

Exploring the Most Significant Barriers to Electronic Health Records

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Introduction

Electronic Health Records (EHRs) represent a transformative shift in healthcare delivery, promising improved patient care, enhanced clinical decision-making, and streamlined healthcare operations. However, there are some potential advantages for healthcare organizations around the globe that face various constraints on extending and sustaining EHR systems. The movement from paper records to electronic systems we have discovered to be challenging, and expensive and involved other barriers that are technical, fiscal, structural, and personnel among others. These barriers are important to be known by healthcare administrators, policymakers, and technology designers to find strategies for successful implementation and adoption of EHR. This paper aims to systematically develop an understanding of the various challenges that face healthcare organizations when in the process of implementing and maintaining EHR systems, their implication on healthcare, and possible solutions. The importance of overcoming these barriers cannot be overemphasized because, EHR system implementation impacts patients' care quality, cost, and efficiency of the health systems.

Financial Barriers

The financial implications of implementing and maintaining EHR systems represent one of the most significant barriers to adoption, particularly for smaller healthcare organizations and practices. The initial capital costs for EHR adoption involve much more than the expense of acquiring the software license; it also involves costs for hardware, additional infrastructures, and costs of customization on the system. Successfully implementing EHR means that healthcare organizations must invest in servers, workstations, mobile devices, and networking equipment. Such capital expenditures can run from hundreds of thousands to millions depending on the organization's size and complexity. Apart from implementing costs, organizations must also meet operational costs that would affect the organization's budget. Such include the annual license fees, the cost of maintaining the system the yearly software upgrades and maintenance, and the technical support services (Yang et al., 2022). Another factor is the lost revenues at the times when staff is working on upgrades, productivity drops during training, or when transitioning to the new system. Such financial costs are burdensome for Small practices especially because they provide their services on relatively small margins and have less access to capital drawings.

The payback period for EHR systems may take several years which puts pressure on financial returns for the healthcare institutions. , even though there can be long-term cost savings by addressing inefficient processes, and fewer cases of medical mistakes along with improving the financial management of the organization's revenue cycle, the desired goals can bear massive expenses in the short term. The clients must also factor in costs related to the movement of data into a new system, compatibility of its system with other systems already in use, and if there may be a need to tailor the system to its specific clinical processes. This is because there are new dangers in the

management of health information that come with the use of EHR systems and as such, insurance and liability expenses are likely to rise. Security should be invested in well and with organizations having to incorporate security into their everyday activities, they need to perform security audits frequently, they need to assess their organization for vulnerabilities and they need to insure their organization against data breach incidences. The above costs add up to the financial costs of EHR implementation and therefore it is essential to reduce these costs to the bare minimum so as to ensure that the expected benefits are realized. It remains apparent that most organizations find it financially difficult to meet the high upfront costs and although government incentives and funding programmes have sought to address this issue, the reality shows that many organizations are still grappling with these costs. While some companies have benefitted from the incentives and tax credits that these programs offer, these incentive programs themselves often have a set of qualification and maintenance criteria that add a layer of complexity and cost. In addition, small healthcare-related organizations may not possess the individual or funds to properly engage with such programs representing a lost opportunity for these extra funds.

Technical and Infrastructure Challenges

The technical and infrastructure challenges associated with EHR implementation present complex barriers that healthcare organizations must overcome. One of the major issues is the integration between the systems persists because the majority of healthcare organizations use numerous systems that have to interact with each other and share data. The fact that there has not been one unified template that EHRs must follow means that there are major barriers to real interconnectivity between hospitals, labs, pharmacists, and more. The main IT infrastructure expectations of EHR systems are strong and efficient access connection, adequate network capacity, and backup systems to support 24/7 functionality.

For several healthcare organizations, especially those located in rural or other staffed regions, technologically advanced EHR systems are unreachable. Always on nature of the system increases pressure on network assets and demands investments in systems backup and disaster recovery. It is also worth noting that current considerations of healthcare organizations face the problems associated with systematic integration with existing medical devices and technologies. A lot of medical devices run on closed-developed protocols or older established standards that are not inherently compatible with most of the current EHR solutions. Despite the apparent advantages of application integration, such an integration strategy may cause workflow discordances and inconsistencies within the data shared between applications as well as result in greater manual data entry needs.

Another technical issue arising from the fast-developing nature of healthcare technology is the increased pressure to make sure that the EHR systems in organizations are capable of embracing change, as new needs and products arise. With systems that continue to evolve on a daily basis new patches and updates to the system require special attention to ensure the clinical functions are not significantly interrupted without at the same time compromising on the safety and efficiency of the system. Common requirements include The technical onus of mobile accessibility or offsite connectivity and both of these factors are highly critical in today's healthcare systems. Implementation of EHRs needs technical support and this is not a small task, EHR systems need IT specialists to support them. Recruiting and staffing IT specialists who have a good understanding of both EHR technologies and the processes that unfold in a healthcare organization remain a challenge for many organizations.

