

A Practical 19-Step Guideline for Conducting and Reporting Systematic Reviews Without Meta-Analysis: The Hawler Medical University Approach

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ABSTRACT

Background and objective: Approximately one-third of health systematic reviews do not employ meta-analysis, and novice reviewers may report narrative syntheses with insufficient methodological detail. Established resources such as PRISMA 2020, PRISMA-P, SWiM, the Cochrane Handbook, and GRADE provide complementary guidance but are distributed across separate documents. This guideline provides a practical, step-by-step approach for conducting and reporting systematic reviews without meta-analysis for students at Hawler Medical University.

Methods: The 19-step guideline was developed by mapping complementary recommendations from PRISMA 2020, PRISMA-P, SWiM, the Cochrane Handbook, MMAT, Garrard's matrix method, GRADE, and JBI guidance across four sections: Methods (Steps 1–9), Results (Steps 10–13), Discussion (Step 14), and Conclusion and reporting elements (Steps 15–19). Reporting standards were distinguished from methodological guidance and institutional recommendations. Each step identifies its intended location, procedure, rationale, and corresponding reporting output. A draft was circulated to a panel for feedback and revised with an audit trail.

Results: The guideline links methodological decisions to reporting outputs, including protocol development and registration, topic scoping, reproducible search design, eligibility criteria, two-stage screening, design-appropriate critical appraisal, standardized data extraction, and structured synthesis. It emphasizes reviewer calibration, transparent documentation, and selection of synthesis methods according to the review question and evidence type. Worked examples, synthesis matrices, and conceptual models are presented as optional teaching tools where appropriate rather than universal requirements.

Conclusion: This practical 19-step guideline integrates established methodological and reporting resources into a single institutional framework for systematic reviews without meta-analysis. It is intended to support novice reviewers while allowing methodological choices to vary according to the review question, study designs, and evidence type. The framework also incorporates considerations relevant to Iraq and the Kurdistan Region and should be refined through future usability and implementation evaluation.

Keywords: Research design, Evidence-based practice, Students, Health occupations, Universities, Iraq

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INTRODUCTION

Systematic reviews are considered one of the most rigorous forms of evidence in health sciences (1). They enable researchers to systematically identify, appraise, and synthesize existing studies addressing a specific research question, which can inform clinical decision-making and health policy (2). However, conducting a systematic review is a complex process, particularly for students and early-career researchers who may have limited methodological experience (3).

This complexity arises from the multiple stages involved. A systematic review requires a clearly defined research question, comprehensive and transparent search strategy, structured study-selection process, assessment of study quality, systematic data extraction, and an appropriate method for synthesizing findings (4,5). Each stage requires careful methodological decisions, and weaknesses in any stage may compromise the reliability of the review (6).

Transparent reporting is equally important, and should be understood as distinct from the methodological conduct of a review. The PRISMA 2020 statement is itself a reporting checklist: it specifies what must be disclosed about a completed review, not the procedural steps used to conduct it (2). This guideline addresses that distinction directly by treating PRISMA 2020 items as reporting benchmarks that the procedural steps below are designed to satisfy, rather than as the conduct methodology itself. However, approximately one-third of health-related systematic reviews do not include meta-analysis and instead use narrative approaches to synthesis (7). Such syntheses are sometimes reported without sufficient methodological detail, making it difficult to assess the validity of their conclusions. The Synthesis Without Meta-analysis (SWiM) guideline was

therefore developed to provide specific reporting standards for systematic reviews in which statistical pooling is not undertaken (7).

A critical-appraisal tool appropriate to the included study designs provides a structured way to assess methodological quality; the Mixed Methods Appraisal Tool is one such option when a review includes a mixture of quantitative, qualitative, and descriptive designs (8). The GRADE approach provides a systematic framework for assessing certainty in the evidence based on factors such as risk of bias, consistency, and precision, and should be applied where it fits the review question and evidence type rather than by default (9). Similarly, structured approaches such as the matrix method can help researchers organize extracted information before synthesis (10).

For students in nursing, pharmacy, medicine, health science, public health, and related health sciences, integrating these components during a first systematic review can be challenging (5). This guideline therefore provides students at Hawler Medical University with a clear, sequential approach to planning, conducting, and reporting systematic reviews. It draws on established reporting standards and methodological guidance, including PRISMA 2020, PRISMA-P, SWiM, the Cochrane Handbook, MMAT, GRADE, and JBI guidance, while maintaining a clear distinction between reporting requirements and methodological conduct (2,7,9,11,12). Its purpose is to guide students systematically from developing the research question to preparing the final manuscript.

