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Use of generative artificial intelligence in medical libraries: A scoping review

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Abstract

Purpose. This study aims to map how health and medical libraries have used GenAI to support library services.

Methods. Scoping review following PRISMA-ScR. Searches covered publications from 2020 to 2025 in PubMed, Embase, CINAHL, LISTA, Academic Search Premier, MEDLINE via Ovid, Scopus, Web of Science, ProQuest Dissertations & Theses, and Google Scholar. After deduplication, 106 of 250 records were screened in Rayyan by two independent blinded reviewers.

Findings. Eleven studies were included: seven primary studies and four secondary or methodological papers. Among primaries, five directly used GPT-family models (GPT-4/ChatGPT/GPT-4o or Perplexity layered on GPT-4) to answer clinical questions, support search-strategy design, trial library tasks, and integrate source-linked answers in a national portal. One survey assessed intention to adopt generative chatbots; one case described a rule-based chatbot. GenAI accelerates workflows and extends services but requires human verification, transparency about limitations, privacy policies, and staff training (including prompt engineering). LLM-generated search strategies exhibited variability and underperformed compared with human designs.

Implications. In its current state, GenAI works best as a copilot useful for drafting, triage, and initial sense-making, while librarians remain essential for high-precision tasks (performance), quality control (reliability), and governance. This suggests that its academic value lies not in automation alone, but in the mediated integration of AI into evidence-informed services, where professional judgment, methodological transparency, and ethical accountability determine whether GenAI strengthens or weakens health information practices.

Keywords: ChatGPT; Information Retrieval; Innovation; Librarian; Medical Libraries; Reference service

1. Introduction

With the speed, capacity to generate content, and ability to answer questions in everyday conversational language, Generative Artificial Intelligence (GenAI) has become a central topic across virtually all fields of knowledge. Librarianship is no exception. Several studies report the use of some form of GenAI to support library services (Cunha, 2025).

Contemporary libraries, as institutions that provide information in different formats and media, must align with emerging trends by integrating advanced technologies, such

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as GenAI, not only in day-to-day activities but also in professional practice (Formanek, 2025).

Within the domain of medical libraries and particularly in the provision of reference services, generative AI is reshaping both the delivery of direct responses to users and the development of search strategies, a service frequently sought by faculty, students, and other users in the health sciences. Despite its evident potential, it remains imperative that AI-generated search strings undergo critical review and refinement by professional librarians or researchers with subject-matter expertise (García-Puente, 2025; Picalho et al., 2025). The integration of GenAI into library activities should be approached with caution, with a focus on preserving the humanized nature of the space and the professional role of librarians (Oluchi Emmanuel et al., 2025).

Although the use of GenAI is promising for redefining professional roles, allowing librarians to focus more on cognitive and less mechanical activities, librarians must understand how AI works. This understanding might lead to the development of prompt-engineering skills and to continuing to act, as the profession has always done, as organizers, facilitators, and mediators of information. Therefore, this study aims to map how medical libraries have adopted artificial intelligence by identifying studies that report the use of GenAI to support services within health sciences libraries.

2. Methods

This scoping review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses – Extension for Scoping Reviews (PRISMA-ScR) checklist (Tricco et al., 2018). The research question followed the PCC (Population, Concept, Context) framework: P - health-sciences libraries (academic, hospital, and clinical); C - use/implementation of generative AI; C - library services (including reference).

The search was conducted in 10 information sources: PubMed, Embase, CINAHL, LISTA, Academic Search Premier (ASP), MEDLINE via Ovid, Scopus, Web of Science, ProQuest Dissertations & Theses, and Google Scholar for grey literature. The MeSH descriptors used were "Libraries, Medical", "Artificial Intelligence", and "Generative Artificial Intelligence".

The protocol for this review, including descriptors and free terms used, and data search strategies for each source, is available as a supplementary file to this article, in accordance with open science principles.

Inclusion criteria. Original articles, review articles, book chapters, conference proceedings, theses, and dissertations; studies addressing Generative AI, LLMs, or conversational chatbots; studies reporting the use of Generative AI in health sciences libraries; full studies in any language; studies published between 2020 and 2025.

