

PRISMA-AI: A Proposal for Reporting Artificial Intelligence Use in Systematic Reviews and Meta-Analysis

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ABSTRACT

Scientific rigor, transparency, and reproducibility are the fundamental characteristics of good systematic reviews and meta-analyses (SRMA). These fundamentals make SRMA resource-intensive and time-consuming. To enhance efficiency and scalability, researchers are increasingly using artificial intelligence (AI) in literature screening, data extraction, and bias assessment. Current reporting guidelines, including Preferred Reporting Items for systematic reviews and meta-analyses (PRISMA)-2020, were designed for human-led workflows and lack explicit requirements for reporting AI use, creating risks of under-reporting and limited reproducibility. Although AI-focused extensions such as Consolidated Standards of Reporting Trials (CONSORT)-AI, Standard Protocol Items: Recommendations for Interventional Trials (SPIRIT)-AI, and Transparent Reporting of a multivariable prediction model for Individual Prognosis or Diagnosis (TRIPOD-AI) are available in other domains, no equivalent framework is available for SRMA. Experts highlighted this gap in January 2023. We enrich their initial proposal by suggesting domains that can act as a conceptual framework for a PRISMA-AI extension. A potential list of items is also provided, including AI tools identification, algorithmic details, workflow role, human oversight, validation, transparency, reproducibility, versioning, ethics, and limitations. Proposed domains were also mapped with existing PRISMA to demonstrate alignment and potential involvement of AI at various stages of SRMA. Our opinion should be considered an early call to mitigate emerging challenges within current PRISMA reporting.

Keywords: Artificial Intelligence, Transparency in Reporting, Systematic Reviews, Reproducibility of Results, PRISMA-AI

INTRODUCTION

Systematic reviews and meta-analyses (SRMA) synthesize the best available evidence to inform policy and practice. Meta-analysis, by pooling results from individual studies, increases the precision and reliability of estimates¹. Although central to evidence-based medicine, their production is often laborious and resource-intensive². Artificial intelligence (AI) is now transforming research practices in multiple domains, including literature screening, data extraction, and bias detection³⁻⁵. AI systems can represent and infer knowledge, process text efficiently, and learn from large datasets, capabilities particularly suited to tasks such as screening and analyzing scientific literature, which are repetitive and time-consuming for human reviewers³. The penetration of AI can be witnessed in that around 7000 AI-related reviews (systematic and non-systematic) have been published in the domain of “medicine”⁶. However, the role of AI still needs to be acknowledged in the SRMA reporting and ensure transparency and reproducibility.

The PRISMA statement, first published in 2009^{7,8} provides a flow diagram and a 27-item checklist covering all stages of reporting. Considering the advances in methodology, the PRISMA 2020 was presented and implemented to improve the reporting of study identification, appraisal, and synthesis⁹. Yet, despite these updates, PRISMA does not address transparency or rigor in AI-assisted workflows, leaving a critical gap, and should be considered a scientific emergency as the proliferation of AI cannot be avoided. Other fields have already moved ahead by introducing AI-related activities and their reporting in their standard practices, like the CONSORT-AI¹⁰ and SPIRIT-AI¹¹ extensions, which provide structured reporting for clinical trials of AI interventions, requiring detailed descriptions of AI integration, human - AI interaction, and error handling. Similarly, TRIPOD-AI¹², extends reporting for prediction models to include data preprocessing, training, validation, and reproducibility. Overall, such guidelines become essential for AI-driven clinical studies to maintain their scientific rigor and reproducibility. However, in the case of

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SRMA, there are no such guidelines, although this type of research has become AI-dependent due to the laborious workflow of SRMA.

Considering the rapid growth of AI, Mallett et al., (2023)⁶. Their work highlighted that existing PRISMA guidelines need to be revised. However, their work was published just after the launch of ChatGPT. During that period, there was a long list of AI tools that were also under development, and their potential, especially in terms of systematic review workflows, was under discussion⁶. This was a potential limitation of their work, and it was just a call to action. Further, in their work, they did not provide any technical checklist or aspects of the existing PRISMA that should be updated while considering the role of AI. Today, there are various tools like LitMap, Rayyan, and Distill that have changed the arena of SRMA in terms of literature searches, screening of data and extraction, and bias detection. Now the workflow of SRMA can be automated, especially through Rayyan's automation and LitMap's visualization. Based on available AI tools and usage by researchers, we are offering potential points (but it is not an exhaustive list) that can be enlisted in the existing PRISMA. This proposal is not an official PRISMA extension. It is a conceptual framework for AI-related structured reporting and potential items for updating existing standards.

Proposed PRISMA-AI Domains and Items

Researchers are using AI tools already in their SRMA to reduce their workload and save time¹³. On the basis of recent available literature, the proposed PRISMA-AI extension introduces domains to ensure transparency, accountability, and methodological rigor in AI-assisted SRMA^{6, 14-17}.

