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Beyond the screen: assessing the impact of hospitalist reliance on electronic medical records in patient-centered care

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BEYOND THE SCREEN: ASSESSING THE IMPACT OF HOSPITALIST RELIANCE ON ELECTRONIC MEDICAL RECORDS IN PATIENT-CENTERED CARE

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Approval of Dissertation

We, the faculty supervising the work of Brian H Cox, affirm that the dissertation, *Beyond the Screen: Assessing the Impact of Hospitalist Reliance on Electronic Medical Records in Patient-Centered Care*, meets the high academic standards for original scholarship and creative work established by the Brad D. Smith Schools of Business and the Lewis College of Business. The work also conforms to the requirements and formatting guidelines of Marshall University. With our signatures, we approve the manuscript for publication.

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Dedication

To my family, you have sacrificed over these last ten years while I took classes in the evenings for my master's degree and traveling to Huntington for DBA classes. Your support has kept me going all these years in this academic pursuit.

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Abstract

The integration of Electronic Medical Record (EMR) systems has transformed healthcare delivery, offering enhanced data accessibility, improved communication, and operational efficiency. However, concerns persist regarding the potential erosion of patient-centered care due to EMR overutilization. This study investigated how hospitalists' use of EMR systems correlates with patient satisfaction, focusing on the dynamics of physician communication, hospital length of stay, and regional characteristics. Using a comprehensive framework combining Resource Dependency Theory and Donabedian's Structure-Process-Outcome model, the research examines the influence of demographic, technological, and structural factors on healthcare outcomes.

The analysis, based on patient survey data from a large integrated delivery system in the southeastern United States, reveals a modest positive association between EMR usage and patient satisfaction, underscoring the potential of EMRs to enhance care delivery when optimally integrated. Regional disparities were evident, with rural hospitals achieving higher satisfaction scores, possibly due to more personalized care approaches.

These findings also challenge assumptions about generational technology adoption, as older hospitalists demonstrated slightly higher EMR usage, suggesting a complex interplay of experience, institutional expectations, and workflow integration. This study contributes to the understanding of how hospitalist EMR usage affects patient satisfaction, particularly in terms of physician communication. The findings will provide insights for hospital administrators and policymakers on optimizing EMR integration to support, rather than hinder, patient-centered care.

Chapter 1: Introduction

With the rapid advancement of technology and its integration into healthcare, Electronic Medical Record (EMR) systems have become an indispensable tool in medical practice (Menachemi & Collum, 2011). EMR systems, or Electronic Health Records (EHR) systems, are digital versions of patients' paper charts. They encompass a range of data, including medical history, diagnoses, medications, treatment plans, immunization dates, allergies, radiology images, and laboratory test results (HealthIT, 2019). Patient-centered care has been characterized by healthcare providers collaborating with patients to recognize and honor their individual needs, preferences, and values, which is pivotal for fostering shared decision-making and enhancing healthcare outcomes (Edgman-Levitan & Schoenbaum, 2021).

This study explored inpatient hospitalist physicians' utilization of EMR systems and their impact on patient-centered care. While EMR systems have offered numerous benefits, including enhanced access to patient data, improved medication safety, and streamlined processes, concerns have been raised about their impact on patient-physician interaction and physician's dependency on the systems (Upadhyay & Hu, 2022). It is vital to ascertain whether the utilization of EMR systems reduced patient interaction and, consequently, patient-centered care (Brown et al., 2016).

This study is important as it addresses the balance between leveraging technology in healthcare and preserving the humanistic elements in healthcare delivery. With healthcare increasingly embracing digital solutions, understanding how technology has impacted patient care has been crucial for optimizing outcomes and ensuring that technology enhances rather than detracts from the quality of care. Through this analysis, the research aimed to contribute valuable

insights into the effective integration of EMR systems in a manner that supports physicians' ability to deliver compassionate, patient-centered care.

In today's healthcare landscape, characterized by the adoption of value-based care (VBC) and an increasing emphasis on operational efficiency, it has become vital to comprehend the intricate web of factors that contribute to overall patient satisfaction (Teisberg et al., 2020). VBC in hospitals is a healthcare delivery model that prioritizes patient outcomes by reimbursing providers based on the quality and effectiveness of care rather than the service volume. This approach aims to improve patient health outcomes, enhance care coordination, and reduce healthcare costs by incentivizing high-quality, efficient, and equitable care (Teisberg et al., 2020). Often, healthcare professionals and administrators with advanced skills have unintentionally misinterpreted patient preferences, resulting in a potential disconnect between the care provided and the satisfaction felt by patients. Therefore, understanding the multifaceted relationship between various factors and the elements patients genuinely value is complex (Tringale et al., 2022). Ultimately, the overarching goal for healthcare organizations is to meet the needs of primary and acute care patients while consistently enhancing and elevating their level of satisfaction (Edgman-Levitan & Schoenbaum, 2021). To aid in this endeavor, the Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009 introduced an incentive program that has encouraged healthcare providers to adopt EMRs through Medicare and Medicaid (HealthIT, 2023).

The primary objective underlying the HITECH Act of 2009 was to promote health information technology and usher the healthcare sector into the digital age (HealthIT, 2023). By implementing EMRs, healthcare organizations anticipated improving care quality and overall patient safety, primarily through increased operational efficiency. EMR systems have been

designed to store and exchange patient health information efficiently, facilitate access to comprehensive health records, and provide decision-support tools for healthcare professionals (Yuan et al., 2021). Leveraging retrospective information, EMR implementation enabled healthcare organizations to gain insights into the factors that hold significance to patients as they assess health data across multiple visits to understand their impact on patient satisfaction (Pawelek et al., 2022).

The Centers for Medicare & Medicaid Services (CMS) have developed, implemented, and administered several patient experience surveys to capture patient feedback on various aspects of healthcare delivery (CMS, 2021). These surveys focus on how patients experienced or perceived key elements of their care rather than solely measuring their overall satisfaction. Specifically, these surveys have addressed critical aspects of healthcare, such as communication with physicians, understanding medication instructions, and coordination of healthcare needs (CMS, 2023).

A notable example of these surveys is the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey developed by CMS, which assesses patients' perceptions of their hospital experience (CMS, 2021). The HCAHPS survey, a 29-item instrument, evaluates patients' experiences with communication from physicians and nurses, the responsiveness of hospital staff, cleanliness and quietness of the hospital, communication about medicines, discharge information, transition to post-hospital care, and overall rating of the hospital (CMS, 2021). The survey is administered to a random sample of adult patients between 2 and 42 days after discharge. It has been conducted through mail, telephone, a combination of mail with telephone follow-up, or Interactive Voice Response (CMS, 2021). These patient experience surveys, including HCAHPS, are part of the broader Consumer Assessment of

Healthcare Providers and Systems (CAHPS) family of surveys. CMS designed the CAHPS surveys to assess various healthcare settings, providing critical insights into patient experiences and helping healthcare providers and organizations improve care quality (CMS, 2023).

Patient satisfaction scores have become increasingly important as they influence hospital reimbursement under VBC programs and provide insights into patient-centered care (Edgman-Levitan & Schoenbaum, 2021). The CMS surveys have offered valuable feedback that healthcare providers can use to improve patient experiences and have played a significant role in shaping healthcare practices and policies (Honavar, 2020). Enhanced communication between physicians and patients has been linked to improved patient satisfaction, highlighting the importance of interpersonal skills and effective information exchange in healthcare settings (Moslehpour et al., 2022). Additionally, patient satisfaction has been associated with various clinical and non-clinical factors, such as hospital cleanliness, noise levels, and the overall hospital environment, which are integral components of the patient experience (Wang et al., 2023).

The use of EMRs has influenced patient satisfaction scores. Although EMRs enhanced communication and information sharing, an overemphasis on them during patient encounters has been shown to reduce direct interaction between physicians and patients, possibly diminishing patient satisfaction (Zahabi & Lyman, 2019). Therefore, healthcare organizations must understand the impact of EMR use on patient experiences and devise strategies to balance technology use with patient-centered care to improve patient satisfaction (Cohen et al., 2021).

The transition from paper-based records to EMRs has represented one of the most significant technological evolutions in healthcare over the past few decades (Pawelek et al., 2022). EMRs have been pivotal in the shift towards more efficient, cost-effective, and quality-driven healthcare. They have not only streamlined the management of patient information but

also enhanced the accessibility and accuracy of data, which has been crucial for effective clinical decision-making (Adane et al., 2019).

The importance of EMRs in modern healthcare cannot be overstated. As of 2021, over 96% of acute care hospitals in the United States (US) reported using an EMR system, underscoring this technology's widespread adoption and critical role in medical practice (Diaz, 2023). Moreover, the global EMR market, valued at approximately $31.5 billion in 2020, has been projected to grow at a compound annual growth rate of 7.8% between 2021 and 2028. This growth has been driven by increasing demands for efficient healthcare operations amid growing health data volumes and enhanced healthcare IT infrastructure (Diaz, 2023).

However, the implementation of EMR systems has encountered challenges, including issues related to system interoperability, data security, and user resistance, which have impeded the realization of their full potential (Tsai et al., 2019). Cyber-attacks and data breaches have emerged as significant concerns, with healthcare institutions increasingly becoming targets for hackers due to the sensitive nature of medical information (Stoumpos et al., 2023). Patient data loss has compromised privacy and undermined trust in digital healthcare systems (Alanazi, 2023). Privacy concerns have been further exacerbated by the risk of unauthorized access and misuse of patient information, highlighting the need for robust security measures (Stoumpos et al., 2023).

Additionally, the effectiveness of EMRs to improve patient outcomes has been a topic of ongoing debate. While some studies have demonstrated that EMRs can significantly reduce medical errors and improve the quality of care (Gopidasan et al., 2022), others have pointed out the complexities and unintended consequences of EMR usage, such as information overload and increased administrative burden for physicians (Nijor et al., 2022). The balance between

leveraging technology for better health outcomes while mitigating the associated risks and challenges has remained a critical area for ongoing research and development.

In hospital settings, hospitalists—physicians or advanced practice providers, like nurse practitioners or physician assistants, whose primary professional focus is the general medical care of hospitalized patients—rely heavily on EMRs (Stevens et al., 2017). The implementation of EMR systems fundamentally changed how hospitalists access and share patient information, coordinate care, and communicate with patients and other healthcare. More time has shifted to the hospitalists accessing, reviewing, and entering information into the patient's records from time spent interacting with the patients (Arslan et al., 2024). This shift has important implications for patient satisfaction, as timely and accurate information can significantly influence patients' experiences and perceptions of care quality in their physician interactions (Wang et al., 2023).

Hospital medicine is a rapidly growing specialty in the US, with hospitalists playing a crucial role in inpatient care delivery (Kisuule & Howell, 2018). Darves (2023) estimated that 50,000 hospitalists practiced in the US as of 2023. According to Lapps et al. (2022), the hospitalist specialty experienced a 50% growth rate between 2012 and 2019. The rise of hospitalists has significantly impacted patient outcomes, healthcare quality, and the efficiency of hospital operations (Wachter & Goldman, 2002). Stevens et al. (2017) found that inpatient care from hospitalists had been associated with a 12% reduction in length of stay (LOS) compared to inpatient care provided by the patient's primary care physician and a 3% reduction in specialist consultations. Hospitalists significantly influence patient satisfaction, which is increasingly essential in VBC (Hirpa et al., 2020). It has been shown that patients under the care of hospitalists report satisfaction levels 2.7% higher than patients whose care was provided by non-

hospitalists in ratings of care coordination and responsiveness (Chen et al., 2013). A focus on patient-centered care and the hospitalists' ability to successfully manage complex inpatient cases has contributed to positive patient experiences and outcomes (Yuan et al., 2021).

Initially developed to track health record access per security requirements related to HIPAA and EMR Meaningful Use criteria, audit logs record clinicians' activity within EMR systems. Additionally, audit logs and other types of EMR system data have become a powerful source of information on EMR use, including navigation and documentation patterns (Cohen et al., 2021). This data-driven approach has enabled healthcare organizations to optimize clinical workflows, enhance data quality, and streamline information exchange among care providers. By leveraging audit log data, organizations have identified training needs, addressed usability issues, and promoted best practices for EMR utilization (Wu et al., 2018).

EMR vendors have offered reporting tools that generate metrics based on user interactions with the system (Cohen et al., 2021). These reports can provide valuable information on key EMR performance indicators, such as time spent on documentation, access frequency, and tasks performed (Burden et al., 2024). By analyzing these metrics, healthcare administrators have assessed the impact of EMR usage on clinical outcomes, patient care quality, and physician satisfaction (Cohen et al., 2021). The increasing integration of EMRs has raised concerns about potential disruptions to the essential patient-physician relationship (Alkureishi et al., 2016).

Research on EMR usage and patient satisfaction has advanced significantly, yet several gaps still need to be addressed. A central theme in previous research was the focus on physicians' perspectives and satisfaction with EMRs during and after implementations, with little to no consideration for patients' experiences and satisfaction with their care (Williams et al., 2019). More patient-centric studies are necessary to explore how EMR usage impacts patient

satisfaction from the patients' viewpoints (Nguyen et al., 2021). Previous EMR usage research often focused on administrative efficiency and physician burden. More studies are needed to examine the relationship between EMR usage, quality of care, and patient satisfaction (Agha, 2014).

Another key area frequently overlooked is patient-physician communication. More research is needed on how EMR usage affected patient-physician communication, both positively and negatively. Understanding how EMRs facilitated or hindered communication can provide insights for improving patient satisfaction (O'Malley et al., 2010).

