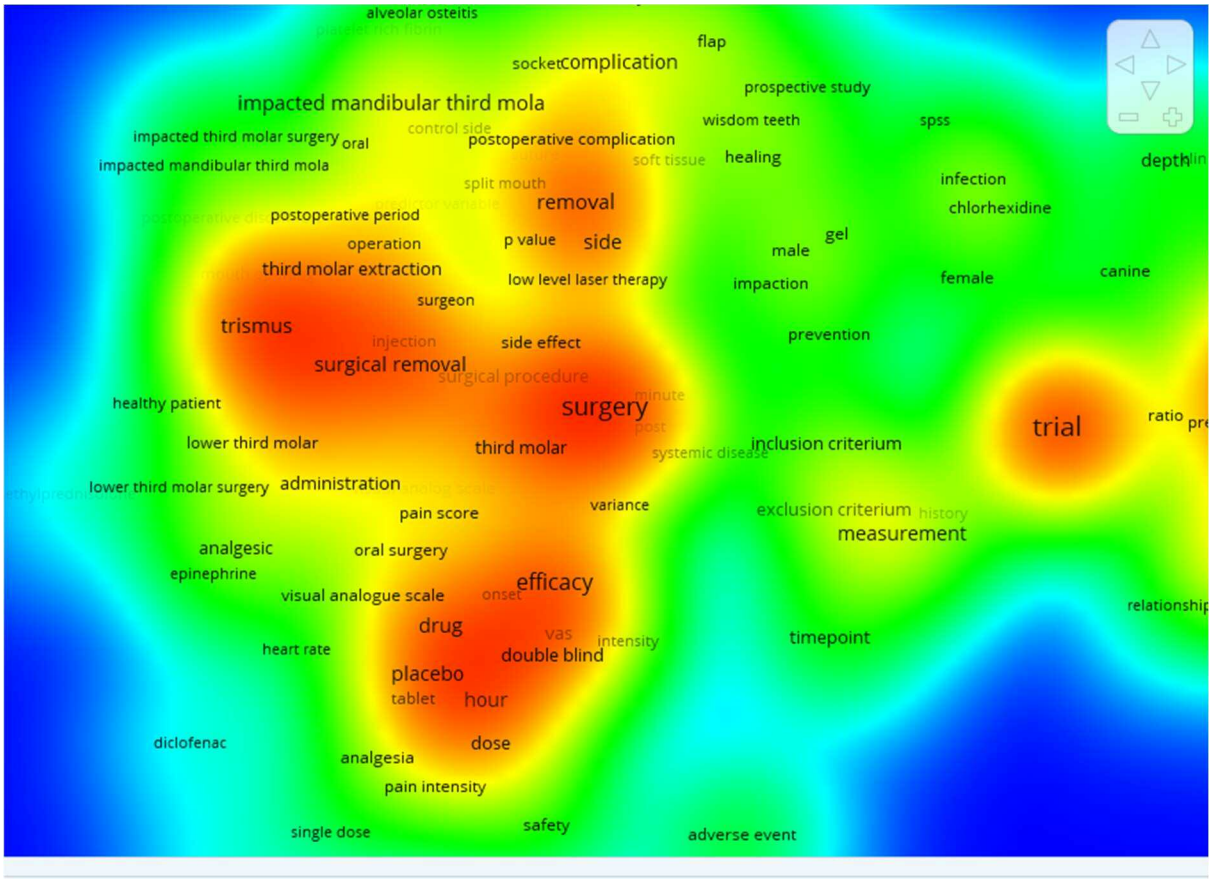


Figure 37: Interventions for impacted / unerupted teeth: screenshot of the results from TerMine

Rank	Term	Score
1	control group	174.82608
2	oral health	169.238632
3	clinical trial	142.71666
4	molar surgery	136.53334
5	results available	104.401405
6	surgical removal	96.800003
7	postoperative pain	76.666664
8	molar extraction	59.611111
9	group a	57.75
10	tooth extraction	52.597015
11	treatment group	49.888889
12	wisdom tooth	49.838711
13	oral health impact	49.36692
14	mouth opening	49.360001
15	surgical extraction	49
16	group b	48.909092
17	visual analog scale	48.836658
18	inclusion criterion	47.5
19	pain intensity	45.684212
20	visual analogue scale	45.511063
21	exclusion criterion	44.333332
22	oral health-related quality	42.476994
23	experimental group	41
24	postoperative complication	39.933334
25	facial swelling	39.799999
26	surgery method	39.75
27	pain relief	38.6875
28	oral hygiene	37.878048
29	surgical procedure	37.807693
30	inferior alveolar nerve	37.666168
31	oral health impact profile	37.42857
32	soft tissue	36.901962
33	intervention group	36
34	test group	35

C11: Traumatised teeth

Figure 38: Interventions for traumatised teeth: screenshot of the results from Voyant

Figure 39: Interventions for traumatised teeth: screenshot of the results from VOSViewer

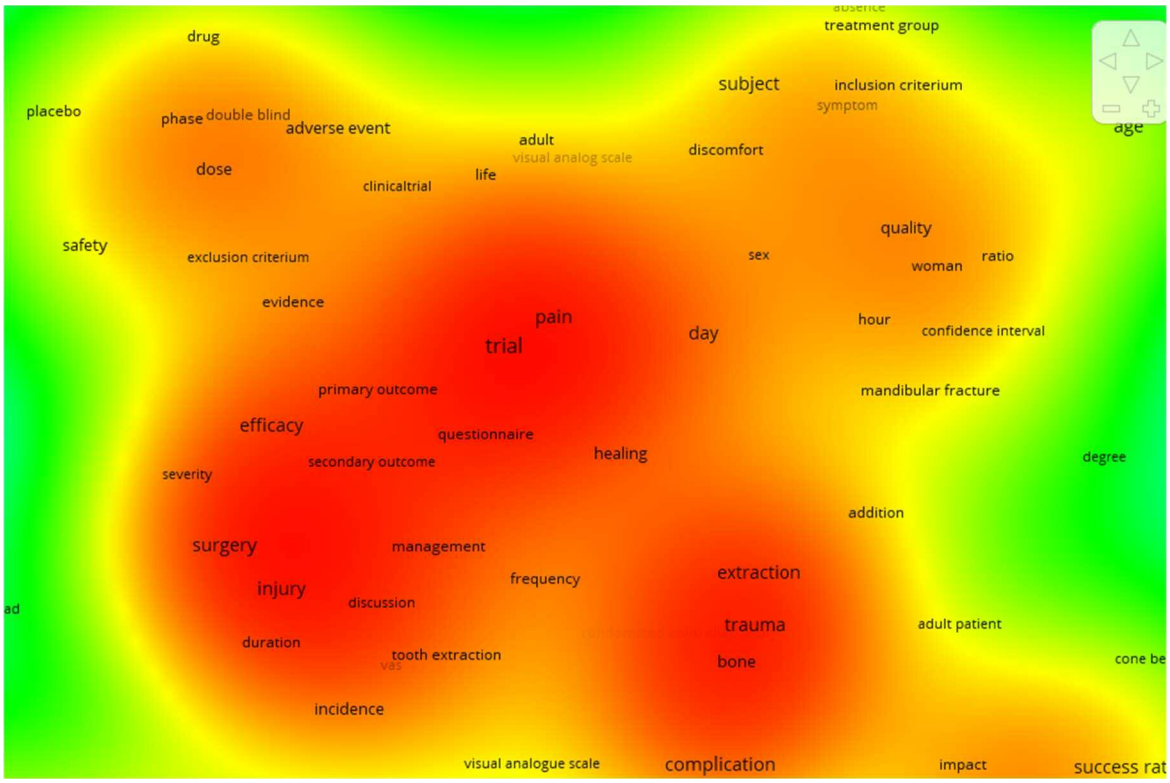


Figure 40: Interventions for traumatised teeth: screenshot of the results from VOSViewer (continued)

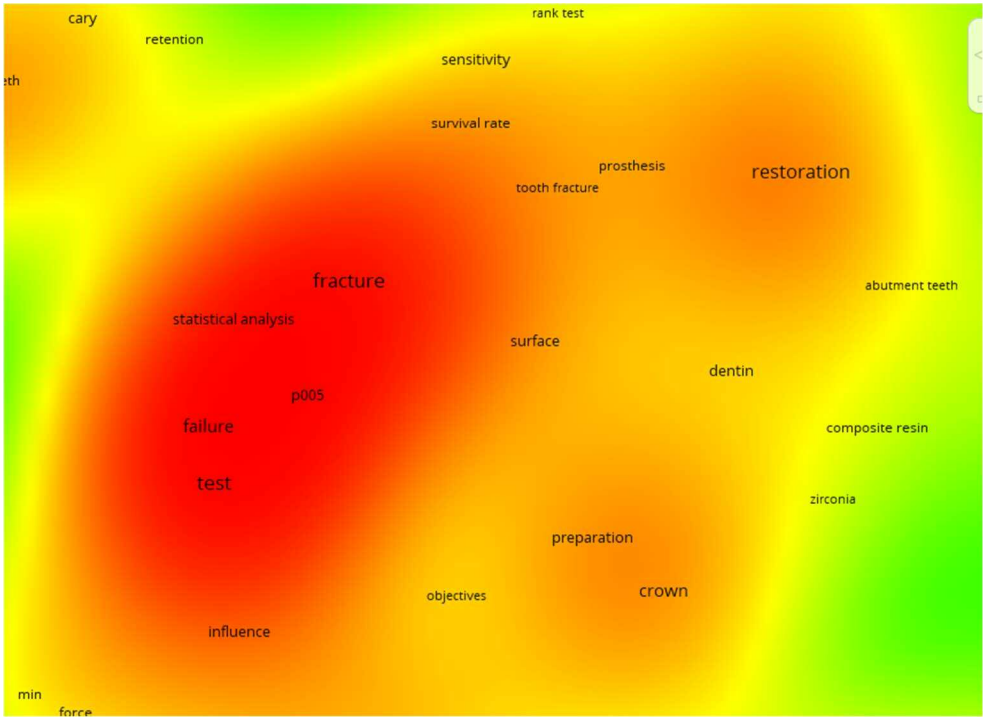


Figure 41: Interventions for traumatised teeth: screenshot of the results from TerMine

Rank	Term	Score
1	control group	105.571426
2	clinical trial	90.031746
3	results available	84.46479
4	success rate	80.509804
5	group a	68
6	group b	65.684212
7	root canal	61.036362
8	composite resin	58.886364
9	resin cement	52.5
10	fiber post	50.849998
11	bond strength	49.838711
12	clinical performance	48.5
13	survival rate	46.799999
14	glass fiber post	44.577068
15	test group	44
16	root fracture	41.5
17	glass fiber	40.954544
18	experimental group	38.142857
19	tracheal intubation	35.823528
20	statistical analysis	34.57143
21	cervical spine	33.5
22	soft tissue	32.870129
23	alveolar bone	31.441177
24	macintosh laryngoscope	30.777779
25	tooth extraction	28.526316
26	ivoclar vivadent	27.571428
27	group c	26.866667
28	inferior alveolar nerve	26.41604
29	resin composite	26
30	wisdom tooth	25
31	inclusion criterion	23.465117
32	shear bond strength	23.422224
33	dental trauma	22.5625
34	mandibular fracture	22.526316

Appendix D: preamble to the online consultation, and the online questionnaire

D1: Preamble to the online consultation, presented on Cochrane Oral Health's website

Cochrane Oral Health is looking for feedback on what people think are the most important questions to answer in taking care of the mouth, teeth and gums.