METHODS

Guideline Development and Scope

This institutional guideline was developed by mapping established reporting standards and

methodological resources to sequential stages of a systematic review without meta-analysis. PRISMA 2020 and PRISMA-P are treated primarily as reporting standards; SWiM is applied when its scope fits the synthesis; and the Cochrane Handbook, MMAT, Garrard's matrix method, GRADE, and JBI guidance provide methodological support for specific stages. The 19 steps were organized to connect each methodological decision

with its expected manuscript output (Figure 1). A draft was circulated to a panel for feedback, and revisions addressed separation of worked examples from institutional recommendations, reviewer calibration, audit-trail documentation, and distinction between core and conditional procedures. The guideline has not yet undergone empirical usability testing, which is identified as a priority for future evaluation.

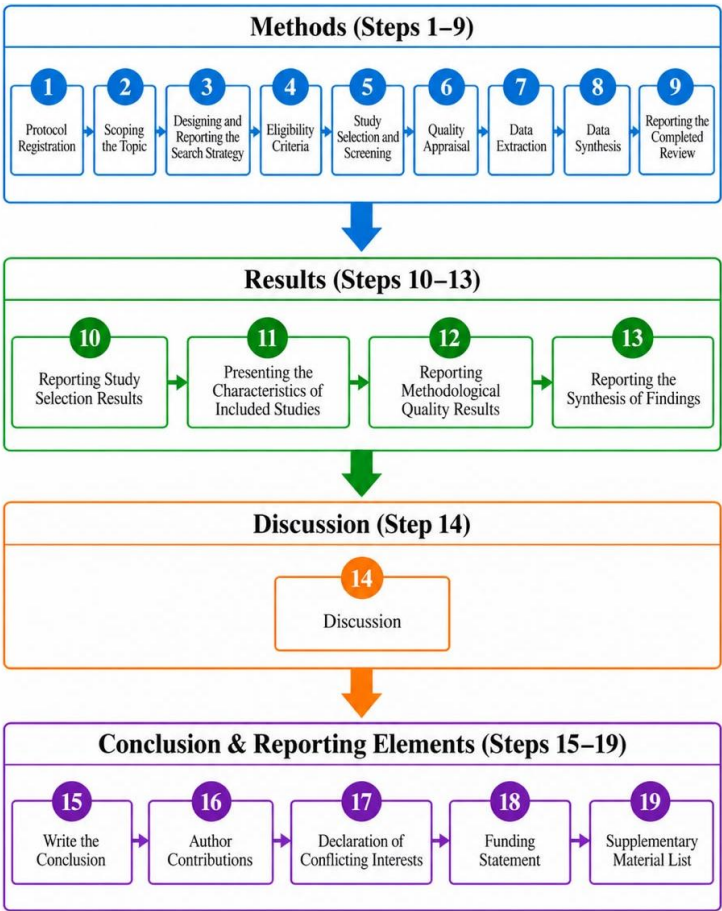


Figure 1. The HMU 19-Step Systematic Review Workflow. The workflow summarizes the sequential framework for conducting and reporting systematic reviews without meta-analysis, organized into four sections: Methods (Steps 1–9), Results (Steps 10–13), Discussion (Step 14), and Conclusion and Reporting Elements (Steps 15–19). The framework links key methodological procedures with their corresponding reporting outputs to support a structured, transparent, and reproducible review process.

THE 19-STEP GUIDELINE

Part 1: Methods

Terminology used in this guideline: "Core recommendation" indicates a procedure expected for most systematic reviews; "conditional recommendation" indicates a procedure that depends on the review question, design, evidence type, or target-journal requirements. These labels describe this institutional guideline and should not be interpreted as universal PRISMA methodological requirements.

Reported location: Early in the Methods section.

Guideline status: Core recommendation for protocol development; prospective registration is strongly recommended where an appropriate registry accepts the review type, with an alternative dated and version-controlled protocol record when needed.

Step 1: Protocol Registration

Guideline status: Core recommendation.

Define the review question and eligibility criteria, identify the planned databases, and specify the intended synthesis approach before the review begins; together, these elements form the core of the review protocol (11). Prospectively register the protocol before formal screening or data extraction begins when an appropriate registry accepts the review type. Prospective registration demonstrates that the principal methods were planned in advance rather than modified in response to the findings obtained (13).

PROSPERO is a widely used prospective registry for eligible health-related systematic reviews. Not all review types are eligible for PROSPERO. If the proposed review is not eligible, use an appropriate alternative registry or repository, such as the Open Science Framework (OSF), a national or institutional

repository, or a dated and version-controlled protocol deposited with the institution. In any route used, cite the registration number, DOI, or archived link in the final manuscript (13). If changes are needed after registration, such as modification of an eligibility criterion, addition of a database, or a change in the synthesis plan, record the date, original wording, revised wording, and reason for the amendment (11,14). This supports transparency and consistency between the registered protocol and the completed review ([see Supplementary Step 1](#)).