Patient-centered care, a healthcare approach where physicians collaboratively and empathetically engaged with patients to fully comprehend and listen to their distinct requirements and inclinations for treatment, is paramount in ensuring superior healthcare outcomes (Epstein & Street, 2011). The patient-physician relationship is the cornerstone of this model, enabling shared decision-making and facilitating enhanced healthcare results. With the escalating utilization of EMR systems, potential disruption to this profound interpersonal dynamic has arisen (Li et al., 2022). Hence, deciphering whether and how the use of EMR systems by inpatient hospitalists impinges upon the fundamental essence of patient-centered care is vital (Epstein & Street, 2011). It has become essential to discern whether the perceived reliance on EMRs disrupts direct patient-physician interaction and comprehend how this shift could holistically impact patient satisfaction (Alkureishi et al., 2016).

The purpose of this study is to examine the impact of EMR usage on hospitalist-patient interactions, focusing on patient satisfaction as a key outcome measure. The following objectives guide the research: Assess the relationship between hospitalist EMR usage and patient satisfaction scores, with a specific focus on perceived communication quality and physician

engagement. Examine the impact of hospitalist age on EMR usage to determine whether physician characteristics influence reliance on EMRs. Compare patient satisfaction scores across different hospital market settings (urban, suburban, rural) to evaluate whether regional differences influence patient perceptions of communication quality. These objectives will serve as a foundation for hypothesis development and the study's methodological framework. By systematically addressing these goals, this research aims to provide actionable insights for hospital administrators, policymakers, and healthcare practitioners seeking to optimize EMR practices without compromising the quality of physician-patient interactions.

Chapter 2: Literature Review and Theoretical Framework

As hospitals increasingly rely on EMRs, it becomes essential to understand the ways they shape patient-centered care. This chapter reviews the existing literature on patient-physician communication, patient satisfaction, and EMR adoption among hospitalists, framing the discussion around three core research questions: the relationship between hospitalist EMR usage and patient satisfaction scores, the influence of hospitalist age on EMR usage, and differences in patient satisfaction across urban, suburban, and rural hospital markets. By structuring the chapter according to these questions, the literature review underscores the multifaceted nature of EMR usage in diverse clinical settings.

Patient-Physician Relationship and Communication

One of the most significant determinants of patient satisfaction is the quality of communication between the patient and physician. Extensive research documented that effective communication fosters better patient adherence to treatment plans, improves patient satisfaction, and enhances trust in the healthcare system (Sharkiya, 2023). However, the last 20 years have witnessed a dramatic shift in this dynamic, primarily due to technology integration into healthcare practices, notably through the extensive use of EMRs. While these changes have brought many benefits, such as improved access to patient data and streamlined administrative processes, they have also introduced challenges like usability for physicians that affect the quality of patient-physician communication (Tsai et al., 2019).

Moslehpour et al. (2022) researched the impact of patient-physician communication on patient satisfaction in inpatient settings through a systematic review of 11 articles. It identified key factors influencing patient satisfaction, including the duration of patient-physician interactions, the effectiveness of verbal and nonverbal communication, and the extent to which

physicians understand patient needs. The author's research showed that time spent communicating with the patient had the most significant impact on patient satisfaction. Additionally, (Belasen et al., 2021) examined the effects of personalized instruction and feedback on improving HCAHPS communication scores among residents and physicians at a hospital in Michigan. By comparing the mean HCAHPS scores before and after the intervention (with sample sizes of 485 and 354, respectively), the study observed statistically significant improvements: an 8.52-point increase in overall HCAHPS ratings, a 6.06-point rise in physician communication performance, a 6.18-point enhancement in physician respect, and a 3.12-point improvement in physician listening skills (Belasen et al., 2021).

The role of verbal and nonverbal communication in fostering effective patient-physician interactions has been well-established. Verbal communication involves the direct exchange of information, while nonverbal cues like body language and facial expressions can significantly enhance empathy and understanding (Ambady et al., 2002). However, the last two decades have seen a growing concern that excessive time spent on EMRs can disrupt these communication forms. Physicians might multitask between patient interaction and EMR navigation, which can detract from active listening and engagement—key components of effective communication that build trust and rapport (Montague et al., 2012).

Studies link effective communication with higher patient satisfaction and better health outcomes. Patients have been more likely to adhere to treatment plans and report higher satisfaction when they view their physicians as good communicators (Street et al., 2009; Zolnierek & DiMatteo, 2009). Additionally, clear communication is pivotal in improving health literacy, particularly for patients with low health literacy levels (Walters et al., 2020). The

distraction posed by EMRs can hinder these outcomes by complicating the communication process.

The integration of EMRs into clinical practice has significantly changed the landscape of patient-physician interactions. Some studies have indicated that patients believe they can still easily talk with physicians and that their relationship with the physician remains unaffected despite EMR use (Zahabi & Lyman, 2019). However, other research highlights the potential for EMRs to disrupt effective communication. Montague et al. (2012) pointed out that physicians might multitask between patient interaction and EMR navigation, which can detract from active listening and engagement—key components of effective communication that build trust and rapport.

In inpatient settings, the balance between EMR use and patient interaction remains critical. Downing et al. (2018) highlight that physicians spend a significant portion of their time, 44%, on EMR documentation, reducing the time available for direct patient care and face-to-face interactions to only 24%. This imbalance may compromise the quality of patient care and communications. Similarly, Hill et al. (2013) found that hospital-based physicians often face challenges in managing their time between EMR tasks, 43% of their daily time and patient interactions, and 28% of their daily time, potentially impacting patient satisfaction and care outcomes.

These findings tie directly to the first research question, the link between EMR usage and patient satisfaction, by illustrating how increased documentation demands might hamper the meaningful dialogue that underpins positive patient experiences. Beyond training interventions, Montague et al. (2012) and Zahabi & Lyman (2019) documented that not all patients perceive EMR usage consistently. Some patients appreciate the thoroughness that EMRs can bring to

clinical encounters, while others feel it detracts from face-to-face engagement. These divergent views hint that factors in physician demographics, such as age or hospital environment, may condition how EMR use is perceived. This observation naturally leads into discussions of hospitalist age, reflecting the second research question about generational differences in EMR usage and their effects on patient satisfaction.

Physician EMR Usage

Age has emerged as a pivotal factor in EMR adoption patterns among hospitalists. The second research question investigated whether hospitalist age influenced patient satisfaction. Research by Tsai et al. (2019) and Barbazza et al. (2021) underscores that older hospitalists may rely more on EMRs due to extensive documentation requirements and decades of institutional practices. Younger hospitalists, by contrast, tend to integrate digital platforms more seamlessly into clinical workflows, possibly perceiving EMR systems as tools to boost efficiency rather than merely a documentation obligation.

The increasing integration of EMRs into healthcare has brought benefits and challenges. On the one hand, EMRs provide a more efficient way of storing and accessing patient data, potentially improving patient care (Honavar, 2020). However, the transition to EMRs has not been without challenges. Barriers to adoption include high initial costs, disruption of workflow, resistance to change, and concerns about data security and privacy (Kruse et al., 2016). Moreover, physicians often express frustration with the usability of EMR systems, which can be cumbersome and counterintuitive (Cresswell et al., 2017). Facilitators for successful adoption include robust training programs, user-friendly interface designs, and administrative support (Boonstra & Broekhuis, 2010). Kruse et al. (2016) conducted a systematic review of the barriers and facilitators to EMR adoption, highlighting the need for improved user training and system

customization. Similarly, Cresswell et al. (2017) focused on the usability issues of EMR systems, suggesting that poor design and lack of integration with clinical workflows were significant obstacles.

EMR usage patterns among hospital physicians vary significantly and are influenced by factors such as specialty, hospital size, and the specific EMR system in use (Hsiao & Hing, 2014). Studies indicate that while some physicians embrace the technology and integrate it seamlessly into their practices, others adopt a minimalistic approach, often due to perceived inefficiencies or lack of training (Barbazza et al., 2021). Hsiao and Hing (2014) analyzed data from the National Ambulatory Medical Care Survey to identify trends in EMR usage, finding significant variability across different medical specialties. Barbazza et al. (2021) investigated the impact of EMR usage on the quality of primary care, noting that consistent and thorough usage correlated with better patient outcomes.

The benefits of EMR usage are well-documented. EMRs facilitate better data management, enhance communication among healthcare providers, and improve the overall quality of care (Buntin et al., 2011). They also support evidence-based practice by providing timely access to patient information and clinical guidelines (Blumenthal & Tavenner, 2010). Buntin et al. (2011) provided a comprehensive review of the benefits associated with EMR usage, emphasizing improved quality of care and patient safety. Blumenthal and Tavenner (2010) discussed the role of EMRs in facilitating the meaningful use criteria set forth by health policymakers, highlighting the potential for system-wide improvements in healthcare delivery.

Usability issues with EMR systems further complicate the situation in inpatient settings. Khairat et al. (2018) noted that EMR systems often have usability issues that increase the cognitive load on physicians, detracting from their ability to engage effectively with patients.

This increased cognitive load can lead to errors and omissions in patient care, complicating communication (Ratwani et al., 2018).

While EMRs offer numerous benefits, their impact on physician workflow and patient care is mixed. Studies have reported increased administrative burden and reduced face-to-face patient interaction due to extensive documentation requirements (Shanafelt et al., 2016). The shift toward EMR documentation has reduced direct patient care time, which has been a core aspect of physicians' job satisfaction and fulfillment, ultimately contributing to burnout (Li et al., 2022). Shanafelt et al. (2016) explored the relationship between EMR usage and physician burnout, suggesting that extensive documentation requirements contribute significantly to stress and job dissatisfaction. Arslan et al. (2024) highlighted the time-consuming tasks within EMRs that contributed to burnout among physicians, underscoring the challenges physicians face in managing electronic documentation. In this study, the duration physicians spend retrieving and reviewing data within the patient chart at the onset of a patient encounter constituted just one of roughly 12 tasks conducted by a physician within the EMR during each visit. On average, this information retrieval process alone consumed about 40 minutes daily (Arslan et al., 2024).

Patterson et al. (2021) reported the unintended consequences of EMR usage, such as interference with the patient-physician relationship and physician dissatisfaction, ultimately leading to burnout. Data was collected through a survey of physicians in seven categories, including time with the patient, time with staff, time listening to resident presentations, time teaching, time multitasking, time dictating, and time on the EMR. Thirty-six percent of the physician's time was spent on the EMR compared to 35% of the time spent with the patient, and 29% was spent in the other five categories (Patterson et al., 2021). The study conducted by Czernik et al. (2022) identified challenges such as frustration with irrelevant auto-populated data,

lack of integration with essential functions, fragmented patient information, excessive documentation time, alert fatigue, and disruptive technology outages, particularly with downtime. Conversely, hospitalists have appreciated the EMR's facilitation of clinical work, including easy access to patient information, remote accessibility, improved task efficiency, better communication among care team members, and simplified oversight of patients (Mirabella et al., 2021). Importantly, hospitalists who had found EMRs efficient were less likely to experience burnout, emphasizing the significance of EMR usability in reducing professional dissatisfaction (Czernik et al., 2022).

This body of research connects closely to the second research question, as it indicates that age-related differences in EMR usage patterns may amplify or mitigate communication challenges. Older hospitalists might experience greater frustration and increased burnout if they are less adept at navigating EMRs during patient encounters. In contrast, younger hospitalists might be more comfortable multitasking—though they are not immune to burnout. Addressing usability concerns is therefore essential for any effort aimed at maintaining high patient satisfaction and ensuring hospitalist well-being.

Patient Satisfaction

The third research question focuses on how patient satisfaction varies across urban, suburban, and rural hospital markets. This inquiry is important because healthcare environments differ significantly in patient volume, resources, and institutional culture, all of which can shape how EMRs are implemented and perceived.

Patient satisfaction has become a pivotal aspect of healthcare delivery, encompassing elements of quality of care and overall health outcomes. Effective communication between healthcare providers and patients has been consistently identified as a significant predictor of

patient satisfaction. A meta-analysis conducted by Zolnierek and DiMatteo (2009) found that effective physician communication is positively correlated with patient adherence to treatment regimens, which in turn influences patient satisfaction. This underscores the critical role that communication skills play in improving patient experiences and outcomes (Zolnierek & DiMatteo, 2009).

Research has also indicated that the size of the hospital can impact patient satisfaction scores. A study by McFarland et al. (2017) revealed that patient satisfaction scores were significantly lower in larger hospitals compared to smaller ones. Hospital size was most strongly associated with lower patient satisfaction on the following HCAHPS items: "receiving help as soon as needed" ($\beta = -.441$, $P < .001$), "room and bathroom cleanliness" ($\beta = -.286$, $P < .001$), and doctor communication ($\beta = -.213$, $P < .001$). It suggests that factors associated with larger hospitals contribute to lower satisfaction scores, such as patients' perceptions of hospital cleanliness, receiving help on time, and doctor communication (McFarland et al., 2017). These findings resonate with the third research question, highlighting that hospital location and setting can either exacerbate or alleviate the communication and documentation hurdles posed by EMRs.

Additionally, various factors have been identified as influencing patient satisfaction within hospitals. For instance, a study by Puppala et al. (2020) analyzed HCAHPS data and found that surgical admissions were associated with higher satisfaction levels. In contrast, longer lengths of stay (LOS) were associated with lower satisfaction. This finding suggests that both the nature of the admission and the duration of the hospital stay are important considerations in patient satisfaction, with shorter stays and surgical interventions being perceived more positively (Puppala et al., 2020).