Privacy and Security Concerns

Privacy and security concerns represent critical barriers in EHR implementation and maintenance, as healthcare organizations must protect sensitive patient information while ensuring appropriate access for authorized users. EHR systems are (often) implemented in digital platforms or networks, they introduce peculiar risks to threats such as data breaches, cyberattacks, and attempts of unauthorized access. Due to the constantly evolving threats security in healthcare organizations aims to safeguard patient's information while at the same time ensuring authorized users have access to the systems (Kågesten et al., 2024). Legal restrictions, such as HIPAA and other healthcare regulative bodies demand that organizations enforce rigorous measures of control on the data, especially the patients' data. Such security measures must be developed and adapted over and over in order to ensure effectiveness in conditions of new potential threats and risks. To adhere to the privacy laws, the organizations also need policies and standards of data access, disclosure, and storage. So, it has been found that enhanced types of cyber threats in recent years have compelled healthcare organizations to spend more on security solutions and continuous security audits. There has been a rise in ransomware assaults against healthcare firms, making backup and incident-dealing strategies crucial.

The non-adherence to the various formulated security measures is another major problem area, especially given the fact that staff play a major role in compromising the security of a campus. There should be awareness created for organizations as well as policies having to do with password and device access and usage. Since security measures always interfere with staff and organizational efficiency, tensions usually appear between the needs of the clinic and security solutions (Hägglund et al., 2024). These, coupled with the need to share data to coordinate client

care and for research purposes add to the privacy concerns. Organizations must implement safe approaches to sharing patient details with other stakeholders whilst taking into consideration rules and regulations of patient information privacy and the patient himself/herself. While patient portals and other consumer-oriented technologies promise to improve patient care and outcomes, they also create new opportunities for exposure of identifiable patient information and new risks that must be mitigated.

Organizational and Cultural Resistance

Organizational and cultural resistance often presents significant barriers to successful EHR implementation and adoption. Some of the key challenges which may arise as a result of implementing the new systems are mentioned below Resistance to change Some healthcare workers may not like changes especially when a new system of work will bring about significant changes to the previous systems of work. This resistance can be categorized as passive, and as active where the employees initiate actions of non-adoption of the system. The implementation of paper-based systems to new electronic systems involves enormous changes in organizational cultures and work practices. Healthcare workers have integrated efficient work patterns within paper-centered environments, and many of them may regard EHR systems as interfering with well-entrenched practices. Fear of change generated by the loss of previous practices together with the demands to embrace new procedures will always be a factor that causes tension among workers.

Effective management support and appropriate engagement constitute the key factors that help organizational decision-makers address resistance in the workplace. Others are due to the lack of strong leadership advocacy to champion for usage of EHRs and clear communication to staffs on the benefits of implementing and the need for EHRs. It indicates that organisations should establish complex strategies of change concerning technical issues as well concerning people related aspects (Hermes et al., 2020). EHR implementation frequently raises professional autonomy issues because some SHMPs may perceive CPOE templates, outcomes metrics, and other components of standardized documentation as restrictions on their judgment. The highly templated structure of EHR documentation can directly interfere with the existing preferred traditional narrative view and result in resistance from experienced clinicians. Another potential advantage turned into an extra issue connected with dissimilarities in the generation's tendency to use technology. Novice workers can get into the technologies more easily than those experienced and more mature in the profession; which means that EHR systems implementation might need encouragement to go in the right direction. These differences have to be reflected through specific policies and training and support programs that reflect and account for different learning modalities and lack of comfort with technology.

Training and Education Requirements

The main challenges and barriers that were noted in relation to EHR implementation include the following; There are very many requirements in regard to training and education that are involved when adopting EHRs. It is crucial to mobilize healthcare organizations to put in place elaborate training programs that require training of various users about their variability, at the same time as the clinical practice continues during the training. Modern EHR systems are relatively complex, entailing great time commitment in the training processes, and difficulties in rationing staff time and other resources. Pre-service training should include general operations of the clinical system, application of the systems by clinical roles, and process flow of utilizing the clinical system. There must also be consistent training for the users particularly because the systems change over time, new functions may have horns as well as new standards of practice in the organization (Alhur, 2024). Effective training demands a lot of resources such as skilled trainers, training content, and training infrastructure such as facilities.

This research identified that training of various user groups within healthcare organizations is specific. The Bluebell clinical staff requires training on patient care documentation and features of clinical decision support while the management staff requires training on scheduling, billing, and reports of the firm. There is a need for organizations to create training regimes per role, so as to meet the peculiar needs of various user groups and at the same time maintain uniformity in the use of the system. Challenges associated with the effects of training requirements on clinical operations are evident. Managers therefore can be faced with the dilemma of ensuring that staff is trained adequately enough to meet the hospital's needs without compromising the effectiveness of patient care services. This sometimes creates the need for innovative ways of time management and the need to hire casual staff to attend to clinical duties while the members are in training sessions. Another cost of EHR implementation is the cost of lost productivity during the time when the personnel is in training (Ibrahim et al., 2021). It should also be noted that owing to the constant updates of the system and new optimization solutions, users themselves require new information constantly. It requires organizations to keep references and facilities for training to address a consistent demand for a higher learning level as well as to facilitate the proper use of the system. These continuing education imperatives can be more effectively managed through the cultivation of a population of super-users and a training capability within the organization.

