Are you still not integrating Gen-AI Frameworks in HEOR Workflows?
It's no longer optional!

Tushar Srivastava
Affiliations: ConnectHEOR
Email: tushar.srivastava@connecttheor.com

connectHEOR

Introduction

Health Economics and Outcomes Research (HEOR) teams operate across complex, time- and labor-intensive workflows that are increasingly unsustainable. With the emergence of Generative AI (Gen-AI), tasks such as literature reviews, economic modeling, real-world evidence generation, and multimodal dissemination can now be automated with greater speed, accuracy, and accessibility. This study explores why integrating Gen-AI into HEOR is no longer optional but essential to meet modern demands. Through a targeted literature review (2022–2024) covering peer-reviewed publications, conference proceedings, case studies, and expert interviews, we identified key use cases and measurable efficiency gains across core HEOR domains — demonstrating Gen-AI's systematic, scalable impact on healthcare decision-making.

Methodology

A targeted literature and industry review was conducted to identify use cases where Gen-AI significantly improves HEOR processes. Sources included expert interviews, recent publications, case studies, and conference proceedings (January 2022–December 2024). Examples highlighting efficiency gains, error reduction, and improved decision-making were catalogued under key areas such as health economic modeling, systematic reviews and RWE generation.

Current Scenario

- Economic Modeling ⇨
- Literature Review & Meta-Analysis ⇨
- Evidence Generation (RWE, Registries, PROs) ⇨
- Strategy & Pricing Forecasts ⇨
- Value Communication ⇨
- Stakeholder Engagement ⇨
- Regulatory & Competitive Intelligence ⇨
- Workflow Automation & Decision Support ⇨

AI-Augmented Approach

- AI-enhanced model automation *(Human + AI)*
- AI-powered literature screening & synthesis *(AI Only / Human + AI)*
- AI-assisted cohort selection, data extraction, and sentiment analysis *(Human + AI)*
- AI-driven insights for market access, pricing, and HTA planning *(Human + AI)*
- AI-powered value messaging, HEOR writing, and training content *(Human + AI)*
- AI-informed KOL insights, advisory board content, and scenario simulation *(Human + AI)*
- AI-based horizon scanning and landscape monitoring *(AI Only)*
- End-to-end AI integration for time-saving, consistency, and faster decisions *(Human + AI)*

Conclusion

While industries such as finance, technology, and logistics have already embedded AI to drive precision, efficiency, and scalability, HEOR is only beginning to realize its full potential. Gen-AI enables structured synthesis of complex data, rapid model prototyping, and evidence generation at a scale previously unattainable. In an era where health policy and market access decisions demand faster, more rigorous insights, the integration of Gen-AI is not optional but vital for scientific integrity, stakeholder relevance, and sustainable impact.

References
1. Srivastava, T et al, Leveraging Large Language Models for Conceptualizing Health Economic Models: A Feasibility Study in Oncology(2024), ISPOR 2024 (https://www.ispor.org/heor-resources/presentations-database/presentation/euro2024-4015/147040)
2. Reason T, Rawlinson W, Langham J, Gimblett A, Malcolm B, Klijn S (2024)
3. Evidence Partners, DistillerSR. Published 2023.
4. Meddeb A, Ebert P, Bressem KK, et al, (2024)

