NHS National Services Scotland

Healthcare Scientist Technical Team Literature Review Process

NHSScotland Assure Healthcare Scientist Technical Team

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Contents

Note

Our literature reviews are not guidance documents in themselves. They are produced to provide the evidence-based to support guidance and advice.

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Preface

This document provides an overview of the process the Healthcare Scientist (HCS) Technical Team follows when conducting literature reviews. It outlines the key stages of the review process, ensuring transparency and consistency while demonstrating the team's commitment to rigorous, high-quality evidence synthesis.

Citation and Acknowledgement

If external organisations or individuals adopt the HCS Technical Team’s literature review process, appropriate citation of NHSScotland Assure is required for acknowledgement. Adaptations are permitted, provided modifications are clearly specified and the original source is properly credited.

1. Introduction

1.1. This document provides an overview of the process the Healthcare Scientist (HCS) Technical Team follow in conducting literature reviews to support the development of NHSScotland Assure's technical guidance and advice. It outlines the key stages of the review process, ensuring transparency and consistency while demonstrating the team's commitment to rigorous, high-quality evidence synthesis.

1.2. The HCS Technical Team's literature review methodology adheres to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, including the PRISMA 2020 statement and relevant extensions,[1] PRISMA for protocols,[2] and PRISMA for scoping reviews.[3] This adherence ensures transparency, replicability, and a rigorous approach to report selection, synthesis, and reporting.

1.3. The HCS Technical Team's literature review process incorporates the latest guidance from recognised organisations such as Cochrane, the Joanna Briggs Institute (JBI), and Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) while also addressing the specific needs of the healthcare-built environment (HBE). Feedback from the subject matter experts (SMEs), team members, and end-users is actively sought to refine the process. In addition, lessons learned from completed reviews inform ongoing improvements, ensuring the team's methodology and practices remain relevant, effective, and evidence-based.

1.4. This document is structured to guide readers through the key components of the literature review process. It begins with the scope and applicability of the literature review process. This is followed by a summary of each stage of the process, including protocol development, literature search, report selection, methodological quality/ risk-of-bias assessments, data extraction, evidence synthesis, confidence assessments, and the final write-up and publication. It concludes with details of governance and the tools and resources used.

1.5. A glossary of key terms and definitions used throughout this document can be found in Appendix A.

2. Scope and applicability

2.1. This document applies to literature reviews undertaken by NHSScotland Assure on the technical aspects of the healthcare-built environment, including, but not limited to critical engineering systems, such as water, ventilation, drainage, and structural design; key safety areas, such as fire and electrical safety; and sustainability, facilities design, and facilities and estates management.

2.2. Given the nature of the built environment, the literature reviews often incorporate evidence synthesis from peer-reviewed primary research, expert opinion, and grey literature, ensuring a comprehensive and robust evaluation of the available evidence.

Types of literature reviews

2.3. The Healthcare Scientist (HCS) Technical Team undertakes three types of literature review: systematic, rapid and scoping. Each type of literature review follows explicit, systematic methods to collate and synthesise evidence. While all three approaches maintain rigour and transparency, they differ in scope, methodology, and intended outcomes. Below is an overview of each review type, while Appendix B provides a comparative table summarising the key methodological differences.

Systematic reviews

2.4. Systematic reviews are the most rigorous approach to evidence synthesis, used to gather and evaluate existing evidence on a specific topic. They involve comprehensive searches, independent screening by at least two reviewers, and detailed critical appraisal to assess methodological quality/risk of bias. The review findings are graded to support subject matter experts (SMEs) in understanding the level of confidence in the evidence.

2.5. Systematic reviews typically take six to 12 months to complete, depending on the scope and complexity of the review. The final review will be published either on the National Services Scotland (NSS) website or in a peer-reviewed journal.

Rapid reviews

2.6. Rapid reviews are designed to provide timely evidence synthesis by streamlining certain processes. They follow similar methodological principles as systematic reviews but may involve targeted searches, fewer databases, single-reviewer screening, and exclude detailed methodological quality/ risk of bias assessments to expedite the process.

2.7. Rapid reviews are usually completed within one to two months, reflecting their expedited nature, and there is no requirement for them to be published.

Scoping reviews

2.8. Scoping reviews aim to map the breadth of evidence available on a broad topic. These reviews are beneficial for identifying gaps in the literature or exploring emerging fields. The findings are often presented in tables and charts, supported by narrative summaries to provide a comprehensive overview.

2.9. Scoping reviews generally take three to nine months to complete, depending on the breadth of the topic. The final review will be published either on the NSS website or in a peer-reviewed journal.

3. Overview of the literature review process

3.1. The literature review is formally initiated when subject matter experts (SMEs) put forward a topic or question(s) aimed at addressing specific evidence gaps in existing technical guidance or closing recognised knowledge gaps.

3.2. A detailed protocol is then developed, outlining the objectives, review questions, and methodology to ensure clarity and transparency. Subsequent stages involve comprehensive literature searching, selection and appraisal of relevant studies, data extraction, synthesis of the review findings, and confidence assessments. The final step is disseminating the review's outputs, typically in the form of a final report published on the National Services Scotland (NSS) website or in academic journals. See Figure 3.1 for the flow chart of the literature review process. Appendix C provides additional details and steps in the process.

