

Electronic health records usability and its influence on nurse decision-making, burnout, and turnover: A literature review

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Abstract

Electronic health records (EHRs) are now the dominant infrastructure through which nurses assess patients, make clinical judgments, document care, and communicate with the interdisciplinary team. Despite widespread adoption following the Health Information Technology for Economic and Clinical Health (HITECH) Act, national surveys consistently show that nurses rate the usability of their EHR systems poorly. This review synthesizes empirical and theoretical literature examining how EHR usability affects nurse clinical decision-making, contributes to professional burnout, and predicts turnover intention, while also considering the sociotechnical and organizational factors that moderate these relationships. Across the reviewed literature, poor usability is repeatedly linked to increased cognitive workload, documentation burden, alert fatigue, burnout, intention to leave, and adverse patient outcomes. At the same time, nurse-centered design and supportive work environments are identified as protective factors.

Keywords: Electronic health records; EHR usability; Nurse burnout; Nurse turnover; Patient safety.

1. Introduction

The use of computers to manage clinical information in hospitals began several decades ago, but widespread adoption of electronic health records did not occur until the HITECH Act of 2009 created strong financial incentives for hospitals to implement certified systems [1]. In 2008, only about 13% of United States hospitals used even a basic EHR system, but by 2015 nearly 90% had one in place, and the proportion of hospitals with comprehensive systems offering advanced functionality such as clinical decision support grew from less than 2% to 40% over the same period [1]. This rapid transformation was intended to improve the safety, quality, and efficiency of care through features such as electronic medication ordering and computerized decision support [1].

Nurses are among the largest groups of EHR users in hospitals and rely on these systems for clinical decision-making, care planning, patient surveillance, medication administration, and communication with other members of the health care team [2]. When an EHR does not allow this work to be performed efficiently, nurse burden increases, and patient outcomes are threatened [2]. A growing body of research indicates that usability, not merely the presence or sophistication of an EHR, is the variable most consistently associated with negative outcomes for nurses and patients [1]. This review synthesizes literature addressing three interconnected outcomes: the influence of EHR usability on nurse clinical decision-making, its contribution to nurse burnout, and its relationship with nurse turnover and patient safety, before examining organizational moderators and design-based interventions.

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2. Defining and Measuring EHR Usability in Nursing Practice

Usability is generally defined as the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use [3]. The System Usability Scale (SUS) has emerged as an industry-standard metric for quantifying this construct, with established benchmarks that allow scores to be interpreted relative to other technologies [3]. In the first national survey to apply this standardized metric specifically to nurses, Melnick et al., [3] surveyed 8,638 nurses representing the American Nurses Association and found a mean EHR SUS score of 57.6 out of 100, a rating in the bottom quartile of scores reported across SUS-based studies and equivalent to a failing letter grade. Nearly three-quarters of the nurses in that survey rated their EHR below the average SUS benchmark of 68 observed across industries, indicating that substandard usability is common rather than exceptional in nursing practice [3].

Qualitative usability testing has produced converging evidence of the same problem from a different angle. Using the think-aloud technique, in which nurse practitioners verbalized their thoughts while completing everyday tasks in an electronic medical record, Alshehri, A. A., & Alanazi, A., [4] found that the system created a heavy cognitive workload, offered limited functionality, and was prone to unintended errors and technical difficulties. Nurse practitioners in that study described laboratory results that were not organized in a clinically meaningful way, information groupings that did not match their preferred cognitive patterns, workflows that lacked a logical sequence of steps and produced what participants called click fatigue, and inconsistent naming conventions across system modules [4]. These findings suggest that usability deficits are not confined to any single EHR vendor or clinical setting but instead reflect systemic mismatches between software design and nursing workflow [4].

Sociotechnical theory offers a useful lens for interpreting these findings, proposing that EHR systems cannot be implemented successfully without careful attention to the fit between the technology and the people who use it, including the broader context of care delivery [1]. Consistent with this framework, Kutney-Lee et al., [1] found that the hospital work environment, including adequate staffing, nurse autonomy, and strong nursing leadership, was independently associated with how nurses rated EHR usability, regardless of the sophistication of the system itself. This suggests that usability is not solely a property of software design but is co-produced by the organizational context in which the technology is deployed [1].