Communication between hospitalists and patients also plays a crucial role in patient satisfaction. A study conducted at a not-for-profit, level 1 regional trauma center in New Jersey examined factors related to patient satisfaction with hospitalist communication. The results indicated that demographic variables did not significantly affect satisfaction. However, patients with longer LOS reported higher satisfaction with communication, highlighting the importance of continuous and effective communication throughout the hospital stay to enhance patient experiences (Khateeb et al., 2020).

Hospitalists play a crucial role in shaping patient satisfaction initiatives and priorities within hospital settings. Understanding hospitalists' perspectives on patient satisfaction is essential for enhancing healthcare delivery and patient outcomes. Their role has expanded significantly over the past few decades, and understanding patient satisfaction with hospitalist care is crucial for improving overall hospital performance. A study by Seiler et al. (2012) compared patient satisfaction with hospital care provided by hospitalists versus primary care physicians (PCPs). The study found that while satisfaction scores for physician care quality were slightly higher for PCPs, ratings for hospitalists and PCPs in terms of behavior, pain control, and communication were equivalent. This suggests that patients are generally satisfied with the care provided by hospitalists, although slight differences in perceived care quality may exist (Seiler et al., 2012).

Despite the generally positive perception of hospitalist care, efforts to improve hospitalist communication skills have shown mixed results. For example, a study by O'Leary et al. (2013) examined the impact of communication skills training for hospitalists on patient satisfaction scores. The study concluded that such training did not significantly improve patient satisfaction, indicating that other factors may also play a critical role in patient perceptions of care. This

highlights the complexity of patient satisfaction and the need for multifaceted approaches to enhance patient experiences (O'Leary et al., 2013).

Khateeb et al. (2020) found through a survey of 448 hospitalists that they were actively involved in various patient satisfaction initiatives, including communication training, utilization of HCAHPS data, and interdisciplinary bedside rounding. Despite these initiatives, hospitalists perceived their effectiveness with varying degrees, indicating the need for further research and improvement.

EMR Usage Analysis Tools

Understanding the capabilities and limitations of existing EMR usage analysis tools in capturing and analyzing data related to physician interactions with EMRs, patient engagement, and workflow patterns is vital in determining their effectiveness. For example, research has demonstrated that EMR audit log analysis can identify workflow inefficiencies, leading to targeted interventions that significantly alleviate clinician documentation burdens and enhance direct patient care (Wu et al., 2018).

Burden et al. (2024) conducted a study focusing on the utilization of EMR event logs to gain insights into inpatient workload. The authors emphasized the importance of rigorous validation techniques to ensure the accuracy and generalizability of measures derived from event logs. It also highlighted the need for building theories and frameworks to interpret the data effectively, particularly in understanding complex measures like work outside of work (Akbar et al., 2021).

Burden et al. (2024) revealed that despite all hospitals having access to EMRs, only 53% reported using EMR data to track clinician time, indicating a gap in leveraging available data for workload management and optimization. The authors stressed the significance of defining and

assessing workload measures and understanding their contextual implications. They cautioned against misinterpreting data and emphasized the necessity of collaboration with relevant stakeholders to address identified issues (Burden et al., 2024).

A report released by the US Department of Health and Human Services concluded that measures based on audit logs, such as total time in the system or time in specific tasks like in-basket management, may be helpful for organizations to internally capture clinician activity and track change over time, particularly in response to interventions designed to reduce burden and improve EMR use (Cohen et al., 2019). Several EMR vendors offered clients reports that provide measures of how clinicians use EMRs based on log data. They also leveraged log data within health systems to examine the association between the volume of in-basket messages received by physicians experiencing burnout (Cohen et al., 2021).

Sinsky et al. (2020) proposed seven core measures of EMR use in Table C1, including total EMR time, time on documentation, and work outside of work, among others. These measures provide insights into practice efficiency and the physician's work experience. The authors emphasized the importance of standardizing EMR log data measures to facilitate cross-study synthesis and comparative research.

Physicians' well-being and burnout have been linked to factors such as EMR alert-related workload and time spent on electronic clinical documentation. Tai-Seale et al. (2019) found a connection between physicians' well-being and in-basket messages generated by EMR algorithms, highlighting the impact of technology on healthcare professionals.

The analysis of EMR log data not only provided insights into physician activity but also offers opportunities to optimize operational, technological, and policy decisions. Sinsky et al. (2020) underscored the importance of normalizing time measures to enhance research on EMR

efficiency and its impact on the physician and patient experience. They advocate for continuous adaptation of EMR use measures to align with technological advancements and evolving healthcare practices.

Several studies have explored the implications of EMR use on physician workload and professional fulfillment. DiAngi et al. (2017) developed a training program to quantify EMR time burden and improve physicians' perceived control over their workload, highlighting the potential benefits of targeted interventions in mitigating EMR-related stress.

EMRs offer many advantages, including improved data accessibility, enhanced coordination among providers, and support for evidence-based decision-making (Buntin et al., 2011; Blumenthal & Tavenner, 2010). However, they also introduce new administrative burdens that can encroach on face-to-face interaction time (Shanafelt et al., 2016). Patterson et al. (2021) discovered that many hospitalists spend nearly as much time on EMR-related tasks as they do directly interacting with patients, underscoring the trade-off between digital documentation and personal connection.

Addressing these workflow challenges links back to the first research question about EMR usage and patient satisfaction, given that less time spent actively engaging patients may lead to lower satisfaction. Meanwhile, the ability to multitask effectively might also vary by hospitalist age, second research question, and by hospital market, third research question, as some settings have more substantial resources to optimize EMR interfaces or reduce administrative burdens (Czernik et al., 2022; Mirabella et al., 2021). Thus, EMR usability improvements, training programs, and effective policy frameworks can all mitigate the negative impact of extensive documentation on patient experience.

Theoretical Framework

The theoretical framework presented in this discussion is designed to explore how hospitalist EMR usage influenced patient satisfaction scores within hospital settings. This framework synthesizes Resource Dependency Theory (RDT) and Donabedian's Structure, Process, and Outcome (SPO) model, offering a multidimensional approach to understanding the dynamics of EMR adoption and its implications for patient care and satisfaction.

RDT provided a theory through which it can be analyzed how organizations manage and strategize around essential resources that are externally controlled to maximize their autonomy and operational efficiency (Pfeffer & Salancik, 1978). EMRs represent critical technological resources that hospitals must effectively implement and manage in healthcare settings. RDT suggests that a hospital's capacity to utilize EMRs efficiently depends significantly on its resource base, which includes financial resources, technological infrastructure, and strategic relationships with technology vendors and IT service providers. Hospitals that are well-resourced are posited to have more sophisticated EMR systems, and thus, their hospitalists are likely to use these systems more comprehensively and effectively (Ginn et al., 2011).

The first notable application of RDT in healthcare research can be traced to the work of Alexander and Morrisey (1989), who applied RDT to hospital contract management. Specifically, they examined how hospitals managed external dependencies through strategic contracting and alliances (Alexander & Morrisey, 1989).

Donabedian’s SPO model complements RDT by offering a structured way to evaluate how the adoption of EMR systems impacts the quality of healthcare delivery and patient outcomes (Donabedian, 1988). The model breaks down the evaluation into three interconnected components:

Structure: This involves the setting attributes where care occurs, including the technological tools available, such as the EMR systems. The quality and integration of these systems within hospital operations are crucial for enabling effective healthcare delivery.

Process: This refers to the actual healthcare delivery processes influenced by the structure. With EMR systems, these processes include the ease and accuracy of documentation, the speed of accessing patient medical histories, and the effectiveness of communication between hospitalists and their patients. Well-integrated EMR systems can streamline these processes, making them more efficient and less prone to errors.

Outcome: The final component focuses on the results of the healthcare processes, measured in terms of patient satisfaction scores.

This literature review provided a comprehensive picture of how EMRs, physician demographics, and hospital market settings collectively influence patient-centered care. In addressing three primary research questions, how hospitalist EMR usage relates to patient satisfaction, whether hospitalist age affects EMR usage, and how patient satisfaction differs across urban, suburban, and rural hospitals. The review underscores the interdependence of technology, communication, and organizational context in shaping healthcare experiences. The next chapter will detail the research hypothesis employed to investigate these relationships, guided by RDT and Donabedian's SPO model. By systematically examining EMR usage alongside demographic and environmental factors, this study aims to inform targeted interventions that preserve patient-centered care while capitalizing on the efficiencies that EMRs can provide.

Chapter 3: Research Hypotheses

In the evolving landscape of healthcare delivery, the integration of EMR systems has revolutionized patient data management and clinical workflows (Brown et al., 2016). However, as physicians navigate the complexities of EMR utilization, questions arise regarding its impact on patient-centered care and overall satisfaction. Building upon the existing literature and theoretical frameworks presented (Arslan et al., 2024; Li et al., 2022; Pfeffer & Salancik, 1978), this chapter delves into a series of research hypotheses aimed at unraveling the intricate relationship between hospitalist EMR usage and patient satisfaction scores.

Recent studies have highlighted the potential negative impact of EMR systems on patient-physician interaction, leading to concerns about patient satisfaction and adherence to treatment plans (Cohen et al., 2021). As healthcare organizations strive to balance technological advancements with patient-centered care principles, it becomes imperative to investigate the specific factors that may influence patient satisfaction within the context of EMR utilization (Butler et al., 2020).

Drawing on the insights from previous research on EMR usage and physician burnout (Arslan et al., 2024; Li et al., 2022; Patterson et al., 2021), the first hypothesis posits that higher inpatient hospitalist physician EMR usage is negatively associated with overall inpatient satisfaction scores. This hypothesis is grounded in the understanding that increased EMR usage may detract from direct patient care time and quality of interactions, potentially impacting patient perceptions of care quality and satisfaction (Cohen et al., 2021).

H1: Higher inpatient hospitalist physician EMR usage is negatively associated with doctor communication satisfaction scores.

Furthermore, considering hospitalists' diverse demographics and experiences, the second hypothesis suggests that hospitalist age is positively associated with increased EMR usage. Although younger physicians are generally assumed to be more technologically adept, research suggests that older hospitalists may use EMRs more frequently due to institutional policies requiring thorough documentation and extensive clinical experience necessitating detailed record-keeping (Tsai et al., 2019; Barbazza et al., 2021). Older physicians, accustomed to traditional documentation methods, may also rely more on EMRs to ensure compliance with regulatory and billing requirements. Conversely, younger hospitalists might adopt more flexible strategies, integrating EMR usage with patient interactions to minimize perceived disruptions. Studies also suggest that while younger hospitalists may be more comfortable with technology, their workflow may not prioritize EMR documentation as highly as their older counterparts, who have historically adapted to evolving record-keeping demands (Shanafelt et al., 2016). This hypothesis seeks to validate whether hospitalist age influences the extent to which EMRs are utilized in clinical practice and how different generations of physicians navigate technological advancements.

H2: Hospitalist age is positively associated with increased EMR usage.

The third hypothesis proposes that Hospitalists located in rural regions have higher doctor communication satisfaction scores. The hypothesis suggests that hospitalists practicing in rural facilities may exhibit lower levels of EMR system utilization compared to their counterparts in urban or suburban settings. This lower EMR usage in rural facilities is hypothesized to have a positive association with doctor communication satisfaction scores. This is supported by a study from Ho (2022) that found rural hospitals had higher patient satisfaction

scores in various aspects, such as communication with nurses and doctors, responsiveness to patient needs, and cleanliness of rooms compared to urban hospitals.

H3: Hospitalists located in rural regions have higher doctor communication satisfaction scores.

In the theoretical framework introduced in chapter two, the integration of Resource Dependency Theory (RDT) and Donabedian's Structure-Process-Outcome (SPO) model provided a framework for examining how EMR usage relates to patient satisfaction. Specifically, RDT highlights the pressures hospitals face to manage external resources, such as EMRs, in ways that optimize efficiency and preserve autonomy. Meanwhile, Donabedian's SPO model interprets healthcare delivery in terms of structures, processes, and outcomes. Within this integrated framework, the first hypothesis, EMR usage negatively affecting patient satisfaction, focuses on how the "Process" of intensive EMR documentation can reduce the time or attention available for direct patient communication, thereby influencing the "Outcome" (patient satisfaction). Hypothesis two, hospitalist age positively associated with EMR usage, addresses the "Structure" element—demographic factors—and how they can lead to varying degrees of EMR engagement in the "Process," ultimately shaping outcomes such as communication and satisfaction. Lastly, the third hypothesis, hospitalists in rural markets reporting higher patient satisfaction, reflects how structural features, such as hospital location, influence the processes of care, yielding differences in patient outcomes. By linking each hypothesis to RDT and the SPO model, the conceptual model illustrates the multi-level influences on patient-centered care, showing how specific variables, such as age, EMR usage, and hospital market type, operate within structural and process dimensions to shape overall patient satisfaction scores.

The hypotheses outlined in this chapter and summarized in Table C9 served as the foundation for the study's empirical investigation into the complex relationship between EMR usage and patient satisfaction. This study aimed to contribute valuable insights into optimizing EMR practices while maintaining high levels of patient-centered care by testing these hypotheses. The findings will provide recommendations for refining EMR workflows, improving physician training, and ensuring that EMRs serve as tools that enhance rather than hinder the patient experience. Understanding these dynamics will help healthcare institutions develop strategic interventions that promote both technological efficiency and meaningful patient engagement. The next chapter will detail the research methodology, including study design, data collection procedures, and analytical techniques employed to test these hypotheses.