Workflow and Productivity Impact

The impact of EHR implementation on clinical workflows and productivity represents a significant barrier to successful adoption. Healthcare organizations need to pay special attention to times of change when existing work practices are replaced with new ones. The first period, that is, the implementation period is rather characterized by a decline in organizational efficiency due to staff adjustments to new means and activities. EHR systems bring intervention into existing clinical processes, as they influence the relationships that clin invent with patients and record those encounters. This is mainly due to the type of documentation used in EHR since such frameworks may slow down the process, especially when patients are being transitioned into EHR. To avoid a decrease in patient care, organizations need to pay special attention while designing and optimizing EHR workflows.

The implementation of the EHR systems into existing clinical experiences needs planning and regular adaptation. Challenges to workflow redesign include having to manage workflow problems that arise when an organization implements new models while separately managing quality of care issues (Keshta & Odeh, 2021). Due to the dynamic nature of operations within the healthcare industry, an unlimited and correct operational health care work environment may entail making adjustments throughout the ideal system, therefore, complex systems especially the healthcare system call for an efficient workflow solution that considers the operational uniqueness of an environment together with the underlying systemic framework. Productivity control and efficiency become two of the greatest challenges that arise due to the implementation of EHR. It is essential for organizations to figure out means to measure productivity and its effects, on what areas to focus for changes. Optimization techniques such as templates, shortcut keys, and automated tools which can be used within the programme to reduce productivity hindrances could also enhance user acceptance.

Data Migration and Quality Issues

Data migration and quality management present substantial barriers to EHR implementation. Organizations must transfer existing patient records into new systems while ensuring data accuracy, completeness, and accessibility. Another factor we find a challenge in healthcare data is that it is often complex which makes it a bit hard to ensure that the quality of the data to be migrated is good. Some concerns that organizations have to wrestle with, concern issues to do with standardization, format transformation as well as information verification. It means that the presence of incomplete or, on the contrary, contradictory information in the existing records may complicate the work on migration and, in some cases, could demand extra check. Handling data quality, however, turns into a continuous process after the migration process. They inspect the regularity of data validation, error correction, and improvements in quality as the fundamental organizational practice.

Any data consistency across different systems and user groups is best managed through constant oversight and intervention (Sharma et al., 2020). Another characteristic of legacy systems is the complexity of the process of data migration due to the higher level of integration difficulty. Some organizations requires structured historical data to remain accessible while at the same time being able to integrate with new EHR systems. The most important concern is to achieve constant availability of patient data, which creates the need for successful data archival and retrieval. It becomes essential to pay sufficient attention to the effects of data quality on continued clinical practice and patient treatment. To that end, organizations must confirm that migrated data is sufficient for clinical assessment and decision-making. When adopting data quality metrics and monitoring systems, high-caliber, reliable information is protected against degradation and obsolescence.

Regulatory Compliance and Legal Considerations

Legal and regulatory factors represent the most challenging factors to implement and function in EHR systems. Currently, managing the healthcare information system is not an easy task since it has to meet regulatory compliance requirements while, at the same time, addressing clinical functionality. Due to the ever-changing regulations of the healthcare sector, the system needs to be updated now and then, and the current compliance needs to be checked. Some of the legal concerns that organizations have to meet include the Health Insurance Portability Accountability Act (HIPAA), meaningful use of innovative systems, and state laws.

Compliance monitoring systems and documentation procedures are integral activities of EHR but they complicate its operations. So, routine auditing or assessment is required when operations become unmanageable fail to meet the legal requirements, and are deemed problematic. Issues on the legal aspect of records and documentation standards are sensitive. Understanding how organizations are handling EHR systems currently, and what documentation practices they promote while meeting legal rules, is crucial for future implementations (Wilson et al., 2021). Policies and procedures for such actions as electronic signatures, amendments, and corrections shall become a legal focus. There are further issues concerning the Implementation of patient access requirements and consent management systems. Healthcare organizations should be able to find ways to provide patients with the means for permission to use their information and the methods of sharing this information with other interested parties while, at the same time, being compliant with privacy laws. Patient rights expansion and data ownership issues also raise

new legal concerns for the concept, implementation, and maintenance of EHR systems. Issues of Risk Management and Liability Issues need to be given close consideration in regard to the deployment of EHR systems. An increase in prospects of legal liabilities arising from operational system failure, data leakage, and poor documentation must also be noted. The need to have appropriate risk management procedures and to implement adequate insurance policies as the part of organization's interests defense appears.

Conclusion

EHRs implementation and maintenance can be challenged by multiple and multifaceted barriers, which healthcare organizations need to consider when enacting change. These are financial, technical, organizational, and regulatory issues that make the establishment of and maintaining such systems complex and costly. One of the key factors affecting EHR success factors include adequate EHR planning, accurate EHR resource investment, and successful change management strategies. Fielded implementations require analyzing short-term implementation concerns and ensuring the incorporation of strategies and solutions that address the system's future development needs. Therefore, it is necessary to continue the development of solutions that help overcome these barriers in order to develop effective healthcare and enhance the results of patient care provided with the help of EHRs.

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