3. EHR Usability and Nurse Clinical Decision-Making

Clinical decision support (CDS) tools embedded in EHR systems are designed to assist nurses and other clinicians by flagging drug interactions, allergies, abnormal values, and evidence-based care reminders at the point of care [5]. When well-designed and appropriately targeted, such tools can meaningfully reduce medication errors and adverse drug events [5]. However, interruptive alerts also impose real cognitive costs, interrupting the clinician's current task and, over repeated exposure, producing a phenomenon known as alert fatigue, in which nurses become desensitized to warnings and increasingly override them regardless of clinical relevance [5]. In a retrospective cohort study of alert acceptance among ambulatory clinicians, Ancker et al., [5] found that the likelihood of accepting a best-practice alert dropped substantially as the proportion of alerts representing within-patient repeats increased, suggesting that redundant, low-value alerts are a key driver of override behavior rather than overall workload alone.

Reviews of alert governance describe similarly low acceptance rates for interruptive clinical decision support across institutions, and note that poor targeting of recipients, incorrect information, non-actionable guidance, and workflows misaligned with clinical practice all contribute to alert distrust and fatigue [6]. Chaparro et al., [6] argue that interruptive alerts are a resource that should be used sparingly and monitored closely, since excessive firing degrades their perceived value and can ultimately undermine the clinician's trust in the entire decision support system. High cognitive load, which is common in routine clinical practice, further exacerbates distrust of unreliable alerts, compounding the risk that a nurse will dismiss a warning that is in fact clinically significant [6].

These usability-related cognitive burdens have direct implications for the accuracy and timeliness of nurse decision-making at the bedside. When default EHR views fail to surface active or held medication orders clearly, nurses may be unaware that a dose has been withheld, delaying necessary treatment until the omission is discovered [7]. Because barcode medication administration and other safety-critical tasks depend on nurses correctly interpreting what the EHR displays, usability failures in these interfaces can directly translate into missed or delayed clinical actions rather than merely inconveniencing the user [8]. Collectively, this literature indicates that EHR usability is not a peripheral satisfaction issue but a variable that shapes the raw material, namely the information nurses see, trust, and act upon, that underlies clinical decision-making [5] [6].

4. Documentation Burden and Cognitive Load

Documentation burden is defined as the increased effort and time required to document patient care within the EHR, and it has become a central concept linking usability to clinician well-being [9]. A scoping review of 35 studies examining how documentation burden has been measured among physicians and nurses found considerable inconsistency in definitions and instruments, with effort-related constructs including EHR workload, clinical documentation and review, after-hours EHR use, administrative tasks, and cognitively cumbersome work appearing most frequently across the literature [10]. Notably, fewer than half of the studies in that review assessed the downstream impact of documentation burden on clinicians or patients, revealing a persistent gap between describing the problem and quantifying its consequences [10].

More granular qualitative work has traced documentation burden to specific EHR components rather than treating it as a single undifferentiated problem. In a mixed-methods study of acute and critical care nurses, Cho et al., [11] found that usability varied across EHR modules such as flowsheets, medication administration records, care plans, and admission-discharge-transfer navigators, driven by factors including misalignment with clinical workflow and duplication of previously entered data. Nurses in that study recommended minimizing redundant data entry, adding clearer visual cues such as error messages and missing-information alerts, and integrating decision support more directly into documentation screens as ways to reduce burden [11]. Similarly, Gesner et al., [9] found a measurable, if modest, correlation between documentation burden and clinician burnout syndrome among nurses in direct patient care, reinforcing the conclusion that poor usability in documentation-specific EHR components is not simply an efficiency nuisance but a contributor to psychological strain.

The cumulative effect of these design shortcomings is a form of chronic cognitive load that nurses must manage in addition to their direct clinical responsibilities. Workflow fragmentation, defined as the frequency of task switching and interruption, has been identified as a related mechanism through which EHR design contributes to documentation burden, particularly in high-acuity settings such as emergency departments [11]. Taken together, this literature suggests that documentation burden functions as a proximate mechanism connecting EHR usability to the burnout outcomes discussed in the following section [9] [10].

