

Dental Care for People With Sickle Cell Disease: A Rapid Response Literature Review



Main Points

- A search of the Embase® and PubMed® databases as well as professional society websites identified no primary research studies or systematic reviews that evaluated the effect of dental care on sickle cell disease (SCD) treatment outcomes.
- Three clinical practice guidelines and two reviews with consensus-based recommendations for dental care for SCD patients were identified and reviewed.
- Preventive care and patient education were recommended to minimize the likelihood of oral infections, periodontal disease, and major dental procedures.
- Both reviews recommended that patients' stress and anxiety status be assessed prior to dental treatments. Further, a complete blood count should be evaluated before invasive dental procedures, because SCD patients may be at higher risk for infection.
- No primary research evidence was available to conclude the appropriate timing for SCD patients to receive dental care in order to optimize the effectiveness of SCD treatments.
- A multidisciplinary approach involving close coordination between dental service providers and a hematologist/sickle cell disease specialist was recommended to ensure that SCD patients receive comprehensive treatments.
- All recommendations were aimed at the management of SCD during dental services, not incorporating dental care as a strategy to improve SCD treatment



Background

Sickle cell disease is a group of inherited hematologic disorders that affect approximately 100,000 individuals in the United States.¹ SCD is caused by a genetic mutation that disrupts the normal formation of hemoglobin within red blood cells (RBCs), changing their shape.² This alteration can occlude blood vessels and prevent RBCs from providing oxygen throughout the body. SCD can lead to various complications, including severe pain, infection, acute chest syndrome, stroke, and venous

thromboembolism. Given the extensive implications of SCD on vascular and systemic health, therapeutic measures such as hydroxyurea are commonly employed in its management.³ Hydroxyurea acts by reducing neutrophil proliferation through mild myelosuppression and by increasing fetal hemoglobin (HbF), which is a type of hemoglobin generally present in the fetus and is gradually replaced by adult hemoglobin during the first year of life.⁴ HbF has a higher affinity for oxygen than adult hemoglobin and prevents sickling of the RBCs, and is thus helpful among SCD patients.

SCD patients are at high risk for dental complications due to ischemia of the dental pulp and the enamel.⁵ Some common oral manifestations that may arise are delayed tooth eruption, disorders of enamel, and changes to the superficial cells of the tongue. Ischemic and inflammatory dental issues observed in SCD exhibit distinct and identifiable patterns, affecting the enamel structure, gingiva, and the mandibular and maxillary bones. Nerve compression resulting from inflamed or infarcted bone can give rise to paresthesia. Acute ischemia may manifest as a syndrome of tooth pain unrelated to caries or infections. In response to a heightened erythropoietic drive in SCD, bone marrow expansion can lead to maxillary hyperplasia, resulting in malocclusion. This marrow expansion also contributes to a reduced density of bony trabeculae, manifesting as a stepladder pattern on mandibular radiographs.^{6,7}

Although hydroxyurea has been used to treat SCD for more than 40 years, there is uncertainty as to whether dental care before, during, or after treatment of SCD with hydroxyurea (and other lesser prescribed treatments) influences clinical outcomes in patients. The Centers for Medicare & Medicaid Services (CMS) has partnered with the Agency for Healthcare Research and Quality (AHRQ) to identify dental services that are inextricably linked and substantially related to the clinical success of Medicare-covered medical services for people with SCD. AHRQ has commissioned a rapid response summarizing recent evidence on this topic. This resulting rapid response aims to support CMS in decision making regarding dental services for people with SCD.



Key Questions

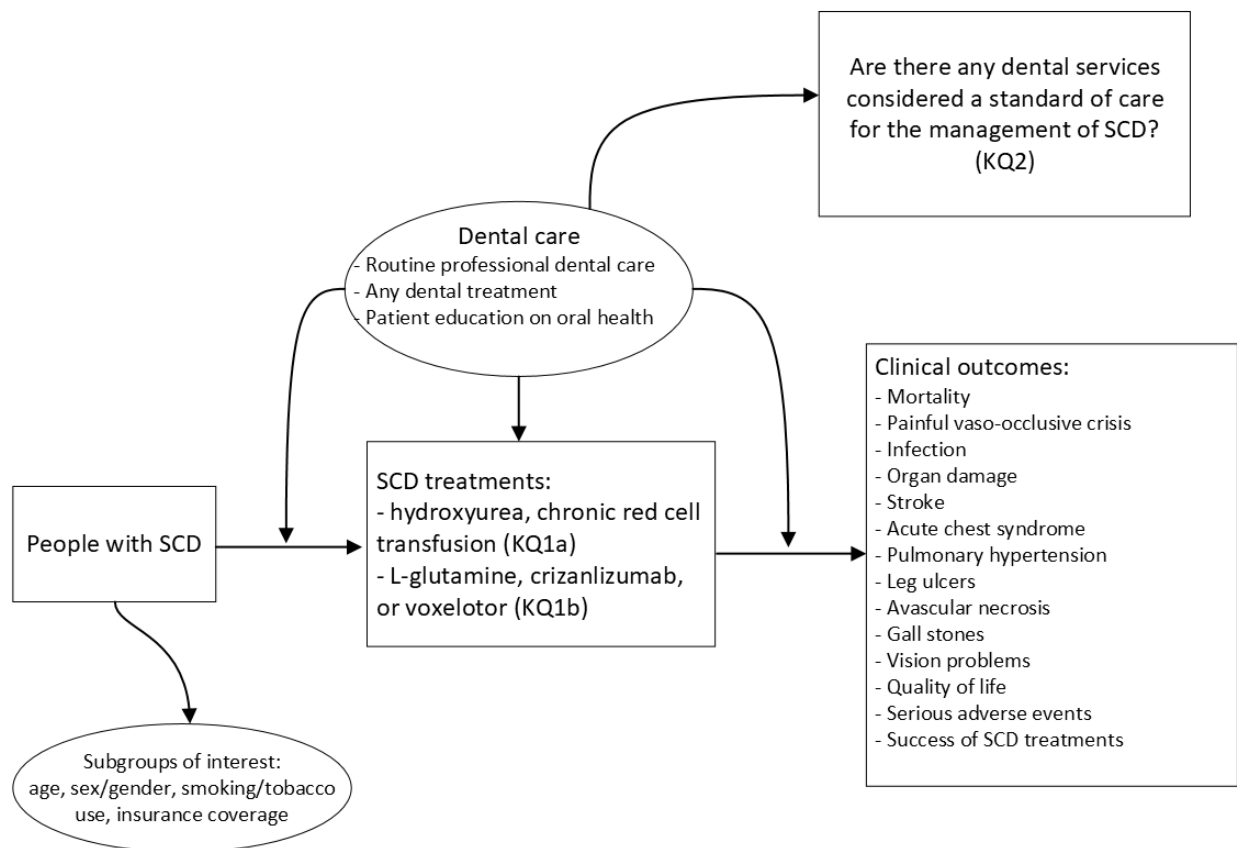
This review was guided by two Key Questions (KQs), which are illustrated in the analytic framework (Figure 1).

KQ1: For people with SCD who undergo treatment for SCD, does dental care before, during, or after treatment of SCD improve clinical outcomes?

- a. Does dental care before, during, or after treatment of SCD with hydroxyurea or chronic red cell transfusion improve clinical outcomes?
- b. Does dental care before, during, or after treatment of SCD with L-glutamine, crizanlizumab, or voxelotor improve clinical outcomes?

KQ2: Are there any dental services considered a standard of care for the management of SCD?

Figure 1. Analytic framework



KQ = Key Question; SCD = sickle cell disease



Methods

This rapid response on dental care for people with SCD followed established best methods used in systematic review (SR) research, while allowing for modifications to meet rapid response project timeframes.⁸⁻¹⁰

Literature Search

A medical research librarian developed a comprehensive search strategy to search PubMed® and Embase® for SRs, randomized controlled trials, controlled observational studies, and clinical practice guidelines. The search strategies used in PubMed and Embase are outlined in Appendix A (Tables A-1 to A-4). The search was limited to English-language publications from 1967 to the present. We chose 1967 based on the use of hydroxyurea as the treatment for SCD. Our review of the search results focused on identifying primary research studies, SRs, and clinical guidelines published by professional societies. We also scanned the reference lists of all included studies.