The decision not to exclude studies by language is consistent with Wang and Moody's argument for including languages beyond the authors' native language (Wang & Moody, 2025). For articles in languages other than Portuguese, Spanish, and English, ChatGPT Plus and Gemini Pro were used only as auxiliary tools for linguistic comprehension and translation support. Data extraction, eligibility decisions, interpretation, and synthesis were performed and verified by the authors.

Exclusion criteria. Studies addressing non-generative AI; studies on multidisciplinary libraries (if serving other fields, the use of AI in health must be reported separately); technical recommendations focused on AI development rather than its use; abstracts, editorials, or commentaries; documents without full-text access; studies before 2020.

Duplicates were removed using Mendeley Reference Manager, and the screening process was supported by Rayyan. Study selection was independently and in a blinded manner by two reviewers: first based on title and abstract, and subsequently through full-text assessment. The conflict rate during Phase 1 (title and abstract screening) was 25.5% (27/106). After calibration with two papers, the conflict rate in Phase 2 (full-text screening) increased to 34.6% (9/26). All conflicts were resolved through consensus.

Data were extracted directly in Rayyan and exported to a spreadsheet to support the results and discussion. The extracted items included authorship and year of publication; study country/countries (based on author affiliation) and article or PDF language; study objective; study type/methodology; generative AI tool(s) used, if any; library areas involved; description of how GenAI was applied; main conclusions/results; stated limitations; suggestions for future research (when available); and keywords.

During data extraction, studies were classified as primary when they reported empirical investigations, implementations, practical testing, surveys, interviews, or case/practice reports. Studies were classified as secondary or methodological papers when they synthesized prior literature (e.g., scoping, systematic, integrative, and other reviews) or proposed methodological guidance without reporting direct empirical implementation.

3. Results and Discussion

Using the PRISMA 2020 flow diagram (Page et al., 2021), the literature search and selection process identified 11 studies on the use of GenAI in medical and health sciences libraries. These studies demonstrate a range of applications and the emerging potential of GenAI in library contexts—the included studies comprised seven primary studies and four secondary or methodological papers.

The primary studies comprised a comparative investigation using clinical questions (Blasingame et al., 2025); a mixed-methods comparative evaluation of search strategies (Bourgeois & Ellingson, 2025); a qualitative interview study with health-sciences librarians (Adegboye et al., 2024); an implementation/practice report of a national medical search system (Эргашева, 2024); a practice report testing library tasks with ChatGPT-3.5 (Schweizer et al., 2023); a survey on the intention to adopt generative chatbots (Song & Park, 2023); and a theoretically oriented essay, preselected, on the impact of GenAI in medical libraries (García-Puente, 2025).

The secondary or methodological works included a scoping review (Sen, 2025); an integrative review focused on ChatGPT (Lund et al., 2024); a systematic review on AI in medical libraries (Orubebe et al., 2024); and a practical/methodological article proposing PICO-structured prompts (Robinson et al., 2025).

The study selection process is presented in Fig. 1, while the characteristics of the included studies, including authorship, year of publication, objective, and standardized study-type classification, are summarized in Table 1.