5. EHR Usability and Nurse Burnout

Burnout is characterized by emotional exhaustion, depersonalization, and a diminished sense of personal accomplishment, and it has become a widely studied outcome of clinical work in technology-saturated environments [12]. In the national survey described earlier, Melnick et al., [3] found that nurse-rated EHR usability was strongly associated with burnout in a dose-response pattern, such that each one-point improvement in SUS score was associated with a 2% lower likelihood of burnout after adjusting for age, gender, years of experience, and practice setting. This dose-response relationship held even though the analysis controlled for a wide range of personal and professional characteristics, strengthening the inference that usability itself, rather than simply demanding jobs or difficult patients, contributes independently to burnout [3].

A systematic review of 29 studies examining EHR-related stress and burnout among physicians and nurses in hospital settings concluded that usability issues and the amount of time spent using the EHR were the most significant predictors of burnout, although the intensity of the broader working environment also shaped how much workload the EHR imposed [12]. That review further noted meaningful differences in burnout levels across clinical specialties, suggesting that usability problems do not affect all nursing roles uniformly and that solutions may need to be tailored to specific practice contexts [12]. Similarly, Gesner et al., [9] reported that poor usability of the EHR was associated with both documentation burden and clinician burnout syndrome among nurses working in direct patient care, using validated instruments including the System Usability Scale and the Maslach Burnout Inventory.

Survey data collected outside the peer-reviewed literature corroborate these academic findings and suggest the problem has persisted over time. A national survey of more than 9,000 U.S. nurses conducted in 2025 found that 69% identified digital documentation burden and poor EHR usability as major contributors to job dissatisfaction or a desire to leave their position, with younger nurses under age 40 particularly likely to rank the EHR experience among their top three job-evaluation factors [13]. This convergence between rigorously designed academic studies and large-scale industry surveys strengthens confidence that the relationship between EHR usability and nurse burnout is a durable feature of contemporary nursing practice rather than an artifact of any single dataset or time period [3] [13].

6. EHR Usability, Turnover, and Patient Safety Outcomes

Because burnout is a well-established precursor to workforce attrition, researchers have increasingly examined whether EHR usability predicts nurse turnover intention and, in turn, patient safety outcomes. In a large cross-sectional analysis linking American Hospital Association data, state patient discharge records, and nurse survey responses across 343 hospitals, Kutney-Lee et al., [2] found that nurses working in hospitals with poorer EHR usability had significantly higher odds of burnout, job dissatisfaction, and intention to leave their position compared with nurses in hospitals with better usability. The same study found that surgical patients treated in hospitals with poorer EHR usability had significantly higher odds of inpatient mortality and 30-day readmission compared with patients in hospitals with better usability, even after accounting for the overall level of EHR adoption [2]. Notably, EHR usability was a stronger predictor of these adverse job and patient outcomes than the comprehensiveness of the EHR system itself, indicating that how well a system functions in daily use matters more than how advanced its feature set is on paper [2].

This relationship between usability and downstream turnover appears to operate partly through the documentation burden pathway described earlier. A qualitative and quantitative synthesis of nurses' EHR experiences noted that when burnout is not addressed, it can lead to career dissatisfaction, absenteeism, and job turnover, positioning EHR-related documentation burden as one modifiable contributor within a broader, multifactorial problem [11]. Consistent with this pattern, the 2025 industry survey found that documentation burden and poor usability were actively influencing nurses' recruitment and retention decisions, not merely their day-to-day satisfaction [13].

Patient safety consequences extend beyond the mortality and readmission findings reported by Kutney-Lee et al., [2]. A federal patient safety resource describes how EHR implementation, even as it addressed older paper-based safety problems, introduced new vulnerabilities, including wrong-patient, wrong-medication, or wrongly timed orders, along with data-entry errors caused by copy-forward and copy-and-paste functions and alert fatigue [14]. A separate analysis of pediatric EHR incidents described a case in which a medication order was held when a patient unexpectedly returned to the operating room, but because the EHR's default display did not indicate the held dose or list it among active orders, the omission went uncorrected until the following day, placing the patient at risk [7]. Usability testing of barcode medication administration during an EHR system transition similarly identified safety-related errors that decreased significantly only after iterative testing and design refinement, underscoring that usability problems, once identified, are addressable through deliberate evaluation rather than being an inevitable cost of digitization [8].