Step 2: Scoping the Topic

Scoping is a preliminary, informal exploration of the study topic used to refine the research question, key concepts, and eligibility criteria; it involves a brief search, review of related published literature, and identification of terminology variation across databases and journal sources (15). For reviews focused on Iraq or the Kurdistan Region of Iraq (KRI), searching the Iraqi Academic Scientific Journals (IASJ) database alongside relevant international databases is recommended where relevant to the review question, particularly when locally published evidence may not be indexed internationally (16). Adequate scoping at this stage reduces the risk of an incomplete search strategy (Step 3) and poorly specified eligibility criteria (Step 4) ([see Supplementary Step 2](#)).

Step 3: Designing and Reporting the Search Strategy

To minimize the risk of missing relevant studies, systematic reviews should use a structured, sensitive, and reproducible search strategy across appropriate databases (2). The search strategy should be designed to maximize sensitivity—that is, to capture as many potentially eligible studies as possible—rather than being narrowed simply because an initial search returns a large number of

records; overly restrictive narrowing risks excluding eligible studies and compromising reproducibility. If an initial search returns an unmanageable number of records, refine the search using additional relevant concept terms or database-specific filters that are methodologically justified (e.g., study type or publication status), rather than arbitrarily tightening Boolean logic (15). Search concepts should be derived from the review question and the framework appropriate to that question (e.g., PICO, PECO, or SPIDER), rather than from a fixed population–setting–outcome structure. Within each concept, synonyms and controlled vocabulary are combined using OR, and the resulting concept groups are combined using AND as appropriate (15). The search strategy should first be developed and tested in one database and then adapted to the indexing and syntax of each additional database. For reviews focused on Iraq or the Kurdistan Region of Iraq, the Iraqi Academic Scientific Journals (IASJ) database should be considered where relevant to capture locally published evidence, including studies published in Arabic or Kurdish that may not be indexed in major international databases. For every database searched, report the exact search string, date searched, filters or limits, and number of records retrieved. Full database-specific strategies should be provided in a supplementary file, consistent with transparent systematic-review reporting (2). [See Supplementary Step 3.](#)

Step 4: Eligibility Criteria

Guideline status: Core recommendation.

Eligibility criteria should be defined a priori to determine which retrieved records qualify for inclusion. The research question should first be structured using a framework appropriate to its type and design—for example, PICO (Population, Intervention, Comparison, Outcome) for intervention questions, PECO (Population,

Exposure, Comparison, Outcome) for exposure-based questions, PICO (Population, Interest, Context) for qualitative questions, or SPIDER (Sample, Phenomenon of Interest, Design, Evaluation, Research type) for reviews of qualitative or mixed-methods evidence (5). PICO/PICOS should not be applied by default to every review; the selected framework should reflect the nature of the research question. Once selected, the framework components are translated into explicit inclusion and exclusion criteria. These criteria are compiled into a single reference table that guides title/abstract and full-text screening and serves as the basis for include/exclude decisions, consistent with PRISMA 2020 reporting standards (2). ([see Supplementary Step 4](#)).

Step 5: Study Selection and Screening

Guideline status: Core recommendation.

Study selection proceeds in two sequential stages following removal of duplicate records, consistent with PRISMA 2020 reporting of the screening and selection process (2). All retrieved records are first imported into a reference management tool to enable automated duplicate detection, supplemented by manual review to identify duplicates missed because of formatting inconsistencies. Two reviewers should independently screen a small common sample of titles/abstracts and full texts before formal screening begins to confirm consistent interpretation of the eligibility criteria; disagreements identified during calibration should be discussed and resolved before full-scale screening (15). Two reviewers then independently screen titles and abstracts of the remaining records, with potentially eligible records advancing to full-text review. Disagreements at both stages are resolved through discussion, with a third reviewer available to arbitrate unresolved conflicts. The

complete selection process is documented in a PRISMA 2020 flow diagram (2) ([see Supplementary Step 5](#) for the detailed screening procedure and worked PRISMA example).

Step 6: Quality Appraisal

Guideline status: Core recommendation; the appraisal instrument depends on the included study designs.