Health Economic Model (HEM) Conceptualization

GPT 4o incorporating Chain of Thought (CoT) with Self-Consistency used in conjugation with advanced Graph RAG to produce HEM conceptualization for HR-positive, HER2-negative breast cancer (Srivastava et al)[1]
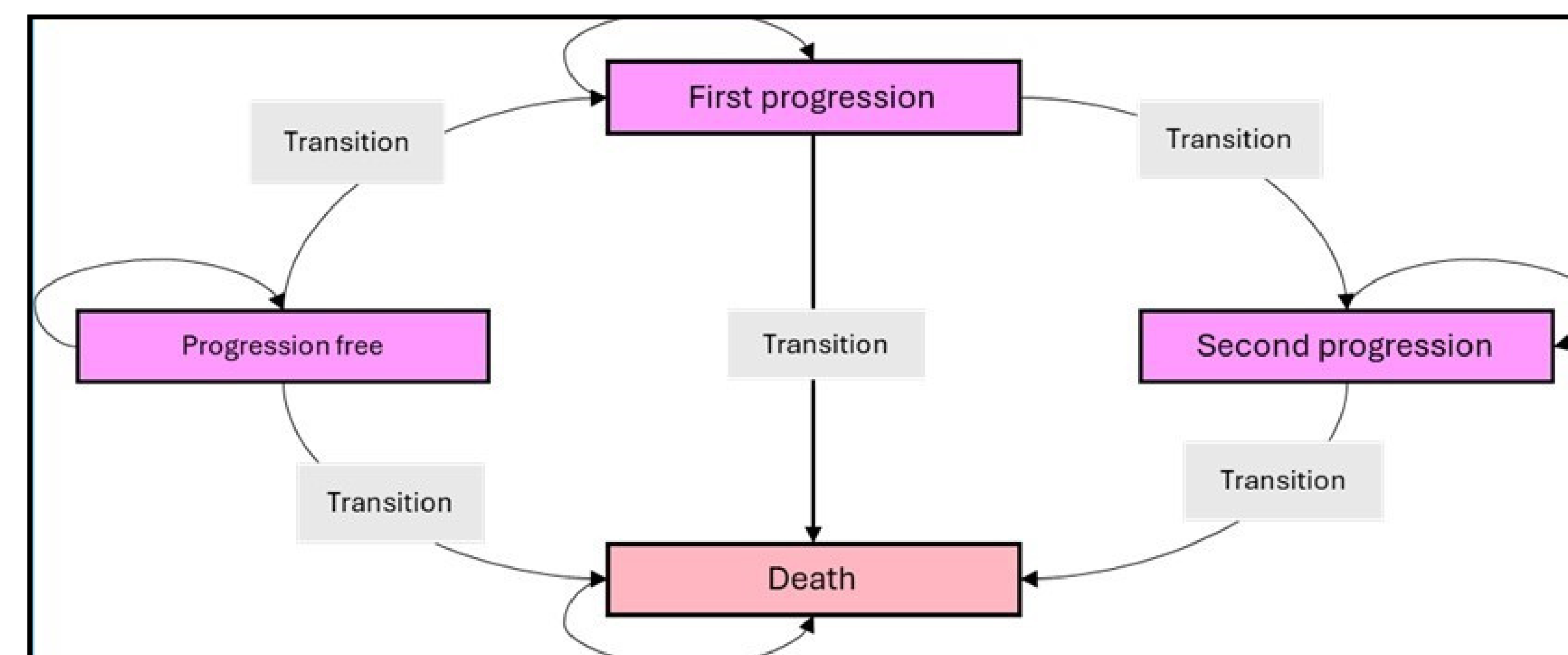

Fig: Recommended model structure by Gen-AI

Agentic Gen-AI framework was able to complete the conceptualization process in merely 1 hour while the same process done manually typically take around 2 months. The model structure, model design plan and disease process outputs were successfully validated by human experts.

