Artifical Intelligence in Electronic Medical Records and Efficient Documentation.

ISBN: 978-1-943295-26-5

Uma Nambiar
Sriram Menon koottala
Gopika K
Maria Martin
TATA IISc Medical School Foundation
(umanambiar@iiscmedicalschoolfoundation.org)
(junior.executive@iiscmedicalschoolfoundation.org)
(Intern6@iiscmedicalschoolfoundation.org)
(intern7@iiscmedicalschoolfoundation.org)

Integrating Artificial Intelligence within hospital Electronic Medical Records (EMR) can reduce documentation time and improve accuracy. Through speech to text systems, doctors can dictate their findings, which are automatically converted into a structured Subjective, Objective, Assessment and Plan (SOAP) format. The same technology can generate discharge summaries by analyzing previous progress notes and test results. This allows physicians to focus on patient care rather than repetitive typing. However, AI tools must be built directly into secure EMR platforms to prevent data leakage. Continuous human verification and ethical oversight ensure that AI improves clinical efficiency without compromising patient confidentiality.

Keywords: Artificial Intelligence, Electronic Medical Records, Speech Recognition, Clinical Efficiency

1. Introduction

Clinical documentation was intended to simplify healthcare operations but has become one of the largest contributors to clinical burnout. Physicians and nurses now spend excessive time completing electronic medical record entries, often at the expense of direct patient interaction and personal wellbeing. The administrative time required for progress note , discharge summaries and billing templates now exceeds the time spent in clinical care .This burden has measurable effects on care quality , safety and staff retention.

Efforts to reduce this workload through dictation, transcription or the use of virtual scribes have offered only partial relief. These methods still rely heavily on manual review and data entry. Even policy changes designed to simplify billing documentation have not significantly reduced the number of keystrokes or cognitive interruptions required in electronic systems.

Artificial intelligence introduces new approach to this problem. Modern ambient documentation tools use natural language processing to listen to clinical conversations and automatically produce structured drafts in real time. Instead of typing or dictating each sentence, the clinician reviews and validates a draft created by the artificial intelligence model. The system captures relevant medical entities, organizes them according to established templates, and enables clinicians to finalize the document with minimal editing. This approach preserves professional authorship while repetitive clerical tasks.

2. Evidence from Recent Multisite Studies

Two multicenter quality improvement studies published by JAMA Network Open in 2025 provide strong evidence for the clinical and operational impact of artificial intelligence documentation.

2.1 Ambient Artificial Intelligence Scribe Implementation Study

In one study conducted across six health systems, 263 physicians and advanced practitioners used an ambient artificial intelligence scribe for 30 days. The results showed a decrease in burnout from 5.19 percent to 38.8 percent, measured through validated self-reported scales. Participants also reported significant improvements in cognitive workload, reduced documentation time outside work hours, and better focus during patient consultations.

Each clinical encounter was recorded after obtaining verbal patient consent. The artificial intelligence systems produced a draft document within seconds, allowing the clinician to review both the text and the corresponding audit transcript. After verification, the document was imported into the medical records. This process preserved data accuracy, improved workflow efficiency and maintained clinician control over the final content.

2.2 Ambient Documentation Survey Across Academic Health Systems

A second study examined clinicians experience with artificial intelligence documentation technology at Mass General Brigham and Emory Healthcare. More than 1400 physicians and advanced participated in the pilot projects which were fully integrated with electronic medical record platforms. The findings showed improvements in professional fulfillment, reduced administrative exhaustion and higher usability rating for the electronic systems.

Clinicians noted that the artificial intelligence accurately captured structured information such as laboratory data and examination findings, while nuanced reasoning still required human articulation. Frequent users of the tools reported greater satisfaction, faster note completion and improved concentration during clinical tasks. The research concluded the consistent

use of artificial intelligence combined with human validation leads to sustained reductions in administrative workload without compromising documentation quality.

3. Operational Expansion Across Documentation Types

Clarity and clinical precision artificial intelligence documentation should adopt the SOAP framework which organizes information onto Subjective, Objective, Assessment, and Plan sections.

The subjective section captures that patient's account of symptoms, medical history, and current concerns using secure speech to text technology. The objective section complies quantifiable data from the electronic medical records including vitals, laboratory values and imaging results. The assessment section summarizes the clinician's diagnostic reasoning and different analysis, clearly labeling provisional impressions. Finally the plan section outlines treatment goals, medication changes, investigations and follows up actions.

This structure ensures that artificial intelligence documentation complaints exiting clinical reasoning. It providers consistency across departments, improves handovers and reduces the variability that often appears in free text notes.

4. Operational Expansion across Documentation Types

Artificial intelligence can support all major types of clinical documentation within a hospital.