The medical research librarian also conducted a grey literature search in relevant stakeholder organizations (e.g., Sickle Cell Disease Association of America, National Alliance of Sickle Cell Centers, American Society of Hematology); government and nonprofit agencies (e.g., Centers for Disease Control and Prevention, National Institutes of Health, World Health Organization); clinical trial

registries (e.g., ClinicalTrials.gov); and other sources identified by the clinical subject matter expert. The search strategies used in the grey literature search are outlined in Appendix A (Table A-5).

Study Selection

Study eligibility was based on the population, intervention, comparator, outcome(s), timing, and setting (PICOTS) criteria, as depicted in Table 1. Study selection was done in a two-step process. In the first step, titles and abstracts of all citations retrieved from literature searches were screened by a single reviewer. In the second step, full texts of the abstracts that were categorized as relevant or potentially relevant were retrieved and reviewed. Exclusion reasons were documented at the full-text level. All screening was done in DistillerSR to maximize efficiency, and EndNote was used to track citations. The scientific lead conducted a final review to confirm inclusions and exclusions.

Table 1. Study eligibility criteria

Category	Inclusion Criteria	Exclusion Criteria
Population	Pediatric and adult patients with SCD (Subgroups of interest: age, sex/gender, smoking/tobacco use, insurance coverage)	None
Intervention	Dental services before, during, or after treatment for SCD: <ul style="list-style-type: none"> • Routine professional dental care (exam/cleaning) • Any dental treatment • Patient education on oral health 	Interventions other than professional dental services
Comparison	No dental services before, during, or after treatment for SCD	Studies were excluded if they did not report any of the specified comparators.
Outcomes	<ul style="list-style-type: none"> • Mortality • Painful vaso-occlusive crisis • Infection • Organ damage • Stroke • Acute chest syndrome • Pulmonary hypertension • Leg ulcers • Avascular necrosis • Gall stones • Vision problems • Quality of life • Serious adverse events • Success of SCD treatments 	<p>Studies were excluded if they did not report any of the specified outcomes.</p> <p>Dental health outcomes and dental procedure outcomes were excluded.</p>
Timing	Before, during, or after treatment for SCD	None
Setting	United States, Canada, Europe, Australia, New Zealand	Countries not listed in the inclusion list
Study Design	<ul style="list-style-type: none"> • SRs/MAs • RCTs • Controlled observational studies • Clinical practice guidelines 	<ul style="list-style-type: none"> • Noncontrolled observational studies • Laboratory studies • Animal studies • Nonclinical publications
Language	English language publications	Non-English language publications
Publication Dates	1967–November 2023 for RCTs and controlled observational studies 2003–23 for SRs/MAs and clinical practice guidelines	Prior to 1967 for RCTs and controlled observational studies Prior to 2013 for SRs/MAs and clinical practice guidelines

Abbreviations: MA: Meta-analyses; SCD: Sickle Cell Disease; RCT: Randomized controlled trials; SR: Systematic review

Data Extraction

Data were extracted into Word tables. For each included primary study, the following information were included:

- General study characteristics: author, year of publication, objective, country
- Study design: study design, study dates, sample size, followup duration, setting
- Study population characteristics: age, gender/sex, smoking/tobacco use, comorbidities, SCD treatment received (hydroxyurea, chronic red cell transfusion, L-glutamine, crizanlizumab, voxelotor)

- Intervention: dental services including routine professional dental care (exam/cleaning), any dental treatment, any patient education on oral health by a dentist or dental professional, timing of dental services
- Outcomes of interest: mortality, painful vaso-occlusive crisis, infection, organ damage, stroke, acute chest syndrome, pulmonary hypertension, leg ulcers, avascular necrosis, gall stones, vision problems, quality of life, serious adverse events, and success of SCD treatment

For each included SR, we extracted the date ranges of the literature search, the primary conclusions, and any strength of evidence assessment that was performed.

Quality Assessment

Methodological quality of included primary studies was assessed using United States Preventive Services Task Force (USPSTF) criteria.¹¹ This assessment instrument is widely recognized, easy to apply, and readily understandable for diverse stakeholder groups.

Data Synthesis

A Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram was developed to illustrate the number of studies involved in the literature search and each step of the study selection process.¹² Data were compiled into evidence tables and synthesized narratively and visually, whenever appropriate. We highlighted any gaps in evidence, with attention given to direct comparisons between receipt of dental care and SCD treatment success. We did not conduct meta-analysis nor perform GRADE (Grading of Recommendations, Assessment, Development, and Evaluations) Strength of the Evidence Base assessment. The clinical subject matter expert reviewed the final report to ensure accurate clinical contextualization of any findings.

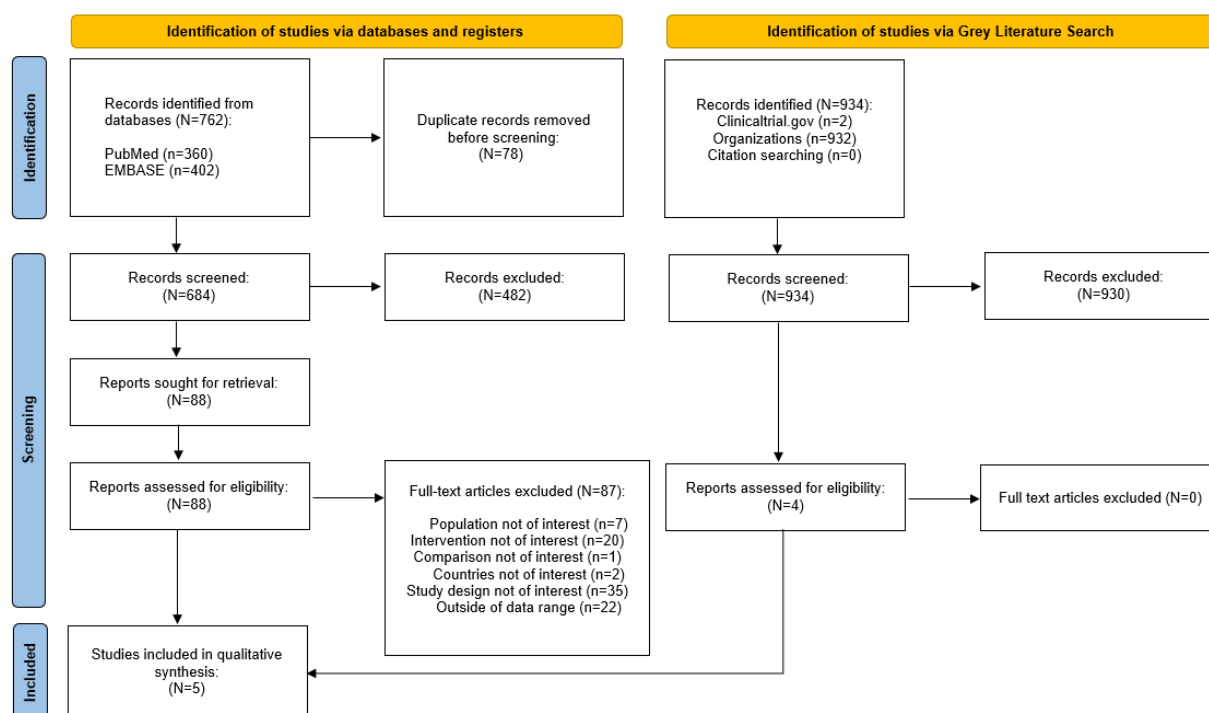


Results

Literature Search

Figure 2 presents the PRISMA flow diagram summarizing the results of the literature search. An electronic database search was conducted on November 30, 2023. A total of 762 citations were found in the database search. Among them, 78 were identified as duplicates and were excluded. After de-duplication, 684 titles and abstracts were screened for eligibility; 482 abstracts were excluded. Of the 88 full-text articles retrieved and reviewed for eligibility, 87 articles were excluded: 7 had irrelevant study population, 20 had intervention not of interest, 1 study was excluded since the comparison not of interest, 2 were conducted outside of the geographic region of interest, 35 had study design not of interest, and 22 were conducted outside of the date range. A list of references excluded at the full-text level along with their reasons for exclusion is available in Appendix D. Supplementary grey literature searches identified 934 records, of which 4 were assessed to be relevant records. Thus, a total of 5 unique publications were included, extracted, and evaluated in this rapid response.