Access our feedback form here [link to survey in the Lime Survey tool]

What is Cochrane?

Cochrane is an international group, who look for the best evidence on healthcare treatments. The evidence is then summarised in one document (a Cochrane review) for doctors, dentists, nurses, healthcare workers, policy makers, patients and the public. You can find out more about Cochrane here.

Why do you need to know my opinion?

We want our research to focus on questions that are important to patients and to the public, as well as dentists and other healthcare workers. We need to know what questions still need to be answered so that we prioritise our resources on research that is important to people, and new research that hasn't been done yet.

What will you do with my answers?

The answers you give will be collected and we will develop questions to answer out of the data. We will then look at these and see if any of them have already been answered by a Cochrane review. If there are questions that we haven't answered yet, we will put those forward to an expert panel and we may develop them into a new Cochrane review. If a Cochrane review on the question already exists, we will make sure that the Cochrane review is kept up-to-date and the results made available to as wide an audience as possible.

The questions are voluntary, and you can skip any questions if you do not want to answer them.

What do you mean by oral health?

We are interested in any aspect of taking care of your mouth, teeth, or gums; or how you feel about visiting the dentist, hygienist, orthodontist or oral surgeon. We are also interested in dental products you might buy over the counter, and those that your dentist might recommend. If you take care of someone else's mouth, whether that's a child, an elderly person or someone with special needs, we are interested in any questions you may have about that too.

The conditions and diseases we look at include:

Tooth decay
Gum disease
Mouth cancer
Mouth ulcers
Removing wisdom teeth

Facial pain
The way cancer treatment can affect your mouth
Crooked teeth or jaws
Cleft lip and palate
Missing or no teeth
Can you help me with a problem?

Unfortunately, we can't help with any dental problems you might be having personally. You will need to contact your dentist.

Your privacy

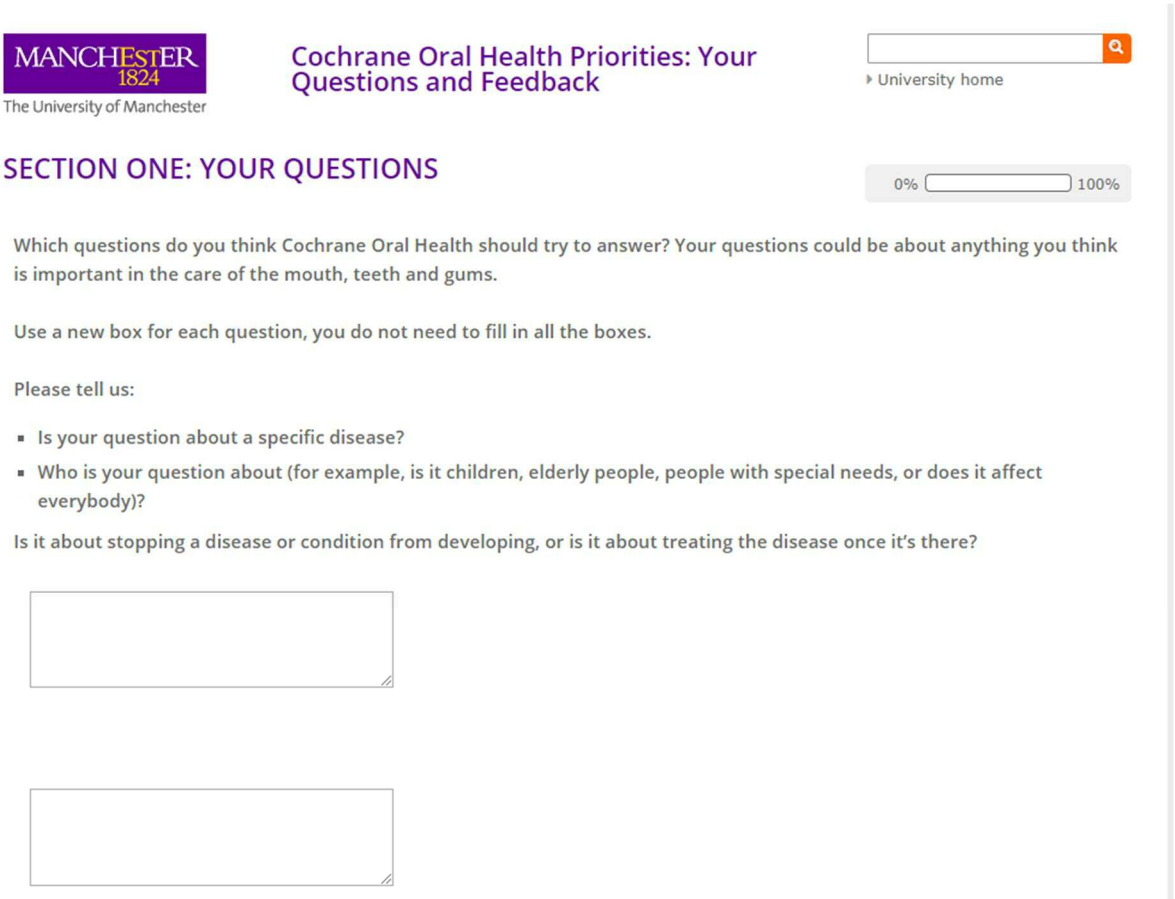
We are not collecting any information that might identify you personally, all of the responses will be kept anonymous. We may use the data from your answers in reports, but we will never disclose your identity.

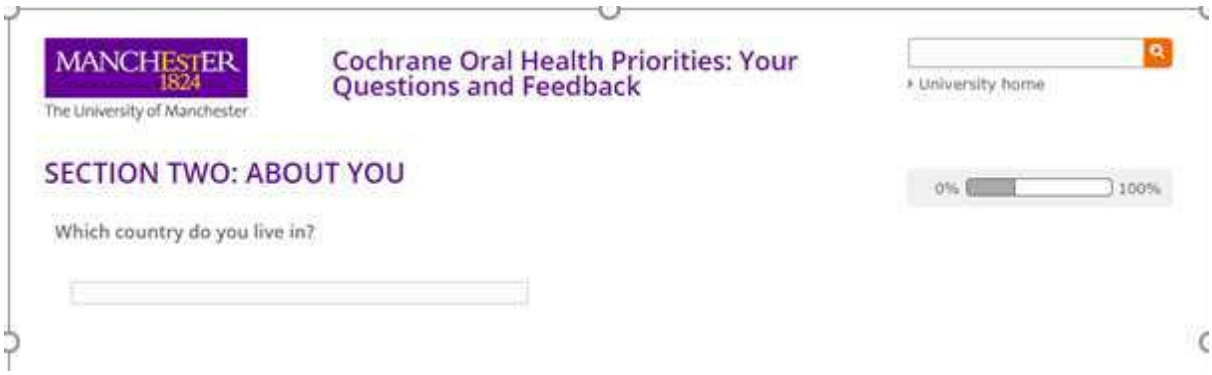
You can find out more about how we're choosing priority questions, here [link to priority setting page on COH website].

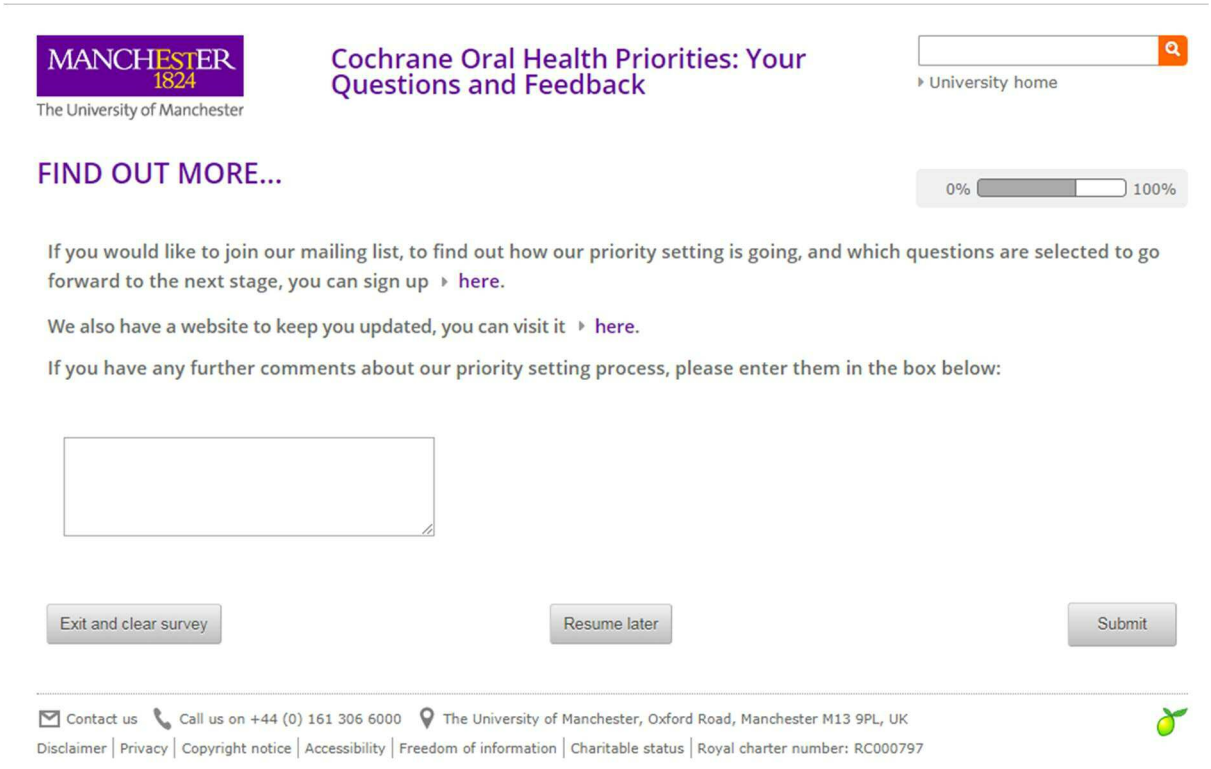
ACCESS OUR FEEDBACK FORM [link to the survey in the Lime Survey tool].

D2: Cochrane Oral Health online questionnaire

Figure 42: Stakeholder consultation phase: screenshots of the online questionnaire




MANCHESTER 1824
The University of Manchester
Cochrane Oral Health Priorities: Your Questions and Feedback
University home
SECTION TWO: ABOUT YOU
0%
100%
Which country do you live in?