Reprogramming HEM

GPT-4 reprogramming of two partitioned-survival models (NSCLC & RCC) directly from design prompts[2]
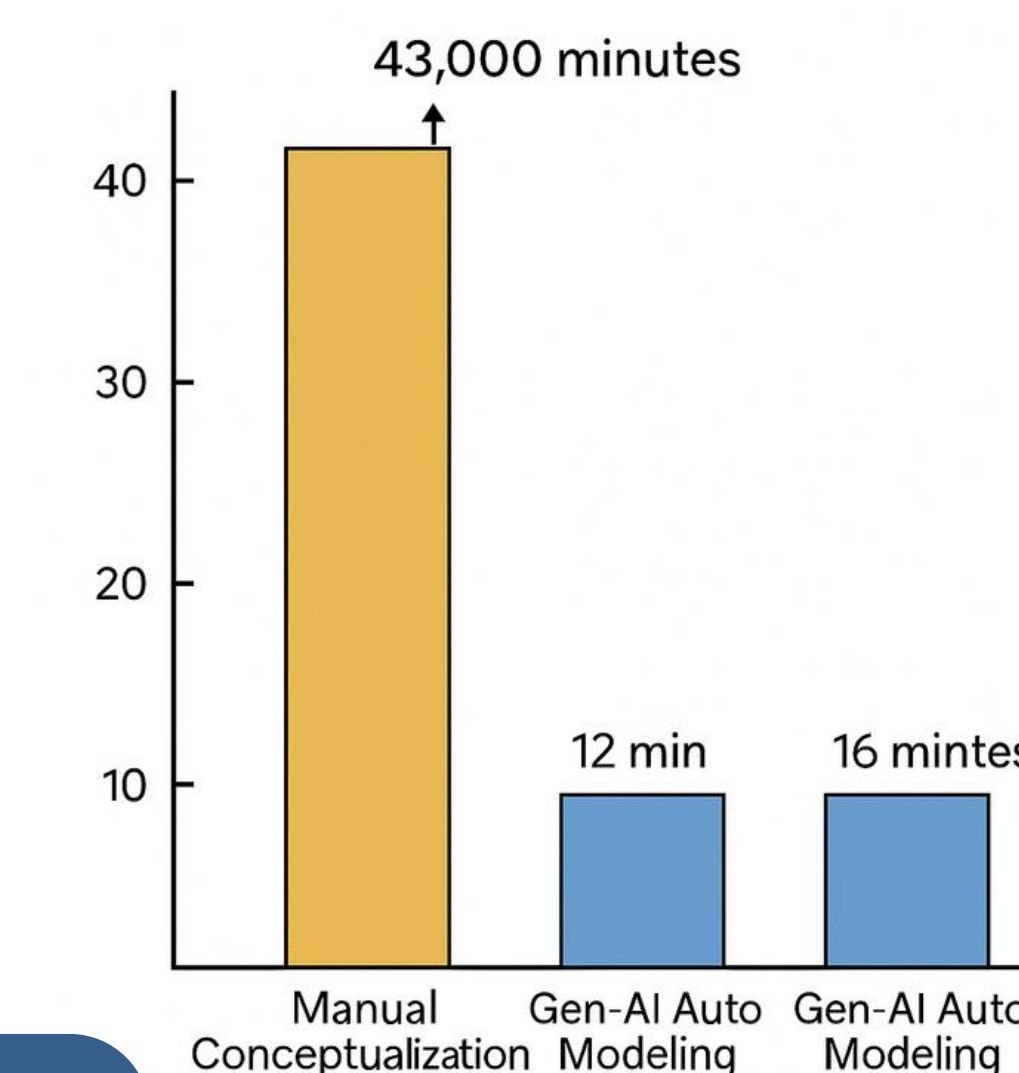

- Gen-AI generated modeling code in 12 min (NSCLC) and 16 min (RCC) (Assuming manual method takes 3 months ~ 720 hours=43000 mins)
- ≤ 10 min human QC to reach error-free scripts
- 93 % of runs reproduced published ICERs within 1 %