Methodological quality or risk of bias of included studies should be assessed using a tool appropriate to the study designs and review question. PRISMA 2020 item 11 requires authors to report the tool used, the number of reviewers involved, and whether assessments were conducted independently (2), but it does not prescribe a single appraisal instrument. For reviews containing a mixture of qualitative, randomized, non-randomized, descriptive, and mixed-methods designs, the Mixed Methods Appraisal Tool (MMAT), version 2018, is one appropriate option (8). Where a review includes only one study design, a design-specific tool such as Cochrane RoB 2 or ROBINS-I may be more appropriate. Reviewers should pilot the selected appraisal tool on a small number of included studies and resolve differences in interpretation before assessing all studies. When MMAT is used, criterion-level responses should be reported as "Yes," "No," or "Cannot tell"; an overall percentage score, total score, or quality category should not be calculated because MMAT guidance discourages summing criteria across different study designs. Two reviewers should conduct appraisal independently where feasible. Cohen's kappa may be reported as an optional measure of inter-rater agreement, particularly for training or calibration purposes, but it should not be presented as a PRISMA requirement. If kappa values are interpreted using conventional categories, the interpretation source should be cited explicitly (17).

Appraisal findings should be used to contextualize the synthesis rather than automatically exclude studies unless quality-based exclusion was predefined in the protocol (2) ([see Supplementary Step 6](#)).

Step 7: Data Extraction

Guideline status: Core recommendation.

Data are extracted from all included studies using a standardized chart designed to capture the specific fields required by the review's research question, following guidance in the Cochrane Handbook. Core fields include study identification and setting, methodological characteristics, and each outcome or variable of interest, recorded exactly as presented in the original source without interpretation, rounding, or conversion. The extraction form is first piloted independently by two reviewers on a small subset of included studies to identify ambiguous fields or missing response categories, with disagreements classified as either form-related or reviewer-related and used to revise the form before full-scale extraction proceeds (18). A second reviewer will independently extract data from a defined subset of the remaining studies to assess consistency, and any discrepancies identified will be resolved through discussion and re-examination of the original article. The completed extraction chart will be reported as a supplementary file, with a condensed excerpt presented in the main text, consistent with PRISMA 2020 reporting standards for data collection processes (2) ([see Supplementary Step 7](#)).

Step 8: Data Synthesis

Guideline status: Core recommendation

Findings from the included studies should be synthesized using an approach appropriate to the review question, study designs, and type of data available. "Systematic review without meta-

analysis" is used here as an umbrella term for reviews in which statistical pooling is not undertaken; the appropriate synthesis approach may therefore differ across review types. Where a review examines quantitative intervention effects but meta-analysis of effect estimates is not possible or appropriate, the Synthesis Without Meta-analysis (SWiM) guideline should be used to guide transparent reporting of the synthesis (7). For descriptive or epidemiological reviews in which the principal findings are frequencies, distributions, characteristics, or other non-comparative outcomes, a structured narrative or descriptive synthesis may be more appropriate. For mixed-methods reviews that formally integrate qualitative and quantitative evidence, an established mixed-

methods synthesis approach, such as the JBI convergent integrated approach, may be considered where appropriate (12). The selected approach should be specified and justified according to the review question and included evidence (Figure 2). A synthesis matrix may be constructed as an organizational tool, with studies listed as rows and relevant outcomes, domains, or themes as columns. For each theme, interpretation should consider the direction and magnitude of findings, size and precision of contributing studies, heterogeneity, and risk of bias rather than relying on a simple count of statistically significant results. The limitations of the chosen synthesis method should be reported explicitly, with SWiM used when applicable (7) ([see Supplementary Step 8](#)).