Figure 2. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram



Key Question 1: Does Dental Care Before, During, or After Treatment of SCD Improve Clinical Outcomes?

Our review did not identify any primary studies that evaluated whether dental services before, after, or during SCD treatment affect clinical outcomes. No data synthesis regarding the dental management of SCD patients can be performed due to the lack of available literature at this time.

Key Question 2: Are There Any Dental Services Considered a Standard of Care for the Management of SCD?

Our review identified three clinical practice guidelines and two reviews with recommendations for dental care for SCD patients. Information from the practice guidelines and the reviews with recommendations are available in Appendix B and Appendix C, respectively.

Practice Guidelines

Of the three clinical practice guidelines, one focused on dental care,¹³ and two addressed overall management of SCD, with a section or brief mention of dental care.^{14,15} The Sickle Cell Society, based in the UK, issued standards of care that emphasized the importance of preventive dental care as well as patient education on the potential dental and orofacial manifestations of SCD.¹⁴ In addition, coordination between dental service providers and a hematologist was recommended, and procedures that require

anesthesia should be performed in a hospital dental department with a hematology team. In the SCD management guideline published by the National Heart, Lung, and Blood Institute, based in the United States, the sole recommendation was that children with SCD should receive fluoride supplements if they do not have fluoride in their water.¹⁵ The American Academy of Pediatric Dentistry included children with SCD in a dental management guideline for children with special health care needs.¹³ This guideline covered topics such as basic oral care, psychosocial support for children with special health needs and their families, and preventive and therapeutic approaches to dental care.¹³ However, there was no recommendation specific to children with SCD.

None of the clinical practice guidelines addressed the link between dental care and SCD treatments. All guidelines appeared to have been consensus based and developed by expert panels, and none of the three guidelines rated the strength of the evidence for each recommendation. Overall, the guidelines emphasized preventive care and the importance of regular dental care. Detailed recommendations provided by these three clinical practice guidelines are available in Appendix B.

Reviews With Recommendations

Both reviews with recommendations for dental care for SCD patients were authored by dental professionals.^{16,17} Both reviews advocated for preventive measures, including routine dental checkups, regular dental cleaning, and oral hygiene education. Furthermore, both publications recognized the need for stress/anxiety management and the importance of infection management, restorative management, and orthodontic management among SCD patients.

Kakkar et al. published a scoping review of dental management and presented recommendations and strategies for dental professionals who provide dental services to SCD patients.¹⁷ These recommendations covered six areas of dental management: early intervention, strategies to manage dental anxiety, restorative management, dental implants, orthodontic management, and infection management. Preventive dental therapy is vital to minimize the likelihood of various oral infections. Routine dental visits with oral health screening every 6 months are recommended. Regarding dental anxiety management, it is recommended that evaluation of anxiety be performed during the initial dental visit. Pharmacological and nonpharmacological pain management strategies may be advised. It is important to maintain a multidisciplinary and collaborative approach to healthcare management. It is crucial to prevent complications during dental implants. The treatment plan should include complete blood count and radiographs prior to surgery. Blood transfusion before or after the surgery may be necessary and should be performed in a hospital-based setting.¹⁷

Kawar et al. summarized oral management considerations for SCD patients.¹⁶ The review noted the absence of evidence-based clinical guidelines and insufficient information concerning the management of dental complications in SCD patients. In addition, Kawar et al. stated that the deficiency in guidelines may lead to inadequate treatment for SCD patients, as dental providers may lack knowledge about anticipated complications, appropriate management strategies, and necessary treatment modifications to address the oral health needs of these patients. Moreover, the importance of working closely together with dentists, hematologists and SCD clinics is emphasized. Highly anxious patients or patients with extensive multiple dental procedures requiring general anesthesia should be referred to a hospital. Further, antibiotic prophylaxis is recommended for invasive dental and major oral surgical procedures. Kawar et al. recommended that only acute infections or trauma should be treated during a sickle cell crisis, and definitive treatments should be postponed until the patient is in a noncrisis state.



Discussion

This rapid response sought to identify available evidence that informed the potential effect of dental care on SCD treatment outcomes and to review standards of practice for dental care in this patient population.

While we identified no studies that examined the impact of dental care on SCD treatment outcomes, our review identified three relevant clinical practice guidelines and two reviews with recommendations for dental care for patients with SCD. People with SCD are at a heightened risk of various dental complications, such as aseptic pulp necrosis and mucosal damage due to anemia, as well as caries and enamel erosion.⁶ All three guidelines and two reviews emphasized the importance of preventive dental measures. In addition, the Sickie Cell Society in the UK recommended that the dental care team include a hematologist for people with SCD. However, all guidelines were aimed at the management of SCD during dental services, not incorporating dental care as a strategy to improve SCD treatment outcomes.

The two reviews with recommendations share several agreed-on areas of dental management for SCD patients. Both reviews stressed the importance of preventive dental care to minimize the likelihood of oral infections, periodontal diseases, and major dental procedures. Both reviews recommended that patients' stress and anxiety status be assessed prior to dental treatments. Further, a complete blood count should be evaluated before invasive dental procedures, because SCD patients may be at higher risk for infection.^{16,17}

We identified another scoping review, by Hsu et al., that included countries outside of our geographic region of interest, and therefore we did not include this publication in our review. Hsu et al. did not identify any clinical trials related to dental treatment for SCD, but found international guidelines emphasizing that proper oral care and health involve early intervention and preventive measures, ensuring stable and long-term success in dental treatment.⁶ In addition to proper oral care, dentists should tailor treatment approaches based on the patient's hematological status and patient needs, and collaboration among dentists, hematologists/sickle cell disease specialists, and SCD clinics is crucial for overall management. Educational efforts aimed at patients and families are essential, emphasizing the significance of oral health and preventive care. Understanding the link between oral and systemic health in SCD should guide treatment decisions.

Our findings highlighted the gaps in the existing literature regarding the management of oral healthcare for individuals with SCD. While some studies have touched upon specific aspects of dental care, such as early intervention and the importance of collaboration between dentists and hematologists, a notable lack of comprehensive guidance and evidence-based protocols for addressing the diverse oral health needs of SCD patients remains. Future research is needed to further enhance our understanding of the challenges and opportunities in managing oral health within the context of SCD.



Conclusions

The body of evidence evaluating dental services before, during, or after the treatment of SCD is lacking in primary clinical data and is limited to available clinical practice guidelines and reviews with recommendations. Existing clinical guidelines advocated for preventive dental care, with the UK Sickie Cell Society recommending hematologist involvement in dental care teams for SCD patients. Our findings revealed the need for comprehensive guidance and evidence-based protocols to address diverse oral health

needs in SCD. Collaborative efforts among dentists, hematologists/sickle cell disease specialists, and SCD clinics are crucial, emphasizing the interdisciplinary approach's potential for better outcomes and improved patient care. Despite the lack of primary evidence that informed the potential effect of dental care on SCD treatment outcomes, all included guidelines advocated for access to dental services and the inclusion of dental care as part of a multidisciplinary approach to SCD management.



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This Rapid Response was prepared by the AHRQ Evidence-based Practice Center (EPC) Program using streamlined literature review methods to assist end-users in making specific decisions in a limited timeframe. To shorten timelines, reviewers made strategic choices about which processes to abridge compared to a comprehensive systematic review. The adaptations made for expediency may limit the certainty and generalizability of the findings from the review.

None of the investigators have any affiliations or financial involvement that conflicts with the material presented in this report.

The information in this report is intended to help healthcare decision makers—patients and clinicians, health system leaders, and policymakers, among others—make well-informed decisions and thereby improve the quality of healthcare services. This report is not intended to be a substitute for the application of clinical judgment. Anyone who makes decisions concerning the provision of clinical care should consider this report in the same way as any medical reference and in conjunction with all other pertinent information, i.e., in the context of available resources and circumstances presented by individual patients.

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Afterword

Recognized for excellence in conducting comprehensive systematic reviews, the Agency for Healthcare Research and Quality (AHRQ) is expanding its portfolio to include rapid evidence products. The program has begun to develop a range of rapid evidence products to assist end-users in making specific decisions in a limited timeframe.