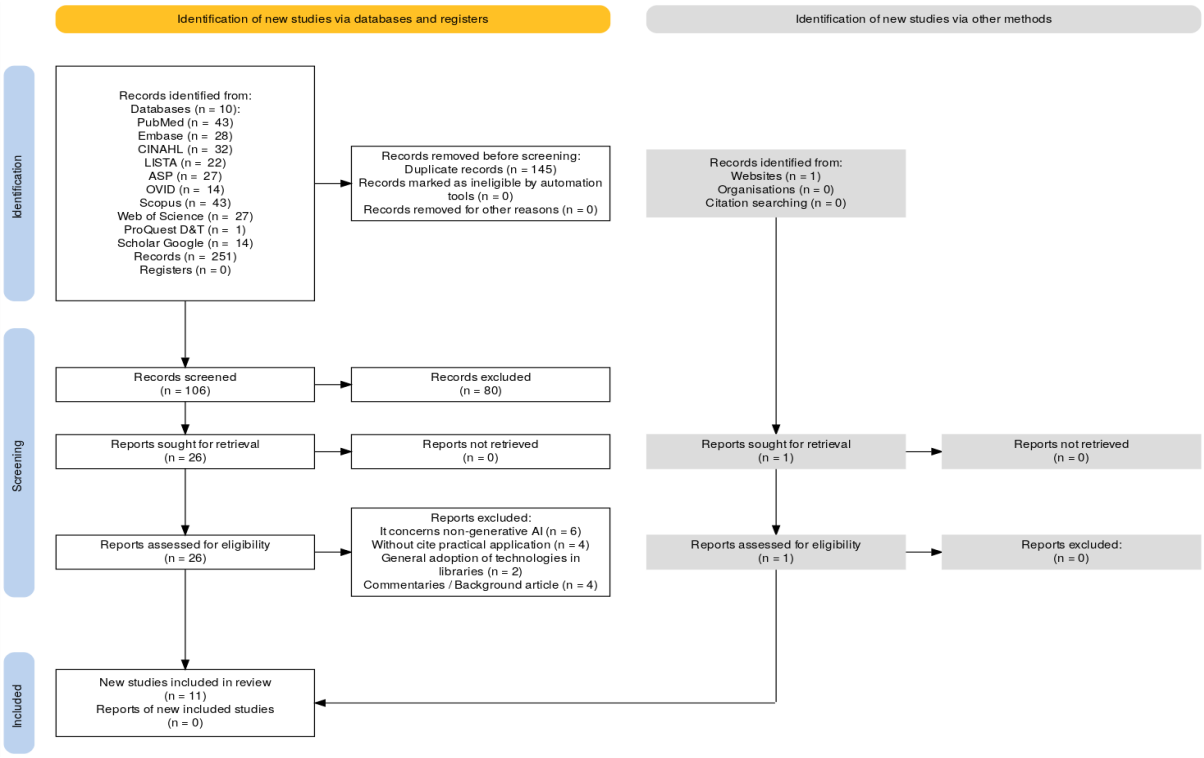


Figure 1. PRISMA flow diagram of study selection

Table 1. Selected studies: Authorship/year, objective, and study design.

Authorship / Year	Objective	Study design
(García-Puente, 2025).	To analyze the integration of generative AI tools in medical libraries	Essay
(Sen, 2025).	To explore the current use and potential of artificial intelligence (AI), particularly generative AI, in medical and health libraries	Review
(Robinson et al., 2025).	To apply the widely understood PICO framework, traditionally used in evidence-based medicine, to the art of prompt engineering	Case report
(Blasingame et al., 2025).	To investigate the performance of a generative artificial intelligence (AI) tool using GPT-4 in answering clinical questions in comparison with medical librarians' gold-standard evidence syntheses	Comparative evaluation
(Bourgeois & Ellingson, 2025).	To compare the reviews published using a Medline OVID search strategy with 3 strategies that ChatGPT created when prompted with the review's objective	Comparative evaluation
(Orubebe et al., 2024).	To analyze the benefits AI brings to medical libraries, the obstacles to its adoption, and best practices for implementation	Review
(Lund et al., 2024).	To synthesize what is currently known about it, to identify gaps, and stimulate further research	Review
(Adegboye et al., 2024).	To explore the integration of ChatGPT into library services, as well as the perceived benefits and challenges associated with its utilization	Qualitative study
(Эргашева, 2024).	To implement the Tesseract information retrieval system into the operations of medical libraries in Uzbekistan, ensuring fast access to medical information resources.	Case report

Continued Table 1...

(Schweizer et al., 2023).	To demonstrate the power and limitations of ChatGPT, we will use examples from the medical library sector.	Case report
(Song & Park, 2023).	To understand librarians' perceptions and the factors influencing librarians' intent to provide a generative AI chatbot service in the medical library	Qualitative study

Regarding actual testing and application of Generative AI, among the seven primary studies, five reported direct use of GenAI/LLMs in library contexts, all employing models from the GPT family (Adegboye et al., 2024; Blasingame et al., 2025; Bourgeois & Ellingson, 2025; Schweizer et al., 2023; Эргашева, 2024).