Identifying the need for a review

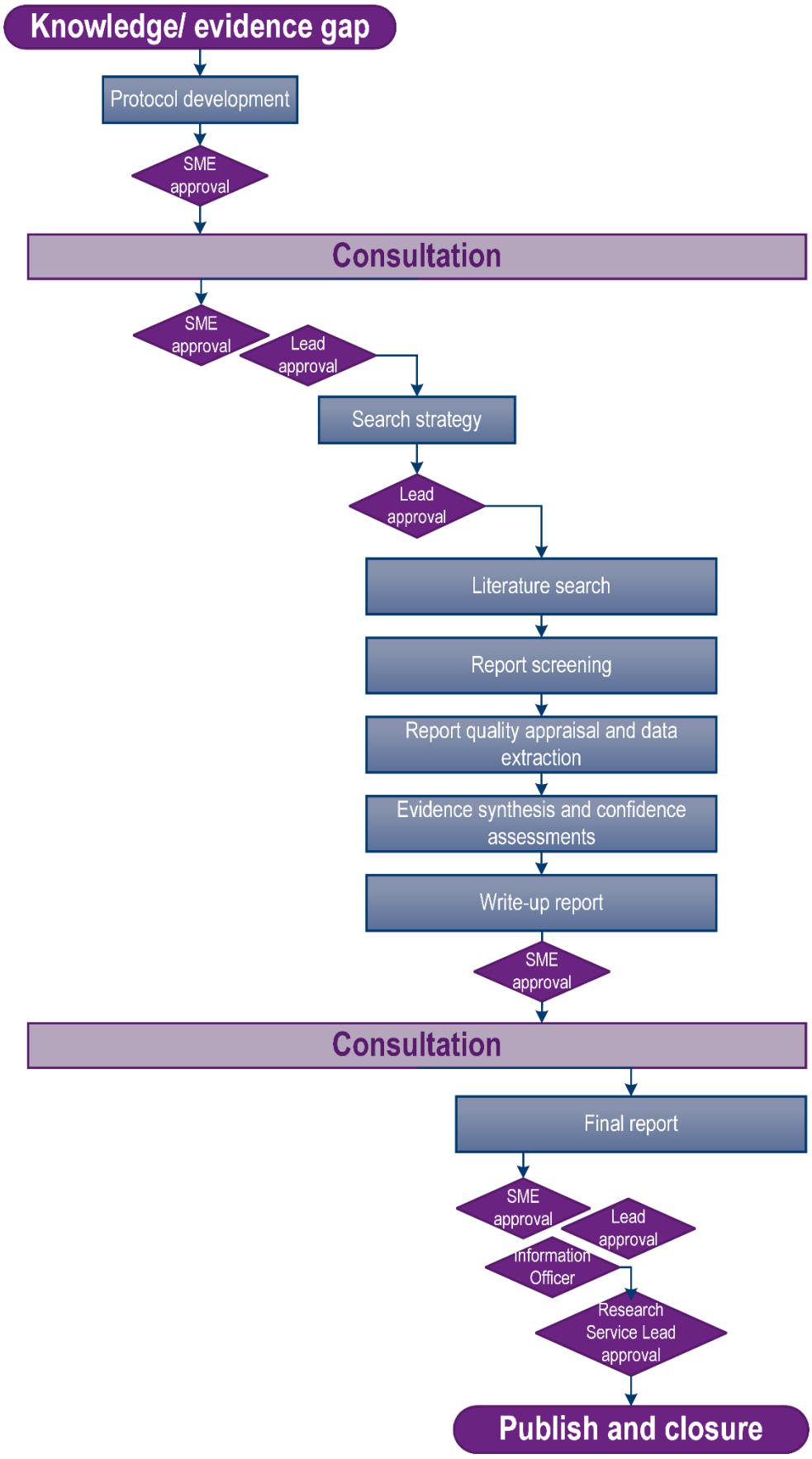
3.3. The process of identifying the need for a literature review begins with the SMEs recognising a gap in knowledge or evidence in either NHSScotland Assure technical guidance or other advice they need support to conclude on.

3.4. To formally initiate the process, SMEs complete an Information Gathering Form, which captures essential details, including the topic background, literature review objectives, preliminary research questions, inclusion and exclusion criteria, key search terms and other parameters necessary for defining the scope of the review. This information allows the Healthcare Scientist (HCS) Technical Team to perform an exploratory search to assess:

- whether there is sufficient and relevant evidence to justify a full literature review and the type of review required, either a scoping or systematic literature review
- if a similar review has already been conducted, making a new review unnecessary
- if the topic appears too specific or novel with limited available evidence, suggesting primary research may be a better approach

3.5. If a topic has potential for a full literature review, it is formally registered within the NHSScotland Assure Refinement and Prioritisation of Research Themes Project to allow the HCS Technical Team to progress reviews based on available resource and agreed priorities.

Figure 3.1 Flow chart of the literature review process



Protocol development

3.6. The literature review protocol outlines the background and rationale of the review, the review objectives and questions, and the planned methods. It serves as a blueprint for the literature review, ensuring clarity, transparency, and methodological rigour throughout the various stages of the review process.

3.7. The HCS Technical Team has established guidelines for protocol development, drawing on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework for systematic review protocols,[2] with adaptations for rapid and scoping reviews where applicable. Each protocol includes:

- review title, review team components, and details of any advisory or short working groups, teams or individuals involved in the consultations
- background and rationale, including the objectives and review questions
- bibliographic databases used for searches, along with specific journals, grey literature sources such as grey literature databases, organisational and manufacturer websites, and search engines, and manual searches (if applicable)
- search terms for developing the search strategy
- eligibility criteria, specifying inclusion and exclusion criteria for report selection
- methods for managing references and conducting the screening stage
- specification of whether methodological quality/ risk-of-bias assessment are required and the checklists used
- approach for data extraction and synthesis to derive review findings
- criteria and process for assessing the confidence in the review findings
- dissemination strategy for sharing the outputs with SMEs and the wider public

3.8. Per standard practice, the search range covers the last 20 years. If a different range is used, a justification must be provided. Additionally, thesis documents are generally excluded due to the extensive time required for review and the assumption that their key findings have already been published in peer-reviewed journals. However, they may be included if the SMEs explicitly request them.

3.9. Protocols are developed by the lead author using the information gathering form, incorporating insights from the initial exploratory search (if available) and in consultation with the SMEs. At this stage, a preliminary search may also be conducted to refine the scope, review questions, inclusion and exclusion criteria, search terms, and identify relevant databases and key journals.

3.10. Once the protocol is finalised, if applicable, it undergoes consultation with the agreed consultation group to refine the review questions, inclusion and exclusion criteria, and search terms. Responses to the feedback received are then communicated back to them.

3.11. The protocol requires sign-off from the SME and the Lead HCS to establish the final version to be implemented.

3.12. Once signed off, and if agreed upon by the SMEs, protocols for systematic reviews and rapid reviews addressing human-related outcomes are registered in the International Prospective Register of Systematic Reviews (PROSPERO), an international database for prospectively registered systematic reviews in health and social care. Similarly, scoping reviews and literature reviews focusing on non-human-related outcomes are registered in the Open Science Framework (OSF). This platform supports open, transparent, and reproducible research by providing a collaborative space for study registration, data sharing, and documentation.

3.13. Minor protocol amendments are permitted, provided they are agreed upon with the SME. These amendments may include adjustments to the number of authors involved in screening and data extraction, modifications to the synthesis method, or updates to the composition of the review team. However, significant changes such as modifications to the review question outcomes, the inclusion of new interventions, or substantial alterations to the review scope require the development of a new protocol to ensure methodological rigour.