Published Practical Use Cases
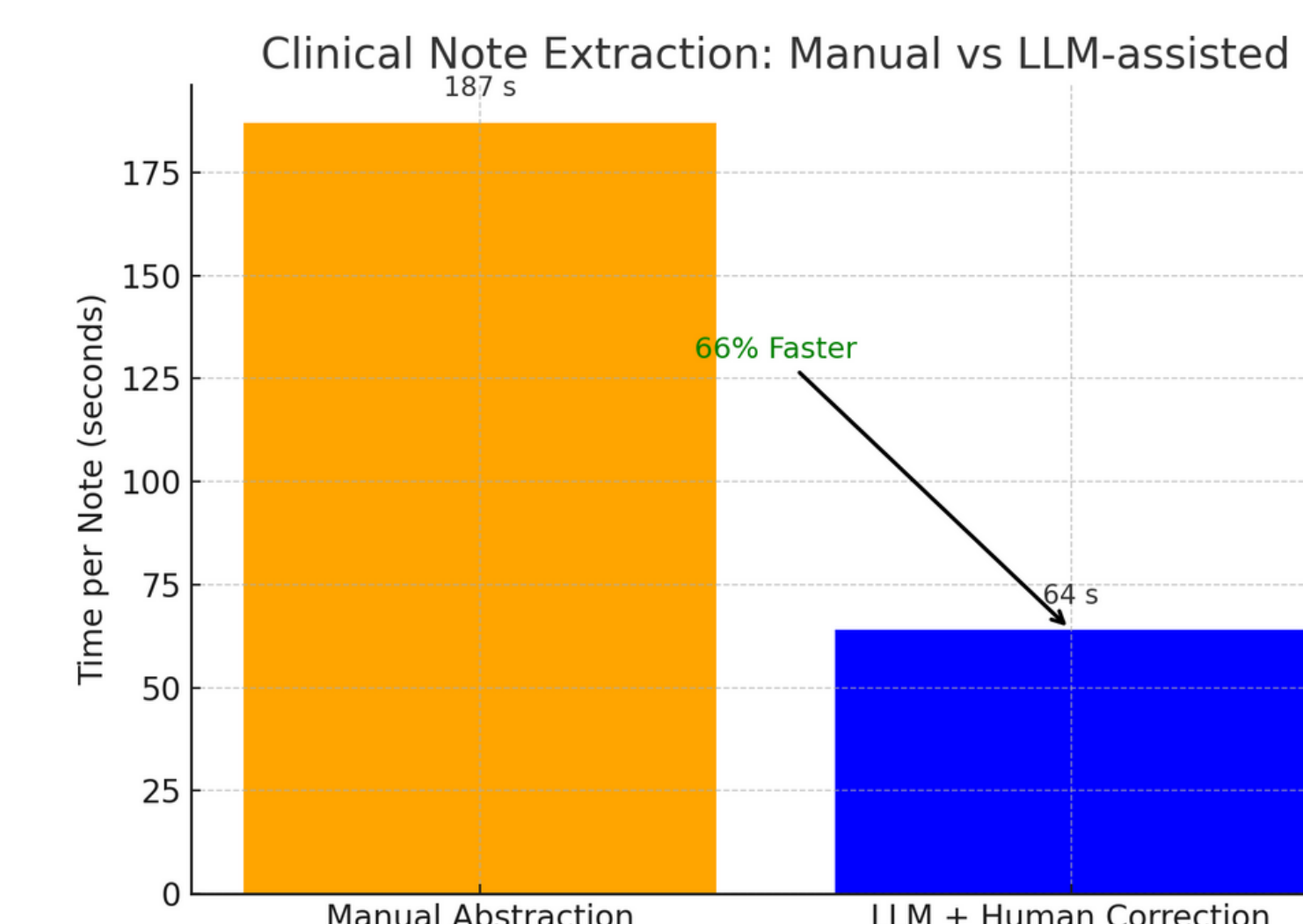
Systematic Reviews