Geographic distribution (by author affiliation). The studies cover North America with four studies (USA: (Adegboye et al., 2024; Blasingame et al., 2025; Bourgeois & Ellingson, 2025; Robinson et al., 2025), Asia with three studies (South Korea: (Song & Park, 2023); India: (Lund et al., 2024); Uzbekistan: (Эргашева, 2024), Europe with three studies (Germany/Austria: Schweizer et al., 2023; United Kingdom: Sen, 2025; Spain: García-Puente, 2025); United Kingdom: (Sen, 2025), and Africa with one study (Nigeria: (Orubebe et al., 2024)).

Medical libraries are increasingly integrating GenAI to enhance operational efficiency, improve user experience, and support decision-making (Orubebe et al., 2024; Sen, 2025). Practical applications reported in the literature span multiple library domains, including reference and research services, cataloging, collection development, management, and other operational areas.

Human oversight is particularly vital in high-risk or high-precision tasks such as systematic searching and evidence synthesis. In comparative testing, AI-generated search strategies showed poorer performance than human-led approaches, especially during the search and screening stages. (Bourgeois & Ellingson, 2025; Picalho et al., 2025; Sen, 2025). Another study addressing research-methodological concerns proposes integrating the PICO framework into prompt engineering for medical librarians to enhance the quality and precision of information retrieval (Robinson et al., 2025). The authors concluded that although GenAI can be a valuable tool, librarians' expertise in formulating effective questions remains indispensable (Robinson et al., 2025). In this sense, the incorporation of GenAI should remain subordinate to a humanistic, user-centered, and responsible practice (Oluchi Emmanuel et al., 2025).

Qualitative reports involving health sciences librarians describe gains in efficiency and user support when ChatGPT is integrated into service workflows (including the development of small health-literacy applications), while emphasizing the need for caution, transparency, and verification of outputs before dissemination to users (Adegboye et al., 2024). In a comparative evaluation using real clinical questions, an LLM (GPT-4, accessed via an institutional aiChat interface) demonstrated promising performance but produced some non-verifiable references, reinforcing the idea that GenAI can complement, but not replace, librarian mediation (Blasingame et al., 2025). Practical tests with ChatGPT-3.5 indicated its usefulness for drafting and formatting tasks, yet also revealed tendencies toward hallucinated references and DOIs, as well as incomplete bibliographic software procedures (Schweizer et al., 2023). Both the integrative and

scoping reviews converge on a central finding: human oversight remains indispensable, particularly for high-precision tasks (Lund et al., 2024; Sen, 2025).

At the systems level, several initiatives have explored integrating generative layers into medical portals and search engines. The TESSERACT case in Uzbekistan exemplifies this approach, incorporating Perplexity (based on GPT-4) to generate source-linked answers, combined with a virtual user service and phased training. The implementation was reported to reduce search time and improve perceived service quality (Эргашева, 2024).

For event planning, tools such as ResearchRabbit and ChatGPT were employed to identify speakers, create promotional materials, and draft post-event communications, significantly reducing manual workload (Sen, 2025). This aligns with the principle that GenAI aims to simplify routine, common, and even creative tasks, acting as an ally in enhancing overall efficiency and productivity (Formanek, 2025).

In an analysis of medical librarians' intention to adopt generative-AI chatbot services, perceived need and convenience emerged as primary factors directly influencing their intention to offer such services. The expected benefits include faster response times and more efficient workflows, enabling librarians to focus on more strategic and value-added tasks (Song & Park, 2023).

Accordingly, training is essential, as the lack of technical skills among library professionals has been identified as a major barrier to the effective use of AI tools. It is therefore crucial for librarians to develop solid AI literacy, especially in prompt engineering (García-Puente, 2025; Sen, 2025). This aligns with reviews that call for institutional policies, disclosure standards, and ongoing capacity building, as well as broader strategic recommendations for integrating AI into medical libraries (Lund et al., 2024; Orubebe et al., 2024; Sen, 2025).