To shorten timelines, reviewers must make strategic choices about which processes to abridge. Common adaptations include: narrowly focusing questions, limiting the number of databases searched and/or modifying search strategies, using a single reviewer and/or abstractor with a second to provide verification, and restricting to studies published in the English language. However, these adaptations may limit the certainty and generalizability of the review findings, particularly in areas with a large literature base. Transparent reporting of the methods used, the resulting limitations of the evidence synthesis, and the quality of included studies is extremely important. While tradeoffs will likely differ for each topic, they are described so readers can adjudicate the limitations of the findings of the review.

AHRQ expects that these rapid evidence products will be helpful to health plans, providers, purchasers, government programs, and the health care system as a whole. Transparency and stakeholder input are essential to AHRQ.

If you have comments on this report, they may be sent by mail to the Task Order Officer named below at: Agency for Healthcare Research and Quality, 5600 Fishers Lane, Rockville, MD 20857, or by email to epc@ahrq.hhs.gov.

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Appendix A. Search Strategies

The International Consulting Associates, Inc., Medical Librarian conducted searches of the peer-reviewed and grey literature, following established systematic review protocols. Searches were conducted of the following biomedical databases: MEDLINE (PubMed interface) and Embase for practice guidelines, systematic reviews, randomized controlled trials and practice guidelines. The search strategies used a combination of medical subject headings (i.e., controlled vocabularies) and keywords, and were written in the syntax of each database. The search strategies used terms for the intervention and condition as well as Boolean operators. All search results were limited to the English language and human species. Searches were restricted to the date range of 1967 to 2023 for RCTs and controlled observational studies and 2013 to 2023 for SRs and clinical practice guidelines. This was done to ensure the literature was relevant to current trends.

Tables A-1 to A-5 depict the search strategies and report results for searches in databases before deduplication.

Table A-1. PubMed search history on November 30, 2023

Search Number	Query	Results
1	"Dental Prophylaxis"[Mesh] OR "Periodontal Diseases"[Mesh:NoExp] OR "dental assess"[Title/Abstract:~3] OR "dental assessment"[Title/Abstract:~3] OR "dental assessments"[Title/Abstract:~3] OR "dental care"[Title/Abstract:~3] OR "dental consult"[Title/Abstract:~3] OR "dental consults"[Title/Abstract:~3] OR "dental consultation"[Title/Abstract:~3] OR "dental consultations"[Title/Abstract:~3] OR "dental evaluate"[Title/Abstract:~3] OR "dental evaluates"[Title/Abstract:~3] OR "dental evaluation"[Title/Abstract:~3] OR "dental evaluations"[Title/Abstract:~3] OR "dental foci"[Title/Abstract:~3] OR "dental focus"[Title/Abstract:~3] OR "dental health"[Title/Abstract:~3] OR "dental infection"[Title/Abstract:~3] OR "dental infections"[Title/Abstract:~3] OR "dental disease"[Title/Abstract:~3] OR "dental diseases"[Title/Abstract:~3] OR "dental inflammatory"[Title/Abstract:~3] OR "dental inflammation"[Title/Abstract:~3] OR "dental inflammations"[Title/Abstract:~3] OR "dental management"[Title/Abstract:~3] OR "dental screen"[Title/Abstract:~3] OR "dental screens"[Title/Abstract:~3] OR "dental screening"[Title/Abstract:~3] OR "dental screenings"[Title/Abstract:~3] OR "dental treat"[Title/Abstract:~3] OR "dental treats"[Title/Abstract:~3] OR "dental treatment"[Title/Abstract:~3] OR "dental treatments"[Title/Abstract:~3] OR "dental treating"[Title/Abstract:~3] OR "dental caries"[Title/Abstract:~3] OR "dental cavity"[Title/Abstract:~3] OR "dental cavities"[Title/Abstract:~3] OR "dental caries"[Title/Abstract:~3] OR "dental extracted"[Title/Abstract:~3] OR "dental extraction"[Title/Abstract:~3] OR "dental extractions"[Title/Abstract:~3] OR "dental prophylaxis"[Title/Abstract:~3] OR "dental prophylaxes"[Title/Abstract:~3] OR "dental prophylactic"[Title/Abstract:~3] OR "oral assess"[Title/Abstract:~3] OR "oral assessment"[Title/Abstract:~3] OR "oral assessments"[Title/Abstract:~3] OR "oral care"[Title/Abstract:~3] OR "oral consult"[Title/Abstract:~3] OR "oral consults"[Title/Abstract:~3] OR "oral consultation"[Title/Abstract:~3] OR "oral consultations"[Title/Abstract:~3] OR "oral evaluate"[Title/Abstract:~3] OR "oral evaluates"[Title/Abstract:~3] OR "oral evaluation"[Title/Abstract:~3] OR "oral evaluations"[Title/Abstract:~3] OR "oral foci"[Title/Abstract:~3] OR "oral focus"[Title/Abstract:~3] OR "oral health"[Title/Abstract:~3] OR "oral infection"[Title/Abstract:~3] OR "oral infections"[Title/Abstract:~3] OR "oral disease"[Title/Abstract:~3] OR "oral diseases"[Title/Abstract:~3] OR "oral inflammatory"[Title/Abstract:~3] OR "oral inflammation"[Title/Abstract:~3] OR "oral inflammations"[Title/Abstract:~3] OR "oral management"[Title/Abstract:~3] OR "oral screen"[Title/Abstract:~3] OR "oral screens"[Title/Abstract:~3] OR "oral screening"[Title/Abstract:~3] OR "oral screenings"[Title/Abstract:~3] OR "oral treat"[Title/Abstract:~3] OR "oral treats"[Title/Abstract:~3] OR "oral	558,697

Search Number	Query	Results
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2	<p>"Anemia, Sick Cell"[Mesh:NoExp] OR "Hemoglobin SC Disease"[Mesh:NoExp] OR "Sickle Cell Trait"[Mesh:NoExp] OR "drepanocytomia"[Title/Abstract] OR "drepanocytosis"[Title/Abstract] OR "haemoglobin SS"[Title/Abstract] OR "hemoglobin SS"[Title/Abstract] OR "meniscocytosis"[Title/Abstract] OR "haemoglobin SC"[Title/Abstract] OR "haemoglobin SD"[Title/Abstract] OR "hemoglobin SD"[Title/Abstract]</p>	25,842
3	<p>"Sickle Cell Anemia"[Title/Abstract:~3] OR "microdrepanocytic Anemia"[Title/Abstract:~3] OR "hemoglobin SD Anemia"[Title/Abstract:~3] OR "sickle cell hemoglobin D Anemia"[Title/Abstract:~3] OR "sickle cell Hb D Anemia"[Title/Abstract:~3] OR "sickle cell haemoglobin D Anemia"[Title/Abstract:~3] OR "Hb SD Anemia"[Title/Abstract:~3] OR "haemoglobin SD Anemia"[Title/Abstract:~3] OR "sickle hemoglobin C Anemia"[Title/Abstract:~3] OR "sickle haemoglobin C Anemia"[Title/Abstract:~3] OR "sickle cell hemoglobin C Anemia"[Title/Abstract:~3] OR "sickle cell Hb C Anemia"[Title/Abstract:~3] OR "sickle cell haemoglobin C Anemia"[Title/Abstract:~3] OR "Hb SC Anemia"[Title/Abstract:~3] OR "hb s c Anemia"[Title/Abstract:~3] OR "haemoglobin SC Anemia"[Title/Abstract:~3] OR "hemoglobin s c Anemia"[Title/Abstract:~3] OR "haemoglobin s c Anemia"[Title/Abstract:~3] OR "SS Anemia"[Title/Abstract:~3] OR "sickle Anemia"[Title/Abstract:~3] OR "Sickle Cell Hemoglobin C Anemia"[Title/Abstract:~3] OR "homozygous sickle cell Anemia"[Title/Abstract:~3] OR "Hb SS Anemia"[Title/Abstract:~3] OR "hemoglobin SS Anemia"[Title/Abstract:~3] OR "haemoglobin SS Anemia"[Title/Abstract:~3] OR "drepanocytic Anemia"[Title/Abstract:~3] OR "sc Anemia"[Title/Abstract:~3] OR "sickling Anemia"[Title/Abstract:~3] OR "hemoglobin S Anemia"[Title/Abstract:~3] OR "haemoglobin S Anemia"[Title/Abstract:~3] OR "HbS Anemia"[Title/Abstract:~3] OR</p>	28,885