Progress notes can be created automatically during ward rounds by transcribing real time dialogue and combining it with laboratory and nursing data. Consultation records can be generated from specialist discussions, formatted immediately in SOAP sequence, and stored within the hospital's electronic system. Discharge summaries can be produced by merging admission data, operative notes and follow up instructions into a single comprehensive document. For nurses and allied health professionals, voice or form based prompts can help capture shift reports, assessment and care updates that are consistent with physician documentation.

By extending artificial intelligence documentation to all care teams, hospitals create a unified digital narrative foe every patient episode.

5. Administrative and Ethical Imperatives

From an administrative perspective, artificial intelligence documentation is essential for maintaining institutional integrity and data security. If hospital do not implement secure and compliant systems, clinicians may rely on public generative tools to save time. This practice could lead to the accidental exposure of patient data and violate national data protection laws.

Hospitals must therefore adopt systems that guarantee patient consent, traceable authorship and transparent data governance. All documentation generated through artificial intelligence should include metadata indicating when it was created, who verified it and what changes were made. Periodic audits should be conducted to ensure factual accuracy and to identify potential algorithmic bias. Governance committees should oversee vendor selection, staff training and ethical compliance.

These safeguards ensure that automation strengthens rather than undermines public trust in healthcare institution

6. Framework for in House Artificial Intelligence Documentation

An institutional framework can be organized into five operational stages.

The first stage involves secure data capture, where conversations or dictations are recorded under encryption. The second stage processes speech into text using medical domain language models that recognize terminology with high accuracy. The third stage structures the text into SOAP sections and highlights medical concepts. The fourth stage allows clinicians to review, correct and approves the content before final integration into the electronic medical records. The fifth stage uses anonymized feedback to continuously refine model performance within institutional boundaries.

This closed system maintains privacy, enhances accuracy and prevent dependence on external servers or commercial data pools.

7. Benefits to healthcare institutions

Integrating AI documentation yields benefits across clinical, operational and administrative domains

- Reduced workload: clinicians recover time for direct care, teaching and research.
- Financial efficiency: shorter documentation cycles reduce overtime and improve billing turnaround
- Quality and safety: structured note minimize omissions and improve communication during shift changes.
- Data analytics: consistent structured data enhances research capability and hospital performance tracking.
- Regulatory compliance: in house systems protect patient information under HIPAA, GDPR and India's Digital Personal Data Protection Act.

For hospital administrations these outcomes translate into improved productivity, better patient satisfaction and sustainable digital transformation.

8. Discussion

The emergence of AI assisted documentation represents more than a technological milestone, it signals a redefinition of the

clinician's cognitive workload. By automating transcription and structuring data through SOAP logic, AI allows physicians to focus on analysis and empathy rather than clerical repetition.

However, overdependence on generative tools can risk factual errors or hallucinated statements. Therefore every implementation must remain human verified. The AI may draft, but the clinicians authors. This principle protects both legal accountability and the professional integrity of medicine.

Ethical adoption also requires transparency clinicians should know how their data are processed and patient should understand how their voices are converted into records. A human centered approach with automation guided by judgment ensures that AI strengthens rather than dilutes clinical care.

9. Conclusion

Artificial intelligence in EMR documentation is both a clinical necessity and a governance challenge. The JAMA Network Open studies demonstrate measurable improvement in physician wellbeing and documentation efficiency through ambient AL scribes. Expanding this model to hospital wide use embedded within SOAP structured workflows can revolutionize documentation quality, continuity and clinician satisfaction.

Hospitals must act quickly to develop in house, secure AI documentation frameworks that emphasize transparency, human validation and ethical oversight. By doing so they prevent uncontrolled data exposure and align digital innovation with clinical accountability. When implemented correctly, AI documentation transforms the medical records from an administrative burden into a dynamic living narrative of patient care.

10. Acknowledgement

The authors acknowledge the clinicians and digital health innovators who continue to advance responsible AI documentation research and practice within modern healthcare.

Author Contribution

- Dr. Uma Nambiar conceptualized the study and provided supervision.
- Dr. Sriram Menon Koottala contributed to framework design and manuscript synthesis
- Ms. Gopika K and Ms. Maria Martin supported literature integration and formatting alignment with AIMS proceedings.
- All authors reviewed and approved the final version.

Conflict of interest

The authors declare no conflicts of interest.

11. References

1. Abridge AI, Inc. *JAMA Network Open.* Multi-site quality improvement study: ambient AI scribes reduce administrative burden and burnout. 2025.
2. Mass General Brigham and Emory Healthcare. *JAMA Network Open.* Survey across two health systems: ambient documentation technology and clinician burnout. 2025.