MANCHESTER 1824
The University of Manchester
Cochrane Oral Health Priorities: Your Questions and Feedback
University home
FIND OUT MORE...
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100%
If you would like to join our mailing list, to find out how our priority setting is going, and which questions are selected to go forward to the next stage, you can sign up here.
We also have a website to keep you updated, you can visit it here.
If you have any further comments about our priority setting process, please enter them in the box below:
Exit and clear survey
Resume later
Submit
Contact us
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Appendix E: Mapping priority topics from the information gathering and stakeholder consultation phases against Cochrane Oral Health reviews

Table 27: priority topics established in each priority setting phase mapped against current Cochrane Oral Health reviews

REVIEW TITLE	EVIDENCE LEVEL	COCHRANE ORAL HEALTH METRICS	STAKEHOLDER CONSULTATION	UNCERTAINTIES FROM GUIDELINES	EVIDENCE BASE SURVEY	JAMES LIND ALLIANCE PSP	TOTAL
Adhesive restorations for the treatment of dental non-carious cervical lesions	PROTOCOL			X			1
Adhesively bonded versus non-bonded amalgam restorations for dental caries	INSUFFICIENT EVIDENCE		X	X			2
Adhesives for bonded molar tubes during fixed brace treatment	ANSWERED				X		1
Adhesives for fixed orthodontic bands	INSUFFICIENT EVIDENCE				X		1
Adhesives for fixed orthodontic brackets	INSUFFICIENT EVIDENCE				X		1
Adjunctive antimicrobial photodynamic therapy for treating periodontal and peri-implant diseases	PROTOCOL		X	X			2
Adjunctive antimicrobial photodynamic therapy for treating periodontal and peri-implant diseases	PROTOCOL		X		X	X	3

Adjunctive systemic antimicrobials for the non-surgical treatment of chronic and aggressive periodontitis	PROTOCOL		X		X	X	3
Aids for mechanical cleaning of teeth with fixed braces	PROTOCOL						0
Antibacterial agents in composite restorations for the prevention of dental caries	OUT OF DATE		X	X			2
Antibiotic use for irreversible pulpitis	INSUFFICIENT EVIDENCE		X	X			2
Antibiotics for the prophylaxis of bacterial endocarditis in dentistry	OUT OF DATE	X	X	X			3
Antibiotics to prevent complications following tooth extractions	ANSWERED		X	X			2
Atraumatic restorative treatment versus conventional restorative treatment for the management of dental caries	INSUFFICIENT EVIDENCE		X				1
Autologous platelet concentrates for treatment of periodontal defects	INSUFFICIENT EVIDENCE		X		X	X	3
CAD/CAM versus traditional indirect methods in the fabrication of inlays, onlays, and crowns	PROTOCOL						0
Chlorhexidine mouthrinse as an adjunctive treatment for gingival health	ANSWERED	X	X	X	X	X	5
Chlorhexidine mouthrinse versus other potentially active mouthrinses as an adjunctive treatment for gingival health	TITLE		X	X	X	X	4
Chlorhexidine treatment for the prevention of dental caries in children and adolescents	INSUFFICIENT EVIDENCE		X	X	X	X	4
Clinical assessment to screen for the detection of oral cavity cancer and potentially malignant disorders in apparently healthy adults	OUT OF DATE		X	X		X	3

Combinations of topical fluoride (toothpastes, mouthrinses, gels, varnishes) versus single topical fluoride for preventing dental caries in children and adolescents	OUT OF DATE		X	X		X	3
Dental cavity liners for Class I and Class II resin-based composite restorations	INSUFFICIENT EVIDENCE		X	X			2
Dental extractions prior to radiotherapy to the jaws for reducing post-radiotherapy dental complications	OUT OF DATE						0
Dental filling materials for managing carious lesions in the primary dentition	PROTOCOL		X	X	X		3
Desensitizing toothpastes for dentine hypersensitivity	OUT OF DATE		X	X			2
Diagnostic tests for oral cancer and potentially malignant disorders in patients presenting with clinically evident lesions	INSUFFICIENT EVIDENCE			X		X	2
Different powered toothbrushes for plaque control and gingival health	OUT OF DATE						0
Direct composite resin fillings versus amalgam fillings for permanent or adult posterior teeth	OUT OF DATE	X	X	X	X		4
Electrical conductance for the detection of dental caries	PROTOCOL			X			1
Enamel etching for bonding fixed orthodontic braces	OUT OF DATE				X		1
Enamel matrix derivative (Emdogain®) for periodontal tissue regeneration in intrabony defects	OUT OF DATE		X	X	X	X	4
Endodontic procedures for retreatment of periapical lesions	INSUFFICIENT EVIDENCE			X			1
Feeding interventions for growth and development in infants with cleft lip, cleft palate or cleft lip and palate	OUT OF DATE			X			1

Fibre-optic transillumination for the detection of dental caries	PROTOCOL			X			1
Final-impression techniques and materials for making complete and removable partial dentures	INSUFFICIENT EVIDENCE						0
Fluorescence devices for the detection of dental caries	PROTOCOL			X			1
Fluoridated milk for preventing dental caries	INSUFFICIENT EVIDENCE		X	X		X	3
Fluoride gels for preventing dental caries in children and adolescents	ANSWERED		X	X		X	3
Fluoride mouthrinses for preventing dental caries in children and adolescents	ANSWERED	X	X	X	X	X	5
Fluoride supplementation in pregnant women for preventing dental caries in the primary teeth of their children	INSUFFICIENT EVIDENCE		X	X		X	3
Fluoride supplements (tablets, drops, lozenges or chewing gums) for preventing dental caries in children	OUT OF DATE		X	X		X	3
Fluoride toothpastes for preventing dental caries in children and adolescents	OUT OF DATE	X	X	X	X	X	5
Fluoride toothpastes of different concentrations for preventing dental caries in children and adolescents	INSUFFICIENT EVIDENCE	X	X	X	X	X	5
Fluoride varnishes for preventing dental caries in children and adolescents	OUT OF DATE	X	X	X	X	X	5
Fluorides for the prevention of early tooth decay (demineralised white lesions) during fixed brace treatment	OUT OF DATE		X		X		2
Full-mouth treatment modalities (within 24 hours) for chronic periodontitis in adults	INSUFFICIENT EVIDENCE		X		X	X	3

Home use of interdental cleaning devices, in addition to toothbrushing, for preventing and controlling periodontal diseases and dental caries	INSUFFICIENT EVIDENCE	X	X	X		X	4
Home-based chemically-induced whitening of teeth in adults	INSUFFICIENT EVIDENCE					X	1
Home-use whitening toothpastes for whitening teeth in adults	PROTOCOL					X	1
Ibuprofen and/or paracetamol (acetaminophen) for pain relief after surgical removal of lower wisdom teeth	OUT OF DATE	X			X		2
Initial arch wires for tooth alignment during orthodontic treatment with fixed appliances	INSUFFICIENT EVIDENCE				X		1
Interventions for central giant cell granuloma (CGCG) of the jaws	OUT OF DATE						0
Interventions for cleaning dentures in adults	OUT OF DATE			X			1
Interventions for iatrogenic inferior alveolar and lingual nerve injury	OUT OF DATE						0
Interventions for increasing acceptance of local anaesthetic in children and adolescents having dental treatment	PROTOCOL						0
Interventions for managing denture stomatitis	PROTOCOL		X	X			2
Interventions for managing halitosis	PROTOCOL			X			1
Interventions for managing immature permanent teeth with necrotic pulps	PROTOCOL		X	X			2
Interventions for managing mandibular fractures	OUT OF DATE		X	X			2

Interventions for managing medication-related osteonecrosis of the jaw (MRONJ)	INSUFFICIENT EVIDENCE			X		X	2
Interventions for managing oral submucous fibrosis	OUT OF DATE		X				1
Interventions for managing relapse of the lower front teeth after orthodontic treatment	OUT OF DATE						0
Interventions for managing root caries	PROTOCOL		X	X	X		3
Interventions for managing taste disturbances	INSUFFICIENT EVIDENCE						0
Interventions for managing temporomandibular joint osteoarthritis	OUT OF DATE		X			X	2
Interventions for missing teeth: removable prostheses for the edentulous mandible	PROTOCOL			X			1
Interventions for preventing oral candidiasis for patients with cancer receiving treatment	OUT OF DATE					X	1
Interventions for preventing oral mucositis for patients with cancer receiving treatment	OUT OF DATE	X		X	X	X	4
Interventions for preventing oral mucositis in patients with cancer receiving treatment: cytokines and growth factors	INSUFFICIENT EVIDENCE			X	X	X	3
Interventions for preventing oral mucositis in patients with cancer receiving treatment: oral cryotherapy	INSUFFICIENT EVIDENCE			X		X	2
Interventions for preventing osteoradionecrosis of the jaws in people receiving head and neck radiotherapy	PROTOCOL			X			1
Interventions for promoting the eruption of palatally displaced permanent canine teeth, without the need for surgical exposure, in children aged 9 to 14 years	TITLE						0

Interventions for replacing missing teeth: alveolar ridge preservation techniques for dental implant site development	INSUFFICIENT EVIDENCE			X	X	X	3
Interventions for replacing missing teeth: antibiotics at dental implant placement to prevent complications	OUT OF DATE		X	X			2
Interventions for replacing missing teeth: attachment systems for implant overdentures in edentulous jaws	INSUFFICIENT EVIDENCE			X			1
Interventions for replacing missing teeth: augmentation procedures of the maxillary sinus	INSUFFICIENT EVIDENCE	X	X	X	X	X	5
Interventions for replacing missing teeth: dental implants in fresh extraction sockets (immediate, immediate-delayed and delayed implants)	OUT OF DATE						0
Interventions for replacing missing teeth: dental implants in zygomatic bone for the rehabilitation of the severely deficient edentulous maxilla	OUT OF DATE			X	X	X	3
Interventions for replacing missing teeth: different times for loading dental implants	OUT OF DATE	X		X	X	X	4
Interventions for replacing missing teeth: different types of dental implants	INSUFFICIENT EVIDENCE	X		X	X	X	4
Interventions for replacing missing teeth: horizontal and vertical bone augmentation techniques for dental implant treatment	OUT OF DATE			X	X		2
Interventions for replacing missing teeth: hyperbaric oxygen therapy for irradiated patients who require dental implants	OUT OF DATE			X		X	2
Interventions for replacing missing teeth: implant placement at different levels in relation to crestal bone	PROTOCOL			X	X		2
Interventions for replacing missing teeth: maintaining and recovering soft tissue health around dental implants	OUT OF DATE			X	X		2

Interventions for replacing missing teeth: management of soft tissues for dental implants	OUT OF DATE			X	X		2
Interventions for replacing missing teeth: treatment of peri-implantitis	OUT OF DATE			X			1
Interventions for the cessation of non-nutritive sucking habits in children	INSUFFICIENT EVIDENCE						0
Interventions for the management of dry mouth: non-pharmacological interventions	OUT OF DATE		X	X		X	3
Interventions for the management of dry mouth: topical therapies	OUT OF DATE		X	X		X	3
Interventions for the management of external root resorption	INSUFFICIENT EVIDENCE						0
Interventions for the management of oral ulcers in Behçet's disease	INSUFFICIENT EVIDENCE						0
Interventions for the prevention and treatment of herpes simplex virus in patients being treated for cancer	OUT OF DATE					X	1
Interventions for the restorative care of amelogenesis imperfecta in children and adolescents	OUT OF DATE						0
Interventions for the treatment of fractures of the mandibular condyle	OUT OF DATE						0
Interventions for the treatment of keratocystic odontogenic tumours	INSUFFICIENT EVIDENCE						0
Interventions for the treatment of oral and oropharyngeal cancers: surgical treatment	INSUFFICIENT EVIDENCE		X	X	X		3
Interventions for the treatment of oral and oropharyngeal cancers: targeted therapy and immunotherapy	INSUFFICIENT EVIDENCE		X	X			2
Interventions for the treatment of oral cavity and oropharyngeal cancer: chemotherapy	OUT OF DATE		X	X	X		3