Search Number	Query	Results
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Search Number	Query	Results
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Search Number	Query	Results
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4	"Sickle Cell Trait"[Title/Abstract:~3] OR "microdrepanocytic Trait"[Title/Abstract:~3] OR "hemoglobin SD Trait"[Title/Abstract:~3] OR "sickle cell hemoglobin D Trait"[Title/Abstract:~3] OR "sickle cell Hb D Trait"[Title/Abstract:~3] OR "sickle cell haemoglobin D Trait"[Title/Abstract:~3] OR "Hb SD Trait"[Title/Abstract:~3] OR "haemoglobin SD Trait"[Title/Abstract:~3] OR "sickle hemoglobin C Trait"[Title/Abstract:~3] OR "sickle haemoglobin C Trait"[Title/Abstract:~3] OR "sickle cell hemoglobin C Trait"[Title/Abstract:~3] OR "sickle cell Hb C Trait"[Title/Abstract:~3] OR "sickle cell haemoglobin C Trait"[Title/Abstract:~3] OR "Hb SC Trait"[Title/Abstract:~3] OR "hb s c Trait"[Title/Abstract:~3] OR "haemoglobin SC Trait"[Title/Abstract:~3] OR "hemoglobin s c Trait"[Title/Abstract:~3] OR "haemoglobin s c Trait"[Title/Abstract:~3] OR "SS Trait"[Title/Abstract:~3] OR "sickle Trait"[Title/Abstract:~3] OR "Sickle Cell Hemoglobin C Trait"[Title/Abstract:~3] OR "homozygous sickle cell Trait"[Title/Abstract:~3] OR "Hb SS Trait"[Title/Abstract:~3] OR "hemoglobin SS Trait"[Title/Abstract:~3] OR "haemoglobin SS Trait"[Title/Abstract:~3] OR "drepanocytic Trait"[Title/Abstract:~3] OR "sc Trait"[Title/Abstract:~3] OR "sickling Trait"[Title/Abstract:~3] OR "hemoglobin S Trait"[Title/Abstract:~3] OR "haemoglobin S Trait"[Title/Abstract:~3] OR "HbS Trait"[Title/Abstract:~3] OR "Hemoglobin SC Trait"[Title/Abstract:~3] OR "Haemoglobin SC Trait"[Title/Abstract:~3] OR "Sickle Cell Traits"[Title/Abstract:~3] OR "microdrepanocytic Traits"[Title/Abstract:~3] OR "hemoglobin SD Traits"[Title/Abstract:~3] OR "sickle cell hemoglobin D Traits"[Title/Abstract:~3] OR "sickle cell Hb D Traits"[Title/Abstract:~3] OR "sickle cell haemoglobin D Traits"[Title/Abstract:~3] OR "Hb SD Traits"[Title/Abstract:~3] OR "haemoglobin SD Traits"[Title/Abstract:~3] OR "sickle hemoglobin C Traits"[Title/Abstract:~3] OR "sickle haemoglobin C Traits"[Title/Abstract:~3] OR "sickle cell hemoglobin C Traits"[Title/Abstract:~3] OR "sickle cell Hb C Traits"[Title/Abstract:~3] OR "sickle cell haemoglobin C Traits"[Title/Abstract:~3] OR "Hb SC Traits"[Title/Abstract:~3] OR "hb s c Traits"[Title/Abstract:~3] OR "haemoglobin SC Traits"[Title/Abstract:~3] OR "hemoglobin s c Traits"[Title/Abstract:~3] OR "haemoglobin s c Traits"[Title/Abstract:~3] OR "SS Traits"[Title/Abstract:~3] OR "sickle Traits"[Title/Abstract:~3] OR "Sickle Cell Hemoglobin C Traits"[Title/Abstract:~3] OR "homozygous sickle cell Traits"[Title/Abstract:~3] OR "Hb SS Traits"[Title/Abstract:~3] OR "hemoglobin SS Traits"[Title/Abstract:~3] OR "haemoglobin SS Traits"[Title/Abstract:~3] OR "drepanocytic Traits"[Title/Abstract:~3] OR "sc Traits"[Title/Abstract:~3] OR "sickling Traits"[Title/Abstract:~3] OR "hemoglobin S Traits"[Title/Abstract:~3] OR "haemoglobin S Traits"[Title/Abstract:~3] OR "HbS Traits"[Title/Abstract:~3] OR "Hemoglobin SC Traits"[Title/Abstract:~3] OR "Haemoglobin SC Traits"[Title/Abstract:~3] OR "Sickle Cell thalassaemia"[Title/Abstract:~3] OR "microdrepanocytic thalassaemia"[Title/Abstract:~3] OR "hemoglobin SD thalassaemia"[Title/Abstract:~3] OR "sickle cell hemoglobin D thalassaemia"[Title/Abstract:~3] OR "sickle cell Hb D thalassaemia"[Title/Abstract:~3] OR "sickle cell haemoglobin D thalassaemia"[Title/Abstract:~3] OR "Hb SD thalassaemia"[Title/Abstract:~3] OR "haemoglobin SD thalassaemia"[Title/Abstract:~3] OR	5,473

Search Number	Query	Results
	"sickle hemoglobin C thalassaemia"[Title/Abstract:~3] OR "sickle haemoglobin C thalassaemia"[Title/Abstract:~3] OR "sickle cell hemoglobin C thalassaemia"[Title/Abstract:~3] OR "sickle cell Hb C thalassaemia"[Title/Abstract:~3] OR "sickle cell haemoglobin C thalassaemia"[Title/Abstract:~3] OR "hb s c thalassaemia"[Title/Abstract:~3] OR "haemoglobin SC thalassaemia"[Title/Abstract:~3] OR "hemoglobin s c thalassaemia"[Title/Abstract:~3] OR "haemoglobin s c thalassaemia"[Title/Abstract:~3] OR "SS thalassaemia"[Title/Abstract:~3] OR "sickle thalassaemia"[Title/Abstract:~3] OR "Sickle Cell Hemoglobin C thalassaemia"[Title/Abstract:~3] OR "homozygous sickle cell thalassaemia"[Title/Abstract:~3] OR "Hb SS thalassaemia"[Title/Abstract:~3] OR "hemoglobin SS thalassaemia"[Title/Abstract:~3] OR "haemoglobin SS thalassaemia"[Title/Abstract:~3] OR "drepanocytic thalassaemia"[Title/Abstract:~3] OR "sc thalassaemia"[Title/Abstract:~3] OR "sickling thalassaemia"[Title/Abstract:~3] OR "hemoglobin S thalassaemia"[Title/Abstract:~3] OR "haemoglobin S thalassaemia"[Title/Abstract:~3] OR "HbS thalassaemia"[Title/Abstract:~3] OR "Hemoglobin SC thalassaemia"[Title/Abstract:~3] OR "Haemoglobin SC thalassaemia"[Title/Abstract:~3] OR "Sickle Cell thalassemia"[Title/Abstract:~3] OR "microdrepanocytic thalassemia"[Title/Abstract:~3] OR "hemoglobin SD thalassemia"[Title/Abstract:~3] OR "sickle cell hemoglobin D thalassemia"[Title/Abstract:~3] OR "sickle cell Hb D thalassemia"[Title/Abstract:~3] OR "sickle cell haemoglobin D thalassemia"[Title/Abstract:~3] OR "Hb SD thalassemia"[Title/Abstract:~3] OR "haemoglobin SD thalassemia"[Title/Abstract:~3] OR "sickle hemoglobin C thalassemia"[Title/Abstract:~3] OR "sickle haemoglobin C thalassemia"[Title/Abstract:~3] OR "sickle cell hemoglobin C thalassemia"[Title/Abstract:~3] OR "sickle cell Hb C thalassemia"[Title/Abstract:~3] OR "sickle cell haemoglobin C thalassemia"[Title/Abstract:~3] OR "Hb SC thalassemia"[Title/Abstract:~3] OR "hb s c thalassemia"[Title/Abstract:~3] OR "haemoglobin SC thalassemia"[Title/Abstract:~3] OR "hemoglobin s c thalassemia"[Title/Abstract:~3] OR "haemoglobin s c thalassemia"[Title/Abstract:~3] OR "SS thalassemia"[Title/Abstract:~3] OR "sickle thalassemia"[Title/Abstract:~3] OR "Sickle Cell Hemoglobin C thalassemia"[Title/Abstract:~3] OR "homozygous sickle cell thalassemia"[Title/Abstract:~3] OR "Hb SS thalassemia"[Title/Abstract:~3] OR "hemoglobin SS thalassemia"[Title/Abstract:~3] OR "haemoglobin SS thalassemia"[Title/Abstract:~3] OR "drepanocytic thalassemia"[Title/Abstract:~3] OR "sc thalassemia"[Title/Abstract:~3] OR "sickling thalassemia"[Title/Abstract:~3] OR "hemoglobin S thalassemia"[Title/Abstract:~3] OR "haemoglobin S thalassemia"[Title/Abstract:~3] OR "HbS thalassemia"[Title/Abstract:~3] OR "Hemoglobin SC thalassemia"[Title/Abstract:~3] OR "Haemoglobin SC thalassemia"[Title/Abstract:~3]	
5	#2 OR #3 OR #4	35,857
6	#1 AND #5	392
7	English[language]	31,564,707
8	#6 AND #7	372
9	((("Animals"[MESH] OR "Animal Experimentation"[MESH] OR "Models, Animal"[MESH] OR "Vertebrates"[MESH]) NOT ("Humans"[MESH] OR "Human experimentation"[MESH]))	5,165,346
10	#8 NOT #9	360