3.14. All minor or substantial amendments are documented in detail and agreed upon with SMEs to maintain transparency and alignment with the review's objectives.

Searching the literature

3.15. The literature search systematically captures all relevant evidence through comprehensive bibliographic database searches and other additional methods, including manual search techniques.

Bibliographic database search

3.16. Comprehensive search strategies are developed for each database identified in the protocol, using the agreed-upon search terms and inclusion/ exclusion criteria. Commonly utilised databases include:

- general academic databases: Scopus and Web of Science (Core Collection)

- biomedical and health sciences databases: Embase (Ovid), Medline (Ovid or PubMed), Cumulative Index to Nursing and Allied Health Literature (CINAHL) (EBSCO), and PsycINFO (Ovid from 1967)
- engineering and construction databases: Institute of Electrical and Electronics Engineers (IEEE) Xplore and Compendex (Engineering Village)
- sustainability and environmental science databases: GreenFILE (EBSCOhost).

3.17. A librarian reviews the search strategies to ensure accuracy and rigour. All search strategies, including the search terms and filters used, are fully documented and presented in the final literature review report. This level of detail promotes transparency and replicability, aligning with best practices in evidence synthesis.

Other methods search

3.18. To enhance the comprehensiveness of the review, additional searches are conducted beyond bibliographic databases. These include:

- key journals, organisational and manufacturer websites
- backward citation searching, which involves reviewing reference lists from included studies and other relevant reports
- forward citation searching, which uses tools like Google Scholar to track studies and reports that cite key studies and other reports
- references cited in literature reviews on the same or a similar topic
- standards and technical reports databases: Barbour Index
- grey literature databases: Health Business Elite (screening the first 50 – 100 hits)
- Google (screening the first 50 – 100 hits)

Managing and deduplicating references

3.19. After executing the search strategies in bibliographic databases, references are uploaded into the bibliographic software EndNote for management and deduplication. Automatic and manual deduplication are performed to ensure the reference dataset is accurate and duplicate-free.

3.20. Automatic deduplication is performed multiple times using various combinations of reference fields, such as author names, titles, and publication details. However, EndNote's automatic deduplication relies on consistent formatting and capitalisation across references; variations in data entry, such as differences in author names or journal titles, may result in some duplicates being missed. To address this limitation, a manual review of the entire reference list is conducted after automatic deduplication to ensure any remaining duplicates

are identified and removed. Once the final deduplicated list is confirmed, references are exported to the HCS Technical Review Tool (see Section 5.3 for further detail on this tool).

3.21. As per the HCS Technical standard operational procedure (SOP), if a literature review extends beyond one year, the search will be re-run before the final synthesis to ensure that any newly published studies and emerging evidence during the review period are captured.

Report selection

3.22. The report selection stage determines whether a report meets the inclusion criteria for the review.

3.23. After deduplication, references are transferred to the HCS Technical Review Tool, where they undergo a structured, multi-stage screening process:

- first screening – involves reviewing the title and abstract of all the records to identify their relevance
- second screening – records that pass the first screening are assessed in full to determine final inclusion in the review

3.24. Decisions during the screening process are recorded using the following labels: 'Y' (Include), 'N' (Exclude), 'U' (Uncertain), or 'D' (Duplicate).

3.25. The number of reviewers involved depends on the type of review, as outlined in Appendix A. For two-author reviews, both authors independently complete each screening stage to minimise bias. Disagreements are resolved through discussion; if consensus cannot be reached, a third author is consulted to make the final decision. When both reviewers are uncertain ('U') about a report, it is not classified as either agreement or disagreement for reporting purposes. Instead, a third author is consulted to make the final decision.

3.26. For other methods search, such as grey literature databases and manual searches, only the second screening is conducted, as the initial identification of these reports serves as the first screening step.

3.27. The search and selection process results are reported using the PRISMA flow diagram, providing a transparent account of the report selection process. This diagram is included in the final review report, reinforcing the team's commitment to transparency and methodological rigour. A template of the PRISMA flow diagram used is provided in Appendix D.

3.28. During the second screening stage, reasons for exclusion are documented and reported in the PRISMA flow diagram. In two-author reviews, both reviewers agree on the reason for exclusion. A list of excluded reports and the reasons for exclusion are provided as an

appendix in the final literature review. Additionally, reports potentially relevant but for which full text or essential data were inaccessible are also documented in an appendix.

Methodological quality/ risk-of-bias assessments

3.29. This stage of the process helps determine the rigour and reliability of the reports included in the review. Evaluating methodological quality/ risk-of-bias ensures that findings are based on robust and trustworthy research.

3.30. The assessment follows a structured approach, applying validated critical appraisal checklists. This process is conducted for all included reports, whether empirical studies, expert opinion, or grey literature, ensuring a systematic and objective assessment of potential biases and methodological limitations.

Critical appraisal checklists

3.31. The critical appraisal checklists used to assess methodological quality/ risk-of-bias were selected by the HCS Technical Team following a structured evaluation of existing checklists based on agreed-upon criteria. A range of checklists from various organisations and authors was reviewed, including the Scottish Intercollegiate Guidelines Network (SIGN50) checklists, which NHSScotland Assure Antimicrobial Resistance and Healthcare Associated Infection (ARHAI) uses.

3.32. Based on this evaluation, the HCS Technical Team applies the following validated checklists to assess methodological quality and risk-of-bias:

- Authority, Accuracy, Coverage, Objectivity, Date, and Significance (AACODS) checklist for assessing grey literature[4]
- Center for Evidence-Based Management (CEBMa) critical appraisal checklist for survey studies[5]
- Critical Appraisal Skills Programme (CASP) checklist for qualitative studies[6]
- Joanna Briggs Institute (JBI) checklist for case reports[7]
- JBI checklist for case series[8]
- JBI checklist for case-control studies[7]
- JBI checklist for cohort studies[7]
- JBI checklist for cross-sectional analytical studies[7]
- JBI checklist for prevalence studies[9]
- JBI checklist for text and opinion[10]
- JBI checklist for quasi-experimental studies[11]

- JBI checklist for randomised controlled trials (RCTs)[12]
- JBI checklist for systematic literature reviews and meta-analysis[13]

3.33. As these original checklists mainly focus on clinical aspects, necessary modifications were made to ensure their relevance to the types of studies and other reports assessed in the review process. Additionally, two screening questions were introduced to each critical appraisal checklist. These questions were adapted from the Mixed Methods Appraisal Tool (MMAT),[14] a validated tool designed for assessing the methodological quality of qualitative, quantitative, and mixed-methods studies. These screening questions ensure that studies meet fundamental methodological standards before undergoing full critical assessment. The screening questions are as follows:

- Are there clear research questions, aims and/ or objectives?
- Does the collected data answer the research questions, aims and/ or objectives?