Interventions for the treatment of oral cavity and oropharyngeal cancer: radiotherapy	OUT OF DATE		X	X	X		3
Interventions for treating bisphosphonate-related osteonecrosis of the jaw (BRONJ)	INSUFFICIENT EVIDENCE						0
Interventions for treating burning mouth syndrome	INSUFFICIENT EVIDENCE						0
Interventions for treating cavitated or dentine carious lesions	PROTOCOL		X	X			2
Interventions for treating oral candidiasis for patients with cancer receiving treatment	OUT OF DATE					X	1
Interventions for treating oral leukoplakia to prevent oral cancer	INSUFFICIENT EVIDENCE			X			1
Interventions for treating oral lichen planus	OUT OF DATE		X	X		X	3
Interventions for treating oral mucositis for patients with cancer receiving treatment	OUT OF DATE			X		X	2
Interventions for treating oro-antral communications and fistulae due to dental procedures	INSUFFICIENT EVIDENCE						0
Interventions for treating post-extraction bleeding	INSUFFICIENT EVIDENCE		X	X			2
Interventions for treating traumatised ankylosed permanent front teeth	INSUFFICIENT EVIDENCE			X			1
Interventions for treating traumatised permanent front teeth: avulsed (knocked out) and replanted	INSUFFICIENT EVIDENCE			X			1
Interventions for treating traumatised permanent front teeth: luxated (dislodged) teeth	OUT OF DATE			X			1
Interventions with pregnant women and new mothers for preventing caries in children	PROTOCOL		X	X		X	3

Intraoperative local anaesthesia for reduction of postoperative pain following general anaesthesia for dental treatment in children and adolescents	INSUFFICIENT EVIDENCE		X	X			2
Irrigants for non-surgical root canal treatment in mature permanent teeth	OUT OF DATE			X	X		2
Laser therapy for dentinal hypersensitivity	PROTOCOL						0
Lasers for caries removal in deciduous and permanent teeth	INSUFFICIENT EVIDENCE		X	X			2
Local interventions for the management of alveolar osteitis (dry socket)	OUT OF DATE						0
Magnification devices for endodontic therapy	INSUFFICIENT EVIDENCE						0
Management of gag reflex for patients undergoing dental treatment	INSUFFICIENT EVIDENCE						0
Materials for retrograde filling in root canal therapy	INSUFFICIENT EVIDENCE			X	X		2
Maternal consumption of xylitol for preventing dental decay in children	PROTOCOL		X			X	2
Maxillary distraction osteogenesis versus orthognathic surgery for cleft lip and palate patients	INSUFFICIENT EVIDENCE						0
Metal-free materials for fixed prosthodontic restorations	INSUFFICIENT EVIDENCE		X	X			2
Micro-invasive interventions for managing proximal dental decay in primary and permanent teeth	ANSWERED	X	X	X			3
Non-fluoride topical remineralising agents containing calcium and/or phosphate for controlling dental caries	PROTOCOL		X	X			2
Non-pharmacological interventions for alleviating pain during orthodontic treatment	INSUFFICIENT EVIDENCE						0

Non-pharmacological interventions for managing dental anxiety in children	PROTOCOL		X			X	2
Non-surgical adjunctive interventions for accelerating tooth movement in patients undergoing fixed orthodontic treatment	INSUFFICIENT EVIDENCE						0
Occlusal interventions for managing temporomandibular disorders	PROTOCOL		X	X	X	X	4
One topical fluoride (toothpastes, or mouthrinses, or gels, or varnishes) versus another for preventing dental caries in children and adolescents	OUT OF DATE		X		X	X	3
One-to-one dietary interventions undertaken in a dental setting to change dietary behaviour	OUT OF DATE		X	X		X	3
One-to-one oral hygiene advice provided in a dental setting for oral health	INSUFFICIENT EVIDENCE		X	X	X	X	4
Open versus closed surgical exposure of canine teeth that are displaced in the roof of the mouth	INSUFFICIENT EVIDENCE			X	X		2
Oral appliances and functional orthopaedic appliances for obstructive sleep apnoea in children	INSUFFICIENT EVIDENCE			X			1
Oral care measures for preventing nursing home-acquired pneumonia	INSUFFICIENT EVIDENCE		X	X			2
Oral health educational interventions for nursing home staff and residents	INSUFFICIENT EVIDENCE		X	X		X	3
Oral hygiene care for critically ill patients to prevent ventilator-associated pneumonia	INSUFFICIENT EVIDENCE	X	X	X			3
Oral hygiene programmes for people with intellectual disabilities	INSUFFICIENT EVIDENCE		X	X	X	X	4
Orthodontic and orthopaedic treatment for anterior open bite in children	INSUFFICIENT EVIDENCE		X				1

Orthodontic treatment for crowded teeth in children	PROTOCOL		X		X		2
Orthodontic treatment for deep bite and retroclined upper front teeth in children	INSUFFICIENT EVIDENCE		X		X		2
Orthodontic treatment for distalising upper first molars in children and adolescents	OUT OF DATE		X		X		2
Orthodontic treatment for posterior crossbites	INSUFFICIENT EVIDENCE		X		X		2
Orthodontic treatment for prominent lower front teeth (Class III malocclusion) in children	OUT OF DATE		X		X		2
Orthodontic treatment for prominent upper front teeth (Class II malocclusion) in children	INSUFFICIENT EVIDENCE		X		X		2
Paracetamol for pain relief after surgical removal of lower wisdom teeth	OUT OF DATE				X		1
Periodontal therapy for the management of cardiovascular disease in patients with chronic periodontitis	INSUFFICIENT EVIDENCE		X	X		X	3
Pharmacological interventions for pain in patients with temporomandibular disorders	OUT OF DATE		X	X		X	3
Pharmacological interventions for pain relief during orthodontic treatment	ANSWERED						0
Pharmacological interventions for preventing dry mouth and salivary gland dysfunction following radiotherapy	INSUFFICIENT EVIDENCE			X		X	2
Physical therapies for temporomandibular disorders	TITLE		X			X	2
Pit and fissure sealants for preventing dental decay in the permanent teeth	ANSWERED		X	X	X	X	4

Pit and fissure sealants versus fluoride varnishes for preventing dental decay in the permanent teeth of children and adolescents	INSUFFICIENT EVIDENCE	X	X	X	X	X	5
Powered versus manual toothbrushing for oral health	ANSWERED	X	X		X	X	4
Preformed crowns for decayed primary molar teeth	INSUFFICIENT EVIDENCE		X	X			2
Preoperative analgesics for additional pain relief in children and adolescents having dental treatment	INSUFFICIENT EVIDENCE			X			1
Primary school-based behavioural interventions for preventing caries	OUT OF DATE		X	X		X	3
Professionally-applied chemically-induced whitening of teeth in adults	PROTOCOL						0
Psychological interventions for improving adherence to oral hygiene instructions in adults with periodontal diseases	PROTOCOL		X	X	X	X	4
Psychological therapies for temporomandibular disorders	TITLE		X			X	2
Pulp treatment for extensive decay in primary teeth	INSUFFICIENT EVIDENCE		X	X			2
Radiography for the detection of dental caries	PROTOCOL			X			1
Recall intervals for oral health in primary care patients	OUT OF DATE	X	X	X		X	4
Reinforcement of anchorage during orthodontic brace treatment with implants or other surgical methods	INSUFFICIENT EVIDENCE			X			1
Replacement versus repair of defective restorations in adults: amalgam	INSUFFICIENT EVIDENCE		X				1

Replacement versus repair of defective restorations in adults: resin composite	INSUFFICIENT EVIDENCE		X	X			2
Resorbable versus titanium plates for orthognathic surgery	INSUFFICIENT EVIDENCE						0
Retention procedures for stabilising tooth position after treatment with orthodontic braces	INSUFFICIENT EVIDENCE		X	X			2
Root coverage procedures for the treatment of localised recession-type defects	INSUFFICIENT EVIDENCE			X	X	X	3
Routine scale and polish for periodontal health in adults	ANSWERED		X	X	X	X	4
Rubber dam isolation for restorative treatment in dental patients	INSUFFICIENT EVIDENCE			X			1
School dental screening for oral health	INSUFFICIENT EVIDENCE		X	X		X	3
Screening programmes for the early detection and prevention of oral cancer	OUT OF DATE		X	X		X	3
Sealants for preventing dental caries in primary teeth	PROTOCOL	X	X	X	X	X	5
Secondary bone grafting for alveolar cleft in children with cleft lip or cleft lip and palate	OUT OF DATE						0
Sedation of children undergoing dental treatment	INSUFFICIENT EVIDENCE		X	X		X	3
Self-ligating brackets versus conventional pre-adjusted edgewise brackets for treating malocclusion	PROTOCOL						0
Single crowns versus conventional fillings for the restoration of root-filled teeth	INSUFFICIENT EVIDENCE		X	X			2
Single versus multiple visits for endodontic treatment of permanent teeth	INSUFFICIENT EVIDENCE						0

Slow-release fluoride devices for the control of dental decay	INSUFFICIENT EVIDENCE		X			X	2
Supportive periodontal therapy (SPT) for maintaining the dentition in adults treated for periodontitis	INSUFFICIENT EVIDENCE			X		X	2
Surgical adjunctive procedures for accelerating orthodontic treatment	INSUFFICIENT EVIDENCE			X			1
Surgical removal versus retention for the management of asymptomatic disease-free impacted wisdom teeth	INSUFFICIENT EVIDENCE	X	X	X	X	X	5
Surgical techniques for the removal of mandibular wisdom teeth	INSUFFICIENT EVIDENCE		X			X	2
Systemic antibiotic prophylaxis for preventing infectious complications in maxillofacial trauma surgery	TITLE		X				1
Systemic antibiotics for symptomatic apical periodontitis and acute apical abscess in adults	INSUFFICIENT EVIDENCE		X	X	X	X	4
Systemic interventions for recurrent aphthous stomatitis (mouth ulcers)	OUT OF DATE		X			X	2
Topical fluoride (toothpastes, mouthrinses, gels or varnishes) for preventing dental caries in children and adolescents	OUT OF DATE		X	X	X	X	4
Topical fluoride as a cause of dental fluorosis in children	OUT OF DATE			X			1
Topical herbal interventions for gingivitis	PROTOCOL					X	1
Topical interventions for recurrent aphthous stomatitis (mouth ulcers)	PROTOCOL		X			X	2
Topical silver diamine fluoride for managing dental caries in children and adults	PROTOCOL		X	X		X	3
Treating periodontal disease for preventing adverse birth outcomes in pregnant women	INSUFFICIENT EVIDENCE		X	X		X	3

Treatment of periodontal disease for glycaemic control in people with diabetes mellitus	INSUFFICIENT EVIDENCE			X		X	2
Triclosan/copolymer containing toothpastes for oral health	OUT OF DATE	X		X		X	3
Visual or visual-tactile examination for the diagnosis of dental caries	PROTOCOL			X			1
Water fluoridation for the prevention of dental caries	INSUFFICIENT EVIDENCE	X	X	X		X	4
Xylitol-containing products for preventing dental caries in children and adults	INSUFFICIENT EVIDENCE	X	X	X		X	4

Appendix F: ranking survey: the participant invitation letter, information sheet and questionnaire

F1: Participant information letter

Dear _

Cochrane Oral Health is currently undertaking a priority setting exercise. We're looking for important questions to answer in taking care of the mouth, teeth and gums.
We are looking at systematic reviews that we've already published over the past 20 years to see which should be updated, and we are also looking at new questions that may need to be answered. We are undertaking priority setting so that we focus on research that is important to people, and new research that hasn't yet been done.

We are writing to you to request your help in the final stage of the priority setting process. We have already identified some priority areas through examining the literature, looking at how our existing reviews are cited and downloaded, and through feedback from our consumers.

We would like you to take part in an online exercise where the identified priorities will be presented to you, and you will then be asked to choose those which you think are the most important, and rank them. We estimate that the survey will take no more than 10-15 minutes of your time.

