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ENHANCING CLINICAL DOCUMENTATION QUALITY AND PATIENT OUTCOMES THROUGH THE INTEGRATION OF NURSING STAFF, EMERGENCY MEDICAL SERVICES, ADMINISTRATIVE ASSISTANTS, AND MEDICAL CODING TECHNICIANS.

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Abstract

Introduction: The need of patient safety and efficiency in healthcare is a clinical documentation. Older techniques are likely to be inaccurate and time consuming and thus may influence clinical judgments. The solution to the quality of documentation and patient outcomes is the use of AI-assisted tools and Interprofessional collaboration between nurses, EMS personnel, administrative assistants, coding technicians, and informatics specialists (Biswas and Talukdar, 2024; Leong, Gao, and Ji, 2024).

Aim of Work: To address the question of how AI-assisted documentation combined with multidisciplinary teams can improve the accuracy of clinical notes, lessen the workload of clinicians, and improve patient-centered care.

Methods: The literature review of the articles on AI documentation, digital scribes, and EMR systems was carried out, and the impact that these systems have on accuracy, efficiency, standardization, and workflow integration were examined. Ethical and human aspects were taken into consideration as well.

Results: The use of AI-assisted documentation and team collaboration enhanced the quality of notes, error reduction, more efficiency, and improved patient care. The technical restrictions, ethical issues, and training requirements are the challenges (Saeidnia et al., 2024; Kernberg et al., 2024).

Conclusion: With the use of AI tools and multidisciplinary teamwork, documentation, patient outcomes, and burden on clinicians can be improved, although ethical and workflow issues should be tackled.

Keywords: Clinical Documentation, Artificial Intelligence, Interprofessional Collaboration, Digital Scribes, Patient Outcomes.

INTRODUCTION

The quality of clinical documentation, which ensures continuity of care, patient safety and functional operations, is a vital element of an effective healthcare delivery. Besides acting as a legal report of the care that has been given, accurate, complete, and timely documentation provides easier communication between multidisciplinary teams with each other, evidence-based decision-making, and enhances communication. The growing patient number, the scarcity of time, and the complicated nature of activities that are undertaken in the healthcare environment all contribute to the idea that healthcare facilities across the board still find it hard to keep documentation standards, even though it is of core importance. Karajizadeh et al. (2022) and Saadat et al. (2025) state that such problems often result in inaccurate records or records that lack some of the required information. This may jeopardize the patient outcomes, disrupt interprofessional collaboration, and create an opportunity to commit medical errors.

The recent advances in health information technology, as electronic medical records (EMRs) and as digital scribe systems, can transform the struggle in an entirely new way. Through the studies, it has been determined that the implementation of automated documentation tools, artificial intelligence (AI), and health informatics can significantly enhance the precision of the documentation, reduce the burden of the administrative work, and enhance the efficiency of the clinical workflow (Nawab, 2024; van Buchem et al., 2024). The solutions powered by artificial intelligence can potentially support healthcare providers by providing extra support, making them automatically write notes based on clinical interactions, find missing or inconsistent information, and guarantee cross-platform interoperability. (Saadat et al., 2025; Leong et al., 2024) Indicatively, modular summarization techniques have been effectively used in the generation of SOAP notes out of doctor-patient conversations. It has led to the decrease of the time taken to input information manually and also maintained the quality of the documentation (Krishna et al., 2020).

Accessibility of interprofessional collaboration cannot be overestimated as far as there is enhancement of clinical documentation procedures. As far as documentation process is concerned, a number of different professionals, e.g. nurses, emergency medical service workers, administrative assistants, medical coding technicians, health informatics specialists, etc. all contribute their own expertise to the table. Karajizadeh et al. (2021), Maleki Varnosfaderani and Forouzanfar (2024) suggest that administrative assistants are organized to guarantee proper scheduling and maintenance of records, coding technicians are in place to provide accurate medical coding to bill and analytics, and health informatics specialists to maximize the data integration and usability of the system. The staff of the nurses and emergency medical services give the real-time clinical observation and essential patient information. The combination of the roles, in addition to enhancing the completeness and accuracy of the records, promotes patient-centered care, whereby the decision on healthcare is informed by reliable and accessible data.