Table A-2. PubMed field tag key

PubMed Field Tag	Description
[Mesh]	Includes all MeSH terms found below the term in the MeSH hierarchy
[Mesh:NoExp]	Does NOT include MeSH terms found below the term in the MeSH hierarchy
[Title/Abstract]	Searches the title and abstracts of the bibliographic record
[Title/Abstract:~N]	PubMed proximity search operator where N=the maximum number of words appearing between the search terms

Table A-3. Embase search history on November 30, 2023

Search Number	Query	Results
#1	'sickle cell anemia'/de OR 'hemoglobin sc disease'/de OR 'hemoglobin sd disease'/de OR 'sickle cell beta thalassemia'/de OR 'sickle cell trait'/de	48288
#2	((haemoglobin OR hemoglobin) NEAR/1 (ss OR sc OR sd)) OR drepanocytemia:ab,ti,kw OR drepanocytosis:ab,ti,kw OR meniscocytosis:ab,ti,kw	2347
#3	('sickle cell' OR microdrepanocytic OR 'sickle cell hb d' OR 'hb sd' OR 'sickle cell hb c' OR 'hb sc' OR 'hb s c' OR ss OR sickle OR 'homozygous sickle cell' OR 'hb ss' OR drepanocytic OR sc OR sickling OR hbs OR 'haemoglobin sd' OR 'hemoglobin sd' OR 'sickle cell haemoglobin d' OR 'sickle cell hemoglobin d' OR 'sickle haemoglobin c' OR 'sickle hemoglobin c' OR 'sickle cell haemoglobin c' OR 'sickle cell hemoglobin c' OR 'haemoglobin sc' OR 'hemoglobin sc' OR 'haemoglobin s c' OR 'hemoglobin s c' OR 'sickle cell haemoglobin c' OR 'sickle cell hemoglobin c' OR 'haemoglobin ss' OR 'hemoglobin ss' OR 'haemoglobin s' OR 'hemoglobin s' OR 'haemoglobin sc' OR 'hemoglobin sc') NEAR/3 (an*emia* OR disorder* OR disease* OR trait* OR thalass*emia)	56419
#4	#1 OR #2 OR #3	56710
#5	'dental procedure'/exp OR 'dental procedure' OR 'dental prevention'/exp OR 'dental prevention' OR 'tooth disease'/exp OR 'tooth disease' OR 'periodontal disease'/exp OR 'periodontal disease' OR 'dental health'/exp OR 'dental health' OR 'dental examination'/exp OR 'dental examination'	480615
#6	dentistry:ab,ti,kw OR ((dental OR tooth OR teeth OR oral) NEAR/2 (care OR caries OR esthetics OR aesthetics OR health OR service* OR technique* OR treat* OR procedure OR cavity OR cavities OR extract*))	399548
#7	'furcation defects':ab,ti,kw OR 'mesial movement of teeth':ab,ti,kw OR 'paradontopathy':ab,ti,kw OR 'paraodontopathy':ab,ti,kw OR 'parodontopathy':ab,ti,kw OR 'periodontopathy':ab,ti,kw OR 'pericoronitis':ab,ti,kw OR ((dental OR root OR tooth OR paradont* OR parodont* OR peridont* OR parodont* OR teeth OR gingiva*) NEAR/2 (disease* OR disorder* OR leakage OR resorption OR ankylos*s OR dystopia OR loss OR migrat* OR mobility OR atrophy OR atroph* OR infect* OR recession OR inflam* OR exfoliation OR health))	132630
#8	(dental OR periodont*) NEAR/2 (assessment* OR exam* OR health OR consult* OR evaluat* OR management OR screening*)	55064
#9	'fluoridation':ab,ti,kw OR 'toothbrushing':ab,ti,kw OR 'tooth brushing':ab,ti,kw OR ((dental OR periodontal OR tooth OR teeth OR mouth OR 'full-mouth') NEAR/2 ('check up' OR 'checkup' OR 'check-up' OR 'disease prevention' OR prevention OR polish* OR cleaning OR prophylaxis OR debridement OR scaling OR brushing))	29792
#10	#5 OR #6 OR #7 OR #8 OR #9	662320
#11	english:la	37558426
#12	#4 AND #10 AND #11	551

Search Number	Query	Results
#13	('animal'/exp OR 'animal experiment'/de OR 'nonhuman'/de OR 'invertebrate'/exp OR 'amphibia'/exp OR 'fish'/exp OR 'boreoeutheria'/exp OR 'afrotheria'/exp OR 'dermoptera'/exp OR 'glires'/exp OR 'scandentia'/exp OR 'sauropsid'/exp OR 'laurasiatheria'/exp OR 'ungulate'/exp OR 'reptile'/exp OR 'cercopithecidae'/exp OR 'marsupial'/exp OR 'monotremate'/exp OR 'prosimian'/exp OR 'tarsiiform'/exp OR 'hylobatidae'/exp OR 'xenarthra'/exp OR 'platyrrhini'/exp OR 'chimpanzee'/exp OR 'gorilla'/exp OR 'orang utan'/exp OR 'homo neanderthalensis'/exp OR 'cephalochordata'/exp OR 'hyperotreti'/exp OR 'urochordata'/exp OR 'ambulacraria'/exp OR 'coelomata'/exp OR 'protostomia'/exp OR 'pseudocoelomata'/exp OR 'coelenterate'/exp OR 'mesozoa'/exp OR 'placozoa'/exp OR 'porifera'/exp OR 'juvenile animal'/exp OR 'male animal'/exp OR 'female animal'/exp OR 'primate'/de OR 'haplorhini'/de OR 'mammal'/de OR 'catarrhini'/de OR 'simian'/de OR 'ape'/de OR 'amniote'/de OR 'tetrapod'/de OR 'vertebrate'/de OR 'chordata'/de OR 'deuterostomia'/de OR 'bilateria'/de OR 'therian'/de OR 'hominid'/de OR 'euarchontoglires'/de OR 'placental mammals'/de) NOT ('human'/exp OR 'human experiment'/de)	7877660
#14	#12 NOT #13	531
#15	#12 NOT #13 AND ([article]/lim OR [article in press]/lim OR [review]/lim OR [preprint]/lim)	402

Table A-4. Embase field tag key

Embase Field Tag	Description
/de	Index term
/exp	Exploded terms
/lim	Limit
:ab	Abstract
:ti	Title
:kw	Author keyword
NEAR/n	Requests terms that are within 'n' words of each other in either direction
*	Wildcard for variable truncation (i.e., one or more letters)