3.34. Both questions must be answered with a definitive 'Yes' for the assessment to proceed. If the response to either question is 'No' or 'Uncertain,' the assessment process will be terminated, and the report will be excluded from the review. The screening question may not apply to expert opinion and grey literature reports.

3.35. Currently, no standardised checklists exist for assessing study designs that do not involve human-related outcomes, such as research on copper pipe corrosion, biofilm growth or fire risk. These studies often use in vitro, in situ, pilot-scale, laboratory, or modelling approaches. At present, such studies are evaluated using the two initial screening questions to determine their methodological quality/ risk-of-bias. However, the HCS Technical Team is currently developing a dedicated critical appraisal checklist tailored to these study designs to enhance the rigour and consistency of their assessments.

3.36. Guidance documents that are not mandated in NHSScotland, such as those from other organisations, undergo an initial evaluation using the Appraisal of Guidelines for Research and Evaluation (AGREE) II tool to determine their quality. If a document is deemed low quality, it is immediately classified as grey literature. If the quality is unclear, a full AGREE assessment is conducted. Guidance documents scoring below 60% in the AGREE II tool are reclassified as grey literature and subsequently appraised using the AACODS checklist.

3.37. Mandatory or legislative documents are exempt from methodological quality/ risk-of-bias assessments.

Assessment process and scoring criteria

3.38. To facilitate the process, the assessments are conducted using Microsoft (MS) Forms, which enable reviewers to complete predefined checklists systematically and populate the results directly in the HCS Technical Team Review Tool.

3.39. The qualitative and quantitative components are assessed and reported separately in mixed-methods studies.

3.40. For reviews involving two authors, one conducts the assessments while the second author performs a complete verification (100% check) to ensure accuracy and consistency.

3.41. Each report is evaluated using a structured scoring system, with each checklist item marked as:

- 'Yes' – scores 1 point
- 'No' – scores 0 points
- 'Unclear' – scores 0 points
- 'Not Applicable' (N/A) – excluded from the total possible score

3.42. The final score is calculated as the percentage of 'Yes' responses out of the total applicable items. For example, if a checklist has 10 questions, where seven are scored 'Yes,' one 'No,' one 'Unclear,' and one 'N/A,' the final score is 78% (7 out of 9 applicable items).

3.43. Based on their scores, each report is categorised as having:

- very minor methodological limitations/ risk-of-bias: 76-100%
- minor methodological limitations/ risk-of-bias: 51-75%
- moderate methodological limitations/ risk-of-bias: 26-50%
- serious methodological limitations/ risk-of-bias: 0-25%

3.44. Only reports with serious methodological limitations/ risk-of-bias are excluded from the review, with 'serious methodological quality/ risk-of-bias' recorded as the exclusion reason in the PRISMA flow diagram. Similarly, reports failing the screening questions are excluded under 'serious methodological quality/ risk-of-bias: failed screening questions'.

3.45. All assessments are included in the final literature review report and presented in a tabular format. This allows readers to understand the key factors influencing the overall methodological quality/ risk of bias judgment.

Data extraction

3.46. During this stage, data from all included reports is systematically collected in a standardised Excel table, enabling consistent comparisons of their characteristics and facilitating the identification of trends across the evidence base.

3.47. The HCS Technical Team has established core data fields applicable to all literature reviews to ensure consistency and completeness. These fields include:

- country
- setting and its characteristics (if applicable)
- report aim
- intervention, exposure or phenomenon investigated
- population studied (if applicable)
- sample size and characteristics
- outcomes and methods used to measure them
- key findings or evidence
- report limitations
- source of funding

3.48. Additional data fields may be included as needed, in agreement with SMEs, to ensure that the extracted data provides a robust foundation for evidence synthesis and enables a comprehensive reporting of findings.

3.49. Sometimes, report authors or other evidence sources, such as organisations or manufacturers, may be contacted to obtain or confirm missing or unclear data. If this occurs, the final literature review report will document how and when these contacts were made, what data were requested, and whether the requested information was obtained.

3.50. For literature reviews involving two reviewers, the lead author is responsible for data extraction, while the supporting author performs a full verification (100% check) of the extracted data. Any disagreements are discussed between the reviewers; if unresolved, a third reviewer makes the final decision.

3.51. The final literature review document provides a summary table of the characteristics of all included reports, while the full data extraction table is available upon request.

Evidence synthesis

3.52. The evidence synthesis stage is key for integrating and interpreting the findings from all included reports. This process identifies patterns, relationships, and gaps in the evidence, shaping the key findings of the literature review.

3.53. The primary synthesis method is narrative analysis, providing a detailed and contextual interpretation of the evidence. However, depending on the nature of the review, particularly in scoping reviews, data may also be presented using graphs, diagrams, or tables to enhance clarity and accessibility.

3.54. An evidence synthesis is provided for each review question, theme, or outcome, ensuring a structured and transparent approach to summarising the literature review findings. This synthesis forms the basis of the review findings, which are then assessed for confidence. To maintain rigour and consistency, the synthesis follows JBI guidance.[15]

Confidence assessments

3.55. Confidence assessments evaluate the strength, reliability, and trustworthiness of the evidence supporting each review finding. In other words, they determine the level of confidence that SMEs and other decision makers can place in each review finding.

3.56. Currently, no standardised approach exists for assessing confidence in mixed-methods reviews, including peer-reviewed qualitative and quantitative empirical research, expert opinion, and grey literature. To address this limitation, the HCS Technical Team has adapted elements of the GRADE-Confidence in the Evidence from Reviews of Qualitative Research (CERQual) approach,[16-21] as the team identified it as the most suitable framework for their requirements. However, the guidelines have not been fully adopted, with certain criteria and their interpretation modified, and a publication bias component added to better reflect the specific nature of the evidence assessed in the HCS Technical Team's reviews.