Chapter 4: Research Methodology

This research examined the impact of hospitalist reliance on EMRs and the resulting effect on patient-centered care within hospital settings. The study intended to test hypotheses that variables related to EMR usage can explain some variability in patient satisfaction scores, mainly focusing on perceived communication quality and attention during hospital stays. This chapter details the research context, setting and sample, design, data sources, data collection, variables, and statistical analysis strategy.

Research Context

It has been identified that while EMRs can enhance operational efficiency and patient data management (Lin et al., 2020), they may also interfere with patient-physician interactions, potentially impacting patient satisfaction negatively (Zahabi & Lyman, 2019).

This study's methodology is designed to empirically test these theoretical propositions and hypotheses developed in earlier chapters. By applying a quantitative approach to measuring both EMR utilization and patient satisfaction, the research aims to provide evidence on how EMR systems influence patient-centered care. This approach aligns with the theoretical framework discussed, where the integration of Resource Dependency Theory and Donabedian's Structure, Process, and Outcome model suggests a complex interplay between technological resources (EMR systems) and healthcare outcomes (patient satisfaction).

This study utilizes one integrated delivery system (IDS) based in the southeastern part of the United States. The IDS is the largest integrated delivery network in its state and surrounding region. It has a faith-based mission with a strategic focus on clinical excellence, compassionate care, and gratitude. The research site provided a large sample size of caregivers and patient stay/visit departments, but results may still limit generalizations as they come from a single case.

The IDS has existed since 1924 and has eight hospitals with over 750 employed physicians and over 2,300 licensed inpatient beds.

Study Participants

This study will include returned surveys for inpatient encounters from January 1, 2023, to December 31, 2023, in which a hospitalist was the discharging physician. The initial sample size for this study was 3,481 returned surveys meeting the criteria of a hospitalist as the discharging physician.

Data Sources and Variables

Four primary and secondary data sources will provide the variables for analysis. The four sources s included the IDS's internal data warehouse (QLIK) database, the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) database, the IDS's internal provider credentialing system (ECHO), and Epic Signal EMR Usage data.

IDS Data Warehouse (QLIK)

The IDS has a data warehouse that contains clinical, financial, marketing, and service measures that can be stratified by geography, site, patient, and physician. The QLIK based platform has been used by the IDS for over 15 years. QLIK is a software specializing in data visualization and business intelligence. The Qlik database will be used for hospital market data, LOS for patient visits, and Medicare Severity Diagnosis-Related Group Case Mix Index (MSDrgCMI). The MSDrgCMI is a metric that reflects the clinical complexity and resource needs of patients treated in a hospital, serving as a relative value assigned to a diagnosis-related group of patients (CMS, 2024).

Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) Database

The HCHAPS database is an IDS internal database that stores patient-level and aggregate de-identified patient experience survey response data. HCAHPS is a national, standardized patient perspective survey addressing hospital inpatient-based care (CMS, 2021). Hospitals that receive reimbursement from Medicare are required to administer the HCAHPS survey and publicly report aggregate level information on CMS' Hospital Compare website (CMS, 2021). The HCAHPS survey has twenty-nine questions about a patient's most recent overnight stay. The questions address physician and nurse communication, discharge instructions, quietness of environment, overall satisfaction rating, and willingness to recommend (CMS, 2021). Outcome measures collected from this database for physician communication will be used in the analysis.

ECHO provider credentialing system

The IDS uses the HealthStream Echo credentialing software for provider data as part of its credentialing process. Echo centralizes and secures provider data, including comprehensive records of qualifications, certifications, and demographic data. The Echo system will be used for predictor variables related to the hospitalist's age and gender.

Epic Signal EMR Usage Data

The IDS uses the Epic EMR and has access to an analytics tool, Signal, that displays how physicians spend time managing their inboxes, placing orders, writing clinical notes, and reviewing the chart. This data is available in a monthly format and can be downloaded by month to aggregate the needed data for the study period. Predictor measures of EMR Usage per patient per day will be collected from this database.

Data Collection

A data broker was used to provide visit-level data related to patient satisfaction, hospital market, MSDrgCMI, and LOS for returned surveys. This data was provided in one file with

physicians identified by the National Provider Identifier (NPI) number to be used when combining data from other sources before final analysis. This data was combined using the NPI number as a key with another file provided by the study author that contained the hospitalist's demographic data and EMR usage. The physician NPI number was then removed from the final file before statistical analysis.

Statistical Analysis

SPSS version 29 was used to analyze the data. Descriptive statistics (univariate) were used to examine the distribution of each variable to look for outliers, missing values, or potential data errors.

Selection Bias

One primary source of selection bias in this study is non-random patient survey participation. Patient satisfaction surveys, in this study, HCAHPS surveys, are voluntary, meaning that certain patient groups may be more likely to respond than others. Dissatisfied patients might be more inclined to express negative experiences, whereas highly satisfied patients may also be motivated to provide positive feedback. Conversely, those with neutral or moderate experiences may not respond at all, skewing the distribution of satisfaction scores and misrepresenting the true impact of EMR usage. Additionally, certain demographic groups, such as elderly patients, non-English speakers, or those with lower health literacy, may be underrepresented in survey responses due to survey comprehension or access barriers, further exacerbating bias.

Variations in hospital market representation also pose a significant risk of bias. Since the study examines patient satisfaction across different hospital market settings (urban, suburban, rural), disproportionate representation from one setting over another could lead to distorted

findings. If more data comes from rural hospitals, where patient volumes are lower and physician-patient interactions are often more personalized, patient satisfaction scores may appear higher than they truly are across all settings. Conversely, if urban hospitals dominate the sample, findings may overemphasize the high administrative burden and lower satisfaction scores typical of high-turnover environments, misrepresenting the broader healthcare landscape.

Conceptual Model

To investigate the impact of hospitalists' EMR usage on patient satisfaction scores, we can integrate Donabedian's Structure, Process, and Outcome (SPO) model into our conceptual model (Figure 1). This integration allows for a structured approach to understanding how various factors interact and influence patient care outcomes.

Structure encompasses several key elements: the EMR system, the hospital's financial and technological resources, and hospitalist demographics, such as age, years since graduation, gender, and market. These structural components are foundational as they set the stage for how care is delivered. For instance, well-resourced hospitals with significant financial and technological capabilities are likely to implement more sophisticated and well-integrated EMR systems. These systems, in turn, can enhance the hospital's operational efficiency and accuracy in managing patient information. Additionally, the demographics of hospitalists can influence their comfort and proficiency with EMR systems, affecting how they interact with these technologies.

Process involves the extent of EMR utilization by hospitalists. The process component is critical because it directly influences how care is experienced by patients. Effective utilization of EMR systems should streamline documentation processes, reduce errors, and facilitate better communication between healthcare providers. However, excessive reliance on EMRs might

detract from the quality of direct patient care, as hospitalists may spend more time interacting with the system than with their patients. This could lead to reduced patient satisfaction if patients feel their concerns are not being fully heard or addressed.

Outcome focuses on the results of healthcare delivery, particularly physician communication scores. These outcomes are influenced by both structural and process-related factors. For instance, high-quality EMR systems and efficient documentation processes should theoretically lead to higher patient satisfaction and improved health outcomes. Conversely, if EMR utilization detracts from patient interaction, it could negatively impact these outcomes.

The relationship among these components can be summarized as follows: Hospital resources and hospitalist demographics influence the quality and integration of EMR systems. In turn, the quality of these systems affects how hospitalists use them, impacting the frequency and extent of EMR utilization. This utilization influences the quality of patient-physician interactions and documentation efficiency, which subsequently affect patient satisfaction scores. Additionally, hospitalist demographics, such as age and years since graduation, directly influence patient satisfaction through their impact on EMR utilization and interactions.

The research hypotheses can be tested within this conceptual model: Higher inpatient Hospitalist EMR usage is hypothesized to be negatively associated with doctor communication satisfaction scores (H1). This hypothesis is based on the premise that increased EMR usage may detract from direct patient care time and quality of interactions. Hospitalist age is hypothesized to be positively associated with increased EMR usage (H2), suggesting that older hospitalists may face more challenges integrating EMR systems into their workflow, potentially impacting patient satisfaction. Finally, hospitalists located in rural regions have higher doctor

communication satisfaction scores. (H3). The empirical models below will be used to test the hypotheses.

Empirical Models

(H1)

$$\text{MD Score Avg} = \beta 0 + \beta 1(\text{Age}) + \beta 2(\text{Gender}) + \beta 3(\text{MSDrgCMI}) + \beta 4(\text{LengthOfStay}) + \beta 5(\text{Market}) + \beta 6(\text{EMR Usage PPPD}) + \varepsilon$$

(H2)

$$\text{EMR Usage PPPD} = \beta 0 + \beta 1(\text{Age}) + \varepsilon$$

(H3)

$$\text{MD Score Avg} = \beta 0 + \beta 1(\text{Urban}) + \beta 2(\text{Suburban}) + \varepsilon$$

By integrating Resource Dependency Theory (RDT) and Donabedian's SPO model, this conceptual framework offers a comprehensive approach to examining how the interplay between hospital resources, EMR system quality, hospitalist characteristics, and EMR usage influences patient satisfaction and healthcare outcomes. Resource Dependency Theory helps to understand how hospitals manage and strategize around essential external resources like EMR systems. At the same time, Donabedian's SPO model provided a structured way to evaluate how these resources impact care processes and outcomes. This combined approach allows for a detailed analysis of direct and indirect effects, providing valuable insights into optimizing EMR usage

while maintaining patient-centered care. For example, Ginn et al. (2014) applied RDT to study Hospital financial position and the relationship to the adoption of EMRs, finding that a higher level of EMR adoption was associated with a lower total asset turnover and a higher total margin. Additionally, bed size, ownership type, and teaching hospital status were significantly related to EMR adoption.

This study deemed a power analysis unnecessary because the dataset encompassed an entire census of relevant patient encounters and hospitalists over the specified period rather than relying on a smaller sample. The research drew on all available data from the IDN's patient population and EMR usage logs for the study parameters, ensuring that each eligible hospitalist and inpatient case was included in the analysis.

Chapter 5: Results

This chapter presents the study's findings, focusing on the relationships between hospitalist reliance on EMRs, patient satisfaction scores, and other influencing factors such as length of stay and market characteristics. The results are organized into descriptive statistics, correlation analysis, regression analysis, and a Univariate ANOVA Analysis, providing a comprehensive view of the data and its implications.

Descriptive Statistics

The initial dataset contained 3481 unique returned surveys for physicians in the hospital medicine specialty who were also the discharging physician. Within this initial dataset, twenty nine surveys did not have a response to the question, doctors explain things in a way you understand, seventeen surveys did not have a response to the question, doctors listen carefully, and fifteen surveys did not have a response for the question, doctors treated you with courtesy and respect. The surveys with any of these missing responses were excluded from the final dataset. The final dataset included forty-seven missing values for the MSDrgCMI variable. This data was included in the analysis using the average MSDrgCMI from the dataset to fill in the missing data.

The final dataset comprised 3,420 patient cases, with no missing data for any variable used in the analysis. This ensured robust statistical results and reliability in identifying meaningful trends. The descriptive statistics in Table C2 provide a foundational understanding of the dataset and suggest potential areas for further exploration, particularly the variability in satisfaction scores, EMR usage, and regional differences. The dependent variable, MD Score Average, reflecting patient satisfaction with physician communication, exhibited a mean value of

3.688 (SD = 0.561). This indicates moderately high satisfaction levels but with noticeable variability.

Among the predictor variables, the average Length of Stay was 4.61 days (SD = 3.30), representing a broad range of hospitalization durations. EMR Usage Per Patient Per Day (EMR Usage PD) showed a mean of 8.90 minutes (SD = 3.16) of electronic medical records systems use by hospitalists during patient care.

Multicollinearity Analysis

The Variance Inflation Factor (VIF) values from the multicollinearity coefficients, listed in Table C3, for the independent variables indicate no concerns regarding multicollinearity, as all values remain well below the commonly accepted threshold of 10. In this model, VIF values range from 1.034 to 1.134, suggesting that none of the predictors exhibit high correlation with one another. The highest VIF value, 1.134 for Length of Stay, is still well within an acceptable range, indicating that multicollinearity is not inflating standard errors or distorting coefficient estimates. These results confirm that each independent variable contributes unique information to the model, ensuring stable and reliable regression estimates for MD Score Avg.

Correlation Analysis

Pearson correlation coefficients, with results in Table C4, were calculated to examine the relationships between key variables. Several significant, though weak, correlations emerged. Length of Stay showed a negative correlation with MD Score Average ($r = -0.073$, $p < 0.001$), indicating that extended hospitalizations were associated with reduced patient satisfaction. This finding aligns with prior research from Puppala et al. (2020), which found that longer stays can lead to fatigue or dissatisfaction due to prolonged exposure to the hospital environment.

The Market variable demonstrated a positive correlation with the MD Score Average ($r = 0.063$, $p < 0.001$). This suggests that patients in certain regions may perceive higher levels of communication quality, potentially due to better resource allocation, regional care practices, or cultural factors affecting healthcare delivery. Similarly, EMR Usage PPPD was positively correlated with the MD Score Average ($r = 0.045$, $p = 0.004$), highlighting the potential role of technology in enhancing patient care and satisfaction. This small but significant correlation underscores the importance of effective and efficient EMR utilization in modern hospital settings.