These proposed domains can help the PRISMA team and related communities as a framework to finalize the PRISMA-AI extension. These domains have been identified after reviewing the existing workflow of SRMA, where researchers use AI tools to assist that need to be enlisted for transparent reporting. Authors should identify the AI

tools used, specify their role across workflow stages, describe human oversight, and report the validation mechanism. Transparency of AI-algorithms, type of AI assistance, reproducibility, version control, ethical safeguards, and limitations must also be included in the existing PRISMA. This reporting of AI assistance in SRMA will provide the confidence to researchers and reviewers to get help from AI tools rather than avoid them. This extension in SRMA will also transform the black-box nature of AI into a white box by providing a complete workflow (Table 1).

Integration of AI with Existing PRISMA 2020 Items

While Table 1 outlines new domains specific to AI and potential items, it is essential to show how these align with the existing PRISMA 2020 checklist. It is a hybrid mapping that enriches the existing PRISMA 2020 rather than replacing it. This can be done by embedding new AI-related items with existing standards. Table 2 displays how each proposed PRISMA-AI domain can be linked with corresponding PRISMA 2020 items.

This mapping is the reflection of the proposed items' integration with the existing PRISMA 2020. This integration will definitely make the hybrid model relatively exhaustive in terms of AI-related reporting challenges.

Potential Benefits

The proposed PRISMA-AI framework can offer various benefits to the SRMA process. (1) Improving efficiency of process: by reducing the time required for literature screening and data extraction through transparent ways (2) Enhancing consistency: by minimizing reviewer fatigue and reducing subjective variability in decision-making (3) Promoting transparency: by preventing the critical "black box" adoption of AI methods. (4) In addition, PRISMA-AI supports scalability, enabling the conduct of living systematic reviews in rapidly evolving fields, especially AI in healthcare.

Table 1. PRISMA-AI Extension Items

Proposed Domain	Acronym	Proposed Item
AI Tool Identification	AI.1	Clearly state the AI tool(s) used,
	AI.1a	Name, developer, version,
	AI.1b	Background algorithm of the AI tool,
	AI.1c	Access model (open/closed source).
AI Role in Workflow	AI.2	Specify which stages were AI-assisted
	AI.2a	Research questions formulation,
	AI.2b	Searching the literature,
	AI.2c	Deduplication of records,
	AI.2d	Title and abstract screening,
	AI.2e	Extraction of data,
	AI.2f	Risk of bias,
	AI.2g	Synthesis.
Human Oversight & Governance	AI.3	Describe how human reviewers verified AI outputs, resolved disagreements, and ensured ethical oversight.
Validation & Performance	AI.4	Reporting of performance metrics and a validation mechanism.
Transparency & Reproducibility	AI.5a	Provide documentation of algorithms and decision logs.
	AI.5b	Provide "prompts" that have been specifically used while searching and scrutinize the literature.
	AI.5c	State whether the AI model/code is open source, licensed, or proprietary; specify data/code availability for replication.
Versioning & Updates	AI.6	Report the exact version, release date, and settings of the AI tool used, noting if updates occurred during the review.
Ethics & Privacy and Limitation	AI.7a	Describe how confidentiality, plagiarism safeguards, and misuse prevention were addressed.
	AI.7b	Acknowledge potential risks (bias, misclassification, over-reliance, reproducibility concerns) and describe mitigation strategies.

Table 2. Mapping of PRISMA-AI Domains to PRISMA 2020 Items

Proposed PRISMA-AI Domain	Mapped PRISMA 2020 Item(s)
AI Tool Identification	Item 6 (Information sources), Item 7 (Search strategy)
AI Role in Workflow	Item 8 (Selection process), Item 9 (Data collection), Item 11 (Risk of bias), Item 15 (Certainty), Item 25 (Implications)
Human Oversight & Governance	Item 8 (Selection process), Item 11 (Risk of bias)
Validation & Performance	Item 9 (Data collection), Item 15 (Certainty/GRADE)
Transparency & Reproducibility	Item 13 (Synthesis methods), Item 26 (Registration & protocol)
Versioning & Updates	Item 26 (Registration & protocol)
Ethics, Privacy & Limitations	Item 24 (Limitations of evidence)

Challenges and Risks

There are potential challenges that can be considered.

- Algorithmic bias associated with AI tools remains an important concern, as it could distort evidence synthesis.
- Ethical issues like privacy, authorship, and attribution also require careful safeguards to ensure responsible use.
- Moreover, acceptance of AI-assisted workflows will depend on consensus-building among journals and the wider research community, many of whom remain cautious without formal guidelines.

Call to Action

To address these potential challenges, we urge the evidence synthesis community, including the PRISMA working group, Cochrane, and international guideline developers, to pilot a PRISMA-AI framework. Early adoption in methodological journals and high-quality systematic reviews could generate the empirical evidence necessary for refinement, validation, and eventual consensus.

CONCLUSION

Undoubtedly, artificial intelligence has redefined evidence synthesis. To ensure innovations enhance rather than erode trust, structured reporting guidance is urgently required in SRMA. This proposal of developing the PRISMA-AI framework and potential AI-related points in the existing checklist can offer a foundation to embed AI use within established reporting standards, safeguarding transparency, reproducibility, and credibility in the era of intelligent evidence synthesis.

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