3.57. Therefore, the confidence assessments conducted by the HCS Technical Team are based on five criteria, with each carrying equal weight:

- type of evidence and limitations: evaluates the quality and reliability of the evidence, including any methodological limitations/ risk-of-bias and type of study design or report
- relevance: assesses how applicable the evidence is to the review question, considering the context and scope
- adequacy: determines whether the evidence is sufficient in terms of quantity and depth to support the review finding
- coherence: examines how clear and cogent the fit is between the evidence and the review finding itself, including consistency across different evidence sources

(contradictions within the evidence are explicitly addressed and factored into this criterion)

- publication bias: evaluates whether the findings are skewed due to selective publication practices

3.58. Each component is rated as:

- no or very minor concerns (unlikely to reduce confidence in the review finding)
- minor concerns (may reduce confidence)
- moderate concerns (likely to reduce confidence)
- serious concerns (very likely to reduce confidence in the review finding)

3.59. For the final confidence level, each finding begins at high confidence and is rated down as necessary based on the identified concerns. Potential interactions and overlaps between the components are also considered, avoiding downgrading a review finding twice for the same concern across components.

3.60. The final confidence level can be classified as:

- high confidence: the evidence is strong, consistent, and reliable, with little to no doubt about the finding
- moderate confidence: some uncertainty exists due to variability or minor limitations, but the finding is likely reliable
- low confidence: significant uncertainty exists due to limited or inconsistent evidence, raising doubts about reliability
- very low confidence: severe limitations result in high uncertainty, indicating the finding may not be reliable

3.61. Special considerations apply:

- standards, guidance, policies, and regulations that are mandatory in NHSScotland are automatically assigned high confidence
- non-mandatory guidance that scores above 60% on the AGREE Tool is automatically assigned high confidence
- findings predominantly based on grey literature or expert opinion are typically rated as low confidence due to concerns about the robustness of the evidence
- standards that are not mandatory in NHSScotland are treated as grey literature

3.62. Confidence assessments are developed collaboratively between the HCS Technical Team and SMEs to ensure a range of perspectives is considered. Given the inherently subjective nature of this process, all decisions are carefully documented and reported using structured tables to maintain transparency and accountability. Two key tables are used for reporting:

- evidence profile table, which includes the references of all reports contributing evidence to each review finding, the assessment for each criterion used in the confidence evaluation, and an overall explanation of the confidence assessment for each review finding
- summary table, a concise version of the evidence profile table, presenting key findings in a clear and accessible format

3.63. The first table is included as an appendix in the final literature review, while the summary table is incorporated into the main body of the report.

3.64. For presenting the review findings in the tables, a concise summary of each review finding is produced in a citation-free format to enhance clarity and readability, ensuring the findings are accessible and easy to interpret.

Write-up and publication

3.65. A final report of the literature review is produced, fully adhering to the requirements of the PRISMA guidelines for reporting systematic literature reviews. [1] The report ensures transparency by detailing all steps of the review process, including any amendments to the protocol during the review.

3.66. The report also includes an acknowledgement of contributions from SMEs and consultation groups, along with a disclosure of any potential conflicts of interest (if applicable).

3.67. As per the PRISMA guidelines, the following report appendices are provided:

- search strategies for each database used
- excluded studies along with the reasons for their exclusion
- table summary of study/ report characteristics
- critical appraisal assessments
- confidence level assessments for each review finding

3.68. If the review protocol was not published or deposited in a public repository, it is included as a supplementary file or appendix in the literature review report.

3.69. The draft report is shared with SMEs and, if applicable, with advisory groups for consultation, review, and validation. Feedback is carefully incorporated to ensure the report's accuracy, relevance, and alignment with the review's objectives. Responses to the feedback received are then communicated back to them.

3.70. Final approval is obtained from the SMEs, the Lead HCS and Research Service Lead before publication.

4. Governance

Governance overview

4.1. NHSScotland Assure are committed to ensuring all reviews undertaken are of a high standard. This is facilitated through clear governance, processes, and roles and responsibilities.

4.2. Key roles in the literature review process include the lead author, supporting authors, Lead and Principal Healthcare Scientist (HCS), Service Lead, subject matter experts (SMEs), consultation group, and information officer. Each plays a distinct role in ensuring methodological rigour, transparency, and quality. A full breakdown of roles and responsibilities is provided in Appendix E.

4.3. The following approvals are required at each stage of the literature review process:

- protocol approval for consultation:
  - approved by the subject matter expert
- protocol approval:
  - approved by the SME, the Lead Healthcare Scientist (HCS) and Research Service Lead to confirm the appropriate review objectives, scope and methodology
- search strategy approval:
  - approved by the Lead HCS to ensure the search methodology is comprehensive, systematic, and aligned with best practices
- final report approval for consultation:
  - approved by the SME
- final report approval:
  - approved by the SME to ensure that the content is relevant to the literature review, the interpretation of the evidence is appropriate, and the findings are valid and accurately reflect the available evidence
  - approved by Lead HCS, followed by approval from the Research Service Lead, to ensure that the report is correctly structured and adheres to the HCS Technical Team Standard Operating Procedure (SOP) for literature reviews, and the final document is of sufficient quality for submission
- closure and final sign-off:
  - approved by the Research Service Lead, who holds overall governance and accountability for the literature review. Their sign-off confirms that the review has been conducted in accordance with governance and quality assurance standards, all necessary quality control checks have been completed, and the final report

has been appropriately filed and uploaded to Ideagen Quality Management (IQM) or published on the National Services Scotland (NSS) website, if applicable

Note 1: In the absence of the Lead HCS, the Research Service Lead and the Principal HCS will assume the responsibilities associated with the Lead HCS role.

4.4. The NHSScotland Assure Information Officer manages the publication process, including the final report and all supplementary materials, ensuring compliance with accessibility and branding standards.

4.5. Rapid reviews are not published on the NSS website also adhere to NHSScotland Assure accessibility and branding guidelines. However, indexing them on IQM will be managed by the HCS team in collaboration with the Quality Management team.

Engagement of subject matter experts

4.6. A collaborative team structure, following a co-production approach, is central to the literature review process. Each review includes at least two SMEs – a lead and a support – who are actively engaged at key stages of the review process, providing subject-specific insights that enhance the relevance, accuracy, and real-world applicability of the review findings. The review maintains transparency and fosters a shared understanding of the evidence base by keeping SMEs informed throughout the process.

