An AI-Augmented, EHR-Centered Framework for the Full Medical Encounter

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Abstract

Background

Clinical care spans screening, diagnosis, treatment, prescription, and follow-up. EHRs improved access but remain fragmented.

Objective

Present a modular, AI-augmented framework that supports the full encounter and multidisciplinary collaboration.

Methods

Mixed-methods design with synthetic vignettes and clinician evaluation, comparing standard EHR versus the proposed framework.

Results

To be completed after evaluation.

Conclusions

The framework emphasizes continuity, extensibility, and collaboration, laying groundwork for real-world studies.

Keywords: clinical decision support; electronic health records; artificial intelligence; multimodal data; human–AI collaboration

1. Introduction

High-quality care requires continuous, context-rich information across the patient journey. While EHRs improved access, real-world workflows remain fragmented. AI—including LLMs and retrieval-augmented systems—can unify information flow. We introduce a modular framework that supports all encounter phases and enables multidisciplinary collaboration.

2. Methods

2.1. Study Design

Mixed-methods exploratory study combining design science and early evaluation with clinicians using synthetic cases.

2.2. Framework Development

Requirements were synthesized from literature and informal clinician input. The architecture models five phases (screening to follow-up) backed by modular AI plugins and a unified patient record. A mid-fidelity prototype demonstrates workflow feasibility.

2.3. Early Evaluation

Participants: 6–12 clinicians from multiple specialties. Materials: two standardized synthetic vignettes (acute and chronic complex). Procedure: counterbalanced sessions comparing standard EHR and framework-assisted workflows; think-aloud and post-task interviews.

2.4. Measures and Analysis

Quantitative: perceived usefulness, trust, decision support, explainability, information continuity, workflow fit, and optional workload. Paired tests (e.g., Wilcoxon) and effect sizes. Qualitative: inductive thematic analysis of interviews; triangulation of findings.

3. Results

Placeholder for quantitative and qualitative outcomes.

4. Discussion

We will interpret early findings with respect to workflow integration, human–AI collaboration, multidisciplinary coordination, and design principles. Limitations and future work will be detailed.

5. Conclusion

The framework provides a foundation for integrative, AI-enhanced encounters, addressing gaps in EHR-based AI by emphasizing continuity, modularity, and collaboration.

6. Ethics

All data used in sessions are synthetic clinical vignettes; no real patient data are accessed. Clinicians provide informed consent. Ethics review will be obtained as required for studies involving clinicians and simulated cases.

7. References