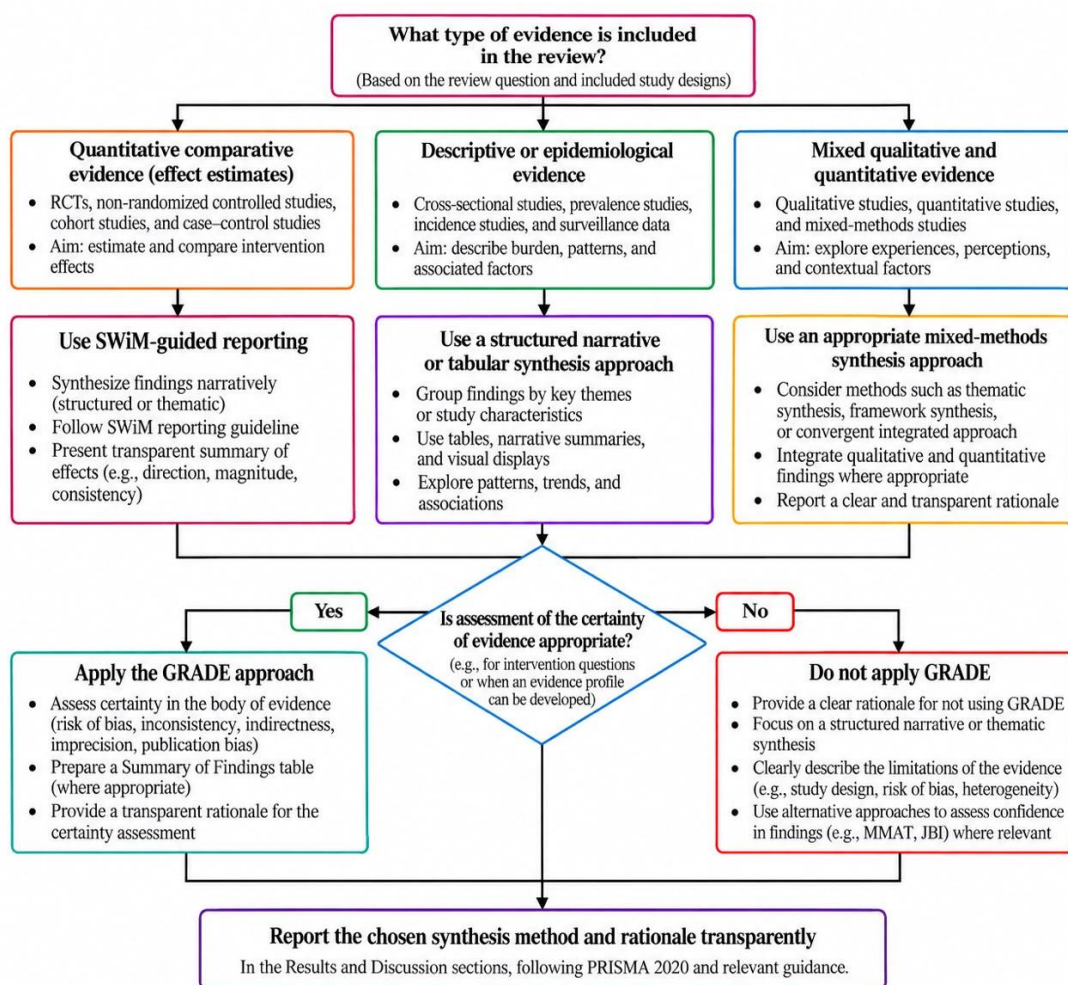


Figure 2. Decision Framework for Synthesis Without Meta-Analysis. The framework guides selection of an appropriate synthesis approach according to the type of evidence included in the review. Quantitative comparative evidence is directed toward SWiM-guided reporting, descriptive or epidemiological evidence toward structured descriptive or narrative synthesis, and mixed qualitative and quantitative evidence toward an appropriate mixed-methods synthesis approach. The framework subsequently prompts reviewers to determine whether certainty-of-evidence assessment is appropriate, with GRADE applied when suitable and a transparent rationale provided when it is not.

Step 9: Reporting the Completed Review

Guideline status: Core reporting recommendation.

Prior to finalizing the manuscript, the completed review should be systematically verified against the PRISMA 2020 reporting checklist to confirm that all applicable reporting items have been addressed (2). This verification checks reporting completeness; it does not itself validate the methodological conduct of the review, which should have been addressed through Steps 1–8. A limitations paragraph should distinguish limitations of the included studies from limitations of the review process itself, including

omission of a formal certainty-of-evidence assessment where such assessment was not appropriate or feasible (9). Researchers should retain a documented audit trail—including search exports, screening decisions, exclusion reasons, extraction forms, appraisal results, and protocol amendments—to support reproducibility (Figure 3). The completed PRISMA 2020 checklist should be submitted as supplementary material where required by the target journal (2) ([see Supplementary Step 9](#)).