4.7. The key stages in which SMEs contribute include:

- commissioning phase – complete the initial information-gathering forms and collaborate with the healthcare scientists to refine the review scope
- protocol development – provide insights to shape the protocol to align with technical and strategic requirements
- screening, data extraction, and synthesis – offer expertise on subject matter aspects to ensure accuracy and completeness
- confidence assessments and grading – work closely with the healthcare scientist to produce the confidence assessments for each review finding
- final report review – validate the report, ensuring clarity and comprehensiveness in terms of the contents

Consultation process

4.8. Consultation is a critical element of the literature review process, ensuring the review is comprehensive and accurate, the findings are well-interpreted, and the outputs are aligned with practical needs and applications.

4.9. Consultation is conducted for the protocol and the final literature review report and typically involves existing NHSScotland Assure advisory groups, short-term working groups, and other NHSScotland Assure teams.

4.10. The consultation duration varies but generally takes up to two weeks. For rapid reviews, consultation may be omitted due to time constraints. Sometimes, the commissioner might deem consultation unnecessary for systematic and scoping reviews. However, this decision may be justified.

5. Tools and resources

EndNote

5.1. EndNote Reference Manager is critical throughout the literature review process. Its applications include:

- uploading and deduplicating references retrieved from bibliographic databases
- integrating references identified through manual searches and grey literature databases
- organising references into folders based on the inclusion status
- generating citations and bibliographies for the final review report

5.2. By consolidating all references in EndNote, the review team ensures consistency, efficiency, and accuracy across all stages of the review process.

Healthcare Scientist Technical Review Tool

5.3. The Healthcare Scientist (HCS) Technical Review Tool is a custom-built, Excel-based interface designed by the HCS Technical Team to support the literature review process, consolidating key review functions to improve efficiency and ensure standardisation across reviews. It facilitates the screening process based on predefined criteria, enables data extraction, automatically generates data for the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram, incorporates the methodological quality/ risk-of-bias assessments through Microsoft (MS) Forms, and produces the tables for inclusion in the final literature review report.

Microsoft Forms

5.4. MS Forms is used within the literature review process to support the methodological quality/ risk-of-bias assessments by enabling reviewers to complete predefined checklists systematically. Additionally, MS Forms are used to collect feedback from consultation with advisory or other short working groups, ensuring that their input is systematically documented.

6. References

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Appendix A Key terms and definitions

Document Title	Document File Path/ Uniform Resource Locator (URL)
Evidence from manufacturers	Information provided by manufacturers. When integrating such evidence, it is crucial to address and consider any conflicts of interest explicitly. Consulting independent experts can help provide an unbiased interpretation of the data presented by manufacturers.
Expert opinion	Insights from subject matter experts (SMEs), including published editorials, commentary articles in peer-reviewed journals, panel discussions at professional conferences, or direct consultations. Expert opinion supplements empirical evidence in literature reviews by providing reasoned judgments that can support or challenge existing findings.
Grey literature	Research and documents that are either unpublished or published outside of traditional peer-reviewed journals. This includes unpublished empirical studies, government reports and policies, working papers, white papers, guidance documents, technical papers, theses, conference papers, and manufacturer documents.
Peer-reviewed empirical studies	Studies that experts in the field have reviewed before publication. This includes both qualitative and quantitative research involving human or non-human subjects.
Qualitative studies	Research that explores people's experiences, perceptions, and meanings using methods such as interviews, focus groups, or observations.
Quantitative studies	Research involving numerical data assessing relationships between variables or the effectiveness of interventions. Quantitative studies can be: • human-related: involving human participants or datasets • non-human-related: involving non-human subjects or datasets, such as laboratory experiments, environmental research, or engineering studies
Record	Used during the screening stage to refer to a report's title or abstract (or both) indexed in a database or website (such as a title or abstract for an article indexed in Medline).
Report	Used to refer to any piece of evidence, irrespective of its type, such as study, guidance document, conference paper, and so on.
Review finding	A review finding synthesises evidence extracted from multiple reports that fully or partially answers a review question. There may be multiple findings under a review question.
Study	An investigation, such as a clinical trial, which includes a defined group of participants and one or more interventions and outcomes. A ‘study’ might have multiple reports, such as the protocol, baseline characteristics, results for the primary outcome, secondary outcomes, and additional mediator and moderator analyses.

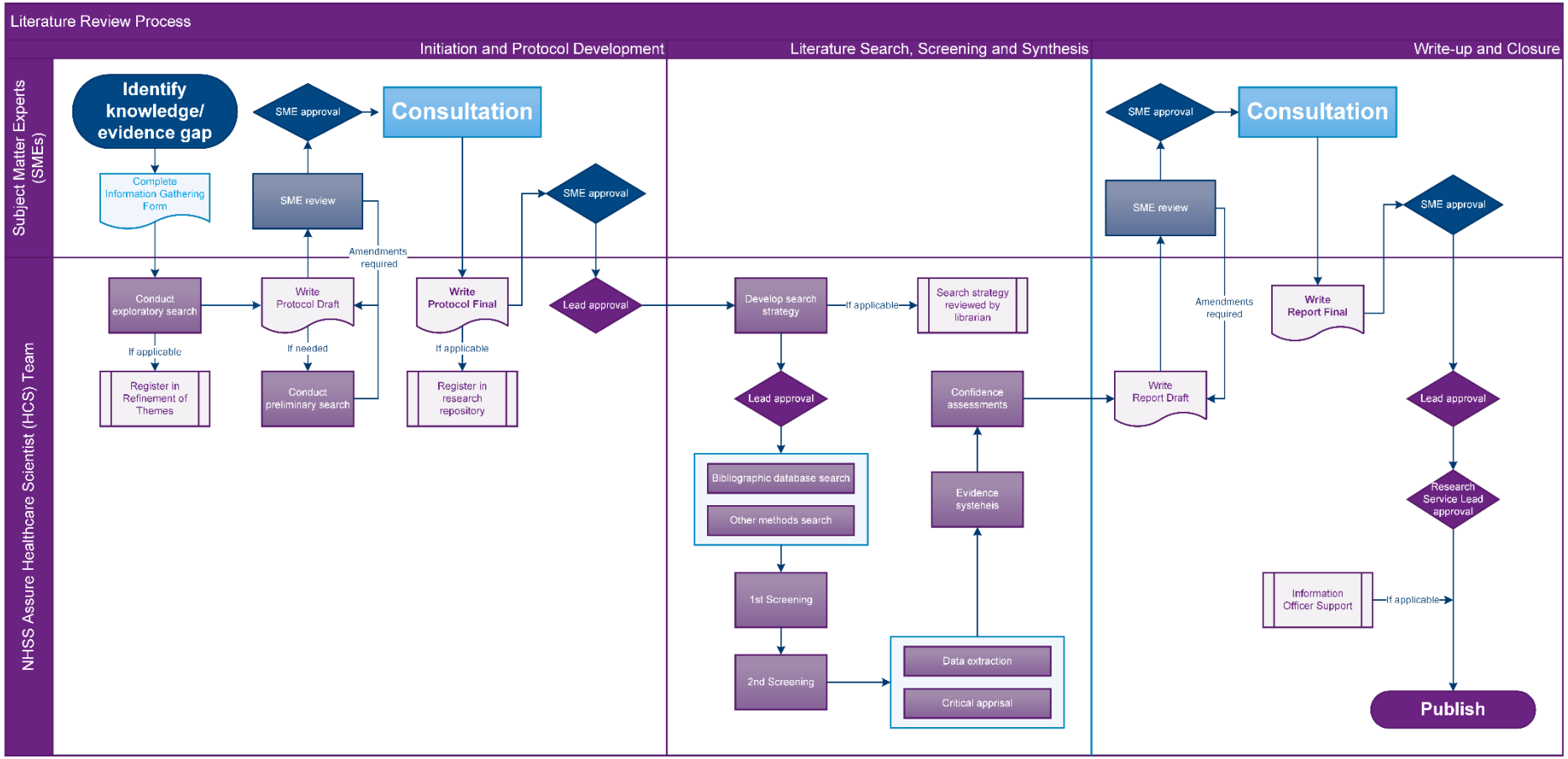
Appendix B Key characteristics across review types

