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College of Management and Human Potential

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Strategies to Reduce the Physician Documentation Burden in Adult Primary Care

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Abstract

Primary care physicians face high rates of burnout, with electronic health record (EHR) documentation identified as a significant contributing factor. EHR systems consume substantial physician time, diverting attention from meaningful patient interactions toward administrative tasks and increasing documentation burden. The purpose of this study is to identify and evaluate best practices for minimizing the documentation burden on primary care providers. The review question centered on how best practices can be implemented by healthcare administrators to reduce the physician documentation burden in primary care. This integrative review used the sociotechnical systems theory framework to identify and evaluate effective strategies to alleviate physician documentation burden in primary care setting. The review examined 25 empirical and non-empirical articles published from years 2020 – 2025 and assessed their relevance and quality using the Johns Hopkins evidence-based practice model. Through thematic analysis, five main themes emerged with 10 supporting subthemes. The five main themes are structured leadership to improve culture, optimizing team structure and functioning, leveraging advanced technology, improving EHR usability, and training and development. A few key subthemes included supporting technological infrastructure, simplifying workflow design, and providing continuous training. Three recommendations emerged from the review: (a) implement advanced technology integration, (b) develop a multidisciplinary team to ensure patient centered care and documentation support, and (c) cultivate leadership support. When healthcare organizations can foster a more sustainable work environment that ultimately enhances healthcare delivery and contributes to broader societal health improvements, positive social change will emerge.

Part 1: Practice-Based Problem

Problem of Interest

After the implementation of the Health Information Technology for Economic and Clinical Health Act in 2009, many healthcare organizations rapidly adopted electronic health records (EHRs) to qualify for federal incentives (Yan et al., 2021). The adoption of EHRs has significantly enhanced quality monitoring, record-keeping, and research over the past few decades, but it has also led to a greater administrative and clerical workload for physicians (Tawfik et al., 2024). Healthcare professionals in the United States experience burnout at rates higher than those of many other occupations (Corby et al., 2021). Key drivers include computerized provider order entry, heavy clerical responsibilities, extended work hours with after-hours charting, and insufficient time allocated for documentation. The use of EHR systems compels clinicians to allocate significant time to creating and reviewing excessively lengthy notes, thereby exacerbating their administrative workload (Corby et al., 2021).

Excessive clinical documentation demands have become a significant factor contributing to physician burnout (Shah et al., 2025). Primary care physicians (PCP) are burdened by unsustainable documentation demands, spending disproportionate time on EHR-related tasks such as after-hours charting, extensive note preparation, and inbox management, which contribute to clinician burnout and reduce the time available for direct patient care (Tai-Seale et al., 2023). The EHR has been recognized as a significant contributor to healthcare providers' clinical workload and a key factor in physician stress, job dissatisfaction, and burnout (Tai-Seale et al., 2023). Time-motion studies and EHR log analyses reveal that physicians spend nearly two hours on desk-based tasks, including

EHR documentation, for every hour of direct patient care (Tai-Seale et al., 2023). Recent findings also highlighted more than 50% increase in patient emails to providers over the past three years, further compounding administrative burdens and exacerbating workflow inefficiencies (Tai-Seale et al., 2023). The increase in patient-provider email use could advance social change by expanding access to care, offering convenient, real-time communication support, earlier problem detection, and greater engagement among patients who face barriers to in-person visits, thereby promoting equity and continuity. Realizing these benefits at scale will require health systems to redesign workflows that enhance care coordination and population health rather than simply adding clinician burden.

Healthcare Administration Problem

Background

PCPs have exhibited high levels of anxiety, job dissatisfaction, and burnout prior to the COVID-19 pandemic (Goldberg et al., 2023). Workload-related factors such as extended hours, complex duties, inadequate communication, and administrative burdens were associated with burnout symptoms and stress (Goldberg et al., 2023). Studies showed that during the COVID-19 pandemic, between 68% and 76% of PCPs experienced burnout (Tawfik et al., 2025). Burnout is a job-related disorder characterized by overwhelming emotional depletion, a sense of detachment, and decreased career satisfaction (Goldberg et al., 2023; Wu et al., 2021). Low job satisfaction is associated with reduced organizational commitment, increased absenteeism and intentions to leave, higher turnover, lower productivity, and substandard work quality. Burnout further

disrupts task performance and is linked to greater interpersonal aggression (Hilty et al., 2022).

The American Medical Association (AMA) described physician burnout as a systemic crisis that is contributing to workforce shortages, particularly in primary care (Owens et al., 2024). Budd (2023) shared, "the consequences of this burnout to healthcare may be expressed as major medical errors, poor quality of care, safety incidents, reduced patient satisfaction, and primary-care workforce turnover" (p. 1). Ko et al. (2025) also expanded on these findings, which stated that physician burnout contributes to workforce attrition and reduced healthcare quality, creating significant economic burdens. Early retirement among burned-out physicians reduces the doctor-to-patient ratio, leading to higher turnover rates that negatively impact patient care and outcomes (Ko et al., 2025). Furthermore, burnout increases patient safety incidents and dissatisfaction, while replacement costs can reach two to three times a physician's salary (Ko et al., 2025). Primary care operates in a dynamic environment of advancing technologies, changing regulations, and evolving care models that have amplified clinician burnout and depression. Clinicians overwhelmingly attribute this to EHR inefficiencies and excessive documentation demands (Goldberg et al., 2023).

According to Tawfik et al. (2024), over 500,000 US physicians now exhibit signs of burnout, which costs the United States healthcare system roughly \$5.6 billion per year (in 2023 dollars). PCPs are often affected because of the unreasonable clerical workload and up to 75% claim that the EHR contributes to their burnout (Tawfik et al., 2024). Heavy clerical burdens, high workloads, after-hours work, and overflowing inboxes contribute to burnout (Ma et al., 2025). PCPs also spent more time using the EHR than

specialists (Nguyen et al., 2022). The rise of medically complex patients, such as those with multiple comorbidities, an aging population, and the introduction of new payment models, will also increase the workload (Nguyen et al., 2022). EHRs add complexity, and so physicians must increase productivity and revenue by thoroughly documenting for billing and quality-reporting purposes. As a result, much clinician time has shifted from in-office patient visits to non-patient-facing tasks, such as managing increasing EHR information (Fogg & Sinsky, 2023). The adoption of EHRs has substantially increased the amount of work completed outside scheduled hours, including evenings, weekends, and even vacations. This work outside work (WOW) EHR workload undermines physician well-being (Attipoe et al., 2023).

Operational Problem

Although healthcare systems have invested heavily in EHR and related health information technologies (HITs) to enhance patient care, the demands of clinical documentation have become a principal contributor to physician burnout (Hudelson et al., 2024). Yan et al. (2021) identified three principal EHR-related drivers of provider burnout: insufficient time to complete documentation, excessive inbox and patient-message volume, and clinicians' adverse perceptions of the EHR system (Yan et al., 2021). Insufficient time for documentation consistently links to increased burnout. Providers spend two hours on EHR and clerical work for every one hour of direct patient care, with this burden often extending into their personal time at home. High volumes of EHR inbox items stemming from patient messages, telephone encounters, and system alerts have been shown to contribute substantially to clinician burnout (Yan et al., 2021). Empirical evidence links greater message burdens with higher rates of physician distress

and exhaustion. A third contributing factor is clinicians' unfavorable appraisal of the EHR itself; many providers report that system design and workflows amplify daily frustration and administrative strain (Yan et al., 2021).

Research indicates that nearly 70% of healthcare professionals report stress related to EHR use, and inadequate time for documentation is a key contributing factor to clinician burnout (Albrecht et al., 2025). In ambulatory practice, physicians allocate only about 27% of their clinical day to direct patient contact, while spending nearly twice as much time on EHR-related and administrative activities (Albrecht et al., 2025). The three highest contributors to the EHR burden are documentation, chart review, and inbox tasks (Albrecht et al., 2025; Dymek et al., 2021). Documentation is the single most time-consuming EHR task for clinicians, accounting for 23.7% of their daily EHR-related activities and significantly contributing to clinician burnout and frustration. Chart review, particularly of clinical notes, is the second-highest contributor to EHR burden, accounting for 16.9% of a clinician's time (Dymek et al., 2021). Clinicians often feel like they are drowning in data, struggling to review a patient's history and test results while also interacting with the patient during a visit. Managing EHR inbox tasks, such as refill requests and result management, is an emerging and substantial burden, consuming 15.5% of a clinician's daily EHR time (Dymek et al., 2021). Dymek et al. (2021) shared that primary care clinicians spend roughly 67 minutes per day processing inbox notifications. The enormous volume of alerts, ranging from test results and medication refill requests to patient and interprofessional messages, drives information overload and contributes to clinician notification fatigue (Dymek et al., 2021).

Budd (2023) summarized EHR-related sources of clinician burnout into several domains, including excessive time demands, documentation and clerical workload, limited usability, elevated cognitive load, and large volumes of electronic messaging. Of these, the increase in clerical responsibilities, particularly substantial data-entry obligations associated with EHR use has been identified as a principal driver of physician burnout (Budd, 2023). This burden stems from documentation requirements that have expanded beyond patient care to encompass billing and compliance, resulting in redundant and cumbersome tasks. Budd (2023) reported that clinicians who did not have adequate time for documentation have approximately 2.8 times the odds of experiencing burnout symptoms compared with those who have sufficient documentation time (Budd, 2023).

The poor usability of EHRs contributes to burnout by causing frustration and inefficiency in daily workflows. Inefficient navigation, cluttered interfaces, and tasks requiring multiple steps lead to fatigue and hinder physicians' ability to perform their duties effectively (Budd, 2023). Information overload, exacerbated by excessively long notes and fragmented data, can contribute to cognitive fatigue and increase the likelihood of medical errors (Budd, 2023). The constant barrage of alerts and reminders further exacerbates this cognitive burden, distracting physicians and making it harder to maintain a holistic view of patient care (Budd, 2023). The constant stream of communication, which includes patient portal messages, refill requests, and other tasks, is often unmeasured and unreimbursed work. Clinicians with high message volumes are significantly more likely to experience burnout and exhaustion, as their inbox competes with other clinical duties (Budd, 2023).

Holmgren et al. (2024) reported that, despite substantial nationwide investments in electronic health information exchange (HIE) aimed at improving quality through information sharing, strengthening care continuity, and reducing unnecessary utilization, current evidence indicates these anticipated benefits have not been realized. Given the substantial EHR documentation burden and time constraints confronting primary care clinicians in the United States, these results hold important implications for policymakers and health-system leaders and help explain the limited adoption and effectiveness of HIE to date (Holmgren et al., 2024).

Ideal State of Operations

Healthcare leaders should acknowledge that the demands of EHR use represent a major driver of physician burnout. As electronic records replace paper charts across clinical settings, clinicians must be able to rely on EHRs as efficient and comprehensive tools, rather than sources of extra work. Healthcare administrators must implement targeted and scalable solutions to reduce the time clinicians spend on documentation and alleviate its adverse effects on their well-being. Ideally, PCPs would operate with a significantly reduced documentation burden, enabling them to prioritize direct patient care over excessive administrative tasks. According to the Berg (2024), the AMA reports that typical times for PCP documentation is 23.5 to 47.9 minutes per patient, this is the median time calculated for primary care physicians with the goal of 23.5 minutes, which will help primary care physicians achieve an improved work/life balance.

PCPs could enhance productivity, reduce burnout, and improve patient outcomes by eliminating redundant reporting requirements and optimizing workflows. Future efforts should integrate innovative technologies, such as artificial intelligence (AI) -

assisted documentation and voice recognition, to minimize administrative tasks (Bundy et al., 2024). Implementing such strategies would foster a more sustainable healthcare system, enabling providers to spend less time on administrative tasks and more time delivering personalized, high-quality care.

Professional Practice Gap Statement

PCPs are spending an inordinate amount of time with documentation that could be better spent caring for patients and also maintaining a healthier work/life balance.

According to Shah et al., (2024) after analyzing various studies, they found that for every eight hours of scheduled patient time many physicians spend much of that time often over five hours working with the EHR and performing other clerical tasks. This study aims to reduce physician documentation time in primary care to align with the AMA's standard, bringing it to between 23.5 to 47.9 minutes per patient with the ultimate goal of 23.5 minutes per patient (Berg, 2024)

Summary of Evidence

PCPs do not have sufficient time to meet expectations for acute, chronic, and preventive care outlined in national guidelines. Beyond face-to-face and telemedicine visits, PCPs increasingly must manage time-consuming EHR inbox work, telephone calls, medical advice messages, prescription refill requests, results review, and electronic consults, which leaves them tethered to the record (Arndt et al., 2024). Multiple studies show that EHRs have become a major driver of physician burnout, particularly in primary care.

Yan et al. (2021) found that overwhelming documentation requirements compel providers to allocate nearly two hours to EHR-related tasks for every hour spent on direct

patient care, significantly disrupting their work-life balance. Similarly, Arndt et al. (2024) reported that PCPs often work on weekends, holidays, early mornings, and late evenings to meet their extensive documentation demands (Arndt et al., 2024). This imbalance diminishes job satisfaction and work-life balance (Tai-Seale et al., 2023). Budd (2023) expanded on these findings, identifying poor EHR usability, cognitive overload from excessive alerts, and relentless inbox messaging as key stressors that divert time from patient care. These studies reveal a systemic inefficiency where EHRs, designed to improve care, have instead created unsustainable clerical burdens that contribute to physician burnout (Budd, 2023).

According to Bongurala et al. (2024), EHR systems are frequently designed with billing and administrative functions taking precedence over clinical decision support and patient care delivery. This design approach results in healthcare providers dedicating excessive time to EHR documentation and desk work, thereby weakening patient-clinician relationships, creating operational inefficiencies, and increasing the cognitive burden on medical professionals (Bongurala et al., 2024).

Purpose of the Integrative Review

The purpose of this study was to identify and evaluate best practices for minimizing the documentation burden on primary care providers. By exploring innovative strategies and tools, my goal was to enhance physician documentation efficiency and reduce documentation burnout, which should also improve the quality of patient care, and reduce the administrative workload for PCPs.

Integrative Review Question

What best practices can be implemented by healthcare administrators to reduce the physician documentation burden in primary care? Answering this review question will generate evidence-based guidance on ideal practices, enabling the translation of best-practice knowledge into targeted interventions that reduce documentation burden.

Theoretical and/or Conceptual Framework

Trist and Bamforth (1951) developed the sociotechnical systems (STS) theory, which conceptualizes the workplace as a combination of a technological system and a social structure. The technological aspect encompasses the equipment, tools, and processes used in production, while the social structure involves the occupational roles and relationships among the people performing the work. These two systems, the technological and the sociological are interactive and create psychological effects for the workers within them (Trist & Bamforth, 1951).

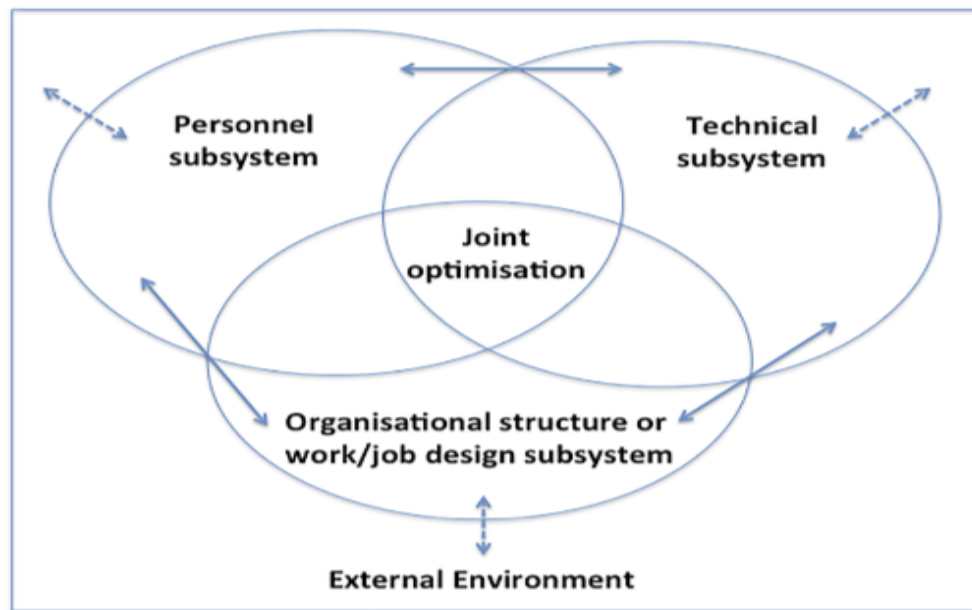
STS conceptualizes organizations as complex STS in which social and technical elements are tightly interdependent. Consequently, modifications to one component can produce intended and unintended effects elsewhere, so design efforts are most effective when they proactively account for both social and technical dimensions (Davis et al., 2025).

According to Yu et al. (2023), the fundamental idea of this theory is to emphasize the reciprocal relationship between humans and technology, promoting a work design where productivity and human well-being are not conflicting but are jointly optimized. Its core principle involves exploring learning and behaviors by considering the system's resources and interactions, which include technology, interpersonal dynamics, and the

external environment. This approach integrates four key subsystems such as personnel, technical, organizational structure, and environmental factors to understand how they collectively transform inputs into desired outputs (Yu et al., 2023).

Figure 1

Basic Sociotechnical Work System Model



The STS theory suggests that technology and human elements function as interconnected components within a unified system. While the technical and social subsystems operate independently, they are mutually dependent, each essential for converting inputs into meaningful outputs (Trist & Bamforth, 1951; Yu et al., 2023). This perspective indicates that one cannot optimize a work system by studying its engineering or human elements separately. The core principle of a sociotechnical approach is that for an effective work system, it must match the social system to the technological system appropriately. A mismatch between the two can lead to significant problems (Trist & Bamforth, 1951; Yu et al., 2023).

Part 2: Literature Review, Quality Appraisal, and Analysis

Literature Search Strategy

Adequate clinical documentation is essential for maintaining care quality, enabling accurate diagnosis and current procedural terminology coding and reimbursement, and ensuring compliance with The Joint Commission (TJC) standards. Physicians dedicate 34% to 55% of their workday to creating and reviewing documentation within EHR systems, resulting in an estimated annual opportunity cost of \$90 to \$140 billion in the United States. This substantial financial burden highlights the potential to reallocate these resources toward enhancing direct patient care (Perkins et al., 2024). This clerical burden diminishes the time clinicians can spend with patients, ultimately affecting the quality of care and contributing to physician dissatisfaction and burnout (Perkins et al., 2024). This study aimed to identify and evaluate effective strategies for alleviating the documentation burden faced by physicians in primary care settings. By exploring various approaches, the study seeks to provide insights into practical solutions that can improve workflow efficiency and reduce burnout among primary care providers.