Please find attached an information sheet. You can also find more information on our website here:

https://oralhealth.cochrane.org/about-us/priority-setting/cochrane-oral-healths-priority-setting-exercise-ongoing

Best wishes,
Anne Littlewood

F2: Participant information sheet

Research Participant Information Sheet

Prioritisng research for evidence synthesis: a case study of Cochrane Oral Health

Participant Information Sheet (PIS)

You are being invited to take part in a research study, prioritising topic areas for systematic reviews in the field of Oral Health. This study is part of a PhD project. Before you decide whether to take part, it is important for you to understand why the research is being conducted and what it will involve. Please take time to read the following information carefully before deciding whether to take part and discuss it with others if you wish. Please ask if there is anything that is not clear or if you would like more information. Thank you for taking the time to read this.

About the research

- **Who will conduct the research?**

The research will be conducted by Anne Littlewood, from Cochrane Oral Health, a research group based at the Division of Dentistry, School of Medical and Human Sciences at the University of Manchester.

- **What is the purpose of the research?**

Cochrane Oral Health is a network of researchers, we are part of a wider group called Cochrane. Cochrane publishes summaries of the best quality research available to help people make informed decisions about oral healthcare choices. These summaries are commonly known as systematic reviews. Cochrane Oral Health is managed by a small team at the University of Manchester in the United Kingdom, but our network of systematic review authors and editors are based in different countries around the world.

Our research is internationally recognised as high-quality, trusted information. You can find out more about the type of research we are involved with on our website: https://oralhealth.cochrane.org/. More information about Cochrane and systematic reviews in general can be found at: https://www.cochrane.org/about-us.

Cochrane Oral Health are currently undertaking a priority setting exercise. We're looking for important questions to answer in taking care of the mouth, teeth and gums. These questions may be turned into new research published by Cochrane Oral Health.

We are looking at systematic reviews that we've already published over the past 20 years to see which should be updated, and we are also looking at new questions that may need to be answered. We are undertaking priority setting so that we focus on research that is important to people, and new research that hasn't yet been done.

At this final stage, we are recruiting a group of people to rank the priorities that we have identified by reviewing the literature, gathering feedback and looking at areas where new healthcare studies have been registered in oral health.

Will the outcomes of the research be published?

The outcome of the research will be a list of priority questions for Cochrane Oral Health to undertake over the next five years, which will go into Cochrane Oral Health's implementation plan. The list of topics will be published on our website, you can also see the other work we have done to date: https://oralhealth.cochrane.org/about-us/priority-setting/cochrane-oral-healths-priority-setting-exercise-ongoing. The findings will also be published as part of a PhD project, and may be presented at conferences and in journal articles.

- **Who has reviewed the research project?**

The project has been reviewed by The University of Manchester Proportionate Research Ethics Committee.

- **Who is funding the research project?**

The project is part funded by the Scottish Dental Clinical Effectiveness Programme.

What would my involvement be?

- **What would I be asked to do if I took part?**

You will be sent an online questionnaire via email. You will be asked to rank priority questions for Cochrane Oral Health. Many priority topic areas have already been identified by looking at existing literature and from feedback gained from Cochrane consumers, and citations and downloads of Cochrane Oral Health's existing reviews.

The questionnaire will contain the priority topics listed, and you will choose the topics you think are the most important to you, and then rank them in order of most to least important. You will also be asked why you have decided on your choices, and whether there are any other priorities that you think we have missed.

The questionnaire should only take 15-20 minutes.

- **Will I be compensated for taking part?**

There is no compensation for taking part.

- **What happens if I do not want to take part or if I change my mind?**

It is up to you to decide whether or not to take part. If you have changed your mind contact Anne Littlewood via a.littlewood@manchester.ac.uk. If you do decide to take part you will be given this information sheet to keep. If you decide to take part you are still free to withdraw at any time without giving a reason and without detriment to yourself. However, it will not be possible to remove your data from the project once you have completed the questionnaire as we will not be able to identify your specific data. This does not affect your data protection rights. If you decide not to take part you do not need to do anything further.

Data Protection and Confidentiality

- **What information will you collect about me?**

In order to participate in this research project we will need to collect information that could identify you, called "personal identifiable information". Specifically we will need to collect:

- Name
- Occupation

- Email address
- Organisation (if applicable)

➢ **Under what legal basis are you collecting this information?**

We are collecting and storing this personal identifiable information in accordance with data protection law which protect your rights. These state that we must have a legal basis (specific reason) for collecting your data. For this study, the specific reason is that it is "a public interest task" and "a process necessary for research purposes".

➢ **What are my rights in relation to the information you will collect about me?**

You have a number of rights under data protection law regarding your personal information. For example you can request a copy of the information we hold about you. If you would like to know more about your different rights or the way we use your personal information to ensure we follow the law, please consult our Privacy Notice for Research.

➢ **Will my participation in the study be confidential and my personal identifiable information be protected?**

In accordance with data protection law, The University of Manchester is the Data Controller for this project. This means that we are responsible for making sure your personal information is kept secure, confidential and used only in the way you have been told it will be used. All researchers are trained with this in mind, and your data will be looked after in the following way:

- Your name, occupation and email address will only be held for the duration of the survey.
- Any identifiable information will be held separately from your responses to the questionnaire.
- For the duration of the survey, your name, occupation and email address will be held on an Excel spreadsheet, held on a secure drive at the University of Manchester. The spreadsheet will only be used to check who has filled in the survey, and follow up where appropriate. At the close of the survey, this spreadsheet will be deleted.

- Once the survey has closed, all data from the survey will be exported from Lime Survey and anonymised in an Excel spreadsheet, which will be held on a secure drive at the University of Manchester. The data will be deleted from Lime Survey.
- At the close of the survey, only the researchers at the University of Manchester will have access to your personal data, and it will be anonymised as soon as possible.

Please also note that individuals from The University of Manchester or regulatory authorities may need to look at the data collected for this study to make sure the project is being carried out as planned. This may involve looking at identifiable data. All individuals involved in auditing and monitoring the study will have a strict duty of confidentiality to you as a research participant.

What if I have a complaint?

- **Contact details for complaints**

If you have a complaint that you wish to direct to members of the research team, please contact: **ANNE LITTLEWOOD (**a.littlewood@manchester.ac.uk**), 0161 275 7814.**

If you wish to make a formal complaint to someone independent of the research team or if you are not satisfied with the response you have gained from the researchers in the first instance then please contact

The Research Ethics Manager, Research Office, Christie Building, The University of Manchester, Oxford Road, Manchester, M13 9PL, by emailing: research.complaints@manchester.ac.uk or by telephoning 0161 275 2674.

If you wish to contact us about your data protection rights, please email dataprotection@manchester.ac.uk or write to The Information Governance Office, Christie Building, The University of Manchester, Oxford Road, M13 9PL at the University and we will guide you through the process of exercising your rights.

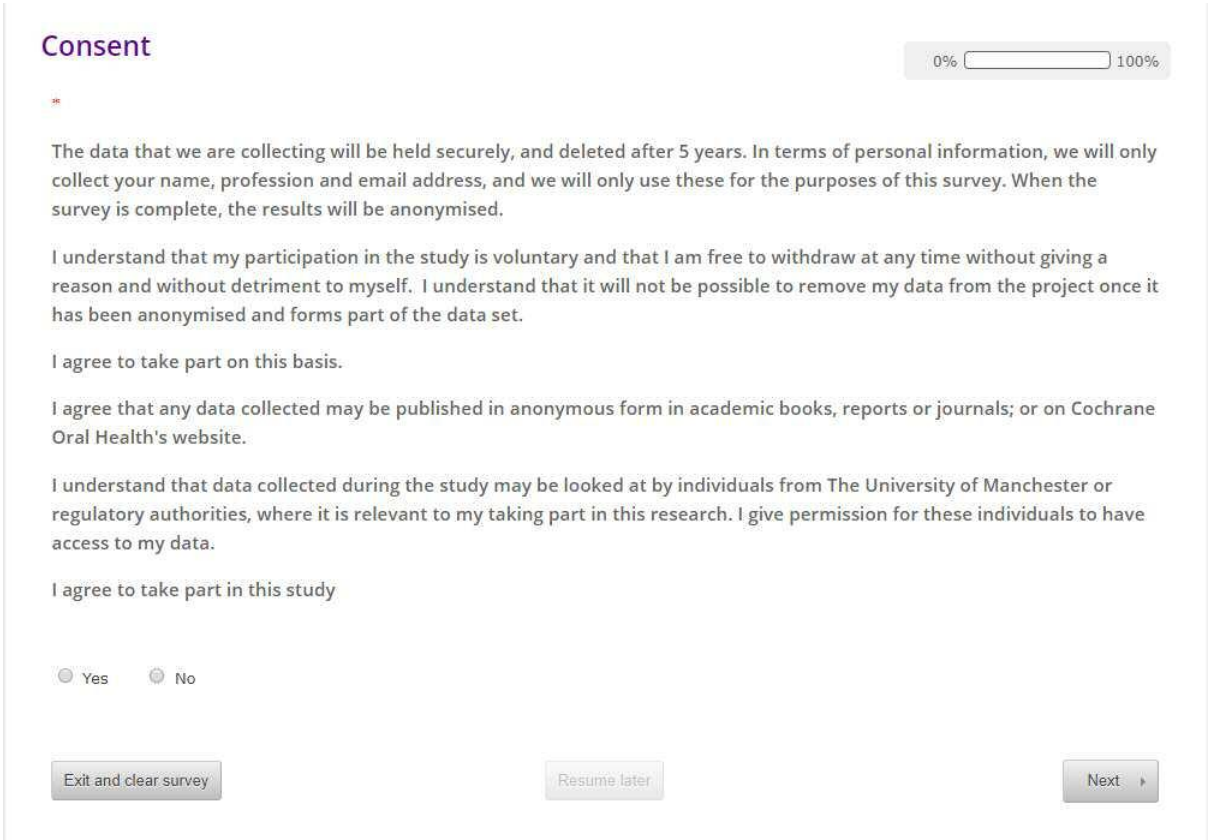
You also have a right to complain to the Information Commissioner's Office about complaints relating to your personal identifiable information Tel 0303 123 1113

Contact Details

If you have any queries about the study or if you are interested in taking part then please contact the researcher(s) **ANNE LITTLEWOOD (**a.littlewood@manchester.ac.uk**), 0161 275 7814.**

F3: Ranking questionnaire

Figure 43: Mapping and ranking phase: screenshots of the ranking questionnaire, sent to the stakeholder panel