Moreover, low resource settings also present special challenges to proper documentation maintenance. Inadequate staffing, limited training, and poor digital infrastructure are usually the impediments to normal practice documentation. This shows the need to develop specific interventions that combine human knowledge with technology-based interventions (Demsash et al., 2023). In a study by Maas et al. in 2020, the automated medical reporting systems, including the Care2Report platform, have shown that they can lower the administrative load and enhance the quality of the reports. This has been achieved through standardization of data entry and the capability of supporting the free flow of information across departments.

The introduction of artificial intelligence and health informatics into clinical practice has led to a paradigm shift in the provision of healthcare in the 21 st century. These technologies can be used to expand the capabilities of human personnel in order to support real-time documentation, predictive analytics, and informed clinical decision-making (Maleki Varnosfaderani and Forouzanfar, 2024; Nawab, 2024). The combination of technological solutions and interprofessional collaboration can transform the healthcare systems by improving patient outcomes, increasing operational efficiency, and developing a safety and accountability culture.

Due to the complexity of clinical documentation, the aim of the proposed research is to explore the approaches that can enhance the quality of documented information and patient outcomes by involving the nursing staff, emergency medical care, administrative aides, medical coding technicians, and health informatics specialists. This project is aimed at development of a comprehensive framework of improving the quality of healthcare in any type of clinic environment. This shall be achieved through an analysis of human and technical inputs in the documentation processes.

Aim of Work

This research paper aims first to investigate and assess the methods of how it is possible to optimize the quality of the clinical documentation and patient outcomes based on the coordinated work of the nursing staff, emergency medical services personnel and administrative assistants, medical coding technicians and health informatics specialists. In particular, the proposed study aims at determining how the accuracy, completeness, and timeliness of clinical records can be maximized by interprofessional collaboration and technological advancements, including electronic medical records (EMRs), AI-assisted documentation, and digital scribe systems. This study highlights synergies between human expertise and technology tools in reducing errors, enhancing data interoperability, and providing evidence-based decision-making in clinical practice by concentrating on several professional roles (Saadat et al., 2025;

Karajizadeh et al., 2022). The purpose of the study is further to examine how systematic documentation processes, when accompanied by AI-assisted real-time note-taking, may help relieve administrative pressure, improve the efficiency of the work process, and eventually lead to better patient safety, treatment outcomes, and overall quality of healthcare (Nawab, 2024; van Buchem et al., 2024). The study also attempts to come up with practical recommendations that healthcare institutions can adopt the integrated documentation strategies to be flexible and responsive to both resource-rich and resource-limited environments to make documentation processes sustainable, standardized, and patient-centered (Demsash et al., 2023; Maas et al., 2020). In the end, this research will serve to fill the knowledge gap between human knowledge and digital transformation and explore how the multidisciplinary teamwork, along with AI and health informatics solutions, may redefine the clinical documentation practice and help to improve the patient care outcomes in the modern healthcare systems.

METHODS

The proposed study will be based on a mixed-methods research design to thoroughly assess the impact that interprofessional collaboration and AI-assisted tools have on the quality of clinical documentation and patient outcomes. The quantitative aspect implies gathering and evaluating records on clinical documentation of the selected hospitals and medical facilities, evaluating the completeness, accuracy, timeliness, and adherence to documentation standards. The data that will be collected will include references to various departments, such as nursing, emergency services, administrative units, medical coding, and health informatics, to obtain the opinion and input of every professional group (Karajizadeh et al., 2021; Demsash et al., 2023). To have the objective measurement of the quality of documentation and to detect the trends of errors, omission and inconsistency within patient records, standardized evaluation tools and audit checklists will be applied.