The literature search strategy for this study was designed to systematically gather relevant and recent evidence on strategies aimed at reducing physician documentation burden in primary care. I conducted the search across multiple reputable electronic databases, including PubMed, Cumulative Index of Nursing and Allied Health Literature (CINAHL), Scopus, Science Direct, American Medical Association and Google Scholar, to ensure a comprehensive collection of scholarly articles, and reviews published between 2020 and 2025. I conducted a literature search using various combinations of keywords

linked by AND/OR, including *physician, clinician, documentation, clerical, administrative, burden, burnout, strain, fatigue, electronic health record, EHR, medical record, health record, primary care, and primary care clinic* to identify relevant studies.

The inclusion and exclusion criteria for this integrative review are detailed in Table 1. The review specifically focused on documentation burden. The populations of interest are primary care physicians. Articles were considered relevant if they addressed strategies aimed at reducing physician documentation burden. Additional details regarding the search results are available in Appendix B: Review Question Search Log.

Table 1

Inclusion and Exclusion Search Criteria

Inclusion search criteria	Exclusion search criteria
<ul style="list-style-type: none"> • Primary care clinic • Physicians • Burnout due to administrative/clerical/documentation • Primary care in the United States • Articles within year 2020-2025 • English • Burden due to ERH documentation • Electronic health record documentation 	<ul style="list-style-type: none"> • Hospital, Long-term care facility, Emergency Department • Nurse, Nursing Assistant • Burnout due to staffing shortage • Primary care outside the United States • Articles before year 2020 • Not in English • Burden not related to EHR documentation • Paper charting

Quality Appraisal

A total of 25 articles from 2020 - 2025 were included for the analysis and were assessed for quality using the Johns Hopkins Nursing Evidence-Based Practice Model and the Research Evidence Appraisal form (Dang et al., 2022). Using this form, there were four articles identified as Evidence Level III and 21 were Evidence Level V. Nineteen of the articles were appraised as high quality, and six were appraised as good quality. The selected articles produced results with the healthcare administration problem about physicians' documentation burden in primary care setting. More details on the quality appraisal results can be found in Appendix C: Critical Appraisal Results Log.

Thematic Analysis of Literature

The literature review included various study types such as cross-sectional study, descriptive and multivariable regression analysis, expert opinion, literature review, longitudinal cohort study, mixed-methods study, non-randomized control evaluation, observational study, prospective quality improvement, quality improvement study, qualitative study, quasi-experimental longitudinal study, randomized control study, scoping review, semi-structured interview, and systematic review. Themes and subthemes were extracted from the 25 articles, with detailed findings provided in Appendix D.

Table 2 summarizes the recurring themes identified in this review, which were frequently referenced in Appendix D and served as the foundation for selecting the final themes and subthemes used to address the problem examined in this study.

Table 2*Themes from Appendix D*

Themes	Themes
Reducing documentation burden	Reduced after-hours work
Improving work-life integration	Increased work satisfaction
Enhancing patient interaction	Enhance patient focus
Potential for increased revenue	Addressing physician burnout
Documentation burden	Optimizing team structure and functioning
Improved quality of life	Understanding the practice environment
Role of medical scribes	Improving organizational culture and leadership
Improving the EHR system	Leveraging advanced technology
Time allocation	Emphasizes a system-level approach
Shared responsibility	Training and development
Improving EHR usability	

Studies by Abbondanza and White (2024), Dymek et al. (2021), Heckman et al. (2020) and Tawfik et al. (2025) addressed the concerning increase in physician burnout. The increasing use of EHR contributes significantly to this problem. Physicians dedicate nearly half of their working hours (49%) to EHR use and administrative tasks, compared to only 27% on face-to-face patient interactions. Documentation has become a significant, time-consuming activity, adversely affecting work-life balance and contributing to burnout. Physicians often spend two hours on EHR and desk work for every hour of direct patient care, frequently extending their work into personal time. These findings have profound implications not only for physician well-being but also for patient care quality, service access, and the overall costs to healthcare institutions (Abbondanza & White, 2024; Dymek et al., 2021; Heckman et al., 2020; Tawfik et al., 2025). Burnout is associated with negative perceptions of EHR, such as feelings of frustration and concerns about inefficiency.

Multiple studies explored how medical scribes influence provider satisfaction and well-being, finding that they reduce after-hours documentation, improve billing accuracy, streamline workflow, and boost overall clinician satisfaction. Scribes help clinicians become more efficient by saving time on documentation during and after clinic hours, enabling them to manage their workload better and create notes more quickly. Implementing remote scribe programs has significantly reduced total EHR time, particularly for notes and after. Implementing scribes in primary care improves productivity, enhances clinic and provider efficiency, and enhances the provider experience and job satisfaction, all while preserving the quality of patient care (Corby et al., 2024; Jhaveri et al., 2024; Micek et al., 2022; Pfoh et al., 2022; Ziemann et al., 2021).

Bundy et al. (2024), Ko et al. (2025), and Ma et al. (2025) highlighted the preliminary potential of AI technologies to improve clinical workflows and reduce documentation-related burdens for physicians. The development of AI-powered primary care documentation has been eagerly anticipated, especially with the rise of advanced large language models (LLM) capable of auto-generating clinical notes. While it remains uncertain whether AI-driven voice technology can significantly lessen physicians' cognitive and documentation burdens, emerging evidence suggests that ambient AI scribes adopted across various specialties show promise in reducing EHR time and alleviating physician burnout by handling repetitive, high-pressure tasks efficiently (Bundy et al., 2024; Ko et al., 2025; Ma et al., 2025).

Olson et al. (2024) and Owens et al. (2025) found that integrating ambient voice recognition technology with natural language processing and AI can effectively reduce documentation burdens and lower physician burnout. These studies found that an ambient

AI scribe platform notably decreased burnout, cognitive load, and documentation time, while also enhancing perceptions of patient access and clinician engagement in ambulatory care, demonstrating AI's potential to alleviate administrative stress and promote more meaningful clinical work (Olson et al.,2024; Owens et al.,2025).

The current integrative review's analysis highlighted several key themes and subthemes, which were carefully selected and presented in Table 3. These findings provide valuable insights into strategies for reducing physician documentation burden.

Table 3

Themes and Subthemes

Main theme	Subtheme
Structure leadership to improve culture	Prioritizing physician well-being Supporting technological advancement and infrastructure
Optimizing team structure and functioning	Use of medical scribes Team-based approach
Leveraging advanced technology	Adopt artificial intelligence Implement voice recognition technology
Improving EHR usability	Simplify workflow design Implement templates and checklist
Training and development	Provide continuous training Develop user manual and quick guides

Part 3: Presentation of Results

Clinical documentation within EHR is a major contributor to clinician burnout. Research shows that this burnout stems from various documentation-related factors, including the significant time and effort required during and after patient consultations, disruptions to patient-clinician interactions during appointments, and the ease of use of the EHR systems involved in the documentation process (Duggan et al., 2025). Murad et al. (2024) also shared that regulatory requirements, payer needs, organizational structures, and litigation fears also compound this documentation challenge (Murad et al., 2024). Notably, the enactment of the 2009 HITECH Act marked the beginning of the modern era of clinical documentation burdens associated with HIT, highlighting the urgent need to explore strategies to reduce physician documentation burden to improve work experience and patient care outcomes (Murad et al., 2024). This section of the literature review, I will present an overview of the themes and subthemes identified in Part 2, along with their key findings.

Thematic Concept Map

The thematic analysis of the 25 selected articles resulted in five major themes and 10 subthemes. The five main themes include: structured leadership to improve culture, optimizing team structure and functioning, leveraging advanced technology, improving EHR usability, and training and development. The 10 subthemes were identified to further elaborate and reinforce the primary themes, highlighting essential strategies aimed at reducing the documentation burden experienced by physicians in primary care settings. These interconnected themes and subthemes, illustrated in the thematic concepts map in Appendix E, reflect research that aligns with the foundational principles of the

Sociotechnical Systems Theory by Trist and Bamforth's framework. For detailed results of the thematic analysis, please refer to Appendix D: DHA Thematic Analysis Results

Sociotechnical Systems Theory Framework

STS theory examines the interrelations between the social system (people) and the technical system (technology) within a work group (Trist & Bamforth, 1951). Its principle is to explore learning and behaviors related to the system's resources and interactions, such as technology, people, and the external environment, to foster a reciprocal relationship in which productivity and humanness are not mutually exclusive (Trist & Bamforth, 1951). The goal is to frame both the social and technical aspects of a job so that productivity and human well-being do not conflict. The theory incorporates four key elements that transform work system inputs into desired outputs. These elements identify the internal and external contexts of the workplace (Yu et al., 2021).

Personnel subsystem concerns social and people-related factors. Technical subsystem encompasses technology-related factors, including physical assets (IT infrastructure, technology complexity) and intangible assets (training, communication, collaboration) (Yu et al., 2021). Organizational structure subsystem encompasses organizational design and work processes, including business strategy, top management support, organizational culture, and organizational size. Environmental factors are external context where the system operates, such as competitive pressures, customer responses, socio-ethical challenges, and government regulations. These external forces can drive the adoption of technology and positively or negatively influence the operating system (Yu et al., 2021).

According to Thomas (2024), focusing only on either the social or technical components of an organization may reduce its overall effectiveness. For an organization to succeed, it must maintain a balance between linear processes that yield predictable results, often driven by technology, and non-linear processes that produce unpredictable results, usually influenced by intricate social dynamics and human creativity. Therefore, organizations must develop systems that support both human and technical elements equally, enhancing adaptability while maintaining predictability and stability (Thomas, 2024).

Explanation of Themes and Subthemes

Structure Leadership to Improve Culture

Organizational leadership should place strong emphasis on supporting staff's emotional and mental well-being by cultivating a culture that promotes overall wellness (Tai-Seale et al., 2023).

Prioritizing Physician Well-being

Balancing workloads and resources are crucial approaches for promoting physician well-being and sustaining the organization's health (Tawfik et al., 2025).

Supporting Technological Advancement and Infrastructure

Invest advanced technological tools and infrastructure to ensure seamless integration and effective use in reducing administrative burdens (Kruse et al., 2022; Olson et al., 2025).

Optimizing Team Structure and Functioning

Promoting high team efficiency is associated with a notable reduction in burnout among family physicians (Rotenstein et al., 2024).

Use of medical scribes

Medical scribes are healthcare professionals who, under a provider's supervision, transcribe information from clinic visits directly into EHRs in real time (Corby et al. 2021).

Team-based approach

This approach involves the collaborative creation of clinical documentation, where team members form a new or ongoing partnership to produce clinical records (Apathy et al., 2024).

Leveraging Advanced Technology

Using advanced technology to record physician-patient interactions and LLM to auto-generate draft note sections significantly reduces documentation time (Ma et al., 2024).

Adopt Artificial Intelligence

AI is a branch of computer science that simulates human intelligence to perform complex tasks such as problem-solving and decision-making. LLMs are a type of AI focused on language comprehension, generation, documentation, and transcription (Ko et al., 2025).

Implement Voice Recognition Technology

An ambient AI scribe technology integrated into the EHR system enables clinicians to capture patient conversations directly in the EHR mobile app, automatically generating draft clinical notes (Sha et al., 2025).

Improving EHR Usability

EHR usability refers to the design and functionality of EHRs and improvements such as tailoring the system to reduce keystrokes, standardizing documentation, and providing better training can lessen the clerical and cognitive burden on physicians and reduce burnout (Olakotan et al., 2025).

Simplify Workflow Design

This topic involves process improvements such as adopting lean methodologies, redesigning care team roles, and changing clinical processes to enhance efficiency and reduce the burden of digital tools on physicians (Thomas-Craig et al., 2020).

Implement Templates and Checklists

Templates are structured, often standardized forms with clear fields used to document patient visits, while checklists are tools recommended to improve data accessibility and streamline tasks such as pre-rounding (Olakotan et al., 2025).

Training and Development

Training and development provide an effective way to lessen the burden of EHR use and mitigate workplace stress caused by HIT (Thomas- Craig et al., 2021).

Provide Continuous Training

Training serves as a key method to address skill gaps that are crucial for ensuring user satisfaction with technology (Thomas-Craig et al., 2021).

Develop User Manual and Quick Guides

Comprehensive user manuals and quick guides to help clinicians efficiently navigate systems and streamline their workflows (Olakotan et al., 2025).

Interpretation of the Findings

Structured Leadership to Improve Culture

Physicians who felt unappreciated or that their leaders' values were inconsistent with their own were more likely to experience burnout. National studies indicate that physicians experience greater career satisfaction and lower stress or burnout in organizations where they have control over workplace issues and where leaders actively engage with frontline staff through regular rounds (Tai-Seale et al., 2023). Collaborative partnerships between physicians and administrators can foster practical, sustainable solutions by ensuring adequate staffing and addressing the needs of both patients and healthcare professionals within the practice environment (Tai-Seale et al., 2023). Micek et al. (2022) shared that scribes have been shown to significantly enhance physician wellness and decrease time spent on EHR tasks, reducing burnout and improving key aspects of workplace well-being, including perceptions of a supportive work environment and manageable work pace/EHR-related stress. To foster a culture of wellness, leadership must support this initiative.

According to a pilot study by Ma et al. (2025), ambient AI scribe technology showed reduced documentation time and shorter time spent in the EHR. Physicians from various clinical specialties observed these benefits, showing that this technology has broad applicability across medical fields (Ma et al., 2025). The multicenter quality improvement study by Olson et al. (2025) found using an ambient AI scribe platform was associated with a notable decrease in burnout, cognitive workload, and documentation time, along with perceptions that it could enhance patient access to care and increase focus on patient concerns in outpatient settings. These results suggest that AI technology

may help lessen administrative burdens for clinicians, allowing them more time for meaningful work and improving their professional well-being (Olson et al., 2025). STS theory emphasizes the need to integrate social factors such as leadership engagement and collaborative partnerships with technical solutions, such as AI scribes, to create a balanced healthcare system that reduces burnout, enhances clinician well-being, and improves patient care.

Prioritizing Physician Well-being

Tawfik et al. (2025) found that many physicians felt organizational demands exceeded the resources available to them, limiting their sense of control and reducing their professional fulfillment. They also reported that the organization often raises job demands, such as increasing patient appointments or encouraging patient messaging to boost satisfaction without offering protected time or flexibility to manage these added responsibilities. Rotenstein et al. (2023) shared that schedule modifications offer physicians greater flexibility, helping to enhance their personal well-being and prevent work overload.

Emerging evidence highlights the link between in-basket messaging burden and burnout, underscoring the need for leadership to balance workloads and resources thoughtfully as a key strategy to support physician well-being and maintain organizational health (Tawfik et al., 2025). Tai-Seale et al. (2023) shed light on a national survey that found that 62.8% of physicians experienced burnout by the end of the second year of the pandemic. To address this, organizational leadership should prioritize the emotional and mental health of their workforce by fostering a culture of wellness that extends beyond individual resilience, enhancing engagement and alignment, focusing

primarily on younger physicians, implementing policies that genuinely value physicians, collecting data to guide and assess wellness initiatives, and supporting self-care practices (Tai-Seale et al. 2023).

Supporting Technological Advancement and Infrastructure

A study found that advanced technology such as AI is linked to decreased burnout and improved perceived well-being among clinicians (Olson et al. (2025). AI scribes contributed to a more satisfying and patient-focused experience, which plays a key role in professional fulfillment and helps protect against burnout. The reduction in after-hours documentation allows clinicians more time for self-care and spending time with family, ultimately enhancing work-life balance and overall satisfaction (Olson et al., 2025).

Providers identified opportunities for improvement in their EHR systems, emphasizing the potential benefits of enhancing performance speed and system reliability. They recognized that optimizing communication technologies and streamlining data-sharing processes could improve their workflow (Kruse et al., 2022). Investing in proper infrastructure, including upgraded hardware, faster network capabilities, and robust support systems, is essential to enhancing system speed and reliability. Such improvements not only streamline clinical workflows but also reduce delays and interruptions, ultimately boosting provider efficiency and satisfaction while minimizing stress and frustration (Kruse et al., 2022).

Optimizing Team Structure and Functioning

The study by Rotenstein et al. (2024) found that a well-structured team with the right mix of professionals can function more efficiently by distributing tasks that would otherwise fall to the physician. Collaborating with certain professionals can help alleviate

the physician's documentation burden by reducing the time spent on the EHR at home (Rotenstein et al., 2024). For instance, collaboration with a physician assistant (PA) was associated with greater odds of having an appropriate amount of home EHR time. The study also found that collaboration between a medical assistant (MA) and a registered nurse (RN) was associated with lower odds of home EHR time, suggesting that the specific roles and their integration into the workflow are crucial. This indicates that a well-structured team can take on tasks that reduce the physician's after-hours EHR workload, which is a significant contributor to burnout (Rotenstein et al., 2024). This demonstrates how aligning team roles and workflows with technical systems can enhance overall efficiency and reduce burnout. Effective team optimization relies on designing social and technical components that work seamlessly together to improve healthcare delivery.

Use of medical scribes

Medical scribes document the EHR in real time during the clinical visit. This practice offloads the clerical task of charting from the physician, allowing them to focus on the patient rather than the computer (Corby et al., 2021; Elton et al., 2022). Medical scribes help reduce documentation time per patient for each clinician and decreased the average time spent on after-hours documentation. Also, the time to complete the encounter note decreased significantly, allowing all providers to finish their visit notes the same day (Jhaveri et al., 2022).

According to Ziemann et al., (2021), medical scribes have emerged as a strategy to address rising clinician dissatisfaction with clerical burdens and the perceived decline in patient-provider interactions resulting from EHR use. Many leaders in primary care

view scribes as an opportunity to restore joy in practicing medicine while simultaneously enhancing clinician efficiency. Pfoh et al. (2022) reported that clinicians who collaborated with scribes experienced reduced work hours, increased job satisfaction, and lower burnout levels. Corby et al. (2021) also shared that medical scribes help alleviate physician burnout by improving work-life balance. Scribes have helped prevent physician early retirements, supported injured providers in remaining active in their practice, and enhanced satisfaction for both providers and patients (Corby et al., 2021).

Team-Based Approach

A team-based approach involves distributing EHR tasks among various members of a clinical care team, which aims to relieve physicians of clerical tasks, such as documentation, non-physician order entry, inbox management, health coaching, and care coordination by delegating these responsibilities to nurses, MAs, or specialized technicians (Yan et al., 2021). Collaborative workflows are associated with significant reductions in a PCP total EHR time, after-hours "pajama time," and time spent managing the electronic inbox, optimizing their time and lessening their overall EHR workload (Rotenstein et al., 2023).

Emerging evidence indicates that redesigning workflows and adopting team-based care can reduce clinician burnout, improve provider well-being, and reclaim time for direct patient care (Goebel et al., 2025). A study by Apathy et al. (2024) showed that team-based documentation support led to a sustained reduction in physician time spent in the EHR. Their findings revealed a 21% reduction in note-writing time, equivalent to about one hour less spent documenting per week, and a 10% decrease in EHR use outside scheduled work hours (Apathy et al., 2024).