Table A-5. Grey literature search strategies

Date	Database Name and URL	Search Strategy(s)/Words Searched Including (if Applicable) How Items Were Selected	# of Items Retrieved/ Search Results
2023-11-6	ClinicalTrials.gov https://classic.clinicaltrials.gov	<ol style="list-style-type: none"> 1. AREA[ConditionSearch] sickle cell AND AREA[OutcomeSearch] (dental OR EXPAND[Concept] "oral care" OR EXPAND[Concept] "oral hygiene" OR EXPAND[Concept] "oral health" OR periodontal OR tooth OR teeth) 2. AREA[ConditionSearch] sickle cell AND AREA[InterventionSearch] (dental OR EXPAND[Concept] "oral care" OR EXPAND[Concept] "oral hygiene" OR EXPAND[Concept] "oral health" OR periodontal OR tooth OR teeth) 	<ol style="list-style-type: none"> 1. 2 2. 0
2023-11-6	World Health Organization www.who.int	<p>Used Advanced Google search to search only www.who.int for:</p> <ol style="list-style-type: none"> 1. dental OR "oral care" OR "oral hygiene" OR "oral health" OR periodontal OR tooth OR teeth "sickle cell" site:www.who.int 3. dental OR "oral care" OR "oral hygiene" OR periodontal OR tooth OR teeth "SCD" site:www.who.int 	<ol style="list-style-type: none"> 1. 26 3. 1
2023-11-6	National Institutes of Health www.nih.gov	<p>Used Advanced Google search to search only www.nih.gov for:</p> <ol style="list-style-type: none"> 1. dental OR "oral care" OR "oral hygiene" OR periodontal OR tooth OR teeth "sickle cell" site:www.nih.gov 2. dental OR "oral care" OR "oral hygiene" OR periodontal OR tooth OR teeth "SCD" site:www.nih.gov 	<ol style="list-style-type: none"> 1. 45 2. 57
2023-11-6	American Dental Association www.ada.org	<p>Used Advanced Google search to search only www.ada.org for:</p> <ol style="list-style-type: none"> 1. dental OR "oral care" OR "oral hygiene" OR periodontal OR tooth OR teeth "sickle cell" site:www.ada.org 2. dental OR "oral care" OR "oral hygiene" OR periodontal OR tooth OR teeth "SCD" site:www.ada.org 	<ol style="list-style-type: none"> 1. 2 2. 22

Date	Database Name and URL	Search Strategy(s)/Words Searched Including (if Applicable) How Items Were Selected	# of Items Retrieved/ Search Results
2023-11-6	American Society of Hematology www.hematology.org	Used Advanced Google search to search only www.hematology.org for: 1. dental OR "oral care" OR "oral hygiene" OR periodontal OR tooth OR teeth "sickle cell" site:www.hematology.org 2. dental OR "oral care" OR "oral hygiene" OR periodontal OR tooth OR teeth "SCD" site:www.hematology.org	1. 40 2. 8
2023-11-6	Cochrane www.cochrane.org	Used Advanced Google search to search only www.cochrane.org for: 1. dental OR "oral care" OR "oral hygiene" OR periodontal OR tooth OR teeth "sickle cell" site:www.cochrane.org 2. dental OR "oral care" OR "oral hygiene" OR "oral health" OR periodontal OR tooth OR teeth "SCD" site:www.cochrane.org	1. 104 2. 0
2023-11-6	American Academy of Pediatric Dentistry www.aapd.org	Used Advanced Google search to search only www.aapd.org for: 1. dental OR "oral care" OR "oral hygiene" OR "oral health" OR periodontal OR tooth OR teeth "sickle cell" site:www.aapd.org 2. dental OR "oral care" OR "oral hygiene" OR "oral health" OR periodontal OR tooth OR teeth "SCD" site:www.aapd.org	1. 107 2. 126
2023-11-6	Sickle Cell Disease Association of America www.sicklecelldisease.org	Used Advanced Google search to search only www.sicklecelldisease.org for: 1. dental OR "oral care" OR "oral hygiene" OR "oral health" OR periodontal OR tooth OR teeth "sickle cell" site:www.sicklecelldisease.org 2. dental OR "oral care" OR "oral hygiene" OR "oral health" OR periodontal OR tooth OR teeth "SCD" site:www.sicklecelldisease.org	1. 10 2. 10
2023-11-6	ASH Research Collaborative www.ashresearchcollaborative.org	Used Advanced Google search to search only www.ashresearchcollaborative.org for: dental OR "oral care" OR "oral hygiene" OR "oral health" OR periodontal OR tooth OR teeth site:www.ashresearchcollaborative.org	0
2023-11-6	The Foundation for Sickle Cell Disease Research www.fscdr.org	Used Advanced Google search to search only www.fscdr.org for: dental OR "oral care" OR "oral hygiene" OR "oral health" OR periodontal OR tooth OR teeth site:www.fscdr.org	3

Date	Database Name and URL	Search Strategy(s)/Words Searched Including (if Applicable) How Items Were Selected	# of Items Retrieved/ Search Results
2023-11-6	American Sickle Cell Anemia Association ascaa.org	Used Advanced Google search to search only ascaa.org for: dental OR "oral care" OR "oral hygiene" OR "oral health" OR periodontal OR tooth OR teeth site: ascaa.org	0
2023-11-6	Sickle Cell Disease Partnership Sickle Cell Disease Partnership (sicklecellpartnership.org)	Used Advanced Google search to search only Sickle Cell Disease Partnership (sicklecellpartnership.org) for: dental OR "oral care" OR "oral hygiene" OR "oral health" OR periodontal OR tooth OR teeth site: www.sicklecellpartnership.org	0
2023-11-30	Global Sickle Cell Disease Network http://www.globalsicklecelldisease.org/	Used Advanced Google search to search only www.globalsicklecelldisease.org for: "oral care" OR "oral hygiene" OR "oral health" OR periodontal OR tooth OR teeth OR mouth OR dental OR dentist site: globalsicklecelldisease.org	0
2023-11-30	International Association of Sickle Cell Nurses and Physician Assistants http://iascnapa.org/	Used Advanced Google search to search only iascnapa.org for: "oral care" OR "oral hygiene" OR "oral health" OR periodontal OR tooth OR teeth OR mouth OR dental OR dentist site: iascnapa.org - Google Search	0
2023-11-30	Sickle Cell Disease Global http://www.sicklecelldisease.org/index.cfm?page=scd-global	Used Advanced Google search to search only sicklecelldisease.org for: "oral care" OR "oral hygiene" OR "oral health" OR periodontal OR tooth OR teeth OR mouth OR dental OR dentist site: sicklecelldisease.org	39
2023-11-30	Childrens' Sickle Cell Foundation https://www.cscfkids.org/	Used Advanced Google search to search only cscfkids.org for: "oral care" OR "oral hygiene" OR "oral health" OR periodontal OR tooth OR teeth OR mouth OR dental OR dentist site: cscfkids.org	0
2023-11-30	National Heart, Lung, and Blood Institute https://www.nhlbi.nih.gov/	Used Advanced Google search to search only nhlbi.nih.gov for: "oral care" OR "oral hygiene" OR "oral health" OR periodontal OR tooth OR teeth OR dental OR dentist "sickle cell" site: nhlbi.nih.gov	332

Appendix B. Guidelines From Relevant Organizations and Professional Societies

Table B-1. Recommendations from relevant organizations and professional societies

Organization	Title	Year	Population	Recommendation(s)	Stated Recommendation Strength
Organization: American Academy of Pediatric Dentistry ¹³ Country: United States	Management of Dental Patients with Special Health Care Needs	2021	Children with Special Health Care Needs	<p>A dental home should be established by 12 months of age.</p> <p>The receptionist should determine the presence and nature of any special health need and, when appropriate, the name(s) of the child's medical care provider(s). The office staff, under the guidance of the dentist, should determine the need for an increased length of appointment and/or additional auxiliary staff to accommodate the patient in an effective and efficient manner. The need for increased dentist and team time as well as customized services should be documented so the office staff is prepared to accommodate the patient's unique circumstances at each subsequent visit.</p> <p>When scheduling patients, familiarity and compliance with Health Insurance Portability and Accountability Act (HIPAA) and Americans with Disabilities regulations applicable to dental practices are imperative.</p> <p>The dentist should include sensory limitations during the history intake and be prepared to modify the traditional delivery of oral care to address the child's unique needs.</p> <p>Dentists should include treating active disease prior to any major medically-necessary procedures, deferring all elective dental treatment during active phases of medical care if a child is immunocompromised or at hematologic risk, and prescribing antibiotic prophylaxis if risk for infective endocarditis or distant site infection is high.</p> <p>Education of parents/caregivers is critical for ensuring appropriate and regular supervision of daily oral hygiene. The team of dental professionals should develop</p>	Not provided in document