Regression Analysis

A stepwise multiple regression analysis was conducted to better understand the factors influencing patient satisfaction, with results in Table C5. The most predictive variables in the final model were retained: Length of Stay, Market, and EMR Usage PPPD. The regression results offered insights into the unique contributions of each predictor to the variability in the MD Score Average.

The final model explained a modest but statistically significant portion of the variance in satisfaction scores (R-squared = 0.010, Adjusted R-squared = 0.009). Although the model's explanatory power is limited, the findings are meaningful for understanding subtle yet impactful dynamics in hospital care. The overall model was statistically significant ($F(3, 3416) = 11.33$, $p < 0.001$), supporting the validity of the results.

$$\text{MD Score Avg} = 3.623 - 0.012(\text{LengthOfStay}) + 0.041(\text{Market}) + 0.006(\text{EMR Usage PPPD})$$

Predictor Contributions

Length of Stay: A significant negative relationship was found between Length of Stay and MD Score Average ($B = -0.012$, $\beta = -0.068$, $p < 0.001$). Each additional day in the hospital

was associated with decreased satisfaction scores. This finding emphasizes the importance of minimizing unnecessary hospital days through efficient care coordination and discharge planning to maintain high patient satisfaction.

Market: The Market variable showed a positive relationship with MD Score Average ($B = 0.041$, $\beta = 0.052$, $p = 0.002$). Regional healthcare systems and practices appear to foster higher levels of patient satisfaction. This could be attributed to differences in staffing levels, communication practices, or localized patient engagement strategies, highlighting the need for tailored interventions based on regional characteristics.

EMR Usage PPPD: Higher usage of EMRs by hospitalists per patient per day was positively associated with satisfaction scores ($B = 0.006$, $\beta = 0.036$, $p = 0.036$). While the effect size was small, this relationship underscores the potential benefits of EMR systems in enhancing communication and streamlining care delivery. However, it also suggests that EMR usage must be optimized to support rather than detract from patient interactions.

Despite finding statistical significance, the study's small effect size suggested that EMR use alone is not the sole determinant of physician-specific patient satisfaction scores. This underscores the multifactorial nature of patient satisfaction; elements like nurse communication, hospital cleanliness, wait times, and the severity of a patient's condition can overshadow incremental differences in EMR usage. Hence, even though the positive correlation contradicts initial expectations, its modest magnitude cautions against over-interpreting EMR tasks as a panacea for boosting satisfaction. It highlights a need for broader, holistic strategies that address multiple touchpoints of the patient experience.

H1: Higher inpatient hospitalist physician EMR usage is negatively associated with doctor communication satisfaction scores. This hypothesis was found to be unsupported by the analysis.

Regression Analysis – Age

A stepwise regression model was used to evaluate the predictive power of age on EMR usage. The results in Table C6 revealed that the regression model was statistically significant ($F(1, 3418) = 10.98$, $p < 0.001$). Age explained 0.3% of the variance in EMR usage (R-squared = 0.003), indicating a small effect size.

EMR Usage PPPD = 8.089 + 0.019(Age)

The unstandardized coefficient for age, shown in Table C7, was B = 0.019, meaning that EMR usage increases by approximately 0.019 hours per patient per day for every additional year in age. The standardized beta coefficient was $\beta = 0.057$, reinforcing the small effect size. The 95% confidence interval for the age coefficient ranged from 0.008 to 0.031, confirming the statistical significance of the relationship.

These results support the hypothesis that hospitalist age is positively associated with EMR usage. The positive association suggests that older hospitalists may engage with EMR systems more than their younger counterparts. This finding is noteworthy, given that younger hospitalists are often presumed to be more technologically inclined. The observed relationship could reflect a combination of factors, such as older hospitalists having more experience with structured workflows or institutional pressures encouraging consistent documentation practices over time.

Despite finding statistical significance, the study's small effect size suggested that EMR use alone is not the sole determinant of physician-specific patient satisfaction scores. This

underscores the multifactorial nature of patient satisfaction; elements like nurse communication, hospital cleanliness, wait times, and the severity of a patient's condition can overshadow incremental differences in EMR usage. Hence, even though the positive correlation contradicts initial expectations, its modest magnitude cautions against over-interpreting EMR tasks as a panacea for boosting satisfaction. It highlights a need for broader, holistic strategies that address multiple touchpoints of the patient experience.

H2: Hospitalist age is positively associated with increased EMR usage. This hypothesis is supported based on the analysis.

Univariate ANOVA Analysis

The univariate ANOVA results in Table C8 provided more profound insights into the impact of market type (urban, suburban, rural) on patient satisfaction, as measured by MD Score Average, and align closely with the findings from the regression analysis. The ANOVA revealed a statistically significant main effect of market type on satisfaction scores ($F(2, 3417) = 9.000$, $p < 0.001$), confirming that regional characteristics influence patient perceptions of care. The analysis indicated that market type accounted for a small but significant portion of the variance in satisfaction scores, with an R-squared value of 0.005. This aligns with the modest effect size observed in the regression analysis and reinforces the importance of understanding market-specific factors in healthcare delivery.

The parameter estimates from the ANOVA in Table C10 highlighted meaningful differences between market types. Urban markets had a significantly lower satisfaction score compared to rural markets, with an average reduction of 0.123 ($p < 0.001$). Similarly, suburban markets scored lower than rural markets, with a reduction of 0.113 ($p < 0.001$). Rural markets served as the reference category and exhibited the highest satisfaction scores. These differences

may reflect variations in patient-physician interactions, with rural markets potentially benefiting from more personalized care.

MD Score Avg = 3.793 − 0.123(Urban) − 0.113(Suburban)

The overall model also supported the findings, with a significant intercept ($B = 3.793$, $p < 0.001$) representing the baseline satisfaction score in rural markets. Adjustments for urban and suburban markets indicated that these settings consistently underperformed relative to rural areas. The ANOVA results, therefore, provide additional granularity to the regression analysis by directly comparing satisfaction levels across market types and further validating the importance of regional characteristics.

H3: Hospitalists located in rural regions have higher doctor communication satisfaction scores. This hypothesis is supported based on the analysis.

The findings presented in this chapter offer critical insights into the complex interplay between hospitalist EMR usage, patient satisfaction, and hospital market dynamics. While the study revealed a modest positive correlation between EMR usage and patient satisfaction—contrary to initial expectations—it also underscored the importance of factors such as hospitalist demographics, length of stay, and regional differences in shaping patient experiences. These results emphasize that while EMRs can enhance care delivery, their impact is heavily influenced by how they are integrated into physician workflows and patient interactions. Building on these findings, the next chapter translates these insights into actionable recommendations, outlining strategies to optimize EMR usage, improve hospitalist training, and tailor interventions to different hospital settings. By leveraging these data-driven recommendations, healthcare organizations can refine EMR implementation to support both operational efficiency and high-quality patient care.

Chapter 6: Discussion

Contribution

This research makes several noteworthy contributions to healthcare management and patient-centered care literature. One of the key findings is the positive relationship between EMR usage and patient satisfaction. Specifically, higher EMR usage per patient per day (EMR Usage PPPD) was associated with slightly higher satisfaction scores. This finding supports the idea that technology can effectively enhance communication and streamline clinical workflows. It aligns with prior research emphasizing the potential of EMRs to reduce errors, improve documentation, and facilitate coordinated care. However, the modest strength of this relationship also indicates that EMR usage alone cannot ensure high levels of satisfaction, emphasizing the need for thoughtful integration of technology into clinical practices.

Although the first hypothesis suggested a negative relationship between EMR usage and patient satisfaction, the data revealed a modest positive correlation. One plausible explanation for this unexpected result is that greater familiarity and competence with the EMR system can enhance clinical efficiency and streamline communication. When hospitalists effectively navigate EMR tasks, they can retrieve vital information faster, ensure more accurate documentation, and, in turn, instill greater confidence in patients. Rather than competing for the hospitalist's attention, the EMR becomes a tool to facilitate more comprehensive care planning, prompt test ordering, and quicker access to results. Healthcare organizations could implement or expand comprehensive EMR training programs that include practical simulations on documenting patient information without sacrificing eye contact or conversational rapport. This approach can build confidence in hospitalists' ability to navigate system features—such as shortcuts, templates, and real-time data access—while keeping the focus on the patient.

Additionally, encouraging hospitalists to integrate EMR tasks into live patient discussions, for instance, by displaying and explaining lab results or treatment plans onscreen, may further highlight transparency and thoroughness. When EMRs cease to be a distraction and instead become a shared resource that enhances communication, hospitalists can simultaneously meet documentation requirements and maintain high-quality, patient-centered dialogue.

Another key factor in the positive correlation between EMR Usage and Patient Satisfaction might be patient perception. When patients see physicians skillfully using technology to verify information or discuss treatment plans, they may interpret this behavior as thoroughness and attentiveness. Such perceptions can boost overall satisfaction, as patients feel their care is being managed systematically and safely. Additionally, some hospitalists adapt their EMR workflow to incorporate real-time explanations, showing patients relevant lab results or using screen prompts to discuss their care trajectory. By leveraging the EMR as a shared information platform, hospitalists can transform what might otherwise be a barrier into an interactive element of the clinical encounter, thus yielding a positive effect on patient satisfaction scores.

Another significant contribution of this study is the identification of Length of Stay as a negative predictor of satisfaction. The results demonstrate that prolonged hospitalizations are associated with decreased patient satisfaction, which may reflect patient fatigue, frustration with the hospital environment, or inefficiencies in care delivery. This finding reinforces the importance of efficient discharge planning, care coordination, and resource management to ensure timely transitions from inpatient care. Strategies aimed at reducing unnecessary delays and optimizing bed turnover could have a meaningful impact on improving patient experiences.

The analysis of the relationship between hospitalist age and Electronic Medical Record (EMR) usage revealed a statistically significant positive association, supporting the hypothesis that older hospitalists engage more with EMRs. While modest in effect size, this finding contributes to understanding how demographic factors like age influence the adoption and utilization of healthcare technology.

The regression analysis showed that as hospitalist age increased, EMR usage per patient per day rose slightly. Specifically, the unstandardized coefficient indicated that EMR usage increased by approximately 0.019 hours for each additional year of age. The statistical significance of this relationship, reinforced by a confidence interval ranging from 0.008 to 0.031, affirms that age plays a role in influencing EMR engagement. However, the small effect size (R-squared = 0.003) underscores that age is only a minor determinant, with other factors likely exerting a more significant influence on EMR usage.

These findings challenged common assumptions that younger hospitalists, presumed more technologically adept, would demonstrate higher levels of EMR engagement. Instead, the results suggest that older hospitalists may rely more on EMRs, potentially due to institutional pressures, familiarity with structured workflows, or the need to adapt to regulatory and documentation demands over time. This finding highlights the complexity of technological adoption in healthcare, where demographic factors interact with professional and institutional contexts.

While the results affirm the hypothesis, they also raise questions about the broader factors influencing EMR usage. The modest explanatory power of age suggests that variables such as training, workload, hospital policies, and attitudes toward technology are likely more influential. For instance, targeted training programs and user-friendly interface designs may play a pivotal

role in shaping EMR engagement across all age groups. Furthermore, organizational culture and peer influence may affect how hospitalists of varying ages integrate EMRs into their workflows.

These findings have implications for healthcare management and policy. Recognizing age's minor yet positive impact on EMR usage highlights the importance of inclusive technological adoption strategies. Institutions must ensure that hospitalists of all ages are equipped with the tools and support necessary to maximize the benefits of EMR systems. Tailored training programs, mentorship opportunities, and intuitive EMR designs could help bridge generational differences and promote equitable engagement with healthcare technology.

The study also provided valuable insights into the role of regional healthcare dynamics. The univariate ANOVA revealed significant differences in satisfaction scores across market types, with rural markets consistently outperforming urban and suburban counterparts. Patients in rural settings reported the highest satisfaction scores, which may be attributed to factors such as closer patient-physician relationships, lower patient-to-staff ratios, or cultural differences in expectations and communication styles. These results underscore the importance of localized strategies to address disparities in patient experiences and highlight the potential for urban and suburban hospitals to adopt best practices from high-performing rural markets.

Finally, this research contributes methodologically by applying a combined theoretical framework of Resource Dependency Theory (RDT) and Donabedian's Structure, Process, and Outcome (SPO) model. This multidimensional approach integrates the organizational perspective of managing resources (RDT) with a structured evaluation of healthcare delivery processes and outcomes (SPO). This framework provided a holistic understanding of how hospital resources, technological tools, and operational factors interact to shape patient-centered care. The findings

support the utility of this combined framework in examining complex healthcare environments and guiding future interventions.

Study Limitations

Despite its contributions, this study has several limitations that warrant consideration. First, the dataset is drawn from a single integrated delivery system (IDS) in the southeastern United States. While this ensures consistency in data collection and organizational practices, it limits the generalizability of the findings to other healthcare systems or geographic regions. Differences in healthcare infrastructure, regulatory environments, and population demographics could influence the relationships observed in this study.

Second, the modest explanatory power of the regression model (R-squared = 0.010) indicates that many factors influencing patient satisfaction were not captured in this analysis. Variables such as physician communication styles, staff-to-patient ratios, hospital cleanliness, and patient socio-economic characteristics may play significant roles in shaping satisfaction scores. Including these factors in future analyses could provide a more comprehensive understanding of patient experiences.