Dymek et al. (2021) study also found that a team-based care model reduced burnout rates from 53% to 13% within six months of implementation. Expanding nurses' and MAs' roles and responsibilities through physician-written standing orders is a strategy that has helped reduce inbox burden (Dymek et al., 2021). Greater team efficiency and appropriate management of home EHR time are associated with reduced burnout risk among family physicians. Fully staffed teams were associated with lower burnout rates, whereas high staff turnover, which disrupts team efficiency, was linked to increased burnout (Rotenstien et al., 2024).

Leveraging Advanced Technology

Advanced technology solutions can provide enhanced insights, streamline processes, and boost engagement, enabling healthcare delivery systems to be more scalable and agile by delivering the correct information to the right people at the right time while reducing stress on the care team. With user-centered design improvements driven by physicians, technology can become an integral member of the care team. (Thomas-Craig et al., 2021). Advanced technology such as Ambient AI scribe, powered by a LLMs, helps ease the documentation burden by allowing physicians to record patient interactions using a mobile app, which the AI then processes to auto-generate drafts of four essential note sections such as history of present illness (HPI), physical exam (PE), results, and assessment and plan (A&P), and are called Smart sections. Physicians can easily insert these sections into their existing EHR templates, which automatically populate after recording, significantly reducing manual data entry and leading to notable decreases in time per note, daily documentation workload, and after-hours EHR work (Ma et al., 2024).

Advanced technology underscores the importance of optimizing both social (clinicians and workflows) and technical (AI algorithms and EHR integration) elements to improve overall healthcare performance. By aligning human users with supporting technology, it can enhance efficiency, reduce burnout, and improve the quality of care, illustrating how sociotechnical principles promote a balanced design that integrates human and technical factors for better outcomes.

Adopt Artificial Intelligence

Clinical documentation burden is a significant factor in clinician burnout, and a recent advancement to address this issue is the use of AI scribes powered by generative AI and LLMs (Shah et al., 2025). AI helps automate highly scrutinized, repetitive tasks such as clinical documentation, significantly reducing the time physicians spend on charting sometimes by as much as 40%. LLMs can generate preliminary clinical notes, summarize patient encounters, and create progress reports (Ko et al., 2024). Shah et al. (2025) shared that the system automatically analyzes and populates the four customizable sections of the note template: PHI, PE, results, and A&P. This automation streamlines the note creation process, turning a manual documentation task into a review-and-edit of an AI-generated draft, mitigating the documentation burden that contributes significantly to physician burnout (Sha et al., 2025).

Implement Voice Recognition Technology

HIT developers have designed various tools to alleviate the documentation burden, and advancements in modern computing have further driven this progress (Wendt et al., 2025). Speech recognition (SR) software, which converts spoken commands into text, enables clinicians to reduce documentation time and increase patient interaction.

The adoption of voice technology for EHR documentation is expanding, with its success largely depending on seamless integration with the EHR system and alignment with clinical workflows. (Dymek et al., 2020).

According to Owens et al. (2024), using ambient voice technology helps reduce the documentation burden by substantially decreasing the time providers spend on notes for each patient encounter. In the study, frequent use of voice technology reduced documentation time by 28% per patient, saving about 1.8 to 2 minutes per encounter. Although this may seem small, it adds up to roughly 50 minutes saved daily for providers seeing 25 patients, totaling around 3.5 hours per week and potentially reducing provider burnout (Owens et al., 2024).

Improving EHR Usability

Improving EHR usability can significantly reduce documentation burden by streamlining clinical workflows and minimizing clinicians' cognitive load. Thomas-Craig et al. (2025) suggested that enhancing technology utilization can be achieved through systematic design improvements and usability principles, by developing tailored solutions for EHR systems, and by reducing data entry time by minimizing keystrokes and mouse clicks through iterative performance adjustments (Thomas-Craig et al., 2025).

Implementing user-centered interface designs that merge tasks, such as using inline order entry and embedded data viewing, to minimize frequent screen changes and task-switching, and enhanced designs can also reduce the high number of keystrokes and complex data input demands that contribute to cognitive strain (Olakotan et al., 2025).

Key improvements include providing structured templates with clear fields, integrating disparate data streams into a single cohesive dashboard to prevent information

fragmentation, and aligning EHR functionalities with real-world clinical processes to eliminate the need for inefficient workarounds like copying/pasting (Olakotan et al., 2025). By optimizing navigation, reducing unnecessary clicks, and presenting information logically, a more usable EHR allows clinicians to complete documentation more efficiently, spend less time on administrative tasks, and focus more on patient care (Olakotan et al., 2025). Yan et al. (2021) reported that EHRs rated as more user-friendly on the System Usability Scale were associated with a lower risk of clinician burnout.

STS theory is applicable here by emphasizing the need to design EHR technology that aligns seamlessly with clinical workflows and cognitive capabilities, ensuring both the social (clinicians' tasks and interactions) and technical (interface design and system integration) elements work together to reduce burden and improve care (Yan et al., 2021).

Simplify Workflow Design

Physicians highlighted the need for significant improvements in the design of EHRs to address current inefficiencies that hinder clinical workflows. These include reducing repetitive tasks, minimizing screen clutter, reducing the number of clicks per task, and eliminating inefficient interfaces that force clinicians to waste time searching for information or entering data unnecessarily (Altman et al., 2023; Kruse et al., 2022; Olakotan et al., 2025).

Olakotan et al. (2025) explained that navigation complexity impairs task completion and leads to operational errors. Standardize navigation with consistent menu layouts, button placement, and terminology to reduce the cognitive effort of re-orienting, provide consolidated views and direct pathways (like quick links or favorites) to commonly used functions, and enable seamless, context-sensitive transitions between

related tasks (for example, moving from lab results straight to ordering follow-up tests) so clinicians don't have to return to a main menu are the desired EHR functionality (Olakotan et al., 2025). Altman et al. (2023) also proposed that a single-screen layout should consolidate all information required for clinical decision-making about a specific diagnosis. Content on this screen should be organized consistently, presented in predictable locations, and behave intuitively to minimize the need for user training (Altman et al., 2023). Implementing electronic pathways reduced time spent on EHR documentation by 27% during initial outpatient consultations. This reduction facilitated smoother transitions for healthcare providers between patient care duties and EHR-related tasks, improving overall workflow efficiency (Olakotan et al., 2025).

Implement Templates and Checklist

Structured templates with clear fields minimize the need for open-ended text, reducing data variability and the likelihood of errors while lessening the cognitive load on providers. Checklists can help streamline pre-rounding by organizing necessary information, and standardizing note templates can make documentation more uniform and easier to navigate, particularly for less experienced clinicians (Olakotan et al., 2025). However, their effectiveness depends on a user-friendly design, as cumbersome templates with excessive clicks can hinder efficiency and cause frustration. Ultimately, well-designed templates and checklists facilitate more efficient documentation, reduce errors, and allow clinicians to focus more on patient care rather than administrative tasks (Olakotan et al., 2025).

Training and Development

Improving the quality and timing of training is an effective solution to reduce the EHR-related burden and address workplace stressors caused by health information technologies, often referred to as technostress. Studies show that advanced training helps close skill gaps, which is critical for user satisfaction with these systems. Providing comprehensive training early in the implementation process can mitigate technology-related stress and anxiety, ultimately easing the burden of EHR use and helping prevent burnout (Thomas-Craig et al., 2021). STS theory applies here by emphasizing the need to align both the social aspects (training, user skills, workflows) and technical components (health information technologies) to reduce technostress and enhance overall system usability and effectiveness.

Provide Continuous Training

Interventions aimed at optimizing the technology use of design enhancements and ongoing user training have proven effective in reducing burnout. Continuous training plays a critical role in addressing skill gaps that can hinder effective technology use and user satisfaction. By providing regular, updated training sessions, organizations ensure clinicians remain confident and proficient with evolving systems and features (Thomas-Craig et al., 2021). Lourie et al. (2020) recommended individualized, one-on-one EHR training delivered outside the clinic to deepen providers' understanding of system functionality and support workspace customization. Such personalized retraining aimed at improving EHR efficiency and proficiency can help reduce clinician burnout. Yan et al. (2021) also recommended EHR proficiency training as a strategy to prevent clinician burnout.

Develop User Manual and Quick Guides

Clinicians face increased information input demands, with a 24% increase in physical keystrokes, which adds to their cognitive load. After adopting EHRs, many found their workload doubled without significant relief, primarily because of the complex interface and the requirement for real-time documentation during patient encounters. These demands make it challenging to sort, sift, and locate relevant documents, as notes are organized by title and chronology, forcing clinicians to navigate through many notes to find the most recent primary care visit (Olakotan et al., 2025). Difficulties locating necessary health information exchange (HIE) tools within the workflow led to inefficiencies, with clinicians having to search further for information and straying from their usual processes. Clinicians indicated the EHR interface should better reflect familiar workflow elements, such as incorporating ‘tabs’ to facilitate more straightforward navigation (Olakotan et al., 2025). A user-friendly guide or reminders can further align workflows and make documentation more efficient and less burdensome.

Conclusion

The themes and sub-themes outlined in this section (see Appendix E) underscore key strategies for alleviating physician documentation burden. A recent analysis of burnout-related retention problems estimated that 11,339 primary care physicians leave their practices annually, leading to over \$ 979 million in additional healthcare costs each year due to turnover. This financial strain on healthcare systems and practices further exacerbates burnout among the remaining caregivers (Wendt et al., 2025). EHR-related burden exists within a complex STS that includes people, workflows, organizational policies, external regulations, and technology itself. Reducing this burden requires a

combination of strategies and strong leadership involvement. Addressing EHR-related burnout requires sociotechnical approaches in which multiple stakeholders across the healthcare system collaboratively ensure that evidence-based tools and applications are accessible and user-friendly. However, because various disciplines share responsibility, implementing practical actions can be challenging when any critical element is missing.

Part 4: Recommendation for Professional Practice and Implications for Social Change

Physicians increasingly rely on EHRs to complete tasks and document encounters, making EHR use a central aspect of modern medical practice. However, the associated burden driven by misalignment with physician needs, usability issues, and extensive time spent on EHRs poses significant challenges to healthcare organizations, affecting care efficiency, quality, and safety, and contributing to physician dissatisfaction and burnout, especially among PCPs (Cross et al., 2024). The purpose of this study was to identify effective strategies for reducing physician documentation burden. Key themes that emerged include structured leadership to improve culture, optimizing team structure and functioning, leveraging advanced technology, improving EHR usability, and training and development.

Thematic Map and Framework

STS theory, as proposed by Trist and Bamforth (1951), views an organization as a collection of interconnected subsystems working together. These subsystems include people with skills and abilities striving to achieve goals, established processes guiding their work, technology supporting their tasks, and the physical environment in which they operate (Guest et al., 2022). STS suggests that the effectiveness of technological systems

is deeply connected to their integration with the social elements of work, such as employees' expertise, skills, and well-being (Zhang et al., 2025).

The study's themes closely align with STS theory, which emphasizes the interdependence of social and technical elements within an organization. Strengthening leadership and fostering a supportive culture address the social subsystem by promoting shared values and well-being, while optimizing team structures enhances human collaboration and task distribution. Leveraging advanced technologies and improving EHR usability, focus on the technical subsystem, ensuring that tools are designed and integrated to complement clinical workflows effectively. Ongoing training bridges the two subsystems by empowering staff and clinicians with the knowledge and skills needed to interact seamlessly with technology.

Yu et al. (2021) shared that rapid digitalization has profoundly transformed how employees interact with technology in work systems, making the STS approach increasingly important. Individuals now face the critical challenge of either mastering technology or becoming overwhelmed by it, underscoring the need to design work systems that accommodate both outcomes. The STS concept emerged to enable organizations to achieve balanced optimization that aligns technological advances with human goals and needs (Yu et al., 2021). By promoting a balance between technical effectiveness and social equity, STS theory offers a framework for reducing physician documentation burden (Zhang et al., 2025).

Dymek et al. (2023) explained that EHR-related burden exists within a multifaceted sociotechnical environment. This system involves not just the technology itself, but also healthcare professionals, clinical workflows and processes, organizational

policies and procedures, and external regulatory requirements. Dymek et al. (2023) emphasized that addressing this burden requires comprehensive organizational approaches and active leadership involvement and support to reduce the strain associated with electronic health record systems effectively.

Recommendations for Professional Practice

Primary care plays a vital role in enhancing population health by acting as the initial gateway to the healthcare system. Better overall health outcomes are linked to more available and accessible primary care services, highlighting their importance in effective healthcare delivery (Abhram et al., 2020). A central role of primary care is to provide continuity of care, which is essential for delivering high-quality healthcare. The ongoing relationship between a patient and their PCP improves the quality of care. It leads to better patient outcomes, including increased access to preventive services, reduced hospitalizations and emergency department visits, and lower costs of managing chronic illnesses. Continuity of care thus serves as a foundation for effective and efficient primary care practice (Sabety et al., 2021).

A recent study estimated that burnout-related turnover could result in over 11,000 primary care physicians leaving their practices annually (Wendt et al., 2025). PCPs experience high levels of burnout due to increased administrative burden. Increased administrative burden reduced provider satisfaction, limited access to care due to decreased clinical hours, strained patient-provider relationships, and negatively affected the patient experience, as PCPs spend more time on EHR than on direct patient care (Ha et al., 2025).

Recommendation 1: Create a process to implement advanced technology integration that will emphasize up-to-date services and will enhance efficiency of physician documentation.

Integrating AI into medical documentation systems represents a significant change in healthcare, offering substantial potential to mitigate physician burnout while simultaneously elevating the quality of patient care (Bongurala et al., 2024).

Implementing AI and related technological innovations has emerged as a promising strategy to alleviate documentation-related challenges in healthcare settings. AI-driven medical documentation systems offer significant advantages by automating labor-intensive processes, such as data entry and chart compilation, thereby reducing the administrative burden on physicians and enhancing clinical workflow efficiency (Bongurala et al., 2024).

LLMs are a class of generative AI systems capable of producing text that meets professional standards. These systems undergo training to process auditory input, transcribe it in real time, synthesize information, and compose comprehensive documentation, with further refinement through human-guided fine-tuning (Olson et al., 2025). Ambient AI platforms can monitor clinical interactions and auto-generate preliminary clinical documentation. This emerging technology has significant potential to mitigate professional burnout by reducing the excessive time healthcare providers spend on EHR documentation (Olson et al., 2025; Shah et al., 2025).

In STS theory (Trist & Bamforth, 1951), the technical subsystem comprises technology-related factors that transform work system inputs into desired outputs (Yu et al.). The technical subsystem encompasses critical technological resources, including

software, hardware, data, networking, and emerging technologies like AI, machine learning, and chatbots, which are essential to an organization's integration of advanced technology and applications (Davis et al., 2025; Yu et al., 2024). The technical subsystem of the framework plays a crucial role in alleviating physician documentation burden by providing advanced tools such as AI-driven software and machine learning algorithms. These technological resources enable more accurate, timely, and streamlined documentation processes, enhancing clinical workflow and allowing physicians to dedicate more time to direct patient care.

Steps To Implement Advanced Technology

- **Artificial Intelligence** - Advances in AI and machine learning have generated interest in using automated systems to simplify and standardize clinical documentation in primary care (Ha et al., 2025).
- **Digital Scribes** - AI scribes, also known as ambient or digital scribes, aim to reduce administrative workload in primary care and other healthcare areas. These systems use automatic speech recognition (ASR) and natural language processing (NLP) to capture, transcribe, and automate clinical notes (Ha et al., 2025). They are available through web browsers, mobile apps, or desktop programs, with some integrated into EHRs and others operating separately. Typically, clinicians start the AI scribe during patient visits, allowing it to listen to conversations, transcribe them, and produce a medical note (Ha et al., 2025). According to Feldheim (2025), the use of generative AI scribes saved approximately 15,791 hours of documentation time (roughly 1,794 eight-hour workdays). It concurrently improved patient–physician communication and clinician job satisfaction. AI scribes are designed to support physicians by

performing real-time transcription and summarization of consultations, reducing cognitive load from documentation and increasing time spent with patients (Feldheim, 2025).

- **EHR Mobile App** - Physicians can also use the EHR mobile app to record the physician-patient interaction. The LLM processes the transcript to generate draft sections of the note. These sections, such as PHI, PE, results, and A&P, can be accessed using predefined shortcuts called SmartSections. Physicians can add one or more SmartSections to their note templates, which automatically fill in after the recording ends (Ma et al., 2024).

Recommendation 2: Develop and emphasize a multidisciplinary team model to ensure patient centered care and documentation support.

Interprofessional healthcare teams in primary care now collaborate on both clinical and administrative tasks. The National Academies of Sciences, Engineering, and Medicine (NASEM) endorse team-based care as an essential component of delivering high-quality primary care (Kwan et al., 2021). An increasing number of studies in primary care show that effectively expanding support staff's roles is essential for transforming primary care while preventing additional provider workload and burnout (Dill et al., 2021). Yan et al. (2022) also pointed out that the team-based care model emphasizes transferring clerical tasks, such as documentation, non-physician order entry, inbox management, health coaching, and care coordination, to nurses, medical assistants, or specialized technicians.

The personnel subsystem comprises social and people-related factors within a work system, including employee demographics, psychosocial factors, and

professionalism. Advanced technology integration can support desired outcomes by augmenting human capabilities, upgrading labor, and making jobs more effective and engaging when technology and human employees work together (Yu et al., 2024). The personnel subsystem of the framework addresses the human factors that influence technology use, ensuring that physician documentation burden solutions align with user needs, skills, and workflows. By fostering collaboration and supporting professional development, this subsystem of the framework helps reduce the documentation burden and promotes more effective and satisfying use of advanced technologies.

Steps To Encourage A Multidisciplinary Team Model

- **Medical assistants** are paraprofessionals who document clinic visit information in EHRs in real time under a physician's supervision (Corby et al., 2021; Elton et al., 2022). MAs contribute to population health by identifying patients who are due for preventive screenings and retrieving data from electronic health records. They are involved in documentation tasks, including entering information into the EHR. MAs screen patients for depression, use motivational interviewing to support health goal setting, and provide education on preventive care for patients with chronic conditions. (Fraher et al. 2020). MAs can support population management by following standing orders and acting as health coaches. They can help handle incoming messages, communicate lab and radiology results to patients, and coordinate care with care managers. MAs can also help by researching and processing medication refill requests (Kwan et al., 2022).
- **Registered nurses** help balance the workload by allowing them to handle tasks such as triage, ordering tests, managing procedures, and responding to in basket messages

related to routine tests and procedures within their scope of practice. This allows physicians to focus more on direct patient care rather than extensive EHR tasks. This teamwork improves overall efficiency and ensures that time spent on home EHR documentation is used effectively and appropriately (Rotenstien et al., 2024).