7. Organizational Moderators and Design-Based Interventions

The literature reviewed above consistently points toward the hospital work environment as a moderator of the relationship between EHR usability and nurse outcomes. Kutney-Lee et al., [1] found that, independent of the level of EHR adoption, the hospital work environment played a significant role in how nurses evaluated usability and whether the EHR achieved its intended benefits for quality and safety of care; key features of a favorable environment included adequate staffing, promotion of nurse autonomy, nurse involvement in administrative decision-making, and strong nursing leadership. This finding implies that strengthening nurse leadership and engagement throughout all phases of EHR adoption, rather than treating implementation as a purely technical exercise, is an important lever for improving usability outcomes [1].

At the level of system design, several intervention strategies have been proposed and tested. Cho et al., [11] recommended minimizing redundant and excessive data entry requirements, using standard terminologies that match real-world clinical practice, and giving nurses more flexibility and control within documentation modules, such as the ability to undo an action or apply a single edit across all relevant records simultaneously. Chaparro et al., [6] similarly emphasized the importance of alert stewardship practices, including monitoring interruptive alert burden, reducing excessive or redundant firings, and establishing formal governance processes to evaluate whether a given clinical decision support alert continues to provide value over time. Structured usability testing methods, including heuristic evaluation and formative and summative testing with end users, have been described as vital components of continuous EHR improvement that can enhance efficiency, reduce error rates, and increase clinician satisfaction [8].

These design-level interventions align with the broader sociotechnical perspective that usability cannot be separated from organizational context. Improving EHR usability, whether through better alert governance, nurse-centered documentation redesign, or stronger frontline leadership involvement in implementation decisions, is repeatedly framed across this literature as a strategy with the potential to simultaneously reduce nurse burnout, decrease turnover, and improve patient safety outcomes rather than requiring a tradeoff among these goals [2] [6].

8. Gaps in the Literature and Future Directions

Despite the consistency of findings linking EHR usability to burnout and turnover, several gaps remain. Moy et al., [10] noted that standardized and validated measures of documentation burden are still lacking, and that no consensus exists regarding the best approach or degree of rigor needed to study this construct, which limits comparability across studies. Alobayli et al., [12] similarly called for expanded qualitative research into the specific mechanisms by which EHR use generates stress, as well as broader research conducted in non-Western health systems, since the existing evidence base is concentrated in the United States and a small number of other high-income countries. Relatedly, Melnick et al., [3] observed that, before their national survey, no study had assessed the state of nurse-perceived EHR usability using a standardized metric alongside a validated burnout instrument, illustrating how much of the earlier literature relied on descriptive or associative designs rather than nationally representative data.

Future research would benefit from longitudinal designs capable of establishing whether improvements in EHR usability produce measurable reductions in nurse turnover over time, rather than relying primarily on cross-sectional associations as in the majority of studies reviewed here [2]. Greater attention to differences across nursing specialties and practice settings is also warranted, since burnout and usability ratings have been shown to vary meaningfully by clinical context [12]. Finally, further evaluation of specific design interventions, such as alert governance programs and documentation redesign initiatives, is needed to determine which strategies produce durable improvements in nurse well-being and patient safety rather than short-term gains that fade once novelty wears off [6].

9. Conclusion

The literature reviewed here demonstrates that EHR usability is not a peripheral technical detail but a central determinant of nurse clinical decision-making, professional well-being, and workforce retention. National survey data show that nurses consistently rate EHR usability poorly, and this poor usability is associated in a dose-response manner with burnout, job dissatisfaction, and intention to leave. Usability problems manifest concretely through excessive documentation burden, alert fatigue, and cognitive overload, each of which degrades the quality of information available to nurses at the point of care and, in some documented cases, has contributed directly to adverse patient outcomes. At the same time, the literature identifies concrete levers for improvement, including stronger nurse leadership involvement in EHR governance, more rigorous alert stewardship, and nurse-centered redesign of documentation workflows, suggesting that these outcomes are not fixed but can be meaningfully improved through deliberate organizational and design action.

Compliance with ethical standards

Disclosure of conflict of interest

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