The qualitative part will entail semi-structured interviews and focus group discussions with healthcare professionals, i.e. nurses, EMS staff, administrative staff, medical coders and informatics specialist. Such discussions will discuss the experience, challenges, and perceived advantages of integrated documentation processes and AI-assisted technologies among the participants (Maleki Varnosfaderani and Forouzanfar, 2024; Saadat et al., 2025). Also, examples of hospitals where digital scribes and AI-assisted EMRs are implemented will also be reviewed to learn the best practices and usability challenges, as well as the effects of these tools on clinical workflow and patient outcomes (van Buchem et al., 2024; Nawab, 2024). The triangulation of the data will be used to combine both the quantitative and qualitative results and provide a solid judgment of the effect of multidisciplinary collaboration and technological interventions on the documentation quality and quality of care. Before data collection, the ethical approval will be sought, and all the participants will be assured of the informed consent to comply with the research ethics standards. Based on the statistical analysis, thematic coding, and comparative methods, the correlations between documentation practices, interprofessional collaboration and AI integration and the patient outcomes will be identified and ultimately, it will be presented as evidence-based recommendations on how the healthcare system could be improved (Leong et al., 2024; Krishna et al., 2020).

DISCUSSION

The implication of AI in terms of the quality of clinical documentation.

The process of recording, storing, and using patient data has been significantly changed in a healthcare setting due to the implementation of artificial intelligence (AI) in clinical documentation. Generative artificial intelligence technologies, including the one outlined by Biswas and Talukdar (2024), can be used to create patient-centric clinical notes based on the interactions with the doctor. These notes can be used to record subtle clinical nuances that can be overlooked in writing by humans. These systems radically relieve the number of errors that are inevitably caused by humans, enhance completeness, and ensure consistency among a large range of healthcare providers, which ultimately leads to a rise in overall quality of clinical records. Other functions of artificial intelligence are the possibility to automatically emphasize missing information, specify any contradictions, and suggest the applicable clinical codes. Such abilities help in ensuring that the standards of high-quality documentation are maintained in departments.

Artificially generated documentation, in its turn, allows to foster interoperability across multiple healthcare systems. Assessing that data is compatible may sometimes be challenging in case multiple electronic health record (EHR) platforms are being employed in current healthcare institutions, which common have many EHR platforms. Leong, Gao, and Ji (2024) assert that artificial intelligence algorithms can normalize and organize data using existing templates, and this makes it easy to share information between clinical units, labs, and administrative administrative units. Interoperability will not only provide continuity of care to patients but also support research, audit, as well as quality improvement initiatives. Due to this, the healthcare teams can get access to information that is either real-time or correct regardless of the source. This will make evidence-based decision-making easier and minimize the chances of clinical errors happening.

Moreover, the use of artificial intelligence in clinical documentation reduces the psychological burden on health workers, and thus, they are free to pay more attention to patients. Note taking through the traditional method is an

inconvenient procedure that often distracts clinicians towards other areas other than direct patient engagement. Biswas and Talukdar (2024) claim that artificial intelligence helps healthcare staff to focus on key decision-making, educating patients, and interventions in a timely manner because critical paperwork is automated. Spending more time on patient-centered activities and less on administrative duties have also been associated with higher degrees of clinician satisfaction and reduced levels of burnout and improved patient experiences. This indicates the dual advantage of artificial intelligence in the areas of enhancing the quality of documentation and clinical outcomes.

Economy Saved by Scribe digital.

It has been made possible by the fact that the digital scribes and the ambient AI-based systems have become indispensable assets in the modern healthcare industry because they have been able to ease the documentation processes without necessarily affecting the accuracy. Based on the research conducted on systems such as the AutoScribe, these tools have been shown to save a lot of time physicians and other medical professionals need to spend on patient care documentation (Crampton, 2020). Digital scribes reduce the necessity of repeating the manual work, therefore, enhancing the effectiveness of working process due to the process of collecting verbal encounters and automatically organizing them into clinical notes. It plays a critical role in cases of intense pressure such as emergency rooms and in the intensive care units where a physician has a very large number of patients to attend to and time-related decisions he or she wants to make.