- **Pharmacy technicians** are professionals who hold associate degrees and possess expertise in medication dispensing, formularies, and related areas, are well-suited to help meet medication access needs. Multiple national pharmacy organizations acknowledge the essential contributions of pharmacy technicians (McNamara et al., 2025). Their roles include supporting medication reconciliation, managing registries, assisting patients, and handling medication prior authorization requests. Pharmacy technicians can significantly help overcome administrative obstacles to proper medication access caused by insurance policies and the pharmaceutical industry (McNamara et al., 2025; Tai-Seale et al., 2023).

Recommendation 3: Cultivate and create an infrastructure that increases leadership support throughout the organization.

Leadership support is crucial for successful technology adoption, as it provides funding, strategic vision, and resource allocation to align technology implementation with organizational goals. Skilled managers who understand new technologies intuitively can effectively leverage them to enhance business processes, while leadership's prioritization of advanced technology fosters engagement and resource commitment (Yu et al., 2025). Meanwhile, a lack of management backing can hinder the adoption of innovation and weaken organizational competitiveness. Organizational culture plays a significant role in technology acceptance, with cultural challenges often matching the impact of

technical and business obstacles. Developing a supportive technological culture needs time and also influences employees' innovation decisions. Leadership that values creativity and innovation builds this culture (Yu et al., 2025).

The organizational structure subsystem of the framework such as business strategy, top management support, organizational culture, and size serve as unique resources embedded within organizations that influence the adoption of new technology-related practices and processes. The framework suggests that organizations that are open to innovation and view change as an opportunity to enhance business operations and strategic effectiveness are more likely to adopt and integrate new technologies successfully (Yu et al., 2025). The framework enables organizations to systematically integrate human workflows with technical systems, ensuring that documentation processes align with clinical needs rather than technological constraints. This holistic approach reduces the documentation burden by streamlining redundant tasks, improving system usability, allocating documentation responsibilities to staff based on their roles and capabilities, enhancing workflow effectiveness, and supporting clinical staff.

Steps To Strengthen Leadership Support

- **Improve patient satisfaction** - Healthcare leaders frequently implement initiatives to enhance patient satisfaction, such as expanded appointment schedules (Tawfik et al., 2025).
- **Improve physician satisfaction** - Healthcare leaders who empower physicians to exercise professional autonomy and promote self-care, along with a positive growth mindset, play a significant role in enhancing physician well-being (Waddimba et al., 2025).

- **Effectively enhancing staffing initiatives** - Healthcare leaders should ensure protected time, adequate staffing, and flexible workflows to manage these additional responsibilities (Tawfik et al., 2025).
- **Optimize the EHR user experience** - Organizations must redefine and expand their improvement criteria to encompass not only reducing time spent in the system but also providing comprehensive training and ongoing support to enhance documentation efficiency (Cross et al., 2024).
- **Optimize system design and implementation** - Healthcare organizations can collaborate closely with their EHR vendors and internal informatics teams to facilitate tailored customizations that better align the technology with clinical workflows and user needs. Organizations can undertake workflow redesigns to improve efficiency and usability, enhancing overall system effectiveness and user satisfaction (Cross et al., 2024).
- **Utilize vendor efficiency tools** – Use of templates, macros, and copy/paste features, alongside providing targeted end-user customization (Cross et al., 2024). Implement merged views and streamlined navigation by providing quick links and logically grouping menu items to make commonly used functions easier to access. Utilize context-aware alerts that activate only when clinically relevant, minimizing alert fatigue and supporting more focused clinical decision-making (Olakotan et al., 2025).
- **Support the Patients Over Paperwork (POP) initiative.** The Centers for Medicare & Medicaid Services (CMS) began implementing the Patients Over Paperwork (POP) initiative in 2019. This initiative aimed to reduce the documentation burden through several strategies, including:

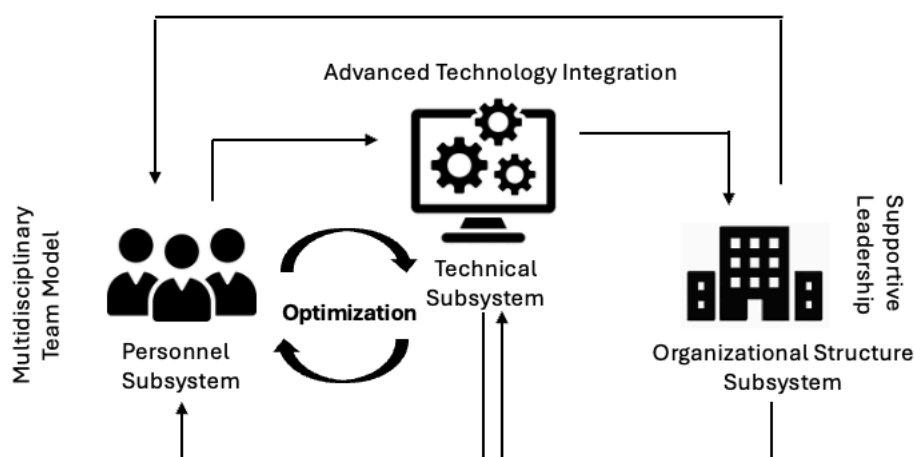
Reducing duplicative documentation requirements. An example of this is allowing clinicians to state that they reviewed information entered by others (e.g., medical students) rather than rewriting it (Nuyen et al., 2023).

Streamlining documentation requirements. In 2020, CMS simplified requirements for certain services, such as standardizing documentation for durable medical equipment (Nuyen et al., 2023).

Revising federal payment rules. To lessen the documentation burden associated with the Evaluation & Management (E&M) coding system, payment rules for office visits were revised in 2021, converting it from a five-level to a three-level system (Nuyen et al., 2023).

Figure 2

Integration of Sociotechnical Systems in Reducing Physician Documentation Burden



Implications for Social Change and Social Determinants of Health

In recent years, there has been increasing recognition of the profound influence that social determinants of health (SDOH) have on both individual and population health

outcomes. This awareness has prompted changes in healthcare practices and policies, underscoring the role of SDOH in sustaining health disparities and enhancing overall understanding of a patient's health status (Martinez-Alfonso et al., 2025).

SDOH clearly affects individual and community health. However, clinicians face challenges in effectively assessing and documenting these factors within the limited time available during clinical visits (Yelton et al., 2023). The substantial gap between the time required to provide care in accordance with clinical guidelines and the constraints of typical clinic schedules leads to incomplete care that deviates from the guidelines. These time constraints potentially contribute to the disparity between guideline-recommended practices and actual clinical care, which could help explain why national health outcomes fall short of expectations (Porter et al., 2022).

A study conducted by Iott et al. (2025) highlights that some physicians do not use structured methods to document SDOH primarily because they add complexity and require additional time. This reflects broader concerns about documentation burdens, where extensive data entry into EHRs can detract from direct patient care (Iott et al., 2025). Consistent with the findings of Yelton et al. (2023), several challenges hinder the assessment of SDOH and the facilitation of referrals. These challenges include the absence of a standardized screening protocol and insufficient incentives to conduct SDOH screenings or utilize Z codes. Healthcare providers also have limited time during patient encounters. As a result, it is difficult to add additional data collection unless it is seamlessly and efficiently integrated into the clinical workflow (Yelton et al., 2023).

Using structured documentation tools within EHRs, such as checkboxes or diagnosis codes, can help physicians efficiently capture SDOH data without time-

consuming free-text entries, saving time and enabling better data sharing. Healthcare organizations can invest in integrated systems that automatically identify and refer patients to community resources based on SDOH data, helping physicians address social needs more effectively without adding administrative burden (Iott et al., 2025). Yelton et al. (2023) also recommended that a top-down approach is necessary to reward the integration of patient SDOH into healthcare, ensuring that assessment and documentation are implemented universally and practically, and accommodating providers across diverse roles and settings. This approach is essential to enhancing healthcare quality, promoting health equity, and improving population health outcomes, particularly through strengthened partnerships with community resources (Yelton et al., 2023).

Limitations

There were several methodological limitations to this review that warrant consideration. The inclusion criteria limited articles to English-language publications within the past 5 years, potentially excluding valuable historical perspectives on the evolution and extent of physician documentation burnout. This temporal constraint may overlook foundational literature that could offer deeper insights into the progression of this phenomenon. The reliance on published literature prevented direct engagement with primary care physicians through interviews or access to internal organizational surveys regarding work satisfaction, limiting the depth of qualitative understanding and potentially missing nuanced, firsthand accounts of documentation burdens.

The scope of the integrative review, which only focused on strategies to reduce physician documentation burden in US primary care settings, inherently limits the generalizability of its findings. This geographical and specialty-specific focus excludes

other healthcare domains where documentation challenges may manifest differently, such as surgical specialties, emergency medicine, or hospital-based practice. The exclusive concentration on physicians neglects the documentation experiences of other healthcare professionals, including nurses, physician assistants, and allied health staff, who may face similar challenges. Future research should explore whether primary care physicians in other healthcare systems experience comparable documentation burdens and examine the cross-cultural applicability of mitigation strategies implemented in different national contexts.

Conclusion

EHRs have transformed healthcare by enabling information sharing, care coordination, and improved patient safety. EHRs provide real-time access to patient data, support evidence-based decisions, and improve team communication. They promote efficiency, reduce medical errors, and support population health management. However, this progress brings consequences. The same documentation systems designed to improve care now create burdens: long clerical hours, cognitive overload, and workflow disruptions during patient encounters. Physicians report frustration with poor system design, excessive data entry, and a focus on documentation over patient care, all of which diminish direct care and increase dissatisfaction.

The widespread adoption of EHRs has introduced significant challenges to physician well-being. The complexity of EHR interfaces, frequent system updates, and regulatory requirements have led to increased documentation demands on physicians. PCPs face the highest EHR burden, spending the most time using these systems and receiving the most inbox messages. This relentless documentation demand extends

beyond clinical hours, with EHR tasks following physicians' home and consuming their personal time. The American Medical Association reports that while physicians may work fewer formal hours, EHR and administrative tasks continue to encroach on their off-hours, leading to emotional exhaustion, depersonalization, and reduced professional efficacy. This burden has become a primary driver of physician attrition and career dissatisfaction.

The documentation burden extends beyond individual physicians to affect multiple dimensions of healthcare quality. It compromises patient satisfaction by reducing face-to-face interaction time and creating a screen-facing rather than patient-facing clinical environment. Quality outcomes suffer as documentation demands crowd out essential clinical activities, including HIE and care coordination. There is a decrease in physician satisfaction when administrative tasks overshadow clinical work, leading to decreased empathy and compromised clinical judgment. The burden negatively affects the documentation of SDOH, as clinicians may avoid capturing these important contextual factors due to time constraints and perceived complexity of documentation.

A STS theory provides a comprehensive framework for addressing documentation burden by recognizing the interdependence between technological systems and human factors. This approach promotes the design of EHR systems that align with clinical workflows and support physician needs. Strategies include involving end users in system development, optimizing interface usability, automating routine tasks, and fostering a supportive environment in which appropriate tasks are delegated to support staff. The sociotechnical perspective recognizes that technology alone cannot solve the problem;

rather, sustainable solutions require alignment between technical capabilities, workflow processes, and human competencies.

Looking ahead, protecting physicians from documentation burden requires sustained commitment to innovation, policy reform, and organizational change. Future actions should prioritize user-centered EHR design, regulatory simplification, and investment in training and support. Collaborative efforts among healthcare leaders, technology vendors, and policymakers are essential to create systems that balance compliance with clinical utility. By championing physician well-being and reducing documentation demands, the healthcare system can ensure high-quality care, improved satisfaction, and equitable outcomes for all stakeholders.

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Appendix A: DHA Practice-Based Problem Literature Review Matrix

Author/ date	Theoretical/ conceptual framework	Research question(s)/ hypotheses	Methodology	Analysis & results	Conclusions	Implications for future research	Implications for practice	Empirical research? (Yes or No)
Albrecht, M., Shanks, D., Shah, T., Hudson, T., Thompson, J., Filardi, T., Wright, K., Ator, G. A., & Smith, T. R. (2025).	N/A	What is the impact of implementing an ambient artificial intelligence (AI) documentation platform on clinicians' perceptions of documentation burden, after-hours work, burnout risk, and job satisfaction across various medical specialties?	Pre and Post implementation survey – Quality improvement	The analysis primarily employed proportional odds logistic regression to compare pre- and post-implementation survey responses, as well as to examine the effects of specialty type and duration of AI tool usage. The results showed significant improvements in clinicians' perceptions of documentation workflow ease and note completion efficiency, with clinicians reporting 6.91 times higher odds of finding the documentation workflow easy and 4.95 times increased odds of completing notes before the next patient visit after implementing the AI tool.	Implementing the ambient AI documentation platform, Abridge significantly improved clinicians' perceptions of documentation efficiency, reduced after-hours work, and enhanced job satisfaction across various specialties within a short timeframe. However, the authors caution these findings should be interpreted carefully because of study limitations, and they recommend further research using validated measures and diverse settings to substantiate the results and explore the long-term impact of ambient AI on clinician workload and burnout.	Ambient AI documentation platforms, such as Abridge, can significantly improve clinicians' workflow efficiency, reduce documentation burden, and enhance job satisfaction across various medical specialties. This suggests that healthcare institutions should adopt these technologies to address longstanding challenges in clinical documentation and potentially improve clinician well-being.	Implementing ambient AI documentation platforms, such as Abridge, could significantly improve clinicians' workflow efficiency, reduce documentation burden, and enhance job satisfaction across various medical specialties. This implies that healthcare institutions may consider adopting such technologies to address longstanding challenges in clinical documentation, thereby improving clinician well-being, reducing burnout, and allowing for increased patient care capacity.	Yes
Attipoe, S., Walker, D.	Techno-stress model	What are the pressures and opportunities	Qualitative approach involving thematic analysis of data from	The analysis involved thematic analysis of data	Physicians perceive the EHR as exerting specific pressures	Further research is needed to explore the	The study identifies specific opportunities for	Yes

M., Schweikhart, S. B., & Hefner, J. L. (2023).		associated with EHR work outside work?	semi-structured interviews.	from semi-structured interviews with 15 primary care pediatricians to examine the pressures and opportunities associated with EHR work outside work hours (WOW). The results showed that physicians regularly spent time working in the EHR outside work hours, feeling that the EHR contributed to their documentation burden and increased their EHR WOW while also appreciating the flexibility it provided in terms of work-life balance.	while also affording new opportunities and conveniences, providing evidence of both the pressures and opportunities of EHR work outside work hours (WOW) and their effect on physician well-being.	factors that influence EHR WOW and its precursors. Investigations into the causal mechanisms behind physicians' evaluation of EHR WOW are essential. Specifically, studying positive deviance could help identify the factors that contribute to favorable Electronic Health Record (EHR) assessments and improved outcomes.	health administrators to enable physicians to manage Electronic Health Records (EHRs) more effectively outside work hours (WOW), including improving EHR usability, enhancing workflow during work hours to free up time for documentation, and providing more training on EHR documentation strategies and software upgrades.	
Berg, S. (2024).	N/A	What system-level factors and their relationship with the amount of time primary care physicians spend on electronic health records (EHRs)?	N/A	The study's analysis revealed that primary care physicians spend an average of 36.2 minutes on the EHR for each 30-minute visit, with significant variation across different clinics. Results indicate that increased team contribution to orders, particularly from nurses, medical assistants,	The significant amount of time primary care physicians spend on EHRs, often exceeding the time spent on patient visits, poses a serious threat to their workforce and is a leading cause of burnout.	Future research should focus on individually targeted interventions, as there is still significant unexplained variation in EHR time at both the physician and clinic levels.	Medical practices can reduce physician EHR time and potential burnout by proactively and systematically involving team members, such as nurses and medical assistants, in EHR-related tasks. Investing in pharmacy technicians to assist with	No

				and pharmacy technicians, was associated with less time spent on the EHR.			medication refill issues and prior authorizations is a valuable strategy for reducing the EHR burden on physicians.	
Budd (2023)	N/A	What specific aspects of electronic health record (EHR) workflows contribute to physician burnout, particularly in primary care?	N/A	The analysis involved a systematic review of 36 selected articles, which identified and categorized the main contributors to EHR-related burnout in primary care. The results revealed five broad categories of EHR-related burnout: time demands, documentation and clerical burdens, complex usability, cognitive load, and electronic messaging volume.	The conclusion acknowledges that while EHRs offer several advantages over paper-based records, they have also created new or exacerbated traditional stressors for physicians, becoming a pronounced contributor to burnout. The study highlights specific issues, including clerical burdens, poor usability, cognitive overload, time demands, and increasing inbox messages, as key factors contributing to EHR-related physician burnout.	Future research should focus on redesigning electronic health records (EHRs) to enhance usability, streamline workflows, and alleviate the clerical and cognitive burdens imposed on physicians. Investigating interventions that manage electronic messaging volume and mitigate the negative impact of after-hours charting on work-life balance is also crucial to combat physician burnout.	Healthcare organizations should implement strategies to reduce the clerical workload on physicians, such as redesigning workflows and simplifying EHR interfaces to make them more intuitive and efficient. Practices must also address the significant burden of electronic messaging and after-hours charting, as these are major predictors of burnout and negatively impact physicians' work-life balance and time with patients.	No
Bundy, H., Gerhart, J., Baek, S., Connor, C. D., Israel, M., Dharod,	N/A	How does the implementation of DAX Copilot (DAXC), an AI-facilitated clinical documentation	Qualitative	The analysis involved inductive and iterative coding of semi-structured interviews with 12 primary care	DAX Copilot (DAXC) demonstrates significant potential for reducing the time spent on	Atrium Health plans to expand the use of DAXC and conduct further research on its impact.	AI-facilitated clinical documentation tools, such as DAXC, have the potential to	Yes

