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The Role of Artificial Intelligence in Enhancing Patient Safety: A Scoping Review

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ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - The review has not yet started.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202570013

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 2 July 2025 and was last updated on 2 July 2025.

INTRODUCTION

Review question / Objective Objective: To identify the extent evidence linking Artificial Intelligence with enhanced patient safety across various healthcare settings.

Background To enhance patient safety by reducing errors, optimizing patient monitoring and improving clinical decision-making, the healthcare industry is exploring ways to increase integration of artificial intelligence (AI) across systems. These AI-driven solutions include machine learning algorithms, large language models, predictive analytics and clinical decision support systems (CDSS), which aim to mitigate preventable adverse events from occurring.

Rationale A comprehensive understanding of the various ways AI is currently used to enhance patient safety in healthcare remains an area in need of further investigation. Furthermore, impact of these technologies on enhancing patient safety remains unclear. We will be conducting a scoping review to investigate the extent of evidence that exists in the literature demonstrating enhanced patient safety utilizing artificial intelligence.

METHODS

Strategy of data synthesis Search Engines: PubMed, CINAHL, Cochrane and IPA databases.
Search terms: (“artificial intelligence” OR “machine learning” OR “large language model”) AND (“patient safety” OR “medical error” OR “medication error” OR "adverse event").
The above search terms will be queried in "Title" and "Abstract" sections of sources.

Eligibility criteria Eligibility Criteria: primary literature documenting enhanced patient safety with the utilization of AI.
Search timeframe: earliest available until June 30, 2025.

Source of evidence screening and selection Utilizing the databases mentioned earlier, we will search for key terms identified in "title" and

"abstract". The query results from different databases will be combined and duplicates removed. Two investigators will then independently screen the titles and abstracts for eligibility criteria. In cases of discordance for inclusion, the investigators will discuss and arrive at consensus for inclusion or exclusion of an article. Full manuscript for all included articles will be extracted. The investigators will then independently review the full manuscripts and utilize a data extraction Excel template to capture their findings. Again, a consensus driven approach will be utilized to reconcile disagreements for inclusion after full manuscript review.

Data management All relevant abstracts and manuscripts will be saved in a password protected computer. A data extraction Excel template will be created to collect pertinent information as the investigators review manuscripts..

Presentation of the results A flow diagram will be utilized to depict the inclusion/exclusion of sources at each step of the screening and the reasons for exclusion. Tables and charts will be utilized to summarize the detailed findings from included sources.

Language restriction English language sources only.

Country(ies) involved United States of America..

Keywords Artificial intelligence; machine learning; large language model; patient safety; medical error; medication error, adverse event.

Dissemination plans We plan to disseminate the findings through abstract submission and manuscript publication in appropriate venues and journals.

Contributions of each author

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