Third, the study's cross-sectional design limits its ability to establish causal relationships between EMR usage, length of stay, market type, and satisfaction scores. While the findings suggest significant associations, longitudinal studies are needed to capture the dynamic interplay between these variables over time. For example, investigating how changes in EMR usage practices influence satisfaction across multiple years could offer more robust evidence for causal inferences.

Another limitation is the reliance on satisfaction scores as the primary outcome measure. Patient satisfaction is inherently subjective and influenced by expectations, cultural factors, and

individual preferences. While satisfaction scores provide valuable insights, they may not always align with objective care quality indicators. Future research should complement patient-reported measures with clinical outcomes, such as readmission rates, complication rates, and adherence to treatment plans, to provide a more balanced evaluation of healthcare performance.

Future Research

Building on this study's findings, several avenues for future research are suggested. First, longitudinal studies are essential to understanding how hospitalist practices and patient satisfaction evolve over time. For instance, tracking EMR usage and satisfaction scores over multiple years could reveal trends and provide insights into the long-term effects of technology adoption on patient-centered care. Longitudinal analyses could also account for external factors such as policy changes, technological advancements, and shifts in patient demographics.

Second, future studies should explore additional variables that influence patient satisfaction. Staffing levels, hospital cleanliness, patient education programs, and cultural competence training could significantly impact patient experiences. Examining these factors alongside EMR usage and length of stay could provide a more nuanced understanding of the drivers of satisfaction.

Third, comparative studies across diverse healthcare settings would help validate and expand the generalizability of these findings. Specifically, comparing private and public hospitals, large urban centers, and rural facilities in different regions or countries could identify universal strategies for improving satisfaction. Such research could also uncover context-specific challenges and opportunities, enabling tailored interventions.

Fourth, experimental studies are needed to evaluate the effectiveness of specific interventions to optimize EMR usage without compromising patient engagement. For example,

training programs designed to enhance hospitalists' proficiency with EMR systems or implementing user-friendly EMR interfaces could improve both provider efficiency and patient perceptions of care. Randomized controlled trials could provide robust evidence for the impact of these interventions on satisfaction and other outcomes.

Finally, future research should investigate the organizational and cultural factors that contribute to the higher satisfaction scores observed in rural markets. Understanding the specific practices, communication styles, and resource allocation strategies that distinguish rural hospitals from urban and suburban counterparts could provide valuable lessons for improving care in less-performing markets. These insights could inform the development of region-specific policies and programs to address disparities in patient experiences.

Chapter 7: Conclusion

This research delved into the intricate relationship between hospitalist reliance on EMRs, patient satisfaction, and key operational factors, such as length of stay and regional market characteristics. Using a combined theoretical framework of Resource Dependency Theory (RDT) and Donabedian's Structure, Process, and Outcome (SPO) model, the study explored how organizational resources and care delivery processes interact to shape patient-centered care outcomes. The findings provide critical insights into the challenges and opportunities of modern healthcare systems, emphasizing the need to balance technological advancements with the interpersonal elements of care delivery to optimize patient satisfaction.

The study produced several significant findings. One key result was the modest but positive relationship between EMR usage per patient per day (EMR Usage PPPD) and patient satisfaction scores. This indicates that effective use of EMRs can enhance communication, care coordination, and overall patient experiences. However, the limited strength of this relationship highlights that EMRs alone are insufficient for driving substantial improvements in satisfaction, emphasizing the need for thoughtful integration of technology into care practices. The study also found that prolonged hospital stays were negatively associated with satisfaction, suggesting that longer hospitalizations may lead to patient fatigue or dissatisfaction. This underscores the importance of efficient care delivery, streamlined discharge processes, and robust transition planning to minimize unnecessary hospitalizations and maintain positive patient perceptions.

Another major finding was the significant role of regional market characteristics in influencing satisfaction. Patients in rural markets consistently reported higher satisfaction scores compared to those in urban and suburban settings. This could be attributed to closer patient-physician relationships, lower patient-to-staff ratios, or cultural differences in expectations and

communication styles in rural areas. These findings suggest that rural hospitals' practices could serve as models for improving satisfaction in urban and suburban settings, where challenges like higher patient volumes and resource constraints may impede similar outcomes.

The study's contributions extend beyond its findings to its methodological approach. By integrating RDT and the SPO model, the research offers a comprehensive framework for analyzing the complex interactions between organizational resources, care processes, and outcomes. RDT highlights the importance of managing external resources, such as EMR systems, to optimize operational efficiency and autonomy. Meanwhile, the SPO model provided a structured lens for evaluating how these resources and processes translate into tangible patient outcomes. Together, these theoretical perspectives offer a robust foundation for future research and interventions in healthcare delivery.

The findings have important practical implications. First, the positive relationship between EMR usage and satisfaction underscores the need to optimize the use of technology in clinical workflows. Hospitals should invest in training programs to enhance hospitalists' proficiency with EMR systems and consider redesigning EMR interfaces to make them more user-friendly and efficient. This could reduce the cognitive load on providers, allowing them to focus more on patient interactions. Second, the negative association between length of stay and satisfaction highlights the importance of operational efficiency. Hospitals must implement strategies to minimize delays in care, optimize bed management, and ensure timely transitions to outpatient care. Third, the disparities in satisfaction across market types suggest a need for tailored regional strategies. Urban and suburban hospitals should adopt best practices from rural settings, such as emphasizing personalized care and improving communication, to address

unique challenges in their environments. Finally, hospitals must prioritize interpersonal aspects of care, ensuring that EMRs support, rather than detract from, meaningful patient engagement.

The findings of this study provide valuable insights into the relationship between hospitalist age and Electronic Medical Record (EMR) usage, contributing to the broader understanding of factors influencing technological adoption in healthcare settings. The analysis confirmed a statistically significant positive association between age and EMR usage, supporting the hypothesis that older hospitalists engage more with EMRs. However, the modest effect size indicates that age is only one of many factors influencing EMR engagement.

This study challenges prevailing assumptions that younger hospitalists, often perceived as more technologically adept, are the primary users of EMR systems. Instead, it highlights that older hospitalists, perhaps driven by professional experience, institutional expectations, or structured workflows, may demonstrate slightly higher levels of EMR usage. These findings underscore the complexity of technology adoption, which is influenced by demographic, organizational, and behavioral factors.

These results have significant implications for healthcare management and policy. To foster effective and equitable EMR adoption, healthcare institutions must prioritize inclusive strategies that address the needs of hospitalists across all age groups. Tailored training programs, mentorship opportunities, and user-friendly EMR interfaces can ensure that both younger and older hospitalists are equipped to utilize EMR systems effectively. Addressing generational differences through collaborative and supportive initiatives can help maximize healthcare technology's benefits for providers and patients.

While age provided a modest explanatory framework for understanding EMR usage, future research should explore additional factors such as clinical experience, workload,

organizational culture, and attitudes toward technology. Longitudinal and qualitative studies could deepen our understanding of how these variables interact and evolve, offering actionable insights for improving EMR adoption strategies. The findings also encourage a broader exploration of the interplay between demographic characteristics and technology use in clinical settings.

While this study makes significant contributions, it is not without limitations. The data was derived from a single integrated delivery system in the southeastern United States, limiting the generalizability of the findings to other regions or healthcare systems. Variations in healthcare infrastructure, policies, and patient demographics across regions may influence the relationships observed. Additionally, the modest explanatory power of the regression model (R-squared = 0.010) suggests that other factors, such as staff-to-patient ratios, hospital cleanliness, and patient socio-economic characteristics, may play a critical role in shaping satisfaction and warrant further investigation. The study's cross-sectional design also limits the ability to establish causal relationships between the variables analyzed, and the reliance on satisfaction scores as the primary outcome measure introduces subjectivity, as these scores reflect perceptions rather than objective indicators of care quality.

Building on these limitations, future research should address several critical areas. Longitudinal studies are essential for understanding how hospitalist practices, EMR usage, and patient satisfaction evolve over time. Tracking changes in EMR usage and satisfaction across multiple years would provide a clearer picture of the long-term effects of technology adoption on patient-centered care. Future studies should also include additional variables, such as staffing levels, cultural competence training, and patient demographics, to provide a more comprehensive understanding of the factors influencing satisfaction. Comparative studies across diverse

healthcare settings, including public and private hospitals, urban and rural facilities, and international contexts, would help validate and expand the generalizability of the findings. Experimental designs testing the impact of specific interventions, such as EMR training programs, workflow optimizations, and communication enhancement initiatives, could provide actionable recommendations for improving care delivery. Additionally, integrating satisfaction scores with objective clinical outcomes, such as readmission rates and adherence to treatment plans, would offer a more balanced assessment of care quality.

In conclusion, this study highlighted the role of EMR usage in shaping patient satisfaction, emphasizing the need for strategies that enhance efficiency without compromising the quality of physician-patient communication, ultimately advancing patient-centered care in an increasingly digital healthcare landscape. By leveraging the strengths of EMRs and adopting best practices from high-performing rural markets, healthcare providers can enhance patient-centered care while addressing regional disparities. Although limitations exist, this research provided a robust foundation for future studies and practical interventions to create a healthcare system that combines technology and human connection. The ultimate goal is to deliver superior patient experiences and outcomes in an increasingly complex and technology-driven healthcare environment.

References

Adane, K., Gizachew, M., & Kendie, S. (2019). The role of medical data in efficient patient care delivery: a review. *Risk Management and Healthcare Policy*, 12, 67–73. https://doi.org/10.2147/RMHP.S179259

Agha L. (2014). The effects of health information technology on the costs and quality of medical care. *Journal of Health Economics*, 34, 19–30. https://doi.org/10.1016/j.jhealeco.2013.12.005

Akbar, F., Mark, G., Prausnitz, S., Warton, E. M., East, J. A., Moeller, M. F., Reed, M. E., & Lieu, T. A. (2021). Physician stress during electronic health record inbox work: In situ measurement with wearable sensors. *JMIR Medical Informatics*, *9*(4), e24014. https://doi.org/10.2196/24014

Alanazi A. T. (2023). Clinicians' perspectives on healthcare cybersecurity and cyber threats. *Cureus*, *15*(10), e47026. https://doi.org/10.7759/cureus.47026

Alexander, J. A., & Morrisey, M. A. (1989). A resource-dependence model of hospital contract management. *Health Services Research*, *24*(2), 259–284.

Alkureishi, M. A., Lee, W. W., Lyons, M., Press, V. G., Imam, S., Nkansah-Amankra, A., Werner, D., & Arora, V. M. (2016). Impact of electronic medical record use on the patient-doctor relationship and communication: A systematic review. *Journal of General Internal Medicine*, *31*(5), 548–560. https://doi.org/10.1007/s11606-015-3582-1

Ambady, N., Koo, J., Rosenthal, R., & Winograd, C. H. (2002). Physical therapists' nonverbal communication predicts geriatric patients' health outcomes. *Psychology and aging*, *17*(3), 443–452. https://doi.org/10.1037/0882-7974.17.3.443

Arslan, F., Marcus, J., Khatami, A., Guergachi, A., & Keshavjee, K. (2024). Towards a Regulatory Framework for Workflow Improvement in Electronic Medical Records. *Studies in health technology and informatics*, *312*, 54–58. https://doi.org/10.3233/SHTI231311

Barbazza, E., Allin, S., Byrnes, M., Foebel, A. D., Khan, T., Sidhom, P., Klazinga, N. S., & Kringos, D. S. (2021). The current and potential uses of electronic medical record (EMR) data for primary health care performance measurement in the Canadian context: A qualitative analysis. *BMC Health Services Research*, *21*(1), 820. https://doi.org/10.1186/s12913-021-06851-0

Belasen, A. T., Oppenlander, J., Belasen, A. R., & Hertelendy, A. J. (2021). Provider–patient communication and hospital ratings: Perceived gaps and forward thinking about the effects of COVID-19. *International Journal for Quality in Health Care*, *33*(1), mzaa140. https://doi.org/10.1093/intqhc/mzaa140

Blumenthal, D., & Tavenner, M. (2010). The "meaningful use" regulation for electronic health records. *The New England Journal of Medicine*, *363*(6), 501–504. https://doi.org/10.1056/NEJMp1006114

Boonstra, A., & Broekhuis, M. (2010). Barriers to the acceptance of electronic medical records by physicians from systematic review to taxonomy and interventions. *BMC Health Services Research*, 10, 231. https://doi.org/10.1186/1472-6963-10-231

Brown, S. M., Aboumatar, H. J., Francis, L., Halamka, J., Rozenblum, R., Rubin, E., Sarnoff Lee, B., Sugarman, J., Turner, K., Vorwaller, M., Frosch, D. L. (2016). Balancing digital information-sharing and patient privacy when engaging families in the intensive care

unit. *Journal of the American Medical Informatics Association*, *23*(5), 995–1000. https://doi.org/10.1093/jamia/ocv182

Buntin, M. B., Burke, M. F., Hoaglin, M. C., & Blumenthal, D. (2011). The benefits of health information technology: a review of the recent literature shows predominantly positive results. *Health Affairs* (Project Hope), *30*(3), 464–471. https://doi.org/10.1377/hlthaff.2011.0178

Burden, M., Keniston, A., Pell, J., Yu, A., Dyrbye, L., & Kannampallil, T. (2024). Unlocking inpatient workload insights with electronic health record event logs. *Journal of Hospital Medicine*. https://doi.org/10.1002/jhm.13386