Another benefit of digital scribes is that they increase standardization and completeness of documentation besides better productivity. The standard format that the AI systems generate ensures that the necessary clinical data, such as vital signs, symptoms, medications, and other diagnostic findings are captured and read and comprehended at ease by all care team members. Such information includes vital signs, symptoms, diagnostic and medication outcomes. It is not only an indication that the extent of miscommunication that may occur in an interdisciplinary team is minimized but it also makes the administrative tasks like medical coding and billing simpler. More to the point, documentation is more reliable in case gains generated by artificial intelligence systems remove duplication or conflicting information. This has certain merits in clinical treatment as well as in research.

The achievement of the digital scribes can be predicted by the user-based development of the software and its inclusion into the already existing procedures in the healthcare sector. According to Knoll et al., the collaboration with a clinician is required to make sure that the artificial intelligence systems are efficient to meet practical demands of end-users and will not disrupt the work with patients (2022). The training lapses and feedback loops are required to provide a continuous input to the system to ensure that they perform to the maximum and are useful. Case studies have shown that when the clinicians actively engage in the process of designing AI tools, documentation is of higher quality and also addresses the priorities in the clinic. This will enable medical staff members to spend more time interacting directly with patients and, simultaneously, ensure that medical records are updated and adequate (Crampton, 2020; Kernberg, Gold, and Mohan, 2024).

Interprofessional Collaboration and Quality of Documentation.

The interprofessional collaboration level is closely related to the quality of clinical documentation. It is nurses, emergency medical services workers, administrative assistants, medical coding specialists, health informatics specialists with their own mastery, and when they are added to each other, they guarantee full-fledged and accurate patient records. Frontline clinical observations and real-time patient data are provided by nurses and staff of emergency medical services (Han et al., 2023). The quality documentation is based on the two types of information. It is normal that such professional can witness some alterations in the condition of the patient, what he/she has performed and the instant outcomes, and can also maintain the flow of care and make clinical decisions.

The administrative staff as well as the medical coding technicians both are also critical to the task of ensuring that the documentation is consistent with the billing requirements, regulatory compliance as well as operational efficiency. Not only is proper coding of diagnoses and procedures necessary to carry out payment based on the data, but it is also needed to carry out data analytics, quality control, and research (Can et al., 2023). These functions are supplemented by artificial intelligence systems that automatically propose acceptable codes, check them and propose errors and improvements. The integration of such human and technical tasks results in an increased documentation accuracy, a reduced number of errors, and increased workflow productivity directly translating into the improvement of the patient care outcomes (Xia et al., 2022).

The level of documentation is also improved by the health informatics specialists since they provide control over data architecture and optimization of artificial intelligence algorithms as well as the inter-departmental interoperability. Kernberg, Gold, and Mohan (2024) are satisfied that their experience will enable healthcare businesses to use modern systems of documentation and, at the same time, be compliant with ethical, privacy, and security standards. The combination of human specialists and AI technologies in the whole process of healthcare guarantees that there are complete, accurate, and functional clinical recordings so that it can assist in delivering high-quality, patient-centered care (Han et al., 2023).

Accuracy and Reliability of AI-Generated Notes.

One of the most crucial aspects of the healthcare system of the current days is to ensure that the clinical notes made by AI are both accurate and reliable. Nevertheless, even strong generative artificial intelligence systems should be thoroughly monitored to exclude the possibility of errors that can put the life of patients at risk. According to Oleson

(2024), such measures of evaluation as DeepScore give the frameworks of the measures of quality of documentation produced by artificial intelligence that can be measured. The measures are applied in measuring the factors such as completeness, coherence and clinical relevance. Transformer-based models and the template-guided note generation framework were demonstrated to improve the precision and reliability of AI responses in particular in complex doctor-patient communication (Abacha et al., 2023; Han et al., 2023). The fact that these frameworks improve the quality of AI outputs has also been proven in other papers

Besides, AI systems can be integrated into a wide spectrum of clinical settings including specialty such as intensive care, pediatrics, and mental health health care settings. Those systems have the ability to anticipate the lack of information, prescribe therapeutic activities, and report the members of staff about the anomalies (Leong, Gao, and Ji 2024; Li et al. 2021). They do this on the basis of the analysis of huge volumes of historical clinical experiences. The latter does not only make the documentation more accurate, but also acts as a protection to provide clinicians with support throughout the process of evidence-based care delivery.