Cochrane Oral Health Stakeholders Priority Setting

University home

New titles

0% 100%

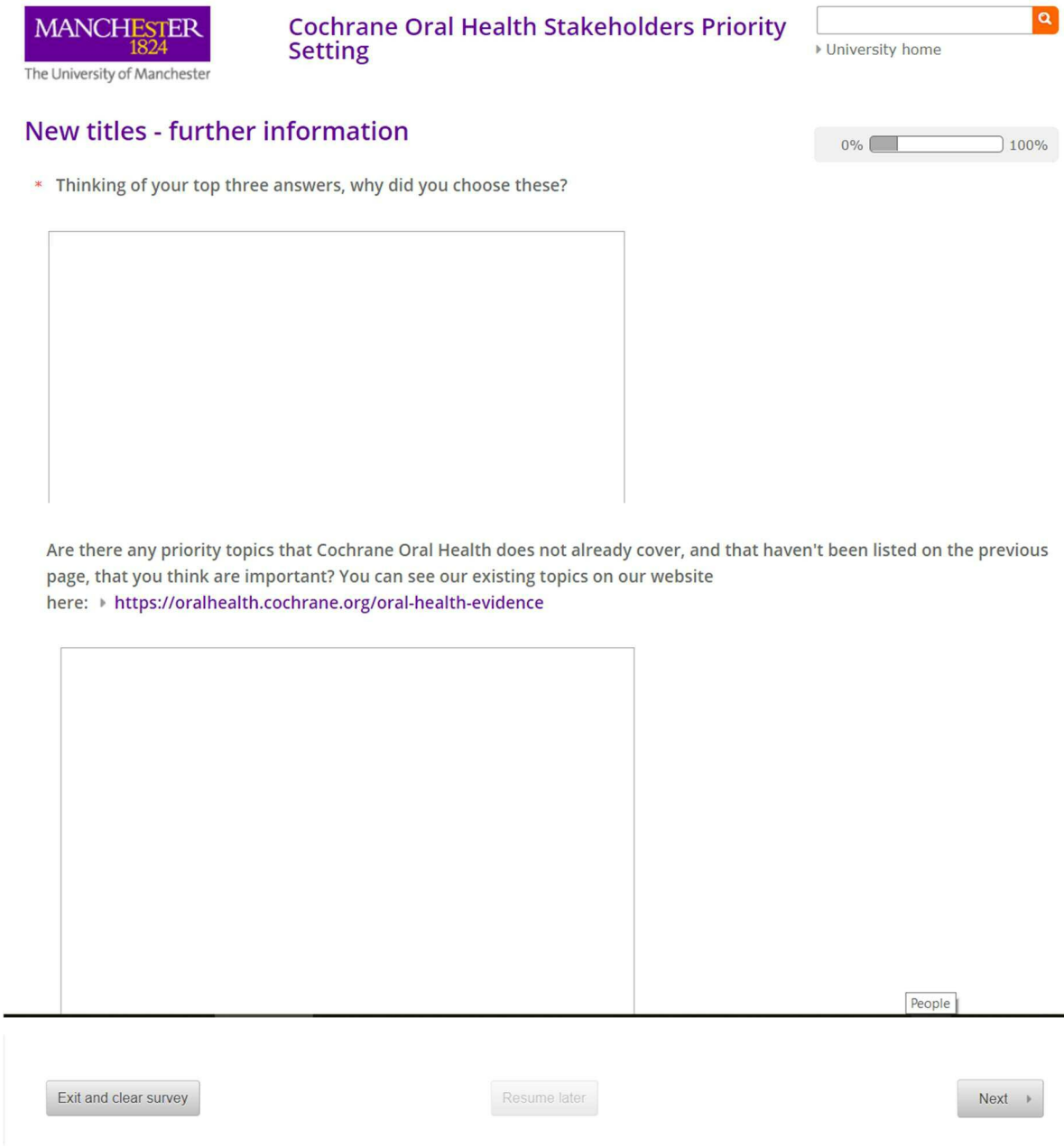
Cochrane Oral Health has identified the following new topics that may become new systematic reviews.

Please choose a maximum of ten and drag and drop them from the "Proposed new titles" column to the "Your ranking" column. Please order them so that the most important topic to you is at the top of the list, and the least important at 10th position.

Proposed new titles	Your ranking
How does chlorhexidine mouthrinse compare with other mouthrinses as an additional treatment for gum disease?	
Can mouthrinses stop cancer patients getting mouth soreness and ulcers (oral mucositis)?	
Can complementary or alternative therapies stop people getting mouth soreness and ulcers (oral mucositis) when they are being treated for cancer?	
Can changing dental health habits or behaviour help people with gum disease?	
Can sealants prevent tooth decay in milk teeth?	
Can light treatment (photodynamic therapy) be a useful additional (adjunctive) treatment for chronic gum disease (periodontitis) and dental infections caused by dental implants (peri-implantitis)?	
Can complementary or alternative therapies relieve pain in the jaw or face (temporomandibular disorders)?	
Are breastfed babies more likely to get tooth decay?	
At what stage of tooth decay should a dentist use a drill?	
Can taking probiotics (live bacteria and yeasts) prevent and control chronic gum disease (periodontitis)?	
What is the strongest material for making long-lasting root canal fillings?	
What is the best way to measure the risk of tooth decay?	
Does a better diet or diet supplements improve oral health? If so what are the best foods/nutrients/supplements?	
Which material is best for filling cavities in milk or primary teeth?	
Can lasers prevent mouth soreness and mouth ulcers (oral mucositis) in cancer patients?	
Can antibiotics be used, instead of surgery, to treat chronic gum disease (periodontitis)?	
What are the best ways to prevent oral diseases in the elderly living in nursing homes or other institutions?	
How should I brush my teeth? For how long, and how often?	
By changing parental, or primary care-giver behaviours, can tooth decay in children be prevented?	
What are the best ways to prevent tooth decay and oral disease in the elderly?	
Can "silver diamine fluoride" (a type of fluoride) prevent tooth decay?	
What is the best way to promote better oral health?	
How can oral cancer be prevented?	
What role does technology play in providing dental care?	
Can changing a person's bite using splints or orthodontic braces (occlusal adjustment) prevent or treat facial and jaw pain (temporomandibular disorders)?	
What is the best way to deal with cavities on the tooth root (root caries)?	

If you need any help with this question, please contact Anne (a.littlewood@manchester.ac.uk)

Exit and clear survey | Resume later | Next


MANCHESTER 1824
The University of Manchester
Cochrane Oral Health Stakeholders Priority Setting
University home
New titles - further information
0%
100%
* Thinking of your top three answers, why did you choose these?
Are there any priority topics that Cochrane Oral Health does not already cover, and that haven't been listed on the previous page, that you think are important? You can see our existing topics on our website here: https://oralhealth.cochrane.org/oral-health-evidence
People
Exit and clear survey
Resume later
Next


MANCHESTER 1824
The University of Manchester
Cochrane Oral Health Stakeholders Priority Setting
University home
Existing titles
0%
100%
Cochrane Oral Health have also been prioritising the topics for reviews which have already been published.
We would like your help in determining which of the systematic reviews related to these topics should be updated.
Please choose 15 of the topics below, and drag them from the "Existing topics" column, and drop them in the "Your ranking" column. Please order them so that the first topic on the list is the most important to you, and the 15th is the least important to you.

Please select 15 answers

Existing topics	Your ranking
Should those at risk of developing the heart condition Bacterial Endocarditis take antibiotics before undergoing dental treatment?	
Are dental patients more likely to change their diet if they have one-to-one advice on diet and nutrition from a health professional at their dental clinic?	
Does the antibacterial (antiseptic) treatment Chlorohexidine prevent tooth decay in children?	
Before attaching artificial teeth, should the bone be allowed to heal after inserting fresh dental implants? If so, how long is appropriate before attaching replacement teeth?	
Can adding fluoride to milk help prevent tooth decay in children?	
How can we best detect early stage oral cancer in healthy adults?	
Which drug best soothes a child's anxiety during dental treatment?	
Do oral hygiene programmes delivered in primary (elementary) schools help children prevent tooth decay?	
How can we best measure that there is sufficient bone in the jaw, before dental implants are inserted?	
Can either the protein Cytokines or a growth factor peptide, eliminate two side effects of cancer treatment- mouth soreness and ulcers?	
Does treating severe gum disease in pregnant women lead to fewer premature births and fewer underweight babies?	
Should healthy people be regularly screened by a health professional to see if they exhibit early signs of oral cancer?	
If gum diseases have eroded too much upper jawbone to support dental implants, should longer dental implants reaching the cheekbone be used?	
How best can those with learning difficulties improve oral and dental health?	
How best can the upper-jaw and surrounding area be prepared in patients requiring dental implants?	
How strong should fluoride be in children's toothpaste?	
What is the best course of chemotherapy in treating mouth or throat cancer? How does chemotherapy compare to forms of treatment, such as surgery or radiotherapy?	
If dormant wisdom teeth are not causing problems, should they nevertheless be removed as a precaution?	
Does using dental floss, interdental bushes or toothpicks help prevent gum disease and tooth decay?	
Which is better in an adult or permanent tooth- a resin (white) filling, or an amalgam (metal-coloured)?	
How often should you have a dental check-up?	
Should children have dental check-ups at school?	
Does the treatment "autologous platelet concentrates" help regenerate gum tissue in people with severe gum disease?	
What is the best treatment for "oral lichen planus" - oral sore patches that may develop into oral cancers?	
What is the best non-drug treatment for controlling the feeling of dry mouth?	
Which type of dental implant best supports the prosthetic (artificial tooth/teeth) replacing a missing tooth or teeth?	
Does fluoride toothpaste prevent tooth decay in children?	
Which surgery best treats mouth or throat cancers? Is surgery the best option is these cases (vs. chemotherapy, radiotherapy etc)?	
Which drug best treats severe jaw or facial pain?	

How can we best educate new and expectant parents or caregivers in oral hygiene, to help (their) children maintain healthy teeth?

Can treating severe gum disease help prevent heart attacks and strokes, and control the risk factors leading to these conditions?

What is the best course of radiotherapy in treating mouth or throat cancer? How does radiotherapy compare to forms of treatment, such as surgery or chemotherapy?

Can antibiotics treat advanced gum disease or dental abscess (pus in the gum caused by infection)?

Is it more effective fighting tooth decay by applying fluoride to the teeth using various means (e.g. toothpaste, mouthrinse, gel, varnish) - or just one?

If a dentist provides one-to-one advice on dental and oral hygiene, will it improve the patient's oral health?

What is the best treatment that can be applied directly to the mouth for controlling the feeling of dry mouth?

Should dentists paint fluoride varnish on children's teeth to prevent tooth decay?

Does it benefit nursing home residents when both they and their carers, are aware of best dental hygiene practices?

Does the artificial sweetener xylitol prevent tooth decay?

Should children take fluoride as tablets, drops, lozenges or chewing gum to prevent tooth decay?

Should pregnant women take fluoride supplements to prevent their child developing tooth decay in milk teeth?

Should severe gum disease be treated by removing the bacteria from the whole mouth in one or two sessions a day apart, and should an antibacterial mouthwash be used as well? Or should the removal of the bacteria be done more gradually in separate sessions over a number of weeks in different parts of the mouth?

Can use of the gel Enamel Matrix Derivative help regenerate gum tissue lost through severe gum disease?

How best can exposed tooth roots (due to receding gums) be covered?

In fighting gum disease and tooth decay, are toothpastes containing antibacterials and fluoride preferable to toothpastes containing fluoride only?

Which helps fight tooth decay in children best – painting a fluoride varnish onto teeth, or covering teeth with sealants to protect from bacteria?

Does applying fluoride directly to teeth (as toothpaste, mouthrinse, gel or varnish) prevent tooth decay in children?

By receiving oral care, are patients in critical or intensive care units better placed to fight lung diseases such as pneumonia?

Which way of applying fluoride to children's teeth best fights tooth decay?

Does adding fluoride to the water supply help fight tooth decay?

If you have any questions about the survey, please email Anne (a.littlewood@manchester.ac.uk).