Butler, J. M., Gibson, B., Lewis, L., Reiber, G., Kramer, H., Rupper, R., Herout, J., Long, B., Massaro, D., & Nebeker, J. (2020). Patient-centered care and the electronic health record: exploring functionality and gaps. *JAMIA Open*, *3*(3), 360–368. https://doi.org/10.1093/jamiaopen/ooaa044

Case Mix Index (CMI) | CMS. (2024, September 10). https://www.cms.gov/medicare/medicare-fee-for-service-payment/acuteinpatientpps/acute-inpatient-files-for-download-items/cms022630

Chen, L. M., Birkmeyer, J. D., Saint, S., & Jha, A. K. (2013). Hospitalist staffing and patient satisfaction in the national Medicare population. *Journal of Hospital Medicine*, *8*(3), 126–131. https://doi.org/10.1002/jhm.2001

Cohen G., Brown L., Fitzgerald M., Somplasky, A. (2019). Exploring the feasibility of using audit log data to quantitate burden as providers use electronic health records. *Washington, DC: Mathematica*. https://aspe.hhs.gov/system/files/pdf/263356/jsk-qebhr-final-concept-report.pdf

Cohen, G. R., Boi, J., Johnson, C., Brown, L., & Patel, V. (2021). Measuring time clinicians spend using EHRs in the inpatient setting: A national, mixed-methods study. *Journal of the American Medical Informatics Association*, *28*(8), 1676–1682. https://doi.org/10.1093/jamia/ocab042

Cresswell, K. M., Bates, D. W., & Sheikh, A. (2017). Ten key considerations for the successful optimization of large-scale health information technology. *Journal of the American Medical Informatics Association, 24*(1), 182–187. https://doi.org/10.1093/jamia/ocw037

Czernik, Z., Yu, A., Pell, J., Feinbloom, D., & Jones, C. D. (2022). Hospitalist perceptions of electronic health records: a Multi-site survey. *Journal of General Internal Medicine, 37*(1), 269–271. https://doi.org/10.1007/s11606-020-06558-8

Consumer Assessment of Healthcare Providers & Systems (CAHPS) | CMS. (2023, January 25). https://www.cms.gov/Research-Statistics-Data-and-Systems/Research/CAHPS

Darves, B. (2023, March 13). Hospitalist update: For hospital medicine physicians, emerging opportunities plentiful in clinical and operational realms. *NEJM CareerCenter Resources*. https://resources.nejmcareercenter.org/article/hospitalist-update-for-hospital-medicine-physicians-emerging-opportunities-plentiful-in-clinical-and-operational-realms/

DiAngi YT, Stevens LA, Halpern-Felsher B, Pageler NM, Lee TC. (2019). Electronic health record (EHR) training program identifies a new tool to quantify the EHR time burden and improves providers' perceived control over their workload in the EHR. *JAMIA Open, 2* (2): 222-230. https://doi.org/10.1093/jamiaopen/ooz003

Diaz, N. (2023, March 7). 96% of US hospitals have EHRs, but barriers remain to interoperability, ONC says. https://www.beckershospitalreview.com/ehrs/96-of-us-hospitals-have-ehrs-but-barriers-remain-to-interoperability-onc-says.html

Donabedian, A. (1988). The quality of care: How can it be assessed? *JAMA*, *260*(12), 1743. https://doi.org/10.1001/jama.1988.03410120089033

Downing, N. L., Bates, D. W., & Longhurst, C. A. (2018). Physician burnout in the electronic health record era: Are we ignoring the real cause? *Annals of Internal Medicine, 169*(1), 50-51. https://doi.org/10.7326/m18-0139

Edgman-Levitan, S., & Schoenbaum, S. C. (2021). Patient-centered care: Achieving higher quality by designing care through the patient's eyes. *Israel Journal of Health Policy Research*, *10*(1), 21. https://doi.org/10.1186/s13584-021-00459-9

Epstein, R. M., & Street, R. L., Jr (2011). The values and value of patient-centered care. *Annals of family medicine*, *9*(2), 100–103. https://doi.org/10.1370/afm.1239

Ginn, G. O., Shen, J. J., & Moseley, C. B. (2011). Hospital financial position and the adoption of electronic health records. *Journal of Healthcare Management*, *56*(5), 337-352. https://doi.org/10.1097/00115514-201109000-00009

Gopidasan, B., Amanullah, S., & Adebowale, A. (2022). Electronic medical records – A review of cost-effectiveness, efficiency, quality of care, and usability. *Journal of Psychiatry Spectrum*, *1*(2), 76. https://doi.org/10.4103/jopsys.jopsys_17_22

What is an electronic health record (EHR)? | HealthIT.gov. (2019, September 10). https://www.healthit.gov/faq/what-electronic-health-record-ehr

Health IT Legislation | HealthIT.gov. (2023, May 2). https://www.healthit.gov/topic/laws-regulation-and-policy/health-it-legislation

Hill, R. G., Jr, Sears, L. M., & Melanson, S. W. (2013). 4000 clicks: A productivity analysis of electronic medical records in a community hospital ED. *The American Journal of Emergency Medicine*, *31*(11), 1591–1594. https://doi.org/10.1016/j.ajem.2013.06.028

Hirpa, M., Woreta, T., Addis, H., & Kebede, S. (2020). What matters to patients? A timely question for value-based care. *PLOS ONE*, *15*(7). https://doi.org/10.1371/journal.pone.0227845

Ho, V. (2022). Healthcare safety-net in the United States: patient satisfaction across rural and urban hospitals.

Honavar S. G. (2020). Electronic medical records - The good, the bad and the ugly. *Indian Journal of Ophthalmology*, *68*(3), 417–418. https://doi.org/10.4103/ijo.IJO_278_20

Hospital CAHPS (HCAHPS) | CMS. (2021, December 1). https://www.cms.gov/Research-Statistics-Data-and-Systems/Research/CAHPS/HCAHPS1

Hsiao, C. J., & Hing, E. (2014). Use and characteristics of electronic health record systems among office-based physician practices: United States, 2001-2013. *NCHS Data Brief*, (143), 1–8. https://pubmed.ncbi.nlm.nih.gov/24439138/

Khairat, S., Burke, G., Archambault, H., Schwartz, T., Larson, J., & Ratwani, R. M. (2018). Perceived burden of EHRs on physicians at different stages of their career. *Applied Clinical Informatics*, *9*(2), 336–347. https://doi.org/10.1055/s-0038-1648222

Khateeb, R., Keniston, A., Moore, A., Hrach, C., Indovina, K. A., Kneeland, P., Rudolph, M., & Burden, M. (2020). Perspectives on patient experience: A national survey of hospitalists. *Journal of Patient Experience*, *7*(6), 1482–1490. https://doi.org/10.1177/2374373520948669

Kisuule, F. and Howell, E. (2018). Hospital medicine beyond the united states. *International Journal of General Medicine,* 11, 65-71. https://doi.org/10.2147/ijgm.s151275

Kruse, C. S., Kristof, C., Jones, B., Mitchell, E., & Martinez, A. (2016). Barriers to electronic health record adoption: A systematic literature review. *Journal of Medical Systems, 40*(12), 252. https://doi.org/10.1007/s10916-016-0628-9

Lapps, J., Flansbaum, B., Leykum, L. K., Bischoff, H., & Howell, E. (2022). Growth trends of the adult hospitalist workforce between 2012 and 2019. *Journal of Hospital Medicine, 17*(11), 888–892. https://doi.org/10.1002/jhm.12954

Li, C., Parpia, C., Sriharan, A., & Keefe, D. T. (2022). Electronic medical record-related burnout in healthcare providers: a scoping review of outcomes and interventions. *BMJ Open, 12*(8). https://doi.org/10.1136/bmjopen-2022-060865

Lin, H. L., Wu, D. C., Cheng, S. M., Chen, C. J., Wang, M. C., & Cheng, C. A. (2020). Association between electronic medical records and healthcare quality. *Medicine, 99*(31). https://doi.org/10.1097/MD.0000000000021182

McFarland, D. C., Shen, M. J., Parker, P., Meyerson, S., & Holcombe, R. F. (2017). Does hospital size affect patient satisfaction? *Quality Management in Health Care, 26*(4), 205–209. https://doi.org/10.1097/QMH.0000000000000149

Menachemi, N., & Collum, T. H. (2011). Benefits and drawbacks of electronic health record systems. *Risk Management and Healthcare Policy*, 4, 47–55. https://doi.org/10.2147/RMHP.S12985

Mirabella, A. C., McAmis, N. E., Kiassat, C., Feinn, R., & Singh, G. (2021). Preferences to improve rounding efficiency amongst hospitalists: a survey analysis. *Journal of Community Hospital Internal Medicine Perspectives, 11*(4), 501–506. https://doi.org/10.1080/20009666.2021.1929047

Montague, E., & Asan, O. (2012). Physician interactions with electronic health records in primary care. *Health Systems, 1*(2), 96–103. https://doi.org/10.1057/hs.2012.11

Moslehpour, M., Shalehah, A., Rahman, F. F., & Lin, K.-H. (2022). The effect of physician communication on inpatient satisfaction. *Healthcare, 10*(3), 463. https://doi.org/10.3390/healthcare10030463

Nijor, S., Rallis, G., Lad, N., & Gokcen, E. (2022). Patient safety issues from information overload in electronic medical records. *Journal of Patient Safety, 18*(6), e999–e1003. https://doi.org/10.1097/PTS.0000000000001002

Nguyen, O. T., Jenkins, N. J., Khanna, N., Shah, S., Gartland, A. J., Turner, K., & Merlo, L. J. (2021). A systematic review of contributing factors of and solutions to electronic health record–related impacts on physician well-being. *Journal of the American Medical Informatics Association*, *28*(5), 974-984. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8068432/

O'Leary, K. J., Darling, T. A., Rauworth, J., & Williams, M. V. (2013). Impact of hospitalist communication-skills training on patient-satisfaction scores. *Journal of Hospital Medicine*, *8*(6), 315–320. https://doi.org/10.1002/jhm.2041

O'Malley, A. S., Cohen, G. R., & Grossman, J. M. (2010). Electronic medical records and communication with patients and other clinicians: are we talking less?. *Issue brief Center for Studying Health System Change*, (131), 1–4. http://www.hschange.org/CONTENT/1125/

Patterson, M., Silver, J., Armstrong, D. G., & Hennrikus, W. L. (2021). Pediatric orthopaedic surgeon time utilization in clinic: A pilot study. *Journal of Pediatric Orthopaedics*, *41*(5), 319-321. https://doi.org/10.1097/bpo.0000000000001786

Pawelek, J., Baca-Motes, K., Pandit, J. A., Berk, B. B., & Ramos, E. (2022). The power of patient engagement with electronic health records as research participants. *JMIR Medical Informatics, 10*(7). https://doi.org/10.2196/39145

Pfeffer, J., & Salancik, G. R. (1978). *The external control of organizations: a resource dependence perspective*. Harper & Row.

Puppala, M., Ezeana, C. F., Alvarado, M. V. Y., Goode, K. N., Danforth, R. L., Wong, S. S. Y., Vassallo, M. L., & Wong, S. T. C. (2020). A multifaceted study of hospital variables and interventions to improve inpatient satisfaction in a multi-hospital system. *Medicine,* 99(51). https://doi.org/10.1097/MD.0000000000023669

Ratwani, R. M., Savage, E., Will, A., Fong, A., Karavite, D., Muthu, N., Rivera, A. J., Gibson, C., Asmonga, D., Moscovitch, B., Grundmeier, R., & Rising, J. (2018). Identifying electronic health record usability and safety challenges in pediatric settings. *Health Affairs* (Project Hope), *37*(11), 1752–1759. https://doi.org/10.1377/hlthaff.2018.0699

Seiler, A., Visintainer, P., Brzostek, R., Ehresman, M., Benjamin, E., Whitcomb, W., & Rothberg, M. B. (2012). Patient satisfaction with hospital care provided by hospitalists and primary care physicians. *Journal of Hospital Medicine, 7*(2), 131–136. https://doi.org/10.1002/jhm.973

Shanafelt, T. D., Dyrbye, L. N., Sinsky, C., Hasan, O., Satele, D., Sloan, J., & West, C. P. (2016). Relationship between clerical burden and characteristics of the electronic environment with physician burnout and professional satisfaction. *Mayo Clinic Proceedings*, *91*(7), 836–848. https://doi.org/10.1016/j.mayocp.2016.05.007

Sharkiya, S.H. (2023). Quality communication can improve patient-centered health outcomes among older patients: a rapid review. *BMC Health Services Research* 23, 886. https://doi.org/10.1186/s12913-023-09869-8

Sinsky, C. A., Rule, A., Cohen, G., Arndt, B. G., Shanafelt, T. D., Sharp, C. D., Baxter, S. L., Tai-Seale, M., Yan, S., Chen, Y., Adler-Milstein, J., & Hribar, M. (2020). Metrics for assessing physician activity using electronic health record log data. *Journal of the American Medical Informatics Association*, *27*(4), 639–643. https://doi.org/10.1093/jamia/ocz223

Stevens, J. P., Nyweide, D. J., Maresh, S., Hatfield, L. A., Howell, M. D., & Landon, B. E. (2017). Comparison of hospital resource use and outcomes among hospitalists, primary care physicians, and other generalists. *JAMA Internal Medicine*, *177*(12), 1781. https://doi.org/10.1001/jamainternmed.2017.5824

Stoumpos, A. I., Kitsios, F., & Talias, M. A. (2023). Digital transformation in healthcare: Technology acceptance and its applications. *International Journal of Environmental Research and Public Health*, *20*(4), 3407. https://doi.org/10.3390/ijerph20043407