Human supervision is still required to ensure reliability of notes that are produced by AI. Biswas and Talukdar (2024) and Li, Wu, Smith, Lo, and Liu (2024) suggest that artificial intelligence can produce structured documentation in an efficient way; however, the outputs that it produces require analysis by doctors to make sure that the contextual nuances, patient preferences, and ethical concerns are incorporated. Efficient and reliable documentation is generated when artificial intelligence automation is coupled with professional control. This leads to the quality of clinical decision-making as well as patient safety.

Problems and Ethical Implications.

The adoption of AI-assisted documentation in the clinical practice presents several challenges that must be addressed to ensure the adoption of the technology is safe and effective. One of the greatest challenges in the technology sphere is the development of the speech recognition and natural language processing algorithms that will be accurate. Although AI systems can be trained to effectively transcribe the conversations between doctors and patients, they are likely to struggle with challenging medical language, accents, speech overlays, or poor audio quality to produce clinical notes that are either absent or incorrect (Xia et al., 2022; Li, Wu, Smith, Lo, and Liu, 2024). Such mistakes can be transmitted throughout the healthcare system and could have a direct impact on patient safety, treatment choices, and billing processes in the future. To minimize such risks and ensure the high quality of documentation, it is thus crucial to constantly improve AI models and strictly test them on data that are checked by clinicians.

Besides the limitations that technology provides, human factors and workflow integration brings about very challenging barriers. (Knoll et al., 2022; Li et al., 2021) Systems with the help of artificial intelligence should be designed with caution so that they do not create a hassle or a nuisance to the medical professionals that already have the established workflow. Clinicians may be reluctant to use new technologies, which can be caused by their perceived complexity or the possibility of the technology being obsolete, and this can be a bottleneck to a successful deployment. To be able to succeed in overcoming these barriers, healthcare companies should focus on the concepts of user-centered design, iterative user feedback, and large-scale training. When end-users participate in the configuration, testing, and constant improvement of artificial intelligence systems, trust is established, usability guaranteed, and a probability of long-term adoption enhanced.

Ethical considerations cannot be deemed any less crucial, as far as the implementation of AI in clinical documentation is concerned. The confidentiality of the information of patients and privacy are the most important issues in the healthcare context due to the sensitivity of this information (Saeidnia, Hashemi Fotami, Lund, and Ghiasi, 2024). To help avoid the incidence of data breach, artificial intelligence systems must comply with legal and regulatory requirements such as as HIPAA and GDPR. Also, an extensive encryption and access control is to be implemented. A related issue is also presented by the phenomenon of algorithmic bias, whereby the artificial intelligence model, trained on the non-representative datasets of the community, can be used to punish certain groups of patients unintentionally (Biswas and Talukdar, 2024). Ethical implementation frameworks recommend frequent audits, identifying bias, and human control to ensure the provision of care that is equal. To make the matter worse, the artificial intelligence is not supposed to substitute human judgment but only to complement it, so that the physicians will still play significant role in the ethical decision-making and treatment of patients based on the patient-centered approach.

CONCLUSION

The results of the research emphasize the great role that the combination of AI-assisted tools with the collaboration between professionals could play to improve the quality of clinical documentation and the results received by patients. The data indicates that AI-based solutions, including generative note-taking models and digital scribes, can enhance the accuracy, efficiency, and consistency of medical records and also decrease the administrative burden that is assigned to doctors (Biswas and Talukdar, 2024; Li et al., 2021). In combination with the expertise of different medical workers, such as nurses, employees of emergency medical services, administrative assistants, medical coding specialists, and health informatics specialists, it is possible to offer standardized and complete documentation, which, in turn, enhances high-quality and patient-centered treatment (Han et al., 2023; Can et al., 2023).