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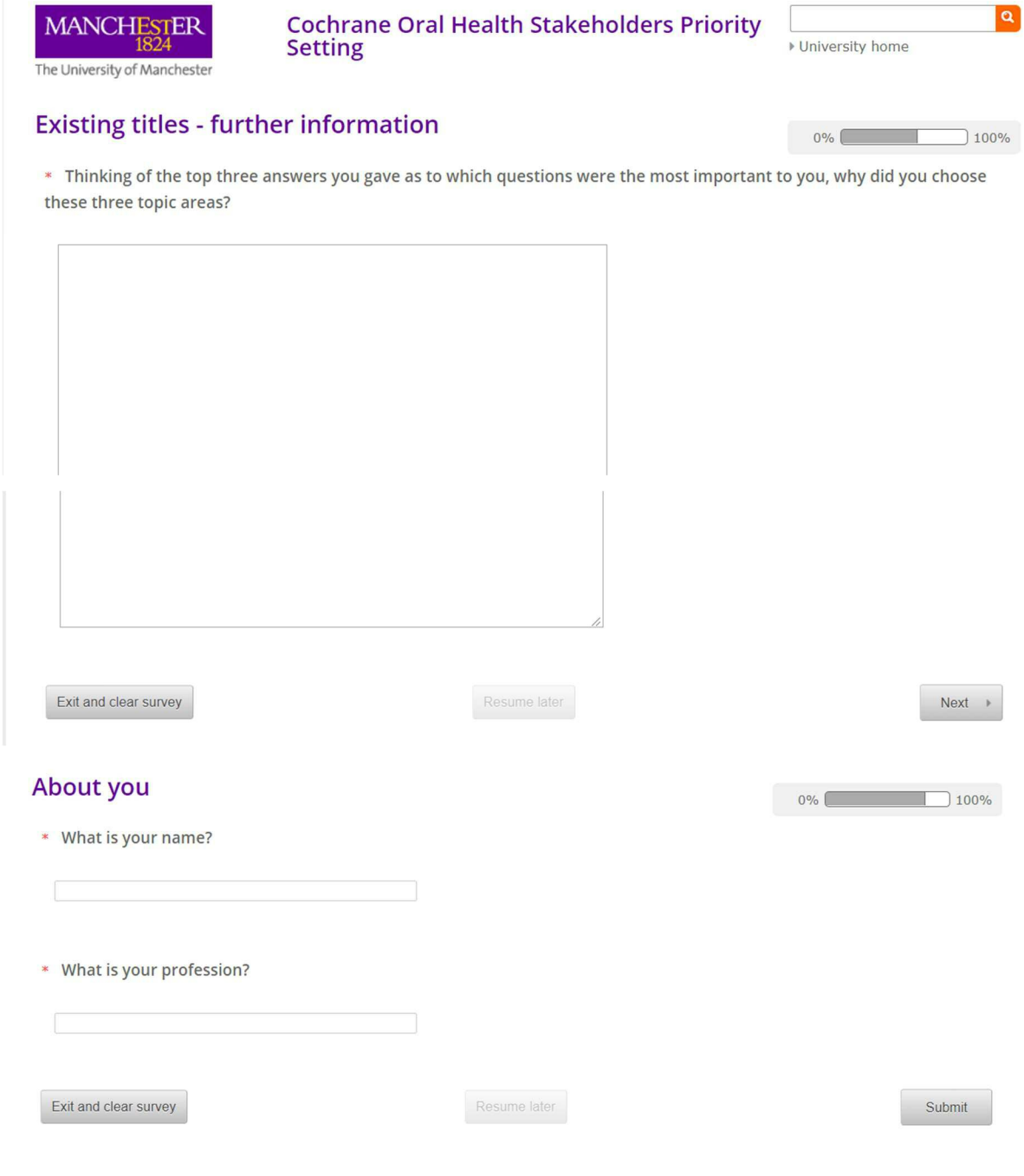
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Cochrane Oral Health Stakeholders Priority Setting
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Survey completed
Thank you for taking part in our survey!
Please contact Anne Littlewood (a.littlewood@manchester.ac.uk) if you have any questions.
You can follow our progress at https://oralhealth.cochrane.org/about-us/priority-setting/cochrane-oral-healths-priority-setting-exercise-ongoing, and sign up for our priority setting bulletins here: https://cochrane.us2.list-manage.com/subscribe?u=d8bc262aa7c39f47d726d3764&id=51e54a1585

Appendix G: References to existing systematic reviews on identified priorities analysed with the AMSTAR checklist

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McGrath, C., Zhou, N. and Wong, H.M. (2019). A systematic review and meta-analysis of dental plaque control among children and adolescents with intellectual disabilities. *Journal of applied research in intellectual disabilities*, 32(3), pp. 522-532.

Panda, S., Karanxha, L., Goker, F., Satpathy, A., Taschieri, S., Francetti, L., Das, A.C., Kumar, M., Panda, S. and Fabbro, M.D. (2019). Autologous platelet concentrates in treatment of furcation defects - a systematic review and meta-analysis. *International journal of molecular sciences*, 20(6), Article no.: 1347.

Oliveira, B.H., Rajendra, A., Veitz-Keenan, A. and Niederman, R. (2019). The effect of silver diamine fluoride in preventing caries in the primary dentition: a systematic review and meta-analysis. *Caries research,* 53(1), pp. 24-32.

Sanjeevan, V., Janakiram, C. and Joseph, J. (2019). Effectiveness of school-based dental screening in increasing dental care utilization: a systematic review and meta-analysis. *Indian
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Tampi, M.P., Pilcher, L., Urquhart, O., Kennedy, E., O'Brien, K.K., Lockhart, P.B., Abt, E., Aminoshariae, A., Durkin, M.J., Fouad, A.F., Gopal, P., Hatten, B.W., Lang, M.S., Patton, L.L., Paumier, T., Suda, K.J., Cho, H. and Carrasco-Labra, A. (2019). Antibiotics for the urgent management of symptomatic irreversible pulpitis, symptomatic apical periodontitis, and localized acute apical abscess: systematic review and meta-analysis - a report of the American Dental Association. *Journal of the American Dental Association*, 150(12), pp. e179–e216.

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Zhou, S., Sun, C., Huang, S., Wu, X., Zhao, Y., Pan, C., Wang, H., Liu, J., Li, Q. and Kou, Y. (2018). Efficacy of adjunctive bioactive materials in the treatment of periodontal intrabony defects: a systematic review and meta-analysis. *BioMed research international*, 2018, Article no.: 8670832.

Appendix H: Cochrane Oral Health's priority setting implementation plan

H1: Introduction

Cochrane Oral Health has undertaken an extensive prioritisation exercise, to determine the priority areas for evidence synthesis in oral health.

Information on priority topics for systematic reviews in oral health was gathered from several sources. These were:

1. Data on how our existing reviews are being used: how often they have been cited, downloaded and discussed on social media;

2. Trials registry records and trials data, to find out the up-and-coming research areas in oral health, which might have scope for a new systematic review;

3. Published guidelines to find out where guideline developers need more research evidence, and where a new systematic review help them to deliver better guidance;

4. The opinions of patients, carers and the general public, to find out what questions people have about their oral health.

5. Priorities emerging from the James Lind Alliance Oral Health Priority Setting Partnership.

Common questions and themes were identified by these five methodologies. The results were then mapped against the existing portfolio of Cochrane Oral Health reviews and protocols to find out where there was scope for new reviews, and which existing reviews should be prioritised for updating.

The final stage in the data collection process was to rank the priorities which emerged, and put them to an international panel consisting of clinicians, policy-makers, guideline developers, researchers and members of the public. This ensured that the number of priority topics was within reasonable limits, so that Cochrane Oral Health have the capacity to undertake the reviews.

The final priorities were shared and discussed with Cochrane Oral Health's Editorial Base team at two meetings. The following people attended and made the decisions documented in this plan:

- Professor Jan Clarkson (co-ordinating editor)
- Professor Anne-Marie Glenny (co-ordinating editor)
- Professor Helen Worthington (former co-ordinating editor and statistical editor)
- Professor Tanya Walsh (statistical editor)
- Dr. Philip Riley (deputy co-ordinating editor)
- Luisa Fernandez-Mauleffinch (managing editor)
- Laura MacDonald (managing editor)
- Anne Littlewood (information specialist)

The purpose of this implementation plan is:

- To show how this priority setting process meets the mandatory requirements of priority setting within Cochrane (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019);

- To demonstrate how each of the priority topic areas will be addressed by Cochrane Oral Health, as determined by the outcomes of the meetings held in Autumn 2020.

We will share this implementation plan with the Cochrane Musculoskeletal, Sensory and Skin Network: https://moss.cochrane.org/.

H2: Cochrane mandatory priority setting requirements

Cochrane's Knowledge Translation Working Group on Priority Setting produced a guidance note, containing a number of mandatory standards Cochrane review groups must meet for each priority setting exercise (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019).

Cochrane Oral Health's most recent priority setting method met these standards in the following ways:

H2.1 Establish a team to lead the priority setting process

As a minimum, this steering group could be drawn from the Group, Network or Field membership and will help define and refine the scope of the exercise (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019).

Cochrane Oral Health's priority setting process was undertaken as a PhD by the group's information specialist Anne Littlewood. The supervisors of the PhD were the group's co-ordinating editors (Professor Jan Clarkson and Professor Anne-Marie Glenny) and the group's statistical editor (Professor Tanya Walsh). These four people comprised the priority setting steering group for Cochrane Oral Health.

H2.2 Engage with at least one stakeholder group

E.g. guideline developer, funder, consumer organization, professional society, etc. Stakeholder engagement must extend beyond the Group, Network or Field membership and/or editorial boards (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019).

Cochrane Oral Health engaged with several stakeholder groups over the course of the priority setting process. A survey was undertaken with members of the general public, which was open to anyone who wanted to take part. This was widely advertised on social media channels and through Cochrane channels. The survey was designed to collect questions about the health of the mouth, teeth and gums. 168 people took part, and submitted 211 questions.

The final stage of the priority setting process also involved stakeholders. A panel of 40 people from 23 countries was convened to rank the priority titles that were established during the priority setting. They included guideline developers, consumers, policymakers, clinicians and researchers.

H2.3 Publish, through relevant Cochrane channels, the intention to conduct a priority setting process

This will give external and internal stakeholders (Groups, Networks and Fields) an opportunity to be involved (for example by facilitating connections to external

stakeholders in other geographic areas, or in a specific thematic area) (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019).

A website has been running alongside the priority setting process, detailing each stage of the process, and publicising opportunities to get involved. It is available here: https://oralhealth.cochrane.org/about-us/priority-setting/cochrane-oral-healths-priority-setting-exercise-ongoing.

The Cochrane Communications Team were informed of the priority setting process, and helped Cochrane Oral Health to promote their stakeholder survey. Relevant fields were informed, and the Musculoskeletal, Oral, Sensory and Skin Network. In addition, we have been producing Priority Setting bulletins on an occasional basis, which contain updates on the progress of priority setting. These are free for anyone to sign up and receive: https://oralhealth.cochrane.org/about-us/priority-setting/cochrane-oral-health-priority-setting-bulletins. We also informed people via our social media channels and our quarterly newsletter.

H2.4 Document the priority setting plan, detailing stakeholder engagement, methods and criteria that will be used for the priority setting process.

(Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019).

A priority setting plan was available on Cochrane Oral Health's website from 2018 onwards. It includes information on governance, stakeholder consultation, the methodology used, plans for implementation and how we will communicate the results. It can be found here: https://oralhealth.cochrane.org/sites/oralhealth.cochrane.org/files/public/uploads/cochrane_oral_healths_priority_setting_plan_2018-2020_1.pdf

H2.5 Document the implementation of the priority-setting process and make it available on the individual Group, Network or Field website.

In the case of Cochrane Review Groups this should also include a link to the relevant network portal. The documentation must include a summary of the exercise undertaken, and contain enough information for stakeholders to get a clear idea of the process used (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019).

This implementation plan is available on Cochrane Oral Health's website. Details of the priority topics and how they will be implemented is presented below, in Section 3.

H2.6 Publish a list of priority topics

This should be in the form of new or existing review titles or placeholder titles where the precise question is yet to be determined) on the individual group or field website where appropriate (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019)..

We have published a list of priority topics here: https://oralhealth.cochrane.org/priority-reviews-0

The list has also been shared with the Cochrane Musculoskeletal, Oral, Sensory and Skin Network.