Stages	Systematic Literature Reviews	Rapid Reviews	Scoping Reviews
Authors	• Two authors	• One author	• One or two authors
Search	• All relevant bibliographic databases • Grey literature search (if applicable) • Manual search • Should the review extend beyond a year, the search process will be revisited before the final synthesis	• Conducted in general bibliographic databases • Specialised database searches limited to 1-2 sources • Manual searching and grey literature may be restricted	• All relevant bibliographic databases • Grey literature search (if applicable) • Manual search
Report selection	• Both authors independently screen titles, abstracts and full texts of eligible reports • Disagreements resolved through consensus; third reviewer involved if required	• One author screen titles, abstracts, and full texts of eligible studies	• Ideally conducted by two authors. If resources are constrained, screening can be done by one author
Critical appraisal	• Lead author conducts the critical appraisals, and the supporting author does a 100% check	• No critical appraisals required	• No critical appraisals required
Data Extraction	• Lead author extracts all the data, and the supporting author conducts a 100% check	• Data extraction may be limited to essential items – existing systematic reviews can be used • A supporting author can be brought to	• For a two-author review, the lead author extracts data, and the supporting author conducts a 30% check

Stages	Systematic Literature Reviews	Rapid Reviews	Scoping Reviews
		conduct a 100% check	
Confidence Assessments	• Collaboration among lead, supporting author, Lead/ Principal HCS, and at least one SME	• SME consultation if time allows • Use proxy indicators for the methodological quality/ risk-of-bias criterion	• No confidence assessments required
Consultation	• Yes	• Not required	• Yes
Publication	• Yes	• Not required	• Yes