Street, R. L., Jr, Makoul, G., Arora, N. K., & Epstein, R. M. (2009). How does communication heal? Pathways linking clinician-patient communication to health outcomes. *Patient Education and Counseling*, *74*(3), 295–301. https://doi.org/10.1016/j.pec.2008.11.015

Tai-Seale, M., Dillon, E. C., Yang, Y., Nordgren, R., Steinberg, R. L., Nauenberg, T., Lee, T. C., Meehan, A., Li, J., Chan, A. S., & Frosch, D. L. (2019). Physicians' well-being linked to in-basket messages generated by algorithms in electronic health records. *Health Affairs*, *38*(7), 1073–1078. https://doi.org/10.1377/hlthaff.2018.05509

Teisberg, E., Wallace, S., & O'Hara, S. (2020). Defining and implementing value-based health care: A strategic framework. *Academic medicine: Journal of the Association of American Medical Colleges*, *95*(5), 682–685. https://doi.org/10.1097/ACM.0000000000003122

Tringale, M., Stephen, G., Boylan, A. M., & Heneghan, C. (2022). Integrating patient values and preferences in healthcare: a systematic review of qualitative evidence. *BMJ Open*, *12*(11). https://doi.org/10.1136/bmjopen-2022-067268

Tsai, M.-F., Hung, S.-Y., Yu, W.-J., Chen, C. C., & Yen, D. C. (2019). Understanding physicians' adoption of electronic medical records: Healthcare technology self-efficacy, service level and risk perspectives. *Computer Standards & Interfaces*, 66, 103342. https://doi.org/10.1016/j.csi.2019.04.001

Upadhyay, S., & Hu, H. F. (2022). A qualitative analysis of the impact of electronic health records (EHR) on healthcare quality and safety: Clinicians' lived experiences. *Health Services Insights*, 15. https://doi.org/10.1177/11786329211070722

Wachter, R. M., & Goldman, L. (2002). Zero to 50,000 - The 20th anniversary of the hospitalist. *New England Journal of Medicine*, *367*(12), 1079-1082. https://doi.org/10.1056/NEJMra1203892

Wang, Y., Liu, C., & Wang, P. (2023). Patient satisfaction impact indicators from a psychosocial perspective. *Frontiers in Public Health*, 11. https://doi.org/10.3389/fpubh.2023.1103819

Walters, R., Leslie, S. J., Polson, R., Cusack, T., & Gorely, T. (2020). Establishing the efficacy of interventions to improve health literacy and health behaviors: a systematic review. *BMC Public Health*, *20*(1), 1040. https://doi.org/10.1186/s12889-020-08991-0

Williams, D. C., Warren, R. W., Ebeling, M., Andrews, A. L., & Teufel Ii, R. J. (2019). Physician use of electronic health records: Survey study assessing factors associated with

provider reported satisfaction and perceived patient impact. *JMIR Medical Informatics*, *7*(2). https://doi.org/10.2196/10949

Wu, D. T. Y., Smart, N., Ciemins, E. L., Lanham, H. J., Lindberg, C., & Zheng, K. (2018). Using EHR audit trail logs to analyze clinical workflow: A case study from community-based ambulatory clinics. *AMIA ... Annual Symposium proceedings. AMIA Symposium*, 2017, 1820–1827. https://pubmed.ncbi.nlm.nih.gov/29854253/

Yuan, B., Li, J., & Wu, P. (2021). The effectiveness of electronic health record promotion for healthcare providers in the United States since the health information technology for economic and clinical health act: An empirical investigation. *The International Journal of Health Planning and Management*, *36*(2), 334-352. https://onlinelibrary.wiley.com/doi/abs/10.1002/hpm.3085

Zahabi, M., & Lyman, A. (2019). Impact of electronic medical records on patient-provider communication. *Proceedings of the International Symposium on Human Factors and Ergonomics in Health Care*, *8*(1), 23–27. https://doi.org/10.1177/2327857919081005

Zolnierek, K. B., & Dimatteo, M. R. (2009). Physician communication and patient adherence to treatment: a meta-analysis. *Medical Care*, *47*(8), 826–834. https://doi.org/10.1097/MLR.0b013e31819a5acc

Appendix A: IRB Approval Letter

IRB Authorization Agreement

Name of Institution or Organization Providing IRB Review (Institution A): Baptist Health Lexington
IRB Registration: 00002954
Federalwide Assurance (FWA): 00003601

Name of Institution Relying on the Designated IRB (Institution B): Marshall University
IRB Registration: 00002205/00003206
Federalwide Assurance (FWA): 00002704

The Officials signing below agree that Marshall University may rely on the designated IRB for review and continuing oversight of the specific human subject research protocol(s) described below:
Name of Research Project: Beyond the Screen: Assessing the Impact of Hospitalist Reliance on Electronic Medical Records in Patient-Centered Care
IRB Protocol Numbers: (A) – BHL-24-1793 (B)
Name of Principle Investigator: Brian Cox
Sponsor or Funding Agency: N/A
Award Number (if any): N/A
Other Information: N/A

The review and continuing oversight performed by the designated IRB will meet the human subjects protection requirements of Institution B's OHRP-approved FWA. The IRB at Institution A will follow written procedures for reporting its findings and actions to appropriate officials at Institution B. Relevant minutes of IRB meetings will be made available to Institution B upon request. Institution B remains responsible for ensuring compliance with the IRB's determinations and with the terms of its OHRP-approved Assurance. This document must be kept on file at both institutions and provided to OHRP upon request.

Authorized Officials' Signatures:

Institution (A): Baptist Health Lexington

Signature *Date*

Chris Roty MHA, FACHE
President
1740 Nicholasville Rd.
Lexington KY 40503
Office: (859) 639-6115
Email: croty@BHSI.com

Institution (B): Marshall University

Signature 6/25/24 *Date*

John M. Maher, PhD
Vice President for Research (IO)

Appendix B: Variables

Variable	Definition
Dependent Variable	
MD Score Avg	Average score of three physician specific questions on HCAHPS Survey
EMR Usage PPPD	The average Hospitalists Electronic Medical Usage per patient per day over the study period
Independent Variables	
Market	Hospital location Urban, Suburban, Rural
Age	Age of the discharging hospitalist
Gender	Gender of the discharging hospitalist
EMR Usage PPPD	The average Hospitalists Electronic Medical Usage per patient per day over the study period
Control Variables	
MSDrgCMI	Medicare Severity Diagnosis-Related Group Case Mix Index used to measure the relative complexity and resource intensity of inpatient cases
Length of Stay	Length of inpatient hospital stay

Appendix C: Tables

Table C1: Measures of EMR Use

Measure	Abbreviation	Definition
Total EMR time	EMR-Time	Total time on EMR (during and outside of clinic sessions) per 8 h of patient scheduled time.
Work outside of work	WOW	Time on EMR outside of scheduled patient hours per 8 h of patient scheduled time.
Time on encounter note documentation	Note-Time	Hours on documentation (note writing) per 8 h of scheduled patient time
Time on prescriptions	Script-Time	Total time on prescriptions per 8 h of patient scheduled time
Time on inbox	IB-Time	Total time on inbox per 8 h of patient scheduled time
Teamwork for orders	TW	The percentage of orders with team contribution
Undivided attention	ATTN	The amount of undivided attention patients receive from their physician. It is approximated by [(total time per session) minus (EMR time per session)]/total time per session.

Table C2: Descriptive Statistics

	Mean	Std. Deviation	N
MD Score Avg	3.6883	0.5612	3420
Market	1.5000	0.7140	3420
MSDrgCMI	1.2944	0.6330	3420
Length of Stay	4.6138	3.2999	3420
Age	42.1300	9.2340	3420
Gender	0.2500	0.4300	3420
EMR Usage PPPD	8.9045	3.1596	3420

Table C3: Multicollinearity Coefficients

Model		Collinearity Statistics	
		Tolerance	VIF
1	Market	.925	1.081
	MSDrgCMI	.887	1.127
	Length of Stay	.882	1.134
	Age	.954	1.049
	Gender	.968	1.034
	EMR Usage PPPD	.960	1.042

a. Dependent Variable: MD Score Avg

Table C4: Pearson Correlation Matrix

Variable	1	2	3	4	5	6	7
1. MD Score Avg	1.000						
2. Market	0.063*	1.000					
3. MSDrgCMI	-0.008	0.000	1.000				
4. Length of Stay	-0.073*	-0.076	0.335	1.000			
5. Age	-0.025	-0.17	0.002	0.02	1.000		
6. Gender	0.027	-0.103	-0.003	0.017	-0.076	1.000	
7. EMR Usage PPPD	0.045*	0.144	0.004	-0.02	0.057	0.088	1.000

* shows significance at p<.05

Table C5: Regression Results – MD Score Avg

Model 1

	Coefficient	Beta	t-statistic	p value	95% Confidence	
Length of Stay	-0.012	-.073	-4.268	<.001	-0.018	-0.007

Model 2

	Coefficient	Beta	t-statistic	p value	95% Confidence	
Length of Stay	-0.012	-.068	-4.006	<.001	-0.017	-0.006
Market	0.045	.057	3.362	<.001	0.019	0.072

Model 3

	Coefficient	Beta	t-statistic	p value	95% Confidence	
Length of Stay	-0.012	-.068	-3.988	<.001	-0.017	-0.006
Market	0.041	.052	3.03	0.002	0.015	0.068
EMR Usage PPPD	0.006	.036	2.096	0.036	0.000	0.012

Table C6: Regression Results – Model Summary EMR Usage PPPD

Model	R	R Square	Adjusted R Square	Std Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	0.057	0.003	0.003	3.15496	0.003	10.983	1	3418	<.001

Table C7: Regression Results – Coefficients EMR Usage PPPD

	Coefficient	Beta	t-statistic	p value	95% Confidence	
Age	0.019	0.057	3.314	<.001	0.008	0.031

Table C8: Univariate ANOVA

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	5.642*	2	2.821	9	<.001
Intercept	31509.66	1	31509.7	100533	<.001
Market	5.642	2	2.821	9	<.001
Error	1070.98	3417	0.313		
Total	47600.889	3420			
Corrected Total	1076.621	3419			

* R Squared = .005 (Adjusted R Squared = .005)

Table C9: Univariate ANOVA – Parameter Estimates

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Intercept	3.793	0.027	142.602	<.001	3.741	3.845
Urban	-0.123	0.029	-4.212	<.001	-0.18	-0.066
Suburban	-0.113	0.033	-3.435	<.001	-0.178	-0.049
Rural	0*					

* This parameter is set to zero because it is redundant.

Table C10: Hypotheses Summary

Hypothesis	Variable Relationship	Conceptual Model Component	Supporting Literature
H1	Higher EMR usage → Lower patient satisfaction	Process	Arslan et al. (2024), Patterson et al. (2021)
H2	Older hospitalists → Higher EMR usage	Structure	Tsai et al. (2019), Shanafelt et al. (2016)
H3	Rural hospitals → Higher patient satisfaction	Structure & Outcome	McFarland et al. (2017), Ho (2022)

Appendix D: Figures

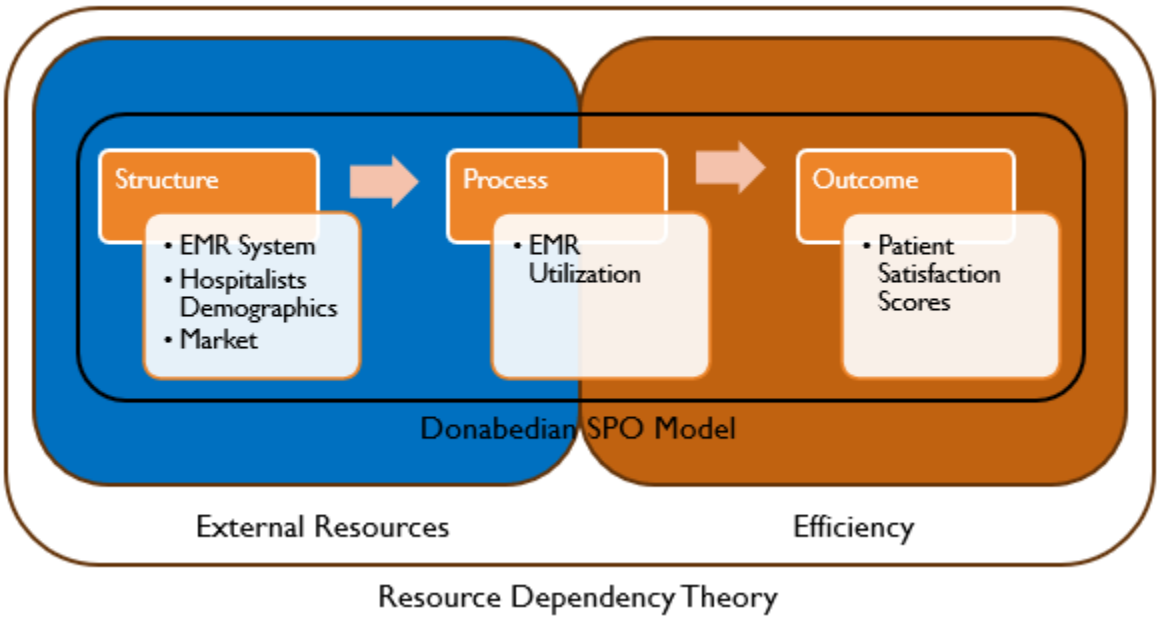

Figure 1. Conceptual Model