Organization	Title	Year	Population	Recommendation(s)	Stated Recommendation Strength
				<p>an individualized oral hygiene program that accommodates the unique disability of the patient.</p> <p>Brushing with a fluoridated dentifrice twice daily helps prevent caries and gingivitis. If a patient's sensory issues cause the taste or texture of fluoridated toothpaste to be intolerable, a toothpaste without sodium laurel sulfate to eliminate foaming nature, a fluoridated mouth rinse, or an alternative may be applied with the toothbrush.</p> <p>Practitioners should encourage a noncariogenic diet for long term prevention of dental disease.</p> <p>Patients with special health care needs may benefit from sealants, which reduce the risk of caries in susceptible pits and fissures of primary and permanent teeth.</p> <p>Interim therapeutic restoration, using materials such as glass ionomers that release fluoride, may be useful as both preventive and therapeutic approaches.</p> <p>Preventive strategies should address traumatic injuries.</p> <p>Dentists should be familiar with community-based resources for patients and encourage such assistance when appropriate.</p> <p>Every effort must be made to assist the family in adjusting to and understanding the complexity of any anomalies in orofacial structure and the related oral needs and provide an overview of goals and progression of treatment. The dental practitioner must be sensitive to the psychosocial well-being of the patient.</p> <p>When patients reach adulthood, their oral health care needs may extend beyond the scope of the pediatric dentist's practice. The successful transition from pediatric to adult dental care is integral to continuity of care and improved long-term outcomes. Education and preparation before transitioning to a dentist who is knowledgeable and comfortable in both adult oral health needs and managing the child's special health care need are important. Until the new dental home is established, the patient should maintain a relationship with the current care provider and have access to emergency services.</p>	

Organization	Title	Year	Population	Recommendation(s)	Stated Recommendation Strength
Organization: Sickle Cell Society ¹⁴ Country: United Kingdom	Standards for Clinical Care of Adults with Sickle Cell Disease in the UK	2018	Adults with SCD	<p>Improve awareness of the potential dental and orofacial manifestations of SCD among patients, their families and the practitioners involved in their care.</p> <p>Adults with SCD should receive regular dental care to facilitate preventive measures such as oral hygiene instructions, diet control, and fluoride prescription/ applications.</p> <p>Dental care should be delivered as a coordinated team approach, with close liaison with the haematologist. If sedation or general anaesthesia is planned, treatment should not be in a community setting, but in a hospital dental department with a sickle cell haematology team on hand, and any pre-procedure interventions must be discussed with them in advance.</p> <p>Dentists caring for patients with SCD presenting with acute dental infections/abscesses should receive urgent dental care and antimicrobial therapy as required.</p>	Not provided in document
Organization: National Heart, Lung, and Blood Institute ¹⁵ Country: United States	Evidence-Based Management of Sickle Cell Disease: Expert Panel Report, 2014	2014	Persons with SCD	<p>All children (aged 3 months to 12 years or as stated) should have:</p> <p>Fluoride supplements should be provided for those over 6 months of age whose water supply is deficient in fluoride.</p>	Not provided in document

Appendix C. Recommendations of Dental Care for Sickle Cell Disease Patients From Review Articles

Table C-1. Recommendations of dental care for sickle cell disease patients from review articles

Publication	Recommendation of Care	Quality of Treatment/ Reduced Likelihood of Complications	Improved Clinical Outcomes/Success of Medical Procedure	Standard of Care for Dental Management of Sickle Cell Disease Patients	Additional Comments
Kakkar M, Holderle K, Sheth M, Arany S, Schiff L, Planerova A. Orofacial Manifestation and Dental Management of Sickle Cell Disease: A Scoping Review. <i>Anemia</i> 2021;2021:5556708.	Recommendations included early intervention, strategies to manage dental anxiety, restorative management, dental implants, orthodontic management, and infection management.	Regarding dental implants, it is crucial to prevent complications. Treatment plan should include complete blood count and radiographs prior to surgery. Blood transfusion before or after the surgery may be necessary and should be performed in a hospital-based setting.	Regarding dental anxiety management, it is recommended that evaluation of anxiety be performed during the initial dental visit. Pharmacological and non-pharmacological pain management strategies may be advised.	Preventive dental therapy is vital. Routine dental visit with oral health screening every 6 months is recommended. It is important to maintain a multidisciplinary and collaborative approach to healthcare management.	Orthodontic treatments for SCD patient are strictly elective.

Publication	Recommendation of Care	Quality of Treatment/ Reduced Likelihood of Complications	Improved Clinical Outcomes/Success of Medical Procedure	Standard of Care for Dental Management of Sickle Cell Disease Patients	Additional Comments
Kawar N, Alrayyes S, Yang B, Aljewari H. Oral health management considerations for patients with sickle cell disease. Dis Mon 2018;64(6):296-301.	Recommendations included prevention and early intervention, stress reduction and pain management strategies, infection management, restorative and prosthodontic management, and orthodontic management.	<p>During a sickle cell crisis, only acute infections or trauma should be treated and definitive treatments should be postponed until the patient is in a non-crisis state.</p> <p>Dental infections must be treated aggressively with both local and systemic measures.</p> <p>Antibiotic prophylaxis is recommended for invasive dental and major oral surgical procedures.</p> <p>Patients on hydroxyurea should have a complete blood count before any invasive dental procedure because hydroxyurea may trigger neutropenia and thrombocytopenia which are risk factors for infections.</p>	For highly anxious patients or patients with extensive multiple dental or surgical procedures general anesthesia may be recommended and patients should be referred to a hospital.	<p>Prevention and early intervention includes routine dental visits, practicing good oral hygiene, a healthy diet, proper hydration, vitamin supplementation (folic acid, vitamin B12, or vitamin B6). Collaboration between healthcare team (including hematologist) and dentist is important.</p> <p>Thermoformed appliances can be used for the application of fluoride containing gel can reduce hypersensitivity and prevent caries. Periodic usage of chlorhexidine one week per month is recommended to prevent oral and dental infection.</p>	Long extensive procedures should be avoided. Appointments is preferably scheduled in the early morning

Appendix D. Studies Excluded at Full-Text Screening

Table D-1. Studies excluded at full-text screening

Bibliography	Reason for Exclusion
Haemoglobinopathies and general anaesthesia for dental surgery British medical journal, (1970). 2(5701), 98	Intervention not of interest
Ahmad, A.,Mihalca, D.,Stacey, B.,Samaee, S.,Mehta, D.,Hibbs, S.,Freeman, T.,Chatterjee, B.,Ali, E.,Cheng, L.,Tsitsikas, D. A. (2022). Rate of Dental Extractions in Patients with Sickel Cell Disease J Clin Med, 11(20)	Study design not of interest
AlAssad, F.,Alkadhi, O. H. (2022). Skeletal and dental manifestations of Glucose-6-phosphate dehydrogenase deficiency, thalassemia, and sickle cell anemia patients in Saudi Arabia Eur Rev Med Pharmacol Sci, 26(22), 8247-8255	Population not of interest
Ali, R.,Oxlade, C.,Borkowska, E. (2008). Sickel cell toothache Br Dent J, 205(10), 524	Study design not of interest
Alrayyes, S.,Compton, A. A.,Kawar, N. (2018). Oral health considerations for pediatric patients with sickle cell disease Dis Mon, 64(6), 302-305	Study design not of interest
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Appendix E. Abbreviations and Acronyms

Abbreviation	Definition
AHRQ	Agency for Healthcare Research and Quality
CMS	Centers for Medicare & Medicaid Services
GRADE	Grading of Recommendations, Assessment, Development, and Evaluations
HbF	Fetal hemoglobin
ICA	International Consulting Associates
KQ	Key question
MA	Meta-analysis
PICOTS	Population, intervention, comparison, outcome(s), timing, setting
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
RBC	Red blood cell
RCT	Randomized controlled trial
SCD	Sickle Cell Disease
SME	Subject Matter Expert
SR	Systematic review
UK	United Kingdom
US	United States
USPSTF	United States Preventive Services Task Force