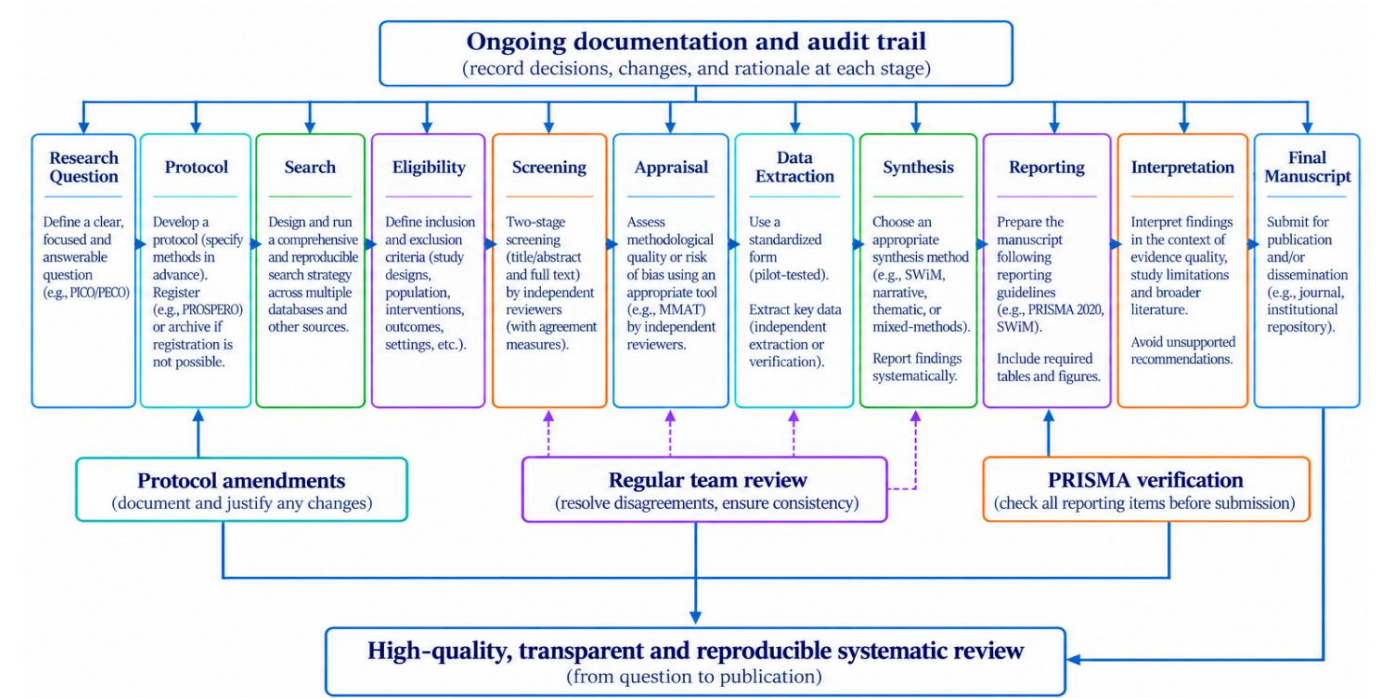


Figure 3. From Review Question to Published Systematic Review. The conceptual workflow illustrates the progression from formulation of the research question through protocol development, literature searching, eligibility assessment, screening, methodological appraisal, data extraction, synthesis, reporting, interpretation, and preparation of the final manuscript. Ongoing documentation and an audit trail support all stages, while protocol amendments, team review, and PRISMA verification provide iterative quality-control checkpoints to enhance transparency, consistency, and reproducibility.

Part 2: Results

This section continues directly from the Methods using Ahmed et al.'s (19) systematic review of sociodemographic characteristics and modes of HIV transmission in Iraq as a worked exemplar. The HIV example is used solely to demonstrate application of the guideline and does not define an institutional requirement or restrict the framework to HIV research. In the final layout, worked-example material should be visually separated from core recommendations using clearly labelled boxes or formatting. The same methodological principles should be adapted to the review question and evidence type across other health-science fields, including clinical research, public health, environmental health, occupational health, and maternal and child health. Every number and table used in a worked exemplar should remain internally consistent across the Methods, Results, tables, figures, and supplementary materials.

Step 10: Reporting Study Selection Results

Guideline status: Core reporting element (PRISMA 2020 items 16a and 16b).

The outcome of the study selection process is reported at the start of the Results section, restating in narrative form the exact figures already documented in the PRISMA 2020 flow diagram (2). This will include the total number of records identified across all databases and citation-searching sources, the number of duplicate records removed, and the number of unique records that proceeded to title and abstract screening. The number of records excluded at the screening stage and the number of full-text reports subsequently assessed for eligibility will then be stated, followed by the number of reports excluded at the full-text stage, broken down by specific reason and count. Consistent with PRISMA 2020 item 16b, at least one study that appeared to meet the eligibility criteria

but was ultimately excluded is identified by name, together with the specific reason for its exclusion, rather than reporting exclusions only as aggregate totals (2). The paragraph will close by stating the final number of studies included in the review, and the PRISMA flow diagram will be presented immediately alongside this text to allow the reader to verify that every reported figure is fully consistent between the narrative and the diagram. See step 10 for more details and examples.

Step 11: Presenting the Characteristics of Included Studies

Guideline status: Core reporting element (PRISMA 2020 item 17).