A., & Cleveland, J. (2024).		tool, affect primary care physicians' administrative workload, cognitive burden, and patient interactions?		physicians, using both horizontal and vertical approaches to identify key themes related to the use of DAX Copilot (DAXC). The results revealed three main themes: the potential benefits of DAXC (including improved quality of life and reduced cognitive burden), the types of encounters suitable for DAXC use, and concerns about the technology (such as transcription errors and potentially increased workload).	clinical documentation, which could alleviate cognitive burden and enable more personalized patient care. However, the current iteration of DAXC may not be suitable for all types of physician encounters, and certain limitations need to be addressed to enhance its broader applicability in clinical practice.	Specifically, they intend to study various aspects of DAXC's impact with a focus on physician and APP wellness and aim to identify which healthcare providers benefit most from this type of intervention.	reduce the administrative burden on healthcare providers, improving their work-life balance and reducing burnout. The study suggests that such tools enable physicians to be more engaged during patient encounters, resulting in more personable and attentive care. However, implementing DAXC should be carefully considered, as it may not be suitable for all types of encounters, and concerns exist about potential errors and increased patient loads.	
Corby, S., Ash, J. S., Mohan, V., Becton, J., Solberg, N., Bergstrom, R., Orwell, B., Hoekstra, C., & Gold, J. A. (2021).	Sittig and Singh's 8-dimensional sociotechnical model	What are the elements of the provider-scribe relationship and describe how and to what extent the use of scribes may influence provider burnout.	Qualitative	The researchers analyzed 184 documents (including field notes, interview transcripts, group discussions, and interview notes) using an interpretive grounded theory	Medical scribes are believed to reduce provider burnout. This transfer of burnout to scribes could impact their decision to pursue careers as medical providers, exacerbating the looming provider	Future research should investigate scribe burnout further, particularly by conducting interviews with former scribes who decided to pursue alternate careers outside of	Scribes can help reduce provider burnout. Healthcare organizations must be aware of the potential for burnout among scribes and take steps to prevent it. The findings	Yes

				<p>approach with NVivo12 software to identify patterns and themes related to burnout. The analysis revealed two main themes: (1) provider burnout (with subthemes of emotional response, provider satisfaction, retirement, and scribe burnout) and (2) ways to alleviate provider burnout beyond scribing (with subthemes of improving the EHR and utilizing team dynamics).</p>	<p>shortage and underscoring the need for ongoing efforts to mitigate the burden of EHR use within the context of current workflow requirements for all providers.</p>	<p>medicine. Future studies should also examine the entire team dynamic, including the integration of scribes within the inter-professional team, to identify what makes the relationships among all team members successful.</p>	<p>suggest that improving EHR usability and team dynamics, as well as adhering to best practices in the selection, training, and supervision of scribes, are essential for mitigating burnout for both providers and scribes.</p>	
<p>Dymek, C., Kim, B., Melton, G. B., Payne, T. H., Singh, H., & Hsiao, C. J (2021)</p>	N/A	<p>How to reduce EHR-related clinician burden?</p>	N/A	<p>This perspective piece synthesizes existing evidence and proposes approaches to address electronic health record (EHR) related clinician burden in three main areas: documentation, chart review, and inbox tasks. The paper discusses promising approaches for each location, such as speech recognition technologies for documentation, natural language processing and machine learning</p>	<p>The article emphasizes that addressing EHR-related burnout requires sociotechnical approaches that involve various actors in the healthcare system, who share responsibility for making evidence-based tools and applications available and easy to use. The authors urge policymakers to facilitate the implementation of evidence-based solutions to alleviate EHR-</p>	<p>Future research must strengthen the evidence for improvement interventions and actively engage EHR vendors and the broader informatics community in their development and implementation. Studies should evaluate how embedding effective design capabilities into certified health technologies can facilitate adoption and</p>	<p>Organizational strategies and leadership involvement are essential to reducing clinicians' documentation burden. Healthcare systems should collaborate with EHR vendors to eliminate non-value-added functionalities and jointly develop and share best practices, potentially through vendor-led consortia, to make these</p>	No

				for chart review, and team-based staffing models for inbox tasks.	related clinician burden, emphasizing the need for a collaborative effort among EHR vendors, healthcare systems, and policymakers to address this complex issue effectively.	underscore the importance of clinician-centered solutions.	evidence-based solutions widely available and user-friendly.	
Fogg, J. F., & Sinky, C. A. (2023).	N/A	How effective is a multiyear, multifaceted approach in reducing primary care physicians' in-basket volume and work burden, and what impact does this have on physician burnout?	Quality improvement	The analysis involved measuring the volume reduction of in-basket messages for each intervention type and tracking these improvements over time using both Epic-generated data and homegrown tools. The results showed a significant reduction in the in-basket volume across various message categories, with an overall decrease of approximately 25% in total daily in-basket volume for primary care physicians from 2017 to 2022.	collaboration around in-basket work. The authors emphasize that continued investment in reducing in-basket volume and work burden is crucial for primary care despite challenges, such as an increase in patient portal queries.	Future research should focus on developing more accurate and comprehensive tools for measuring in-basket work burden, as current methods have limitations in capturing the full scope of the work involved. Researchers need to investigate how reducing in-basket volume impacts physician burnout and patient outcomes, as well as how to address the challenges of rising patient portal queries and other factors affecting message volume.	A systematic and multifaceted approach to reducing in-basket volume can significantly decrease the workload on primary care physicians, thereby improving job satisfaction and reducing burnout. Healthcare organizations can implement similar strategies, such as elimination, automation, delegation, and collaboration, to manage in-basket messages more efficiently while maintaining the quality of care and patient safety.	No

<p>Hudelson, C., Gunderson, M. A., Pestka, D., Christiaansen, T., Stotka, B., Kissock, L., Markowitz, R., Badlani, S., & Melton, G. B. (2024).</p>	<p>Digital Health Tools Adoption, Quality Improvement</p>	<p>How does the implementation of live and asynchronous virtual scribe solutions impact clinician documentation burden, efficiency, and burnout in a diverse healthcare setting?</p>	<p>Mixed Method</p>	<p>The analysis involved a mixed-methods approach, combining quantitative data from surveys and EHR metadata with qualitative data from semi-structured interviews to evaluate the impact of virtual scribe solutions on clinician documentation practices, efficiency, and burnout. The results showed that while some clinicians reported significant benefits, including reduced documentation time and improved well-being, others experienced challenges with scribe quality and consistency, suggesting that virtual scribes may be beneficial for some clinicians but not universally effective.</p>	<p>The virtual scribe solutions show promise in reducing the documentation burden for some clinicians. Researchers need to investigate further the optimal implementation process and its effects on clinical practice and clinician burnout. The authors emphasize the importance of documenting IT selection and implementation processes for these tools to ensure their effective incorporation into complex health systems. They note the need to consider varying clinician needs, costs, IT requirements, and other factors.</p>	<p>Future research should focus on understanding the long-term effects of virtual scribe solutions on clinical practice, documentation quality, and clinician burnout across different specialties and healthcare settings. Further investigation is needed to optimize the implementation process of virtual scribe solutions, including exploring factors that influence their effectiveness, such as scribe consistency and training, as well as comparing virtual scribes to other documentation assistance tools like digital scribes and speech recognition software.</p>	<p>Virtual scribe solutions may be a valuable tool for reducing the documentation burden and improving clinician well-being in specific healthcare settings, but their effectiveness varies among clinicians and specialties. Healthcare systems considering the implementation of virtual scribes should carefully evaluate their particular needs, consider the variable quality and consistency of scribes, and be prepared to invest time in training and adaptation to maximize the benefits of these tools.</p>	<p>Yes</p>
<p>Ma, S. P., Liang, A. S., Shah, S. J., Smith, M., Jeong, Y.,</p>	<p>N/A</p>	<p>What is the impact of implementing a large language model-powered</p>	<p>Quality improvement</p>	<p>The analysis compared EHR use measures between a pre-pilot baseline period and the pilot</p>	<p>The large language model (LLM)-powered ambient AI scribe showed robust adoption</p>	<p>Future research on ambient AI scribes should include evaluating the</p>	<p>The ambient AI scribes have the potential to reduce documentation</p>	<p>No</p>

<p>Devon-Sand, A., Crowell, T., Delahaie, C., Hsia, C., Lin, S., Shanafelt, T., Pfeffer, M. A., Sharp, C., & Carcia, P. (2025).</p>		<p>ambient artificial intelligence scribe on physician documentation time and electronic health record (EHR) usage in ambulatory care settings across multiple specialties?</p>		<p>period, focusing on changes in documentation time per note, daily documentation time, after-hours EHR time, and total EHR time across 45 physicians from 8 specialties. The results showed significant reductions in all measured time metrics, with a median decrease of 0.57 minutes per note, 6.89 minutes in daily documentation time, 5.17 minutes in daily after-hours EHR time, and 19.95 minutes in daily total EHR time. However, there was notable individual variability in both utilization and time savings.</p>	<p>across multiple specialties, with modest reductions in documentation and EHR times, highlighting its potential to reduce the EHR documentation burden and mitigate physician burnout. However, the technology is not yet a one-size-fits-all solution, and ambient AI scribe technology will need to evolve to effectively support the diverse needs and practices across the medical landscape to reach its full potential.</p>	<p>quality of AI-assisted notes, understanding how physicians review and edit generated text, assessing the impact on the patient-physician relationship, and optimizing tool performance and workflows. Future research should focus on understanding which user phenotypes derive the most utility from current ambient AI technology and how to evolve the technology to support diverse medical needs and practices effectively.</p>	<p>burden and EHR time for physicians across multiple specialties, which could mitigate burnout and improve efficiency. However, the notable individual variability in utilization and time savings implies that the current technology may not be equally beneficial for all users, showing that healthcare organizations should carefully consider individual physician needs and workflows when implementing such tools.</p>	
<p>Nguyen, O. T., Turner, K., Apathy, N. C., Magic, T., Hanna, K., Merlo, L. J., Harle, C. A., Thompson, L. A., Berner, E. S.,</p>	<p>N/A</p>	<p>How do specific electronic health record (EHR) proficiency tools and efficiency behaviors impact the time primary care physicians spend interacting with the EHR system, both during and</p>	<p>Quantitative</p>	<p>The researchers conducted multivariable quantile regression models with fixed effects for physician-level factors and time to identify factors independently associated with time spent in the EHR.</p>	<p>The study found a complex relationship between the effectiveness of doctors' use of EHRs and the time they spend on them. The researchers suggest that examining the prevalence of EHR</p>	<p>Future research should focus on identifying the reasons for the non-use of specific documentation support tools and testing team-based models for their impact on EHR-related</p>	<p>Healthcare organizations should focus on targeted approaches for training initiatives to improve EHR proficiency, particularly in documentation-related tools and efficiency</p>	<p>Yes</p>

<p>& Feldman, S. S. (2022)</p>		<p>outside scheduled clinical hours?</p>		<p>The results showed mixed associations between certain EHR proficiency behaviors and time spent in the EHR, with some tools (like QuickActions, SmartPhrases, and documentation length) positively associated with increased EHR time, while others (like greater assistance from team members in note writing) were associated with less time spent in the EHR.</p>	<p>proficiency behaviors may indicate targeted areas for initial and ongoing EHR training while noting that team-based models for documentation and inbox management require further study.</p>	<p>burdens. Studies should examine the feasibility of implementing pre-visit questionnaires and their impact on physicians' documentation burden, as well as explore other unmeasured proficiency behaviors and the effect of team-based models on time spent managing messages.</p>	<p>behaviors. Implementing team-based documentation models, such as utilizing nursing staff, medical assistants, or scribes, might reduce EHR-related burden and documentation burden for primary care physicians.</p>	
<p>Owens, L. M., Wilda, J. J., Hahn, P. Y., Koehler, T., & Fletcher, J. J. (2024).</p>	<p>N/A</p>	<p>What is the impact of high usage of ambient voice technology (DAX™) on primary care provider burnout and documentation burden?</p>	<p>Cross-sectional cohort survey</p>	<p>The study examined the relationship between high DAX™ usage (greater than 60% of encounters) and the provider's burnout scores, as measured by the Oldenburg Burnout Inventory (OLBI), as well as its impact on documentation time per patient encounter. The results showed that high DAX™ use was associated with significantly less burnout on the OLBI disengagement subscore and a 28.8%</p>	<p>The high use of ambient voice recognition technology (DAX) was associated with a lower documentation burden and reduced provider burnout, as indicated by the OLBI disengagement subscore. However, the researchers noted that high DAX™ use did not significantly affect the OLBI exhaustion subscore or the total OLBI score.</p>	<p>Future research should further investigate the impact of ambient voice technology on various aspects of the provider's burnout, with a focus on why it affects disengagement more than exhaustion. Future investigations should explore the generalizability of these findings across a broader group of primary care providers,</p>	<p>Implementing ambient voice technology, such as DAX, in primary care settings can significantly reduce documentation time and potentially alleviate some aspects of the provider's burnout, particularly disengagement. Healthcare organizations considering ways to address provider burnout and improve</p>	<p>Yes</p>

				reduction in documentation time per encounter (1.8 minutes). However, there was no significant difference in the OLBI exhaustion sub-score or total score.		considering factors such as baseline efficiency, years in practice, visit complexity, visit type, and other elements of the practice environment.	efficiency may find value in adopting such technology, as it could save the providers a substantial amount of time over a day or week, potentially improving work-life balance and job satisfaction.	
Pfoh, E. R., Hong, S., Baranek, L., Rothberg, M. B., Beinkampen, S., Misra-Hebert, A. D., Rehm, S. J., & Sikon, A. L. (2022).	N/A	How does the implementation of scribes impact clinician efficiency in terms of chart closure time and after-hours work? What is the effect of scribe implementation on clinician burnout and professional fulfillment?	Mixed-Method	The analysis involved a combination of qualitative thematic analysis of interview data and quantitative difference-in-difference analysis of electronic health record (EHR) data, along with descriptive statistics from survey responses. The results showed that implementing scribes was associated with reduced time to close charts, decreased after-hours work, improved clinician satisfaction and focus on patients, and potentially reduced burnout. However, there was a learning curve in	The study suggests that working with scribes was associated with improved efficiency markers, including reduced time to close charts and decreased time spent using the EHR. The study found that increased satisfaction among clinicians accrued once scribes had gained sufficient experience, indicating that the benefits of scribes became more apparent over time.	Future research on the long-term effects of scribes on clinician burnout, patient care quality, and healthcare system efficiency. Future studies could focus on the cost-effectiveness of scribes, their impact on patient outcomes, and potential strategies to optimize the integration of scribes into various healthcare settings, addressing the initial learning curve and maximizing their benefits over time.	The study's findings suggest that implementing scribes in primary care settings can lead to improved clinician efficiency, reduced after-hours work, and increased job satisfaction, which might address issues of burnout and retention in healthcare. However, healthcare systems considering scribe implementation should be prepared for an initial learning curve and should carefully consider how to balance the cost of scribes with their	Yes

				working with scribes, and they did not reduce the overall inbox burden.			potential benefits, including the possibility of long-term savings through improved physician retention and work satisfaction.	
Rotenstein, L. S., Holmgren, J., Horn, D. M., Lipsitz, S., Phillips, R., Gitomer, R., & Bates, D. W. (2023).	N/A	How are specific primary care physician (PCP), patient panel, clinic, and team collaboration factors associated with PCPs' electronic health record (EHR) time?	Cross-sectional study	The analysis used generalized estimating equations to examine associations between various factors (PCP, patient panel, clinic, and team collaboration) and EHR time metrics (total time, pajama time, and inbox time) per visit. Results showed substantial variation in EHR time across individual PCPs and clinics, with factors such as team collaboration on orders, presence of a pharmacy technician, and practicing in a community health center associated with significantly lower per-visit EHR time across multiple categories.	The electronic health record (EHR) time burden poses a significant threat to the primary care physician (PCP) workforce, with substantial variation in EHR time across both individual PCPs and PCPs within clinics. The findings suggest that team and clinic factors, such as teamwork on orders, having a pharmacy technician, and practicing in a community health center, were associated with lesser EHR time, which can guide health system leaders in developing new approaches to care delivery that address the burden of EHR for PCPs and enhance the sustainability of modern primary care practice.	While this study provides valuable insights into factors associated with EHR time variation, its cross-sectional nature precludes drawing causal conclusions, suggesting a need for longitudinal studies to establish causality. Given that the study was based on two academic medical center primary care networks with part-time clinical physicians, future research should explore these associations in non-academic settings, settings where physicians devote a greater portion of their professional effort to clinical care, and in	Health system leaders should focus on system-level interventions to alleviate the EHR burden for primary care physicians (PCPs). Specifically, the results indicate that implementing team-based approaches to EHR tasks (such as increased team collaboration on orders), providing specialized support staff (like pharmacy technicians), and considering the benefits of community health center models could effectively reduce EHR time expenditure and potentially alleviate burnout among primary care physicians.	Yes

						specialties beyond primary care to enhance generalizability.		
Shah, M., De Arrigunaga, S., Forman, L. S., West, M., Rowe, S. G., & Mishuris, R. G. (2024)	N/A	How do average cumulated time to chart closure (CTCC) and specific EHR usage metrics relate to the severity and dimensions of clinician burnout?	Retrospective cross-sectional study	The study's analysis employed descriptive statistics and adjusted logistic regression models to examine the relationship between various electronic health record (EHR) use metrics and clinician burnout. The results include data from 305 attendings, encompassing 242,4322 ambulatory encounters (2021). Among them, 42% (128 physicians) experienced burnout. The median CTCC for all clinicians was 32.5 hours.	The workload burden, as represented by the average Cumulated Time to Chart Closure (CTCC), is a practical and quantifiable measure that predicts clinician burnout. This metric holds the potential to help identify clinicians at risk and to effectively evaluate the success of interventions aimed at reducing burnout.	Future research can use Cumulated Time to Chart Closure (CTCC) to identify clinicians at risk for burnout and to evaluate the effectiveness of interventions designed to reduce it, serving as a more practical outcome metric than traditional surveys.	Cumulated Time to Chart Closure (CTCC) can serve as a practical and easily derivable measure for healthcare systems to identify clinicians who are at risk of burnout, without relying on time-consuming surveys. Organizations can implement targeted support interventions for these identified clinicians and use CTCC as an ongoing metric to assess the effectiveness of these interventions in reducing workload burden and burnout.	Yes
Shah, S. J., Crowell, T., Jeong, Y., Devon-Sand, A., Smith, M., Yang, B., Ma, S. P., Liang, A. S., Delhi, C., Meng, C. H.,	Reach, Efficacy, Adoption, Implementation, Maintenance/Practical, Robust Implementation, and Sustainability Model (RE-AIM/PRISM).	What are physician perspectives on the use of ambient AI scribes, including adoption, effectiveness, and opportunities for improvement in	Qualitative	The analysis involved the thematic coding of 22 semi-structured interviews with physicians, utilizing both inductive and deductive approaches guided by the RE-	The ambient AI scribes had a positive impact on physician workload, work-life integration, and patient engagement, with key facilitators and barriers to adoption identified.	Future research should investigate the impact of ambient AI scribe tools on medical synthesis, clinical communication,	Ambient AI scribes have the potential to reduce clinician burnout by positively impacting workload, work-life integration, and patient	Yes