Based on the emerging literature, GenAI applications in medical libraries can be preliminarily organized into six domains: (1) reference and clinical question answering; (2) search strategy development and evidence synthesis support; (3) user education, training, and prompt guidance; (4) content creation and outreach; (5) technical and operational services, including cataloging, metadata, collection development, and management; and (6) integration into library portals, chatbots, and information retrieval systems.

Table 2. Mapping of GenAI application domains in medical libraries based on the included studies.

Domain	Included studies	Main contribution
Reference and clinical question answering.	Schweizer et al. (2023); Adegboye et al. (2024); Blasingame et al. (2025); Sen (2025)	Use of GenAI to answer clinical questions, support evidence summaries, and assist user-facing library services.
Search strategy and evidence synthesis support	Schweizer et al. (2023); Lund et al. (2024); Sen (2025); Bourgeois & Ellingson (2025); Robinson et al. (2025)	Use of GenAI for search-strategy drafting, PICO-based prompting, bibliographic tasks, and review workflows, with emphasis on human validation.

Continued Table 2...

User education, training, and prompt guidance	Song & Park (2023); Lund et al. (2024); Orubebe et al. (2024); Robinson et al. (2025); García-Puente (2025); Sen (2025)	Development of AI literacy, prompt-engineering skills, adoption readiness, and professional training for responsible use of GenAI.
Content creation and outreach	Schweizer et al. (2023); Adegboye et al. (2024); Sen (2025)	Use of GenAI to prepare communication materials, support event-related tasks, draft content, and assist outreach activities.
Technical and operational services	Schweizer et al. (2023); Adegboye et al. (2024); Orubebe et al. (2024); Sen (2025); García-Puente (2025);	Application of GenAI to operational areas such as cataloging, collection development, content organization, management, and workflow support.
Portals, chatbots, and retrieval systems	Song & Park (2023); Эргашева (2024); Adegboye et al. (2024); Blasingame et al. (2025);	Integration of GenAI into information retrieval systems, chatbot services, institutional interfaces, and source-linked medical information portals.

This descriptive mapping provides an analytical structure for examining how GenAI has been incorporated into health sciences library services.

4. Conclusions

GenAI expands the responsiveness and workflow capacity of medical libraries, particularly in supporting reference services, content organization, and outreach operations, but it does not eliminate the librarian's central role as curator and guarantor of information quality. For sensitive tasks, such as search strategies for systematic, scoping, integrative, and other reviews, the human role remains irreplaceable. GenAI should be used as an adjunct for mechanical tasks (e.g., inserting quotation marks and applying Boolean operators), always with prompts that yield outputs that are easily understood by professionals and amenable to correction.

Study limitations. Because this review maps GenAI uses in health sciences libraries drawing from heterogeneous studies (comparative investigations, qualitative designs, practice reports, and reviews) with non-standardized metrics and outcomes, it is difficult to perform deeper comparisons and causal inferences, work that could be undertaken in a future systematic review.

Future research. We suggest comparative studies with standardized task-specific outcomes (e.g., constructing search strategies for health information retrieval) that measure recall/precision, time, workload, bias, hallucinations, and reproducibility across different GenAI models.

5. Acknowledgment

5.1 Declaration of Generative Artificial Intelligence Use

During the preparation of this manuscript, ChatGPT Plus (GPT-6) and Gemini Pro (3.5 Flash-Lite) were used exclusively to assist with translation and grammatical editing. All

suggestions were reviewed by the authors, who take full responsibility for the final content of the manuscript.

5.2 Author Contributions (CRediT)

Conceptualization: Picalho, AC. Methodology: Picalho, AC; Fadel, LM. Validation: Picalho, AC; Nascimento, MR. Formal analysis: Picalho, AC; Nascimento, MR. Investigation: Picalho, AC; Nascimento, MR. Resources: Picalho, AC; Nascimento, MR; Fadel, LM. Writing – original draft: Picalho, AC; Nascimento, MR. Writing – review and editing: Picalho, AC; Nascimento, MR; Fadel, LM. Visualization: Picalho, AC; Nascimento, MR; Fadel, LM. Supervision: Picalho, AC; Fadel, LM. Project administration: Picalho, AC. Statistical analysis: Not applicable.

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