Moreover, assisted medical documentation has a direct effect on the improvement of clinical decision-making, continuity of care, and patient safety. When routine tasks are automated, the situation improves the ability of physicians to spend more attention on interactions with patients (Leong, Gao, and Ji, 2024; Kernberg, Gold, and Mohan, 2024). This leads to high patient satisfaction levels, higher turnout to treatment and general healthcare outcomes. Interoperability between different departments and healthcare systems is also made easier through the use of the artificial intelligence. This guarantees that precise and viable patient information is available in real time in the interests of clinical, administration and research pursuits.

The last fact is that even the benefits of applying AI when helping with documentation are substantial, it is critical to consider the ethical, technical, and human issues that it entails. According to Saeidnia, Hashemi Fotami, Lund, and Ghiasi (2024) and Knoll et al. (2022), to attain sustainable change in documentation processes, one needs to overcome such barriers as algorithm bias, data integrity, workflow interconnection, and clinician adoption. To conclude, interprofessional collaboration and the synergy between artificial intelligence technology offer a revolutionary solution to clinical documentation. Such an approach can enhance the quality of care services delivered to patients, enhance the efficiency of clinicians, set new standards of practicing healthcare in the 21 st century.

REFERENCES

- Abacha, A. B., Yim, W.-w., Michalopoulos, G., & Lin, T. (2023). An investigation of evaluation metrics for automated medical note generation. arXiv preprint arXiv:2305.17364. https://doi.org/10.48550/arXiv.2305.17364
- Biswas, A., & Talukdar, W. (2024). Intelligent clinical documentation: Harnessing generative AI for patient-centric clinical note generation. arXiv preprint arXiv:2405.18346. https://doi.org/10.48550/arXiv.2405.18346
- Can, D. C., Nguyen, Q. A., Nguyen, B. N., Nguyen, M. Q., Nguyen, K. V., Do, T. H., & Le, H. Q. (2023). UETCorn at MEDIQA-Sum 2023: Template-based summarization for clinical note generation from doctor-patient conversation. In CLEF (Working Notes) (pp. 1423–1432).
- Crampton, N. H. (2020). Ambient virtual scribes: Mutuo Health's AutoScribe as a case study of artificial intelligence-based technology. Healthcare Management Forum, SAGE Publications. https://doi.org/10.1177/0840470419872775
- Demsash, A. W., Kassie, S. Y., Dubale, A. T., Chereka, A. A., Ngusie, H. S., Hunde, M. K., et al. (2023). Health professionals' routine practice documentation and its associated factors in a resource-limited setting: A cross-sectional study. BMJ Health & Care Informatics, 30(1). https://doi.org/10.1136/bmjhci-2022-100699
- Han, B., Zhu, H., Zhou, S., Ahmed, S., Rahman, M. M., Xia, F., & Lybarger, K. (2023). HuskyScribe at MEDIQA-Sum 2023: Summarizing clinical dialogues with transformers. In CLEF (Working Notes) (pp. 1488–1509).
- Karajizadeh, M., Nikandish, R., Yousefianzadeh, O., Hamedi, Z., & Saeidnia, H. R. (2021). Usability evaluation of the electronic medical record of the rapid response team: A case study. Applied Health Information Technology. https://doi.org/10.18502/ahit.v2i2.7991
- Karajizadeh, M., Nikandish, R., Zalpour, Z., Roozrokh Arshadi Montazer, M., Soleimanijafarbiglo, M., Mazaher, Y., et al. (2022). Identification of the information needs of a nurse-led rapid response team to design and develop an electronic medical record system. Health Management & Information Science, 9(4), 236–242. https://doi.org/10.30476/jhmi.2023.96214.1143
- Kernberg, A., Gold, J. A., & Mohan, V. (2024). Using ChatGPT-4 to create structured medical notes from audio recordings of physician-patient encounters: Comparative study. Journal of Medical Internet Research, 26, e54419. https://doi.org/10.2196/54419
- Knoll, T., Moramarco, F., Korfiatis, A. P., Young, R., Ruffini, C., & Perera, M., et al. (2022). User-driven research of medical note generation software. arXiv preprint arXiv:2205.02549. https://doi.org/10.48550/arXiv.2205.02549
- Krishna, K., Khosla, S., Bigham, J. P., & Lipton, Z. C. (2020). Generating SOAP notes from doctor-patient conversations using modular summarization techniques. arXiv preprint arXiv:2005.01795.
- https://doi.org/10.48550/arXiv.2005.01795
- Leong, H. Y., Gao, Y. F., Shuai, J., Zhang, Y., & Pamuksuz, U. (2024). Efficient fine-tuning of large language models for automated medical documentation. arXiv preprint arXiv:2409.09324.
- https://doi.org/10.48550/arXiv.2409.09324
- Leong, H. Y., Gao, Y., & Ji, S. (2024). A Gen AI framework for medical note generation. In 2024 6th International Conference on Artificial Intelligence and Computer Applications (ICAICA) (pp. 423–429). IEEE. https://doi.org/10.1109/ICAICA63239.2024.10823004
- Li, B., Crampton, N., Yeates, T., Xia, Y., Tian, X., & Truong, K., et al. (2021). Automating clinical documentation with digital scribes: Understanding the impact on physicians. In Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems. https://doi.org/10.1145/3411764.3445172
- Li, Y., Wu, S., Smith, C., Lo, T., & Liu, B. (2024). Improving clinical note generation from complex doctor-patient conversation. arXiv preprint arXiv:2408.14568. https://doi.org/10.48550/arXiv.2408.14568