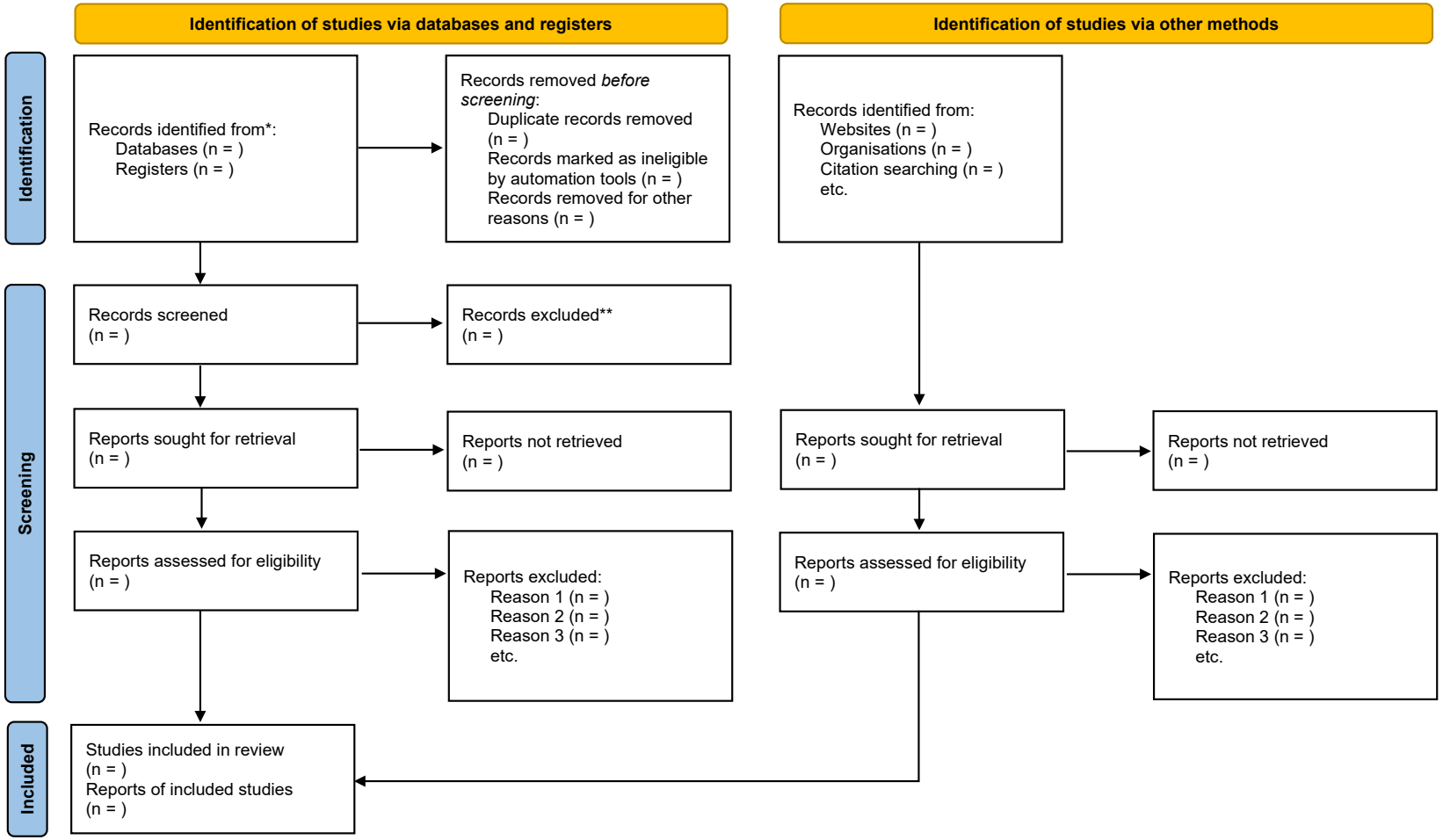
Appendix C Detailed process overview

Figure C.1 Detailed flowchart overview of literature review process



Appendix D Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram template

Figure D.1 PRISMA Flow Diagram



Appendix E Roles and responsibilities

Lead author

E.1 The lead author's roles and responsibilities include:

- being responsible for all aspects of the review and considered the first line of contact for any queries and discussions regarding its content
- liaising with the Commissioner to gather the required information to initiate the work
- leading all the meetings related to the review
- liaising with the Lead/ Principal Healthcare Scientist (HCS) to ensure the proposed timeline for the review is feasible and meets internal deadlines
- liaising with the Subject Matter Experts (SMEs) allocated to the review, ensuring clear and timely communication
- setting up a group chat on Microsoft Teams, including all the HCS involved and the Lead/ Principal HCS
- sharing relevant information with other HCS when it is pertinent to the tasks they are working on
- seeking assistance from other HCSs if there is insufficient time to complete a task
- liaising with other relevant parties when required throughout the review process
- formatting the Evaluation Tool that goes out to consultations groups along with the consultation documents
- conducting final checks of any drafts following SMEs/ Commissioner sign-off
- liaising with the NHSScotland Assure Information Officer to review drafts for accessibility, format, branding, functionality, and tone of voice, ensuring all hyperlinks and the table of contents are correct before consultation and final report publication
- coordinating with the designated HCS for uploading of the final report and other related material on Ideagen Quality Management (IQM)
- liaising with the designated HCS to update the National Services Scotland (NSS) website - HCS Technical Landing Page
- assessing the suitability of the literature review for publication in a peer-reviewed journal and manages the submission process
- keeping the file '[Year-Year] HCS Tech Review Timeline' updated for the literature review
- ensuring that all the review documentation is appropriately saved and filed in the correct locations including sign offs and correspondence

Supporting author

E.2 The supporting author's roles and responsibilities include:

- in a two-person review, having joint responsibility for developing the protocol, search strategy, screening, retrieving and requesting reports from the library, and conduct the grey literature search
- performing 'checks' of the critical appraisals and data extraction, subject to resource availability and type of literature review
- providing feedback on the confidence assessment drafts
- actively engage in discussions with SMEs and attend regular meetings, taking the lead when the Lead Author is unavailable
- conducting a detailed proofread of the final literature review report and appendices, ensuring all citations and references are correct and traceable back to the original source
- proofreading all the revisions leading up to the publication if publishing in a journal
- keeping the file '[Year-Year] HCS Tech Review Timeline' updated for their part

Other supporting HCSs

E.3 They are not directly involved in the review but can provide essential support, such as:

- retrieving records
- conducting a detailed proofread of the final written literature review and appendices, ensuring all citations and references are correct and traceable back to the original source
- being consulted in cases of disagreement between reviewers during screening and data extraction stages

Lead/ principal HCS[1]

E.4 The Lead/ Principal HCS roles and responsibilities include:

- assigning members of the HCS team to literature reviews and agrees on proposed timelines
- providing a sense check and feedback on the protocol, search strategy, confidence assessments, final report, and supporting materials prior to sign-off
- signing off on the final search strategy, protocol and final report

[1] These tasks are typically assigned to the Lead HCS. However, in the absence of a Lead HCS, the Principal HCS will assume some of these responsibilities.

- commissioning the literature review using the NHSSA commissioning process when a review is not part of the annual work plan
- attending regular review team meetings when available

Subject matter experts (SMEs)

E.5 The SMEs roles and responsibilities include:

- supporting the HCS team throughout the literature review, providing insight and input when required
- being available for ad-hoc contact
- identifying appropriate working groups and individuals for consultation and introduces the Lead Author to these groups
- attending scheduled meetings on a regular basis or, if unavailable, suggests a suitable alternative date
- reviewing and provides feedback on the protocol and final report and contributes to the confidence assessments
- reviewing consultation feedback and draft responses
- signing off on the protocol and final literature review report

Consultation group

E.6 The consultation group roles and responsibilities include:

- reviewing and provides comments, in a timely manner, on the protocol and final literature review report
- declaring any conflict of interest

Information officer (external documents only)

E.7 The Information Officer roles and responsibilities include:

- ensuring correct formatting of the protocol and final literature review report and adherence to branding guidelines
- verifying the functionality, tone of voice, hyperlinks and accessibility of documents
- uploading the protocol and literature review report to the NSS website

Abbreviations

AACODS:	Authority, Accuracy, Coverage, Objectivity, Date, and Significance
AGREE:	Appraisal of Guidelines for Research & Evaluation
ARHAI:	Antimicrobial Resistance and Healthcare Associated Infection
CASP:	Critical Appraisal Skills Programme
CEBMa:	Center for Evidence-Based Management
CERQual:	Confidence in the Evidence from Reviews of Qualitative Research
CINAHL:	Cumulative Index to Nursing and Allied Health Literature
GRADE:	Grading of Recommendations, Assessment, Development, and Evaluations
HBE:	healthcare-built environment
HCS:	Healthcare Scientist
IEEE:	Institute of Electrical and Electronics Engineers
IQM:	Ideagen Quality Management
JBI:	Joanna Briggs Institute
MMAT:	Mixed Methods Appraisal Tool
OSF:	Open Science Framework
PRISMA:	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PROSPERO:	International Prospective Register of Systematic Reviews
RCTs:	randomised controlled trials
SIGN50:	Scottish Intercollegiate Guidelines Network 50
SME:	subject matter expert
SOP:	standard operating procedure
URL:	Uniform Resource Locator