Shanafelt, T., Pfeffer, M. A., Sharp, C., Lin, S., & Garcia, P. (2025)		workflow integration?		AIM/PRISM framework. Code counts were summarized, and sentiment analysis was performed. The results showed predominantly positive perspectives on the impact of ambient AI scribes on temporal demand, cognitive demand, work-life integration, and patient engagement while highlighting concerns about note construction, accuracy, and style, along with specific suggestions for improvement.	The findings suggest the potential for ambient AI scribes to reduce clinician burden, while user-centered recommendations offer practical guidance for improving future iterations and enhancing adoption.	and clinical reasoning, extending beyond the focus on note creation in this study. Researchers should also conduct future qualitative research to explore clinician perspectives after more extended use and to investigate patient perspectives on ambient AI scribe tools.	engagement. The user-centered recommendations provided by physicians offer practical guidance for improving future iterations of ambient AI scribes, which could enhance their adoption and effectiveness in clinical practice.	
Tai-Seale, M., Baxter, S., Millen, M., Cheung, M., Zisook, S., Celebi, J., Polston, G., Sun, B., Gross, E., Helsten, T., Rosen, R., Clay, B., Sinky, C., Ziedonis, D. M., Longhurst, C. A., & Savides, T. J. (2023)	N/A	What is the relationship between burnout and stress-related EHR, as measured by physicians' perception of EHR work stress and potentially malleable measures of their workload in the EHR?	Survey	The study used logistic regression analysis to find that higher odds of physician burnout were significantly associated with increased perceived EHR stress, a greater number of prescription reauthorization messages, not feeling valued or aligned with leaders' values, being in practice for 15 years or less, and sleeping less than six hours per night.	A comprehensive, systems-based approach is necessary to improve physician well-being, focusing on actionable factors such as providing staff support for prescription reauthorizations and addressing organizational issues, including a lack of feeling valued. The organization should pay special attention	Future research should focus on the impact of policy changes on physician well-being, use objective EHR workload measures applicable to diverse specialties beyond ambulatory care, and continue to identify actionable levers to improve working conditions.	The organization should implement a multi-pronged approach that includes targeting actionable levers, such as delegating prescription reauthorization tasks to support staff, fostering a culture where physicians feel valued and aligned with leadership, and providing dedicated support for early-career	Yes

				The results showed that compared to medical subspecialists, physicians in COVID-intense specialties, primary care, hospital-based roles, psychiatry, and obstetrics-gynecology all had significantly higher odds of burnout.	to the needs of younger physicians.		physicians to enhance overall well-being.	
Tawfik, D., Sebok-Syer, S. S., Bragdon, C., Brown-Johnson, C., Winget, M., Bayati, M., Shanafelt, T., & Profit, J. (2025)	N/A	How do primary care physicians' experiences with Electronic Health Record (EHR) usage relate to quantitative EHR measures identified as predictors of burnout, and what additional factors influencing physician well-being may not be captured by these measures?	Exploratory Qualitative Study	The analysis involved inductive and deductive coding of interview responses from 16 physicians and four clinic managers, using a priori themes related to the machine learning model categories of patient load, documentation burden, messaging burden, orders, and physician distress and fulfillment. The results identified three dominant themes: 1) Messaging and Documentation Burden are high and require more time than most physicians have available during standard working hours; 2) While EHR-related burdens are high, they also provide	The electronic health record-related work burden, essentially quantifiable through EHR usage measures, is a significant source of distress among primary care physicians. Organizational recognition of this work, along with staffing and support to predict associated work burdens, may increase professional fulfillment and reduce burnout among primary care physicians.	Future research could focus on refining and expanding the set of EHR usage measures that predict burnout, incorporating the qualitative insights from this study to develop more comprehensive predictive models. Studies could evaluate the effectiveness of various organizational strategies to recognize and support EHR-related work burden, as well as explore dimensions that are difficult to quantify, such as a perceived imbalance between job demands and	Healthcare organizations should recognize EHR-related work burdens as a significant source of distress among primary care physicians and implement strategies to address them. Organizations should consider providing adequate staffing and support to manage EHR-related tasks, as well as developing methods to predict and mitigate associated workloads, which may increase professional fulfillment and reduce burnout among primary care physicians.	Yes

				patient-care benefits; and 3) Turnover and insufficient staffing exacerbate time-demands associated with patient load.		individual resources, which were found to contribute to burnout.		
Wu, D. T., Xu, C., Kim, A., Bindhu, S., Mah, K. E., & Eckman, M. H. (2021).	N/A	What are the roles of health information technology (HIT) in contributing to, measuring, and mitigating clinician burnout, and how have these roles evolved?	Scoping literature review	The analysis employed a two-phase approach: first, a statistical summary was generated to characterize all included papers based on various attributes (specialty, publication year, variables of interest, and study design); second, a narrative synthesis was conducted to identify the potential roles of HIT in clinician burnout. The results revealed three primary roles of HIT in relation to clinician burnout: as a contributor to burnout (examined in 21 studies), as a tool for measuring burnout (in 8 studies), and as a potential solution to mitigate burnout (in 7 studies).	The scoping review suggests that health information technology (HIT), especially electronic health records (EHRs), can play multiple roles in clinician burnout, including contributing to burnout, measuring burnout, and potentially mitigating burnout. Based on these findings, the authors encourage researchers to consider HIT's multifaceted role in burnout and provide four recommendations for future research: validating and standardizing HIT burnout measures, focusing on EHR-based solutions to mitigate burnout, expanding burnout studies to other specialties and types of healthcare providers, and utilizing mobile and	Future research should focus on addressing the gaps identified in the current literature and expanding the scope of burnout studies to provide a more comprehensive understanding of the phenomenon. Specifically, the authors recommend four key areas for future research: (1) validating and standardizing HIT burnout measures, (2) developing and testing EHR-based solutions to mitigate burnout, (3) expanding burnout studies to include a broader range of medical specialties and healthcare provider types, and (4) utilizing mobile and	Focus on the potential for health information technology (HIT), especially electronic health records (EHRs), to both contribute to and mitigate clinician burnout. Specifically, the study suggests that healthcare organizations should consider implementing EHR-based interventions to reduce burnout, such as enhancing EHR usability, providing comprehensive EHR training for clinicians, and exploring ways to alleviate the documentation burden while also acknowledging the need to address the impact of HIT on various types of healthcare	No

					tracking technology to study time efficiency.	tracking technology to study time efficiency and its relation to burnout more accurately.	providers and specialties.	
Yan, Q., Jiang, Z., Harbin, Z., Tolbert, P. H., & Davies, M. G. (2021).	N/A	What is the relationship between EHR use and provider burnout?	Systematic review	The study conducted a systematic review of 26 articles that objectively evaluated the relationship between EHR usage and provider burnout, synthesizing the findings through qualitative analysis due to the heterogeneity of the included studies. The results identified three main EHR-related factors associated with increased provider burnout: insufficient time for documentation, high inbox or patient call message volumes, and negative perceptions of EHR by providers.	The authors identified three main EHR-related factors associated with increased burnout in providers: insufficient time for documentation, high inbox or patient call message volume, and provider negative perceptions of EHR.	Future research suggests a need for more objective evaluations of the relationship between EHR usage and provider burnout. This research should focus on using EHR-derived data, investigating computerized provider order entry systems and synchronous alerts, and exploring burnout in advanced practitioners and nursing populations.	Healthcare organizations should prioritize interventions that address the three main EHR-related factors associated with burnout: providing adequate time for documentation, managing message volumes, and improving providers' perceptions of EHR systems, to reduce provider burnout and potentially improve patient care.	No

Appendix B: DHA Review Question Search Log

Database or location name	Search terms	Results	Notes
CINAHL Plus	EHR OR electronic health records AND burden OR strain OR fatigue AND physician AND primary care	11	40 articles are not relevant to the study; limited to peer-reviewed; past 5 years
Scopus	Documentation burden OR burnout AND electronic health record OR medical record AND primary care physicians	18	6 are duplicate, 19 articles not relevant to the study; limited to peer-reviewed; past 5 years
PubMed	Electronic health record or medical record AND burden AND reduce AND primary care AND physicians OR clinician	16	100 articles will not be used due to duplicates from other source or not relevant to the study; limited to peer-reviewed; past 5 years
Backward/Forward hand searching references list (Google Scholar)	Strategies AND reduce AND documentation OR clerical OR administrative AND burden OR strain AND primary care physician	32	788 articles, most are not related to the study; limited to peer-reviewed; past 5 years
Science Direct	Electronic health record OR health record AND documentation burden AND physician AND primary care	2	42 articles are not relevant to the study, 1 is a duplicate from other source; limited to peer-reviewed; past 5 years
American Medical Association	Primary care AND time in EHR	3	312 results, many are more than 5 years and several are not relevant to the study

Appendix C: DHA Appraisal Results Log

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
<p>Abbondanza, L., & White, P. (2024). Evaluating a scribe program in reducing provider burnout <i>The Journal of Nurse Practitioner</i>, 20(3), 104913. https://doi.org/10.1016/j.nurpra.2023.104913</p>	<p>Evidence level V and quality rating High</p>	<p>PCP documentation burden</p>	<p>Scribes can improve job satisfaction and decrease the documentation burden.</p>	<p>Mini Z 2.0 Burnout survey.</p>	<p>A small sample of PCPs limits its applicability to larger populations or specialties, and the pajama time data is from a different period than other metrics because of EHR issues.</p>
<p>Apathy, N. C., Holmgren, J., & Cross, D. A. (2024). Physician EHR time and visit volume following adoption of team-based documentation support. <i>JAMA Internal Medicine</i>, 184(10), 1212–1221. https://doi.org/10.1001/jamainternmed.2024.4123</p>	<p>Evidence level V and quality rating High</p>	<p>Physician documentation burden</p>	<p>Adoption of team-based support reduce physician EHR documentation time.</p>	<p>Weekly visit volume, documentation time, total EHR time, HER time outside clinic hours</p>	<p>Used a staggered adoption difference-in-differences framework estimation, used only single EHR vendor, and did not identify which team contributed to the shared documentation.</p>
<p>Bundy, H., Gerhart, J., Baek, S., Connor, C. D., Israel, M., Dharod, A., & Cleveland, J. (2024). Can the administrative loads of physicians be alleviated by AI-facilitated clinical documentation? <i>Journal of General Internal Medicine</i>, 39(15), 2995–3000. https://doi.org/10.1007/s11606-024-08870-z</p>	<p>Evidence level III and quality rating Good</p>	<p>Physician documentation burden</p>	<p>Implementing AI-facilitated clinical documentation tools, such as DAX Copilot (DAXC), can significantly</p>	<p>Qualitative study used semi-structured interviews.</p>	<p>The study's primary limitation is its small sample size of only 12 interviewees, which may not be fully representative of the</p>

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
			alleviate the physician documentation burden by reducing the time spent on clinical documentation and relieving the cognitive load associated with retaining critical clinical details.		broader physician population using DAXC. The analysis relies solely on qualitative data from semi-structured interviews, lacking quantitative metrics that could provide more objective measures of DAXC's impact on physician documentation burden and workflow efficiency.
Corby, S., Ash, J. S., Mohan, V., Becton, J., Solberg, N., Bergstrom, R., Orwell, B., Hoekstra, C., & Gold, J. A. (2021). A qualitative study of provider burnout: Do medical scribes hinder or help? <i>Journal of American Medical Informatics Association</i> , 4(3), 1–8. https://doi.org/10.1093/jamiaopen/ooab047	Evidence level III and quality rating High	Primary Care, Information Management, How to reduce physician documentation burden	Medical scribes help reduce provider burnout.	Qualitative methods to identify the provider's perception about the role of scribes and burnout.	The study is limited by the volunteers, which results in a potential bias in the answer to the question. The use of purposive sampling, which involves a small, non-random sample, and the exclusion of off-site virtual scribing

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
					contribute to these limitations.
<p>Dymek, C., Kim, B., Melton, G. B., Payne, T. H., Singh, H., & Hsiao, C. J. (2021). Building the evidence-base to reduce electronic health record–related clinician burden. <i>Journal of the American Medical Informatics Association</i>, 28(5), 1057–1061. https://doi.org/doi: 10.1093/jamia/ocaa238</p>	<p>Evidence level V and quality rating High</p>	<p>Physician EHR burden.</p>	<p>EHR-related burnout requires sociotechnical strategies in which diverse healthcare stakeholders collaborate to make evidence-based tools and applications.</p>	<p>Measuring EHR burden, based on cited studies, includes the percentage of time clinicians spend on tasks like documentation, chart review, and inbox management, along with measures of redundancy, notifications, and changes in burnout.</p>	<p>The research studies on Speech Recognition (SR) usage in Electronic Health Records (EHRs) are limited, as they are often heterogeneous and confined to specific care settings, making it difficult to generalize their impact on reducing clinician burden.</p>
<p>Heckman, J., Mukamal, K. J., Christensen, A., & Reynolds, E. E. (2020). Medical scribes provider and patient experience, and patient throughput: A trial in an academic general internal medicine practice. <i>Journal of General Internal Medicine</i>, 35(3), 770–774. https://doi.org/10.1007/s11606-019-05352-5</p>	<p>Evidence level V and quality rating High.</p>	<p>Physician documentation burden.</p>	<p>Scribes supported greater patient throughput and improved provider perceptions of</p>	<p>The study measured the effect of medical scribes on patient and provider experience</p>	<p>Survey response rate was low providers were not randomized to the scribe vs. control group, and financial analysis was based</p>

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
			documentation burden.	using 5-point Likert scale surveys and on provider productivity through visits and work Relative Value Units (wRVUs) per hour.	on estimates of past performance.
<p>Jhaveri, P., Abdulahad, D., Fogel, B., Chuang, C., Lehman, E., Chawla, L., Foley, K., Phillips, T., & Levi, B. (2022). Impact of scribe intervention on documentation in an outpatient pediatric primary care practice. <i>Academic Pediatric Association</i>, 22(2), 289–295. https://doi.org/10.1016/j.acap.2021.05.004</p>	<p>Evidence level V and quality rating Good.</p>	<p>Reduce clinician documentation workload and increase efficiency.</p>	<p>Medical scribes can reduce doctors' documentation work, speed up note signing, and cut down on after-hours work.</p>	<p>The effects of medical scribes on note completion time and clinician experience, especially during clinic and after-hours charting.</p>	<p>There are only six willing clinicians, and the scribes are not randomly assigned. The study did not account for the learning curve or the evolving relationship between scribes and providers, though prior research shows increasing productivity.</p>
<p>Ko, C., Shectman, B., Uy, D., Minars, C., Ingram, B., Chary, N., Chung, K., Girdler, G., Le, H., Miri, S., & Jacobs, R. J. (2025). A scoping review of the role of artificial intelligence in physician burnout. <i>Cureus</i>, 17(7). https://doi.org/10.7759/cureus.88580</p>	<p>Evidence level V, Quality rating Good</p>	<p>Physician documentation burnout</p>	<p>AI has the potential to mitigate physician documentation burnout.</p>	<p>Scoping review to examine the impact of AI on physician burnout in the</p>	<p>Limited number of databases, specific medical specialty, source of information and timing.</p>

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
				context of medical carting and administrative task.	
Kruse, C. S., Mileski, M., Dray, G., Johnson, Z., Shaw, C., & Shirodkar, H. (2022). Physician burnout and the electronic health record leading up to and during the first year of COVID -19: Systematic review. <i>Journal of Medical Internet Research</i> , 24(3), e36200. https://doi.org/10.2196/36200	Evidence level V, Quality rating High	Physician administrative burden and symptoms of burnout	Recommend work redesign, customized templates, training and use of scribes.	Systematic review of physician burnout due to electronic health record and managing the pandemic COVID-19.	Review selection of 5 years, plenty of opinion articles with little empirical evidence.
Lourie, E. M., Utidjian, L. H., Ricci, M. F., Webster, L., Young, C., & Grenfell, S. M. (2021). Reducing electronic health record-related burnout in providers through a personalized efficiency improvement program. <i>Journal of the American Medical Informatics Association</i> , 28(5), 931–937. https://doi.org/doi: 10.1093/jamia/ocaa248	Evidence level V and quality rating high	Improve EHR efficiency and reduce burnout	Provide EHR personalized training to improve knowledge and efficiency.	A quality improvement study used a series of pre- and post-surveys to measure changes in provider efficiency, EHR knowledge, after-hours work, burnout, and program satisfaction.	Limitations of the study included the lack of objective time measurement and incomplete survey participation by some providers. The study was conducted at a single institution in an ambulatory setting, and the researchers noted the absence of a control group.

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
<p>Ma, S. P., Liang, A. S., Shah, S. J., Smith, M., Jeong, Y., Devon-Sand, A., Crowell, T., Delahaie, C., Hsia, C., Lin, S., Shanafelt, T., Pfeffer, M. A., Sharp, C., & Carcia, P. (2025). Ambient artificial intelligence scribes: utilization and impact on documentation time. <i>Journal of the American Medical Informatics Association</i>, 32(2), 381–385. https://doi.org/10.1093/jamia/ocae304</p>	<p>Evidence level V and quality rating High</p>	<p>Physician documentation time.</p>	<p>Ambient AI scribe was associated with modest but statistically significant reductions in documentation time per note, daily documentation time, after-hours EHR time, and total daily EHR time.</p>	<p>Utilization rate and documentation time per note.</p>	<p>Small sample size, volunteer and selection bias, potential secular trends, the inability to analyze time outcomes per encounter, the absence of a comparison to alternative strategies, restriction to English-speaking patients, and a cohort predominantly composed of primary care physicians.</p>
<p>Micek, M. A., Arndt, B., Baltus, J. J., Broman, A. T., Galang, J., Dean, S., & Sinky, C. (2022). The effect of remote scribes on primary care physicians' wellness, EHR satisfaction, and EHR use. In. <i>Healthcare</i>, 10(4), 100663 https://doi.org/10.1016/j.hjdsi.2022.100663</p>	<p>Evidence level V, Quality rating High</p>	<p>Improve physician wellness and reduce EHR use.</p>	<p>Remote scribes are associated with significant improvements in physician wellness, reduced EHR time, and potential help in lowering documentation burnout.</p>	<p>Pre-post, non-randomized controlled evaluation of a scribe program.</p>	<p>Response rate is low, participation in the scribe project was not randomized and result may be bias. The implementation of the scribe project prior to COVID-a9 pandemic that could have affected the post-intervention</p>

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
					and wellness and EHR measures.
Olakotan, O., Samuriwo, R., Ismaila, H., & Atiku, S. (2025). Usability challenges in electronic health records: Impact on documentation burden and clinical workflow: A scoping review. <i>Journal of Evaluation in Clinical Practice</i> , 31(4), e70189.	Evidence level V and quality rating High	Contributing factors to documentation burden.	Redesign EHR to minimize workflow disruptions that cause a documentation burden.	This scoping review examined 28 studies using various methods to identify usability problems in EHRs that contribute to documentation burden and disrupt workflows.	The study does not fully capture usability. The study conducted in a high-resource healthcare system may not fully capture usability challenges in low-resource healthcare systems. Using three databases and limited hand-searching could have excluded relevant studies in other databases.
Olson, K. D., Meeker, D., Troup, M., Barker, T. D., Nguyen, V. H., Manders, J. B., Stults, C. D., Jones, V. G., Shah, S. D., Shah, T., & Schwamm, L. H. (2025). Use of Ambient AI scribes to reduce administrative burden and professional burnout. <i>JAMA Network Open</i> , 8(10), e2534976. https://doi.org/10.1001/jamanetworkopen.2025.34976 .	Evidence level V and quality rating High	Reducing clinician administrative burden and burnout	The use of AI scribe platform was associated with reduction of burnout, cognitive task load and time spent documenting.	Quality improvement study used preintervention and 30 day post-intervention survey. Difference	The evaluation was not designed for research purposes, potential bias, baseline demographic data for the participating organizations were unavailable,

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
				between preintervention and post intervention score were determined using pared <i>t</i> tests.	preventing assessment of whether the sample represented the professional populations or whether self-selection and attrition produced bias. No control group to adjust for temporal trend and 69 of the respondents did not participate in the burnout question.
Owens, L. M., Wilda, J. J., Hahn, P. Y., Koehler, T., & Fletcher, J. J. (2024). The association between use of ambient voice technology documentation during primary care patient encounters, documentation burden, and provider burnout. <i>Family Practice</i> , 41(2), 86–91. https://doi.org/0.1093/fampra/cmadv092	Evidence level V and quality rating High	Physician documentation burden	Ambient voice technology significantly reduce documentation burden.	Observational study	No pre-implementation or control-group comparison to assess changes over time, potential unidentified confounders between high- and low-users, and limited generalizability to other primary care cohorts.