The characteristics of the included studies should be presented primarily in a study-level characteristics table so that readers can identify the design and context of each included study. Core fields may include author/year, country or setting, study design, participant characteristics, sample size, exposure or intervention, comparator where applicable, and outcomes or variables relevant to the review question. Aggregate frequencies by publication year, design, sample-size band, or other variables may be added as a secondary summary where useful, but they should not replace study-specific information. As Ahmed et al. (19) (p. 9) reported: "A total of six studies were included... Most studies were published in 2020 ($n = 2$) and 2021 ($n = 2$). Sample sizes varied, ranging from 39 to 72 participants ($n = 4$) and from 539 to 892 participants ($n = 2$). The mean age across the included studies was 35.17 years ($SD = 9.06$)." This published value is reproduced here only as part of the worked example and should not be interpreted as a recommended method for pooling study-level means and standard deviations. Reviewers should not calculate an unweighted arithmetic average of means or SDs reported by heterogeneous primary

studies. If a pooled quantitative estimate is required, an appropriate meta-analytic method incorporating study-specific sample sizes and variance information should be used; otherwise, study-specific summary statistics should be reported descriptively. [See Supplementary Step 11.](#)

Step 12: Reporting Methodological Quality Results

Guideline status: Core reporting element (PRISMA 2020 item 18).

Methodological quality or risk-of-bias results should be reported criterion by criterion, summarizing the pattern of "Yes," "No," and "Cannot tell" ratings when MMAT is used, with discrepancies between reviewers resolved through discussion (8). The criteria most frequently unmet may be identified by examining individual appraisal domains rather than relying on an overall percentage or total score, since no aggregate MMAT score is computed under this guideline's approach (see Step 6). Where Cohen's kappa was prespecified as part of reviewer calibration or reliability assessment, it may be reported with an appropriate interpretation source (17); it should not be implied to be mandatory under PRISMA. For example, Ahmed et al. (19) reported a kappa value of .76 for inter-rater agreement. This guideline uses the worked example to demonstrate reporting while retaining criterion-level appraisal rather than numeric per-study averages. [See Supplementary Step 12.](#)

Step 13: Reporting the Synthesis of Findings

Guideline status: Core reporting element (PRISMA 2020 item 20); the presentation format depends on the synthesis approach.

For the descriptive epidemiological example used in this guideline, findings from the included studies are synthesized using a structured narrative and thematic organization of the reported sociodemographic and transmission-related data.

This approach is selected because the review primarily summarizes descriptive characteristics rather than pooled intervention-effect estimates. Where qualitative and quantitative evidence require formal integration, an appropriate mixed-methods synthesis framework, such as the JBI convergent integrated approach, may instead be used where justified (12). Each sub-theme may be presented under its own heading, reporting the number of contributing studies, relevant figures and sample sizes, and the studies contributing to each finding. The Results section should synthesize only evidence from studies included through the predefined systematic-review process. Comparisons with external studies, surveillance reports, guidelines, prior reviews, or other evidence not included in the systematic review should normally be reserved for the Discussion (Step 14). Any included study whose findings diverge from the predominant pattern should be identified in the Results, while possible methodological, contextual, or structural explanations should be explored in the Discussion. A conceptual model may be included when it meaningfully clarifies relationships among themes; it is an optional presentation tool rather than a universal requirement. [See Supplementary Step 13](#) for detailed procedures and worked examples.

Part 3: Discussion

Step 14: Discussion

This guideline provides Hawler Medical University students with a sequential, 19-step framework for planning, conducting, and reporting systematic reviews without meta-analysis. It brings together PRISMA 2020 and PRISMA-P as reporting and protocol-reporting standards, SWiM as reporting guidance for applicable syntheses without meta-analysis, and methodological resources including MMAT, Garrard's matrix method, the Cochrane

Handbook, GRADE, and JBI guidance (2,7–12,20). These resources are complementary rather than interchangeable, and their use should depend on the review question, evidence type, and intended synthesis. To our knowledge, this is an institution-specific resource developed for Hawler Medical University that links methodological decision points with publication-ready examples and expected reporting outputs, rather than presenting procedural instruction and reporting standards as disconnected documents (6).

The need for this kind of integration is well supported by empirical evidence on training gaps. Early-career researchers consistently report that systematic review training is fragmented across stages, with searching, screening, appraisal, and synthesis often taught as isolated skills rather than as a connected workflow, and this fragmentation is repeatedly identified as a major barrier to producing methodologically sound reviews (21). Capacity-building research further shows that individual skills training has limited value unless tightly coupled to hands-on practice within an actual review, and that this coupling is frequently absent from institutional training programs, particularly in settings with limited research infrastructure (22). By anchoring all 19 steps to one running example, this guideline directly addresses that coupling gap, allowing students to see exactly how a decision made at an early stage, such as search strategy design, constrains and feeds into a later stage, such as reporting study selection results (3).