Active-machine-learning screening for systemic reviews by dynamically learning the human reviewer's decisions[3]
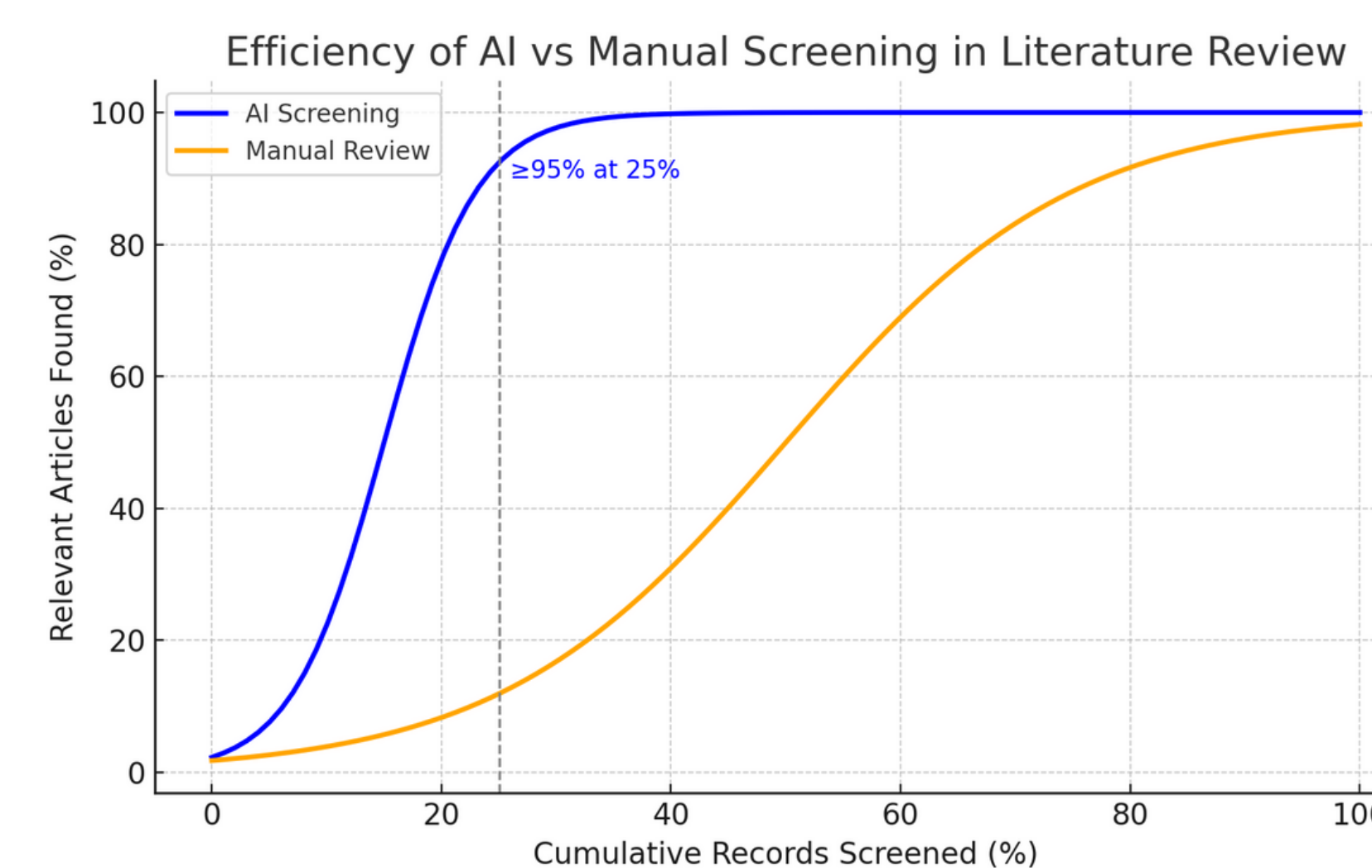
- AI predicts ≥ 95 % of studies to be included after screening only 25 % of records
- Median SR takes 67.3 weeks end-to-end with manual processes
- Overall, 60 % reduction in abstract-screening time.

Real World Evidence

Local open-source LLM used to auto-extract structured data from patients' unstructured clinical notes[4]

- Manual abstraction: 187 seconds (s) per note
- LLM extraction: 4s + 60s corrections
- → 66% faster (64s vs 187s) with comparable accuracy