H2.7 Ensure that priority reviews are promoted on publication using the KT dissemination brief.

> (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019).

We will promote priority topics using the KT dissemination brief as the systematic reviews are published.

H2.8 Provide formal feedback on the results of the priority setting process to the stakeholders that were involved in it.

> (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019).

Feedback is available on Cochrane Oral Health's website, and via the priority setting bulletins. The stakeholders who took part in our panel have been acknowledged and thanked on the website: https://oralhealth.cochrane.org/priority-setting-our-stakeholder-panel

H2.9 The priority-setting exercise should be repeated at regular intervals

It should be repeated according to emerging treatment and intervention options within the Group, Network or Field scope and changing stakeholder needs. At a minimum, the exercise should be repeated within five (5) years (Cochrane Knowledge Translation Working Group on Embedding Prioritisation, 2019).

We will aim to update the priority setting process in 2023, for publication in 2024.

The remainder of this document will present the priority topics established in this priority setting process, alongside the decisions made about them by the Editorial Base Team, at two meetings held in Autumn 2020.

H3: Priority updates

The following titles are reviews previously published by Cochrane Oral Health. They have been prioritised for updating:

Table 28: Priority topics for updating as presented in the implementation plan

Rank	Review title	Decision	Date of last publication
1	Clinical assessment to screen for the detection of oral cavity cancer and potentially malignant disorders in apparently healthy adults	We will aim to publish an update in 2021	2013
2	Periodontal therapy for the management of cardiovascular disease in patients with chronic periodontitis	We will aim to publish an update in 2022/2023	2019
3	Recall intervals for oral health in primary care patients	An update was published 2020, we will make this review stable on The Cochrane Library and re-run the literature search at a later date.	2020
4	Home use of interdental cleaning devices, in addition to toothbrushing, for preventing and controlling periodontal diseases and dental caries	We will aim to publish an update in 2022/2023	2019

5	Water fluoridation for the prevention of dental caries	We will aim to publish an update in 2022/2023	2015
6	Oral hygiene care for critically ill patients to prevent ventilator-associated pneumonia	We will aim to publish an update in 2021/2022	2016
7	Interventions with pregnant women and new mothers for preventing caries in children	We will aim to publish an update in 2022/2023	2019
8	Surgical removal versus retention for the management of asymptomatic disease-free impacted wisdom teeth	Revisit in 2022/2023 – we will run a new literature search and update if there is new evidence.	2020
9	Direct composite resin fillings versus amalgam fillings for permanent or adult posterior teeth	We will aim to publish an update in 2021/2022	2014
10	Primary school-based behavioural interventions for preventing caries	We will aim to publish an update in 2022/2023	2013
11	Oral hygiene interventions for people with intellectual disabilities	We will aim to publish an update in 2022/2023	2019
12	Oral health educational interventions for nursing home staff and residents	We will aim to publish an update in 2022/2023	2016
13	One topical fluoride versus another for preventing dental caries in children and adolescents	We will convene a meeting with the American Dental Association, our Global Evidence Ecosystem for Oral Health partner, to discuss whether we can work with them to reframe this question to make it more clinically relevant.	2004
14	Screening programmes for the early detection and prevention of oral cancer	There is no new evidence to include in this review. We will make it stable on the Cochrane Library.	2013
15	Enamel matrix derivative (Emdogain®) for periodontal tissue regeneration in intrabony defects	We will convene a meeting to get advice from clinical experts in the field of periodontitis, to understand how we might update this review and make it clinically relevant.	2009
16	Treating periodontal disease for preventing adverse birth outcomes in pregnant women	We will aim to publish an update in 2022/2023	2017
17	Antibacterial toothpastes for oral health	This review was previously published as “Triclosan/co-polymer toothpastes for oral health”. However, triclosan has been withdrawn from toothpastes (Versaci, 2019). We will therefore	2013

		broaden the scope of this review to include all antibacterials, and aim to publish by 2023.	
18	Interventions for the treatment of oral and oropharyngeal cancers: surgical treatment	We will aim to publish an update in 2022/2023	2018
19	School dental screening programmes for oral health	Revisit in 2022/2023 – we will run a new literature search and update if there is new evidence.	2019
20	Systemic antibiotics for symptomatic apical periodontitis and acute apical abscess in adults	We will aim to publish an update in 2023	2018
21	Full-mouth treatment modalities (within 24 hours) for chronic periodontitis in adults	We will aim to publish an update in 2022/2023	2015
22	Antibiotics for the prophylaxis of bacterial endocarditis in dentistry	We will aim to publish an update in 2021/2022	2013
23	One-to-one dietary interventions undertaken in a dental setting to change dietary behaviour	We will aim to publish an update in 2023	2012
24	Root coverage procedures for treating localised and multiple recession-type defects	We will convene a meeting to get advice from clinical experts in the field of periodontitis, to understand how we might update this review and make it clinically relevant.	2018
25	Combinations of topical fluoride (toothpastes, mouthrinses, gels, varnishes) versus single topical fluoride for preventing dental caries in children and adolescents	We will convene a meeting with the American Dental Association, our Global Evidence Ecosystem for Oral Health partner, to discuss whether we can work with them to reframe this question to make it more clinically relevant.	2004
26	Autologous platelet concentrates for treating periodontal infrabony defects	We will convene a meeting to get advice from clinical experts in the field of periodontitis, to understand how we might update this review and make it clinically relevant.	2018
27	Pit and fissure sealants versus fluoride varnishes for preventing dental decay in the permanent teeth of children and adolescents	An update was published in 2020, we will revisit with a new literature search at a later date.	2020
28	Sedation of children undergoing dental treatment	We will aim to publish an update in 2022/2023	2018
29	Fluoride toothpastes of different concentrations for preventing dental caries	We will revisit this review with a new literature search in 2023 to see	2019

		if there is enough evidence to update the review.	
30	Topical fluoride (toothpastes, mouthrinses, gels or varnishes) for preventing dental caries in children and adolescents	We will convene a meeting with the American Dental Association, our Global Evidence Ecosystem for Oral Health partner, to discuss whether we can work with them to reframe this question to make it more clinically relevant.	2003

The editorial base team also agreed that the following reviews should be regarded as priorities, as they form a suite with Interventions for the treatment of oral and oropharyngeal cancers: surgical treatment. We also plan to update these reviews within the next 3-5 years:

Table 29: Additional priority reviews as presented in the implementation plan

Review title	Date of last publication
Interventions for the treatment of oral and oropharyngeal cancers: chemotherapy	2011
Interventions for the treatment of oral and oropharyngeal cancers: radiotherapy	2010
Interventions for the treatment of oral and oropharyngeal cancers: targeted therapy and immunotherapy	2015

H4: Dissemination priorities

The following titles are reviews previously published by Cochrane Oral Health. They have been prioritised for dissemination as they are questions which are already supported by high or moderate certainty evidence, and were not ranked by the panel. They may or may not be updated, depending on the topic. If they are not updated, they will be made stable on the Cochrane Library:

Table 30: Priorities for dissemination as presented in the implementation plan

Review title	Decision	Date of last publication
Chlorhexidine mouthrinse as an adjunctive treatment for gingival health	There is unlikely to be new evidence to include in this review that would change the results. We will make it stable on the Cochrane Library.	2017
Fluoride gels for preventing dental caries in children and adolescents	There is unlikely to be new evidence to include in this review that would change the results. We will make it stable on the Cochrane Library.	2015
Fluoride mouthrinses for preventing caries in children and adolescents	There is unlikely to be new evidence to include in this review that would change the results. We will make it stable on the Cochrane Library.	2016
Micro-invasive interventions for managing proximal dental decay in primary and permanent teeth	We will aim to update this review by 2023.	2015
Pit and fissure sealants for preventing dental decay in permanent teeth	We will aim to update this review by 2023.	2017
Powered versus manual toothbrushing for oral health	We will aim to update this review by 2023.	2014
Routine scale and polish for periodontal health in adults	There is unlikely to be new evidence to include in this review that would change the results. We will make it stable on the Cochrane Library.	2018

H5: New priority topic areas

The following priority topic areas were identified as areas where new Cochrane reviews could be published:

Table 31: New priority review topic areas as presented in the implementation plan

Rank	Review title	Decision
1	What are the best ways to prevent tooth decay and oral disease in the elderly?	This is a broad question, and we believe that we have already covered many aspects of this topic. We will develop a special collection for Cochrane Oral Health's website, highlighting the reviews that cover this question, with an accompanying commentary. This will be a pilot project, and will be completed in 2021.

2	How can oral cancer be prevented?	This is a broad question, and we believe that we and other Cochrane review groups have already covered many aspects of this topic. If our pilot project to develop a special collection for on prevention of oral disease in the elderly is a success, we will develop a special collection for Cochrane Oral Health's website on this topic, highlighting the reviews that cover this question.
3	What is the best way to promote better oral health?	This is a broad question, and we believe that we and other Cochrane review groups have already covered many aspects of this topic. If our pilot project to develop a special collection for on prevention of oral disease in the elderly is a success, we will develop a special collection for Cochrane Oral Health's website on this topic, highlighting the reviews that cover this question.
4	What is the best way to measure the risk of tooth decay?	After discussion, we decided that this question is not suitable for a Cochrane review, although it is an important question. It would also overlap work currently being undertaken by the Scottish Dental Clinical Effectiveness Programme, and we do not want to contribute to research waste.
5	At what stage of tooth decay should a dentist use a drill?	This is a broad question, and we believe that we have already covered many aspects of this topic. If our pilot project to develop a special collection for on prevention of oral disease in the elderly is a success, we will develop a special collection for Cochrane Oral Health's website Cochrane Oral Health's website on this topic, highlighting the reviews that cover this question.
6	How should I brush my teeth? For how long, and how often?	We agreed that there was not enough available evidence to warrant separate reviews on these questions. Instead, we will incorporate what little evidence there is in our existing reviews on toothbrushing and toothpaste.
7	What are the best ways to prevent oral diseases in the elderly living in nursing homes or other institutions?	After our pilot project, creating a special collection on prevention of oral disease in the elderly is complete in 2021, we will see if we have gaps in our review portfolio which could be filled by a new review on one or more aspects of this question.
8	By changing parental, or primary care-giver behaviours, can tooth decay in children be prevented?	There is potential for a new title to be registered. We will seek help from experts in the field to scope out a new title.
9	Interventions for managing root caries	This title has already been registered and a review is underway. We aim to publish before 2023.

10	Does a better diet or diet supplements improve oral health? If so what are the best foods/nutrients/supplements?	This is a broad question and there is potential for one or more new titles to be registered. We will advertise this as a priority vacant topic area on our website and in our newsletter.
11	What role does technology play in providing dental care?	This is a very broad topic area and there is potential for one or more new titles to be registered. We agreed that we would like to explore the area of teledentistry in the light of the COVID-19 pandemic. We will look to see if there is funding available to progress a review in this area.
12	Topical silver diamine fluoride for managing dental caries in children and adults	This title has already been registered and a review is underway. We aim to publish before 2023.
13	Psychological interventions for improving adherence to oral hygiene instructions in adults with periodontal diseases	This title has already been registered and a review is underway. We aim to publish before 2023.
14	Adjunctive systemic antimicrobials for the non-surgical treatment of chronic and aggressive periodontitis	This title has already been registered and a review is underway. We aim to publish before 2023.
15	Can taking probiotics (live bacteria and yeasts) prevent and control chronic gum disease (periodontitis)?	We will convene a meeting to get advice from clinical experts in the field of periodontitis, to understand how we might approach this review and make it clinically relevant. There is potential for a new Cochrane review.