A deliberate design choice in this guideline was to distinguish study-level methodological appraisal from certainty-of-evidence assessment. MMAT-based appraisal evaluates methodological quality at the individual-study level, whereas GRADE addresses certainty in a body of evidence and

should be applied only where it is appropriate to the review question, outcome structure, and evidence type. GRADE is therefore treated as a conditional component of the framework rather than a universal requirement. Where GRADE or another formal certainty framework is not appropriate, authors should explain this decision and avoid implying that critical appraisal of individual studies is equivalent to certainty assessment across the body of evidence. This separation reduces the risk that students conflate study-level appraisal with the confidence that can be placed in conclusions drawn across the overall evidence base (9).

This guideline's principal strength is its specificity: every step names where its output belongs in the manuscript and which upstream table or figure it must match exactly, and it includes a consistency checklist to catch numerical mismatches between the Methods, Results, and PRISMA flow diagram, a category of error frequently flagged during peer review (2). This level of cross-referencing detail is largely absent from general-purpose systematic review guidance and is particularly valuable given that resource and training constraints can compound methodological errors in settings without established review infrastructure (22).

Structured peer feedback on the draft identified several areas requiring clarification, including clearer separation between worked examples and institutional recommendations, reviewer calibration before formal screening and appraisal, explicit documentation of an audit trail, and clearer distinction between core and conditional procedures. These elements were incorporated during revision. Remaining limitations include the need for further standardized institutional templates, a concise workflow figure, and empirical evaluation of the guideline's usability and its effect on the methodological and reporting quality of

student-authored systematic reviews. The current guideline should therefore be regarded as a practical institutional framework that requires prospective usability and implementation evaluation.

Future revisions should further develop standardized institutional templates, incorporate a concise one-page workflow figure, and empirically evaluate whether use of the guideline improves the methodological and reporting quality of student-authored systematic reviews. A pilot evaluation among students and supervisors should assess clarity, feasibility, usability, and consistency of application.

Part 4: Conclusion and Reporting Elements

Step 15: Write the Conclusion

The Conclusion belongs in the final section of the manuscript, positioned immediately after the Discussion. It should briefly restate the principal finding or synthesis, explain its practical or scientific implication in proportion to the strength and certainty of the evidence, and identify a specific research or practice implication only when supported by the review findings. Recommendations for clinicians, policymakers, or guidelines should not be made when the evidence is insufficient or uncertain. The conclusion should remain concise, avoid introducing new findings, numbers, or references, and use cautious language that reflects the limitations of both the included studies and the synthesis ([see Supplementary Step 15](#)).

Step 16: Author Contributions

This element appears immediately after the Conclusion and before the Funding statement, listing each author's specific contribution so that authorship is transparent and verifiable rather than assumed, in line with authorship standards

requiring substantial methodological or intellectual input rather than seniority or administrative role as set out by the International Committee of Medical Journal Editors (ICMJE) (23). Each author's initials should be listed with a specific statement of contribution, such as designing the review, conducting the search, screening records, extracting data, performing quality appraisal, or drafting and editing the manuscript, generally expressed as one sentence per author or role ([see Supplementary Step 16](#)). Journals increasingly require this level of specificity because transparent contribution statements strengthen accountability in systematic reviews.

Step 17: Declaration of Conflicting Interests

This element follows Author Contributions and requires a clear statement of whether any author has a financial, professional, or personal interest that could reasonably be perceived to influence the conduct, interpretation, or reporting of the review (2). If no conflict exists, this should be stated explicitly rather than omitting the section, consistent with ICMJE recommendations (23) ([see Supplementary Step 17](#)).

Step 18: Funding Statement

This element follows the Declaration of Conflicting Interests and requires explicit identification of the funding source and grant or award number when financial support was received. If the review was conducted without external funding, this should also be stated explicitly. Transparent funding disclosure allows readers to assess the possibility of sponsor influence on review conduct or interpretation and should follow the requirements of the target journal and relevant authorship/reporting guidance (23).

Step 19: Supplementary Material List

This element appears near the end of the manuscript, positioned before or after the reference list according to the target journal's requirements. Its purpose is to provide a complete index of supplementary files so that readers and reviewers can locate material supporting the methods and reported findings (2). Each supplementary file should be listed by its exact name and a concise description, and each entry should match how the file is cited in the manuscript. The supplementary package should include, where applicable, full database-specific search strategies, the complete data-extraction matrix, criterion-level appraisal results, the completed PRISMA checklist, the list of full-text exclusions with reasons, the registered protocol or protocol record, and other materials needed to support reproducibility.

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COMPETING INTEREST

The authors declare that they have no competing interests.

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