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
Pfoh, E. R., Hong, S., Baranek, L., Rothberg, M. B., Beinkampen, S., Misra-Hebert, A. D., Rehm, S. J., & Sikon, A. L. (2022). Reduced cognitive burden and increased focus: A mixed methods study exploring how implementing scribes impacted clinicians. <i>Medical Care</i> , 60(4), 316–320. https://doi.org/10.1097/MLR.0000000000001688	Evidence level III and quality rating High	Reduce EHR time.	Working with scribes was associated with reduced time to close charts and use the EHR, markers of efficiency.	Structured surveys and unstructured interviews with clinicians who adopted scribes	Small number of clinicians and not randomly chosen, only 6 months follow-up period and some clinicians did not fill out the survey have different experience.
Rotenstein, L. S., Hendrix, N., Phillips, R. L., & Adler-Milstein, J. (2024). Team and electronic health record features and burnout among family physicians. <i>JAMA Network Open</i> , 7(1), pe2442687. https://doi.org/10.1001/jamanetworkopen.2024.42687	Evidence level V and quality rating High	EHR experiences with burnout	Clinical leaders and policymakers should focus on optimizing primary care team support and family physicians' EHR experiences to enhance the sustainability of primary care practices.	Multivariable logistic regression models	Respondents perception of their EHR time and EHR proficiency were not measured. Specific respondents were not followed up overtime.
Rotenstein, L. S., Holmgren, J., Horn, D. M., Lipsitz, S., Phillips, R., Gitomer, R., & Bates, D. W. (2023). System-level factors and time spent on electronic health records by primary care physicians. <i>JAMA Network Open</i> , 6(11), e2344713. https://doi.org/10.1001/jamanetworkopen.2023.44713	Evidence level V and quality rating High	EHR time burden.	Team collaboration on orders and support for medication refill functions is associated with lower EHR time for PCPs. The findings highlight the importance of	Total per visit HER time, pajama time and time on electronic inbox as measured by activity log data.	Study based on 2 academic medical primary care network, EHR database counts only the time a user is interacting and only English PCP panel.

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
			addressing EHR burden at a systems level.		
Shah, S. J., Devon-Sand, A., Ma, S. P., Jeong, Y., Crowell, T., Smith, M., Liang, A. S., Delahaie, C., Hsia, C., Shanafelt, T., Pfeffer, M. A., Sharp, C., Lin, S., & Garcia, P. (2025). Ambient artificial intelligence scribes: Physician burnout and perspectives on usability and documentation burden. <i>Journal of the American Medical Informatics Association</i> , 32(2), 375–380. https://doi.org/10.1093/jamia/ocae295	Evidence level V and quality rating High	Physician documentation burden.	Ambient AI scribe technology demonstrated a reduction in physician burden and burnout.	Outcome measures included burden, burnout and perceived time savings.	Only 50 ambient AI licenses were available during the pilot, potential selection bias.
Tai-Seale, M., Baxter, S., Millen, M., Cheung, M., Zisook, S., Celebi, J., Polston, G., Sun, B., Gross, E., Helsten, T., Rosen, R., Clay, B., Sinky, C., Ziedonis, D. M., Longhurst, C. A., & Savides, T. J. (2023). Association of physician burnout with perceived EHR work stress and potentially actionable factors. <i>Journal of the American Medical Informatics Association</i> , 30(10), 1665–1672. https://doi.org/10.1093/jamia/ocad136	Evidence level V and quality rating High.	Physician burnout due to EHR.	Recommends a multi-faceted approach to improve physician well-being by targeting actionable factors like providing staff support for prescription reauthorization and fostering a supportive work culture.	Survey of physician burnout using a validated 5-point scale, perceived EHR work stress via a composite score from three questions,	The study's limitations include its cross-sectional design which prevents establishing causation, its setting within a single academic health system during the pandemic which may limit generalizability, the use of a single-item burnout measure, and constraints in the available objective EHR data

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
					across multiple specialties.
Tawfik, D., Sebok-Syer, S. S., Bragdon, C., Brown-Johnson, C., Winget, M., Bayati, M., Shanafelt, T., & Profit, J. (2025). Qualitative verification of machine learning-based burnout predictors in primary care physicians: An exploratory study. <i>Applied Clinical Informatics</i> , 16(4), 1031–1040. https://doi.org/DOI:10.1055/a-2595-0415	Evidence level III and quality rating Good.	EHR work-related burden.	Staffing and support may increase professional fulfillment and reduce documentation burnout among primary care physicians.	Qualitative	The study's findings may not be generalizable to all physicians, as experiences could differ for those who did not participate in the interviews or who work in other settings, and social desirability bias might have influenced the responses given.
Thomas-Craig, K. J., Willis, V. C., Gruen, D., Rhee, K., & Jackson, G. P. (2021). The burden of the digital environment: A systematic review on organization-directed workplace interventions to mitigate physician burnout. <i>Journal of the American Medical Informatics Association</i> , 28(5), 985–997. https://doi.org/10.1093/jamia/ocaa301	Evidence level V and quality rating High.	Physician burnout due to digital environment such as HER.	Technology and workflow optimization, training, team expansion, and careful consideration of factors affecting burnout, such as specialty, practice setting, and regulatory	Systematic literature review.	The study focused only on physicians, while digital technologies also contribute to additional work and stress for a wide variety of clinicians. Most studies used US primary care settings, thus limiting

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
			pressures, can help reduce physician documentation burden.		generalizability across specialties and globally. Most studies were of low quality with short follow-up durations, limiting the credibility of the evidence.
Wendt, S. J., Dinh, C. T., Sutcliffe, M., Jones, K., Scanlan, J. M., & Smitherman, S. (2025). Deploying ambient clinical intelligence to improve care: A research article assessing the impact of nuance DAX on documentation burden and burnout. <i>Future Healthcare Journal</i> , 12(3), 100450. https://doi.org/10.1016/j.fhj.2025.100450	Evidence level V and quality rating Good.	Provider's documentation burden.	ACI documentation software is a valuable tool for reducing documentation time, lessening burnout, and reducing providers' frustration.	Assess changes in objective measures of documentation burden.	Small number of provider, limited time and single healthcare system.
Yan, Q., Jiang, Z., Harbin, Z., Tolbert, P. H., & Davies, M. G. (2021). Exploring the relationship between electronic health records and provider burnout: A systematic review. <i>Journal of the American Medical Informatics Association</i> , 28(5), 1009–1021. https://doi.org/10.1093/jamia/ocab009	Evidence level V and quality rating High.	Physician documentation burden.	Recommendations to reduce provider burden include medical scribes, team approach to care, EHR improvement, and EHR proficiency training.	Systematic literature review.	A high number of studies used subjective EHR data, introducing recall bias, and most studies had poor response rates, leading to selection bias.

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
<p>Ziemann, M., Erikson, C., & Krips, M. (2021). The use of medical scribes in primary care settings: A literature review synthesis. <i>Medical Care</i>, 59, S449–S456.</p> <p>https://doi.org/10.1097/MLR.0000000000001605</p>	<p>Evidence level V and quality rating High.</p>	<p>Primary care provider clerical burden</p>	<p>Medical scribes contribute to greater productivity and efficiency, improved provider satisfaction, and often higher patient satisfaction.</p>	<p>Literature review</p>	<p>It does not meet the reporting standards for systematic reviews. The lack of strong empirical data across studies and the variable quality of evidence for scribes' effectiveness were noted. Small sample sizes, lack of matched comparison group, and were unable to account for potential confounding variables.</p>

Appendix D: DHA Thematic Analysis Results

Author(s) and date	Data extracted	Initial codes	Preliminary themes
<p>Abbondanza, L., & White, P. (2024). Evaluating a scribe program in reducing provider burnout. <i>The Journal of Nurse Practitioner</i>, 20(3), 104913. https://doi.org/10.1016/j.nurpra.2023.104913</p>	<p>The documentation burden from the EHR contributed to provider burnout. The scribe program directly addressed this by having scribes handle the documentation, allowing providers to focus on patient care.</p>	Documentation burden Scribe	Reducing documentation burden
	<p>A key problem was the significant time providers spent on the EHR after work hours ("pajama time"). The scribe program served as a solution by significantly reducing this time, improving work-life balance.</p>	Pajama time	Improving work-life integration
	<p>The need to document during patient encounters was a stressor. By using Scribble, providers felt more present during encounters, made better eye contact, and perceived an improved provider-patient connection.</p>	Work-life balance	Enhancing patient interaction
	<p>Although RVUs did not increase, a theme emerged that the more detailed scribed notes might support higher billing for encounters, and faster note completion could prevent lost revenue.</p>	Higher billing encounter	Potential for increased revenue

Author(s) and date	Data extracted	Initial codes	Preliminary themes
<p>Apathy, N. C., Holmgren, J., & Cross, D. A. (2024)). Physician EHR time and visit volume following adoption of team-based documentation support. <i>JAMA Internal Medicine</i>, 184(10), 1212–1221. https://doi.org/10.1001/jamainternmed.2024.4123</p>	<p>The substantial EHR workload, including desktop medicine and extensive off-hours documentation, contributes to physician burnout and turnover, leading to higher costs, supply shortages, and diminished quality of care.</p> <p>The adoption of team-based documentation led to higher visit volumes and decreased time spent on documentation and EHR tasks.</p>	<p>EHR workload Desktop medicine</p> <p>Team-based documentation</p>	<p>Documentation Burden</p> <p>Team-Based Optimization</p>
<p>Bundy, H., Gerhart, J., Baek, S., Connor, C. D., Israel, M., Dharod, A., & Cleveland, J. (2024). Can the administrative loads of physicians be alleviated by AI-facilitated clinical documentation? <i>Journal of General Internal Medicine</i>, 39(15), 2995–3000. https://doi.org/10.1007/s11606-024-08870-z</p>	<p>A majority of physicians reported DAXC reduced the time spent on clinical documentation, which helped alleviate cognitive burden and allowed for more engaged and personable patient care.</p> <p>Many physicians felt DAXC improved their quality of life by reducing after-hours work, allowing them to get more sleep and feel less stressed.</p> <p>The tool was not without issues. Physicians noted it could make significant errors, such as misinterpreting negatives, inventing details, misgendering patients, and producing overly verbose notes.</p>	<p>Clinical documentation Reduce after hours work</p> <p>Dax reduce documentation time</p> <p>Issues with tools</p>	<p>Reduced administrative burden</p> <p>Improved quality of life</p> <p>Challenges and errors</p>

Author(s) and date	Data extracted	Initial codes	Preliminary themes
<p>Corby, S., Ash, J. S., Mohan, V., Becton, J., Solberg, N., Bergstrom, R., Orwell, B., Hoekstra, C., & Gold, J. A. (2021). A qualitative study of provider burnout: Do medical scribes hinder or help? <i>Journal of American Medical Informatics Association</i>, 4(3), 1–8. https://doi.org/10.1093/jamiaopen/ooab047</p>	<p>Provider burnout, a healthcare crisis characterized by emotional exhaustion, depersonalization, and diminished personal achievement, is driven by factors associated with EHR use, such as excessive documentation, extended work hours, and after-hours charting.</p> <p>Scribes alleviate provider burnout by reducing the documentation burden, enhancing job satisfaction, enabling timely departures, and allows providers to concentrate on patients, not computers, which should increase patient satisfaction.</p> <p>To reduce burnout, it is essential to address the root cause of EHR issues by directly enhancing usability and optimizing template design to lessen the documentation burden.</p> <p>Improving teamwork is suggested as a strategy to prevent provider burnout, but integrating scribes effectively into clinical care teams is challenging because their activities are limited and their roles are often temporary.</p>	<p>Burnout Excessive documentation Extended work hours</p> <p>Scribes Reduce documentation burden Job satisfaction</p> <p>Reduce burnout EHR usability</p> <p>Teamwork Scribes integration</p>	<p>Provider burnout and its causes</p> <p>Role of medical scribes</p> <p>Improving the EHR system</p> <p>Enhancing teamwork</p>
<p>Dymek, C., Kim, B., Melton, G. B., Payne, T. H., Singh, H., & Hsiao, C. J. (2021). Building the evidence-base to reduce electronic health record–related clinician burden. <i>Journal of the American Medical Informatics Association</i>, 28(5), 1057–1061. https://doi.org/doi: 10.1093/jamia/ocaa238</p>	<p>The study pinpoints the three highest contributors to EHR-related burden: documentation, chart review, and inbox management tasks.</p> <p>Clinicians spend 49% of their time on EHR use and desk work, compared to only 27% on face-to-face interactions with patients.</p>	<p>EHR related burden Chart review Inbox messages Documentation</p> <p>Less time with patient</p>	<p>Documentation burden</p> <p>Time allocation</p>

Author(s) and date	Data extracted	Initial codes	Preliminary themes
	The EHR vendors, healthcare system leaders, and policymakers have a shared and integral role in developing and implementing evidence-based sociotechnical solutions to the physician documentation burden.	Evidence-based solution Sociotechnical solution	Shared responsibility
Heckman, J., Mukamal, K. J., Christensen, A., & Reynolds, E. E. (2020). Medical scribes provider and patient experience, and patient throughput: A trial in an academic general internal medicine practice. <i>Journal of General Internal Medicine</i> , 35(3), 770–774. https://doi.org/10.1007/s11606-019-05352-5	<p>Documentation has become a major driver of physician time, negatively affecting work-life balance and contributing to burnout. Physicians often spend two hours on EHR and desk work for every hour of direct patient care, plus additional personal time.</p> <p>Balancing patient load, clinic schedules, and financial viability is a constant challenge for primary care practices.</p> <p>The heavy focus on documentation and the EHR can detract from the physician's ability to give full attention to the patient, potentially harming the patient-provider relationship.</p>	<p>Documentation Burnout Work-life balance Desk work</p> <p>Patient load Clinic schedule Delay</p> <p>High volume of documentation Less attention to patient</p>	<p>Excessive documentation and physician Burnout</p> <p>Improving provider capacity and patient throughput</p> <p>Maintaining patient-centered care</p>
Jhaveri, P., Abdulahad, D., Fogel, B., Chuang, C., Lehman, E., Chawla, L., Foley, K., Phillips, T., & Levi, B. (2022). Impact of scribe intervention on documentation in an outpatient pediatric primary care practice. <i>Academic Pediatric Association</i> , 22(2), 289–295. https://doi.org/10.1016/j.acap.2021.05.004	<p>Offloading the clerical task of real-time documentation from the clinician to a trained scribe directly tackles the increased documentation time caused by EHRs.</p> <p>By saving time on documentation during and after clinic hours, scribes help clinicians become more efficient, allowing them to manage their workload more effectively and complete notes faster.</p>	<p>Clerical task Scribes</p> <p>Time saving Efficient</p>	<p>Reduce documentation burden</p> <p>Increase clinician efficiency</p>

Author(s) and date	Data extracted	Initial codes	Preliminary themes
	Allowing clinicians to step away from the computer enhances their physical and intellectual engagement with patients.	Well-being Patient engagement	Improve the clinician-patient relationship
Ko, C., Sheckman, B., Uy, D., Minars, C., Ingram, B., Chary, N., Chung, K., Girdler, G., Le, H., Miri, S., & Jacobs, R. J. (2025). A scoping review of the role of artificial intelligence in physician burnout. <i>Cureus</i> , 17(7). https://doi.org/10.7759/cureus.88580	<p>AI integration has proven effective in reducing physician burnout by significantly decreasing documentation time —up to 40% in one study and 28.8% per encounter in another —leading to lower burnout scores and enhanced job satisfaction.</p> <p>AI automates repetitive tasks to enhance clinical workflow efficiency, enabling physicians to spend less time on EHRs and more time engaging with patients, improving physician-patient interactions.</p> <p>The primary concerns with AI tools like ChatGPT include the risk of misinformation because they rely on internet sources without rigorous medical fact-checking, and the potential to diminish the doctor-patient relationship by making interactions impersonal.</p>	<p>Artificial intelligence Reduce physician burnout Job satisfaction</p> <p>Automate Clinical workflow Improve patient interaction</p> <p>Chat GPT Concerns with information</p>	<p>Reduction in burnout and documentation time</p> <p>Improving workflow and physician-patient interaction</p> <p>Challenges and risks identified</p>
Kruse, C. S., Mileski, M., Dray, G., Johnson, Z., Shaw, C., & Shirodkar, H. (2022). Physician burnout and the electronic health record leading up to and during the first year of COVID -19: Systematic review. <i>Journal of Medical Internet Research</i> , 24(3), e36200. https://doi.org/10.2196/36200	Using scribes or physician partners for data entry during patient encounters, along with workflow customization such as pre-encounter preparation, can enhance efficiency, reduce burnout symptoms, and save administrative time, despite slight organizational costs.	Scribes Efficiency Reduce burnout Save time	Workforce and workflow optimization