• Maas, L., Geurtsen, M., Nouwt, F., Schouten, S. F., Van De Water, R., & Van Dulmen, S., et al. (2020). The Care2Report system: Automated medical reporting as an integrated solution to reduce administrative burden in healthcare. In HICSS (pp. 3608–3617).
• Maleki Varnosfaderani, S., & Forouzanfar, M. (2024). The role of AI in hospitals and clinics: Transforming healthcare in the 21st century. Bioengineering (Basel, Switzerland), 11(4).
• https://doi.org/10.3390/bioengineering11040337
• Nawab, K. (2024). Artificial intelligence scribe: A new era in medical documentation. Artificial Intelligence in Health, 1(4), 12–15. https://doi.org/10.36922/aih.3103
• Oleson, J. (2024). DeepScore: A comprehensive approach to measuring quality in AI-generated clinical documentation. arXiv preprint arXiv:2409.16307. https://doi.org/10.48550/arXiv.2409.16307
• Saadat, S., Khalilizad Darounkolaei, M., Qorbani, M., Hemmat, A., & Hariri, S. (2025). Enhancing clinical documentation with AI: reducing errors, improving interoperability, and supporting real-time note-taking. Infoscience Trends, 2(3), 1-13.
• Saeidnia, H. R., Hashemi Fotami, S. G., Lund, B., & Ghiasi, N. (2024). Ethical considerations in artificial intelligence interventions for mental health and well-being: Ensuring responsible implementation and impact. Social Sciences, 13(7), 381. https://doi.org/10.3390/socsci13070381
• van Buchem, M. M., Kant, I. M., King, L., Kazmaier, J., Steyerberg, E. W., & Bauer, M. P. (2024). Impact of a digital scribe system on clinical documentation time and quality: Usability study. JMIR AI, 3(1), e60020. https://doi.org/10.2196/60020
• Xia, X., Ma, Y., Luo, Y., & Lu, J. (2022). An online intelligent electronic medical record system via speech recognition. International Journal of Distributed Sensor Networks, 18(11), 15501329221134479. https://doi.org/10.1177/15501329221134479