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	Ongoing, robust training enhances EHR efficiency, reducing physician frustration, shortening work hours, and improving work-life balance; for younger providers, small-group sessions focused on emotional and professional development can further aid stress management and peer rapport.	Training Work-life balance Emotional support Professional development	Training and development
<p>Lourie, E. M., Utidjian, L. H., Ricci, M. F., Webster, L., Young, C., & Grenfell, S. M. (2021). Reducing electronic health record-related burnout in providers through a personalized efficiency improvement program. <i>Journal of the American Medical Informatics Association</i>, 28(5), 931–937. https://doi.org/doi: 10.1093/jamia/ocaa248</p>	<p>The study highlights a significant increase in provider burnout, directly associated with the widespread adoption of EHR systems. Physicians attribute this burnout to factors like poor user-centered design, increased clerical work, and a heavy documentation burden.</p> <p>A primary issue is the lack of adequate and ongoing EHR training. Providers do not sustain the training provided during the initial "go-live," leading them to use inefficient, imprinted workflows.</p> <p>Instead of group classes, the program used individual, one-on-one sessions. This approach ensured uniform attention and tailored education for each provider, addressing specific knowledge gaps and customization needs.</p> <p>The program's designers intended to offer training and address the feeling of isolation many providers experience. By providing direct contact within the information services department, the program reduced feelings of helplessness and frustration, empowering providers.</p>	<p>Burnout Poor design Clerical work Documentation burden</p> <p>Training Inefficiency</p> <p>Program One-on-one session Education</p> <p>Program design Helplessness Frustration</p>	<p>Provider Burnout Linked to EHRs</p> <p>Training and Knowledge Gap</p> <p>Personalized Training</p> <p>Addressing Feelings of Isolation</p>

Author(s) and date	Data extracted	Initial codes	Preliminary themes
<p>Ma, S. P., Liang, A. S., Shah, S. J., Smith, M., Jeong, Y., Devon-Sand, A., Crowell, T., Delahaie, C., Hsia, C., Lin, S., Shanafelt, T., Pfeffer, M. A., Sharp, C., & Carcia, P. (2025). Ambient artificial intelligence scribes: Utilization and impact on documentation time. <i>Journal of the American Medical Informatics Association</i>, 32(2), 381–385. https://doi.org/10.1093/jamia/ocae304</p>	<p>The fundamental solution centers on deploying ambient AI scribes driven by large language models (LLMs) to automate aspects of clinical documentation, marking a move toward more autonomous and integrated technological approaches.</p> <p>By integrating directly into the existing Epic EHR system and allowing physicians to incorporate generated text into familiar note templates, the technology emphasizes the importance of seamless, non-disruptive solutions.</p> <p>Reducing documentation time, particularly for after-hours work, aims to lessen the EHR documentation burden and, by extension, mitigate a major driver of physician burnout.</p>	<p>AI scribes LLM Clinical documentation</p> <p>EHR system integration Note templates</p> <p>Reduce afterhours work Less EHR documentation time</p>	<p>Leveraging advanced technology</p> <p>Integration with existing workflows</p> <p>Mitigating physician burnout</p>
<p>Micek, M. A., Arndt, B., Baltus, J. J., Broman, A. T., Galang, J., Dean, S., & Sinky, C. (2022). The effect of remote scribes on primary care physicians' wellness, EHR satisfaction, and EHR use. In <i>Healthcare</i>, 10(4), 100663 https://doi.org/10.1016/j.hjdsi.2022.10066</p>	<p>Remote scribes serve as a strategy to improve physician wellness, particularly among primary care physicians. Findings show significant reductions in the Mini-Z burnout score, a metric linked to physicians' likelihood of leaving their practice.</p> <p>The remote scribe program effectively reduced total EHR time, especially notes and after-hours work, addressing the EHR's role as a primary</p>	<p>Remote Scribes</p> <p>Scribe program</p>	<p>Addressing physician burnout</p> <p>Reducing EHR-related burdens</p>

Author(s) and date	Data extracted	Initial codes	Preliminary themes
	<p>source of physician dissatisfaction and burnout by offloading documentation and other tasks.</p> <p>Scribe programs can be cost-neutral with slight boosts in physician productivity—such as seeing one extra patient per half-day—making them an appealing intervention for healthcare organizations.</p>	Cost-effective	Creating a cost-effective intervention
<p>Olakotan, O., Samuriwo, R., Ismaila, H., & Atiku, S. (2025). Usability challenges in electronic health records: impact on documentation burden and clinical workflow: A scoping review. <i>Journal of Evaluation in Clinical Practice</i>, 31(4), e70189.</p>	<p>Clinicians experience an average of 1.4 task switches per minute, driven mainly by data viewing, entry, and ordering tasks, with workflow fragmentation and note duplication exacerbating inefficiencies, as evidenced by distinct screen transition patterns showing suboptimal information gathering.</p> <p>High keystroke demands, a doubled workload post-EHR adoption, nurse-reported information overload from redundant data fields that add time, and the organization of information in chronologically irrelevant notes all significantly contribute to clinicians' cognitive burden.</p> <p>Clinicians' workflow misalignments extend their workdays by an average of 90 minutes, leading many physicians to use off-system notes, copy-and-paste, and external applications like Word to manage persistent workflow challenges, despite the risks of redundancy and errors.</p> <p>Clinicians often perceive EHRs as nonintuitive. They require excessive navigation, and deep</p>	<p>Fragmented workflow Duplication</p> <p>Cognitive demand</p> <p>Workflow misalignment</p> <p>Navigation</p>	<p>Task-switching and workflow fragmentation</p> <p>Excessive cognitive demands and information complexity</p> <p>EHR-clinical workflow misalignment and inefficient workarounds</p> <p>Navigation challenges in EHR design</p>

Author(s) and date	Data extracted	Initial codes	Preliminary themes
	<p>menu hierarchies lead to double-clicks, which account for 17% of data entry errors.</p> <p>Scattered information across separate systems—labs, radiology, and medications—frustrates clinicians. It increases the risk of missing critical data, often forcing them to rely on verbal updates or paper lists because of the fragmented structure.</p>	Scattered information	Fragmented information retrieval
<p>Olson, K. D., Meeker, D., Troup, M., Barker, T. D., Nguyen, V. H., Manders, J. B., Stults, C. D., Jones, V. G., Shah, S. D., Shah, T., & Schwamm, L. H. (2025). Use of Ambient AI scribes to reduce administrative burden and professional burnout. <i>JAMA Network Open</i>, 8(10), e2534976. https://doi.org/10.1001/jamanetworkopen.2025.34976.</p>	<p>Clinicians, particularly in ambulatory care, spend more time on administrative tasks and documenting in the electronic health record (EHR) than on direct patient care. This documentation workload is continually increasing.</p> <p>The heavy documentation burden is a primary driver of clinician burnout, which can lead to intentions to leave the profession and reduced work effort.</p> <p>A significant portion of a clinician's workday is spent on EHR documentation, leaving only about a quarter of their time for face-to-face patient interaction.</p> <p>The time spent on documentation, especially after clinic hours, detracts from time that could be used for self-care or with family, impacting work-life satisfaction.</p>	<p>Administrative task</p> <p>Increase EHR documentation</p> <p>Documentation burden Clinician burnout</p> <p>Less patient interaction Work after clinic hours Less time with family</p>	<p>Excessive administrative & documentation burden</p> <p>Clinician burnout</p> <p>Reduced patient-facing time</p> <p>Negative impact on well-being</p>

Author(s) and date	Data extracted	Initial codes	Preliminary themes
<p>Owens, L. M., Wilda, J. J., Hahn, P. Y., Koehler, T., & Fletcher, J. J. (2024). The association between use of ambient voice technology documentation during primary care patient encounters, documentation burden, and provider burnout. <i>Family Practice</i>, 41(2), 86–91. https://doi.org/0.1093/fampra/cmadv092</p>	<p>Technologies like DAX™ show promise in reducing the administrative and cognitive strain from documentation.</p> <p>High usage of DAX™ significantly reduced the average documentation time in notes per encounter.</p> <p>DAX™ use was associated with significantly lower burnout on the Oldenburg Burnout Inventory (OLBI) disengagement sub-score</p>	<p>Technologies Reduce administrative strain</p> <p>Reduce cognitive strain</p> <p>Reduce documentation time</p>	<p>Targeting administrative burden with technology</p> <p>Improve documentation time</p> <p>Improve well-being</p>
<p>Pfoh, E. R., Hong, S., Baranek, L., Rothberg, M. B., Beinkampen, S., Misra-Hebert, A. D., Rehm, S. J., & Sikon, A. L. (2022). Reduced cognitive burden and increased focus: A mixed methods study exploring how implementing scribes impacted clinicians. <i>Medical Care</i>, 60(4), 316–320. https://doi.org/10.1097/MLR.0000000000001688</p>	<p>Implementing scribes was associated with a significant decrease in the time it took for clinicians to close charts.</p> <p>Clinicians with scribes worked fewer minutes after hours on clinic days and significantly fewer minutes on non-clinic days.</p> <p>A higher percentage of clinicians reported that working with a scribe improved their job satisfaction.</p> <p>Scribes enabled clinicians to focus on patients and created more time for cognitive tasks like considering a differential diagnosis and plan.</p>	<p>Scribes Decrease chart closure time</p> <p>Reduce after hours</p> <p>Job satisfaction</p> <p>More time with patients</p>	<p>Improve efficiency</p> <p>Reduced after-hours work</p> <p>Increased work satisfaction</p> <p>Enhanced patient focus</p>

Author(s) and date	Data extracted	Initial codes	Preliminary themes
<p>Rotenstein, L. S., Hendrix, N., Phillips, R. L., & Adler-Milstein, J. (2024). Team and electronic health record features and burnout among family physicians. <i>JAMA Network Open</i>, 7(1), pe2442687. https://doi.org/10.1001/jamanetworkopen.2024.42687</p>	<p>The study observed a continued substantial prevalence of burnout among US family physicians.</p> <p>High team efficiency is linked to lower burnout.</p> <p>Reducing burnout among physicians requires interventions that minimize the after-hours burden of EHR work at home.</p>	<p>Burnout</p> <p>Team efficiency</p> <p>Reduce EHR documentation</p>	<p>Persistent burnout</p> <p>Optimizing team structure and functioning</p> <p>Managing EHR workload</p>
<p>Rotenstein, L. S., Holmgren, J., Horn, D. M., Lipsitz, S., Phillips, R., Gitomer, R., & Bates, D. W. (2023). System-level factors and time spent on electronic health records by primary care physicians. <i>JAMA Network Open</i>, 6(11), e2344713. https://doi.org/10.1001/jamanetworkopen.2023.44713</p>	<p>Distributing EHR tasks among the care team can reduce the physician's burden.</p> <p>The effectiveness of support staff depends on having the right personnel to manage high-volume, time-consuming EHR tasks, not merely increasing staffing ratios.</p> <p>Because of the significant individual variation among physicians, personalized interventions are necessary rather than one-size-fits-all solutions.</p> <p>Practice setting, patient population, and clinic structure influence a primary care physician's EHR workload, making the EHR burden context-dependent.</p>	<p>Task distribution</p> <p>Support staff Staffing ratio</p> <p>Personalized intervention</p> <p>Patient population EHR workload</p>	<p>Optimizing team-based workflows</p> <p>Investing in targeted Staff support</p> <p>Addressing physician-level variation</p> <p>Understanding the practice environment</p>

Author(s) and date	Data extracted	Initial codes	Preliminary themes
<p>Shah, S. J., Devon-Sand, A., Ma, S. P., Jeong, Y., Crowell, T., Smith, M., Liang, A. S., Delahaie, C., Hsia, C., Shanafelt, T., Pfeffer, M. A., Sharp, C., Lin, S., & Garcia, P. (2025). Ambient artificial intelligence scribes: Physician burnout and perspectives on usability and documentation burden. <i>Journal of the American Medical Informatics Association</i>, 32(2), 375–380. https://doi.org/10.1093/jamia/ocae295</p>	<p>The study showed a considerable, statistically significant reduction in both physician task load and burnout.</p> <p>Physicians found the DAX Copilot AI scribe to be moderately more usable than their previous clinical documentation methods.</p> <p>A significant majority of physicians reported they could see themselves using the DAX Copilot in their practice long-term, suggesting high potential for sustained use.</p> <p>Ambient AI scribes can enhance clinical workflows and improve the overall experience of clinical documentation for physicians.</p>	<p>Task load Burnout</p> <p>AI scribe</p> <p>High potential DAX Copilot</p> <p>Enhance clinical workflow</p>	<p>Reduction of physician burden and burnout</p> <p>Improved usability</p> <p>Potential to enhance clinical workflows</p> <p>High long-term adoption interest</p>
<p>Tai-Seale, M., Baxter, S., Millen, M., Cheung, M., Zisook, S., Celebi, J., Polston, G., Sun, B., Gross, E., Helsten, T., Rosen, R., Clay, B., Sinky, C., Ziedonis, D. M., Longhurst, C. A., & Savides, T. J. (2023). Association of physician burnout with perceived EHR work stress and potentially actionable factors. <i>Journal of the American Medical Informatics Association</i>, 30(10), 1665–1672. https://doi.org/10.1093/jamia/ocad136</p>	<p>Perceived Electronic Health Record (EHR) stress and the volume of prescription reauthorization messages are significantly linked to burnout.</p> <p>There is a strong association between burnout and physicians not feeling valued or perceiving a misalignment of values with their leaders.</p> <p>Physicians with 15 or fewer years of practice experience have significantly higher odds of burnout than their more senior colleagues.</p>	<p>EHR stress Prescription reauthorization</p> <p>Messages Burnout Not feeling valued Misalignment</p> <p>Practice experience Odds of burnout</p>	<p>Reducing EHR-related workload</p> <p>Improving organizational culture and leadership</p> <p>Providing targeted support</p>

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<p>Tawfik, D., Sebok-Syer, S. S., Bragdon, C., Brown-Johnson, C., Winget, M., Bayati, M., Shanafelt, T., & Profit, J. (2025). Qualitative verification of machine learning-based burnout predictors in primary care physicians: An exploratory study. <i>Applied Clinical Informatics</i>, 16(4), 1031–1040. https://doi.org/DOI:10.1055/a-2595-0415</p>	<p>Physicians find messaging and documentation to be significant burdens that demand more time than available during work hours, mainly because of the overwhelming volume of the EHR's internal messaging system, often requiring attention after hours and during vacations.</p> <p>Although EHR systems provide benefits such as enhanced accessibility and organization, features aimed at expanding patient access can, if implemented without sufficient support, increase physicians' workload and contribute to burnout.</p> <p>High turnover and insufficient staffing exacerbate time pressures from heavy patient loads, negatively affecting teamwork, clinic efficiency, and physicians' professional fulfillment.</p>	<p>Messaging Documentation Overwhelming</p> <p>EHR enhanced accessibility Staff support</p> <p>Staffing Turnover Teamwork</p>	<p>Messaging and documentation burden</p> <p>EHR-related burdens and benefits</p> <p>Turnover and insufficient staffing</p>
<p>Thomas-Craig, K. J., Willis, V. C., Gruen, D., Rhee, K., & Jackson, G. P. (2021). The burden of the digital environment: A systematic review on organization-directed workplace interventions to mitigate physician burnout. <i>Journal of the American Medical Informatics Association</i>, 28(5), 985–997. https://doi.org/10.1093/jamia/ocaa301</p>	<p>Interventions that expanded the care team, primarily by adding medical assistants or scribes for clerical support.</p> <p>Shifting clerical tasks to other team members, resulting in improved clinical efficiency and significantly less documentation time for physicians, especially after hours and on weekends.</p> <p>Optimizing technology through design improvements, user training, and customizing EHRs to reduce clicks and keystrokes based on</p>	<p>Care team Medical assistant</p> <p>Shifting task Improve efficiency Less documentation time</p> <p>Optimizing technology Training EHR customization</p>	<p>Expansion of the care team</p> <p>Time-saving measures</p> <p>Leveraging technology</p>

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	<p>user feedback has proven effective in reducing EHR burden.</p> <p>Physician burnout is a systemic issue requiring organizational solutions such as expanding care teams with scribes, enhancing workflows through quality initiatives, and increasing physicians' control over their time.</p>	<p>Burnout Organizational solution Scribes</p>	<p>Emphasizes a system-level approach</p>
<p>Wendt, S. J., Dinh, C. T., Sutcliffe, M., Jones, K., Scanlan, J. M., & Smitherman, S. (2025). Deploying ambient clinical intelligence to improve care: A research article assessing the impact of nuance DAX on documentation burden and burnout. <i>Future Healthcare Journal</i>, 12(3), 100450. https://doi.org/10.1016/j.fhj.2025.100450</p>	<p>Physical and emotional exhaustion from chronic workplace stress, which has reached crisis levels and is described as a global pandemic.</p> <p>A primary contributor to burnout, with providers spending excessive time on clerical tasks, often conflicting with patient care.</p> <p>The common practice of providers completing documentation during off-hours, weekends, and holidays, showing a significant work-life imbalance.</p> <p>High costs associated with physician turnover and reduced clinical hours because of burnout, affecting the financial stability of healthcare systems.</p>	<p>Exhaustion Workplace stress Crisis</p> <p>Clerical task</p> <p>Off hours work Work-life imbalance</p> <p>Physician turnover Burnout</p>	<p>Physician burnout</p> <p>Documentation burden</p> <p>Pajama time</p> <p>Financial strain</p>
<p>Yan, Q., Jiang, Z., Harbin, Z., Tolbert, P. H., & Davies, M. G. (2021). Exploring the relationship between electronic health records and provider burnout: A systematic review. <i>Journal of the American Medical Informatics Association</i>, 28(5), 1009–1021. https://doi.org/10.1093/jamia/ocab009</p>	<p>The strong association between insufficient documentation time and burnout suggests solutions should focus on minimizing this load. This includes strategies like clerical support, scribes, and optimizing documentation workflows within the EHR.</p>	<p>Documentation time Burnout Clerical support</p>	<p>Reducing documentation burden</p>

Author(s) and date	Data extracted	Initial codes	Preliminary themes
	<p>High volume of inbox and patient call messages is a significant stressor.</p> <p>Negative perceptions of EHR, including its contribution to frustration and inefficiency, are linked to burnout.</p>	<p>Inbox messages Call messages Frustration</p> <p>Inefficient Burnout</p>	<p>Managing communication overload</p> <p>Improving EHR usability</p>
<p>Ziemann, M., Erikson, C., & Krips, M. (2021). The use of medical scribes in primary care settings: A literature review synthesis. <i>Medical Care</i>, 59, S449–S456. https://doi.org/10.1097/MLR.0000000000001605</p>	<p>Delegating documentation to a scribe allows primary care providers to engage more meaningfully with patients, addressing the clerical burden of EHRs that contributes to burnout, job dissatisfaction, and after-hours documentation.</p> <p>Heavy reliance on computers during visits diminishes direct face-to-face interaction between providers and patients, which can negatively affect patient satisfaction and the quality of the clinical encounter.</p> <p>The cost of hiring a scribe is a significant concern for primary care practices, many of which have limited budgets.</p>	<p>Scribe Clerical burden</p> <p>Physician-patient interaction Quality</p> <p>Cost Hiring Scribe</p>	<p>Provider Burnout and Inefficiency</p> <p>Restoring the Quality of Patient-Provider Interaction</p> <p>Overcoming Financial Barriers to Scribe Implementation</p>

Appendix E: Strategies to Reduce Physician Documentation Burden

Thematic Concept Map

