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An interview study with medical scribes on how their work may alleviate clinician burnout through delegated health IT tasks

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ABSTRACT

Objectives: To understand how medical scribes' work may contribute to alleviating clinician burnout attributable directly or indirectly to the use of health IT.

Materials and Methods: Qualitative analysis of semistructured interviews with 32 participants who had scribing experience in a variety of clinical settings.

Results: We identified 7 categories of clinical tasks that clinicians commonly choose to offload to medical scribes, many of which involve delegated use of health IT. These range from notes-taking and computerized data entry to foraging, assembling, and tracking information scattered across multiple clinical information systems. Some common characteristics shared among these tasks include: (1) time-consuming to perform; (2) difficult to remember or keep track of; (3) disruptive to clinical workflow, clinicians' cognitive processes, or patient–provider interactions; (4) perceived to be low-skill "clerical" work; and (5) deemed as adding no value to direct patient care.

Discussion: The fact that clinicians opt to "outsource" certain clinical tasks to medical scribes is a strong indication that performing these tasks is not perceived to be the best use of their time. Given that a vast majority of healthcare practices in the US do not have the luxury of affording medical scribes, the burden would inevitably fall onto clinicians' shoulders, which could be a major source for clinician burnout.

Conclusions: Medical scribes help to offload a substantial amount of burden from clinicians—particularly with tasks that involve onerous interactions with health IT. Developing a better understanding of medical scribes' work provides useful insights into the sources of clinician burnout and potential solutions to it.

Key words: medical scribe, health information technology, professional burnout [C24.580.500], workflow [L01.906.893], documentation [L01.453.245], electronic health records [E05.318.308.940.968.625.500]

INTRODUCTION

As defined by the US Agency for Healthcare Research and Quality, clinician burnout is "a long-term stress reaction marked by emotional exhaustion, depersonalization, and a lack of sense of personal accomplishment."[1] Prior research has repeatedly shown that clinician burnout is associated with a variety of adverse consequences, such as reduced time efficiency,[2] decreased job satisfaction,[3,4] higher turnover rate,[5] increased medical errors,[4] and poorer patient health outcomes.[6,7] It is estimated that annually clinician burnout costs US \$5000–\$10 000 per provider due to lost productivity and

staff turnover.[5,8,9] As a result, there is an imperative need for researchers, clinicians, and healthcare administrators to better understand the burnout phenomenon and to reduce its prevalence and detrimental effects.

It has been shown in the literature that clinician burnout can be driven by a variety of factors, such as excessive workload,[4,10] inefficiencies,[11,12] and loss of professional autonomy (eg, work dictated by rigid templates and automatically generated alerts and reminders).[13,14] In recent years, there has been a growing concern regarding clinician burnout attributed directly or indirectly to the widespread use of health IT systems, such as electronic health records (EHRs) and computerized order entry.[14,15] Certain health IT systems, due to their poor usability and/or poor implementation, could make it difficult for clinicians to conduct their work efficiently and effectively.[16] It is also believed that health IT oftentimes mediates or magnifies the undue documentation and reporting burden as a result of external influences, such as growing regulatory and billing requirements.[14,15]

Before longer-term solutions become available, some clinical practices have opted to employ data workers to provide much needed assistance to clinicians. Most commonly referred to as medical scribes, this emerging class of paraprofessionals is tasked with preparing clinical documentation by transcribing patient–provider conversation and entering the data into computerized clinical information systems.[17] It is generally assumed that the use of medical scribes is an effective means to improve clinicians' time efficiency, thus reducing burnout.[18] However, existing studies have predominantly focused on cost–benefit analysis of medical scribes[19–22] and their acceptance in clinical practices.[21,23–26] Few have attempted to understand the nature of their work;[24,27,28] and even fewer examined their work in the context of using health IT.[29,30]

This research aimed to address this gap. We conducted semistructured interviews with medical scribes who worked in a variety of healthcare settings to investigate what they do and how their work contributes to the reduction of clinician burnout through their interactions with clinicians, patients, and computerized systems. The premise is that, by studying clinical tasks commonly offloaded to medical scribes including delegated health IT use, we will be able to better understand the nature of the type of clinical work that clinicians would rather "outsource" to others instead of doing on their own. This knowledge may lead to the identification of sources of clinician burnout and inform future opportunities for technology and clinical practice redesign and change of policies and regulations, benefiting particularly the vast majority of general practices (eg, primary care, family medicine, pediatrics) that do not have the luxury of affording medical scribes.

OBJECTIVES

The overarching goal of this research is to understand how medical scribes' work, particularly through delegated use of health IT, contributes to the reduction of clinician burnout. In this vein, our specific objectives are 2-fold:

1. Understand the range of tasks that medical scribes perform to offload clinician burden attributable directly or indirectly to the use of health IT.
2. Understand the nature of these tasks and why clinicians choose to delegate them to medical scribes.

MATERIALS AND METHODS

Participant recruitment and interview procedure

Study participants were recruited nationally through advertisements in medical scribing-related Facebook groups, e-mail announcements distributed via relevant listservs (eg, mailing lists provided by professional medical scribing companies), as well as through a word-of-mouth and snowballing sampling approach.[12] Participants must be active medical scribes when this study was conducted, or had recent scribing experience within the past year. Each interview lasted approximately 1 hour. All interviews were conducted by phone and were tape-recorded and subsequently transcribed for qualitative analysis. A $25 Amazon gift card was provided after the participant completed the interview. We continuously analyzed the data while the interviews were being conducted and stopped recruiting additional participants when theoretical saturation was reached. Determination of theoretical saturation leveraged the Work Model of Medical Scribes (WMOMS)—a comprehensive list of scribing tasks as reported in the literature—that we developed from a previously conducted systematic review study.[30] We deemed theoretical saturation reached when all dimensions of the work described in the WMOMS model had been adequately covered and no substantially new information regarding these tasks, and how our interviewees carried out these tasks, continued to emerge from the data.

We conducted the interviews using the semistructured interview approach, a qualitative data collection method allowing participants to provide any information they deem relevant, while maintaining a focus on the research questions of interest.[31] To ensure that participants answered the questions honestly and transparently, we did not collect identifying information about them or about their employer healthcare organization and/or scribing company. Development of the interview protocol (provided in Supplementary Data File S1) was informed by the WMOMS model, which is based on a comprehensive literature review and contains 5 dimensions characterizing medical scribes' work, from tasks and interactions to supporting technologies.[30] This research was reviewed and approved by the Institutional Review Board at the University of California, Irvine.

Qualitative coding and data analysis

We used both deductive and inductive coding methods to explore thematically similar patterns of perspectives across the participants. We started with a deductive, theoretically-informed approach to coding,[32] which drew from a prior literature review study that we conducted on medical scribes' work[30] to generate *a priori* task categories relevant to scribing. These included task and expectation, interaction and workflow, data source, content, and structure; and supporting technology and artifact. Then, we recoded the data inductively to identify additional phenomena that may be relevant to medical scribes' work but do not fit into the deductive framework. We also conducted member-checking with 2 participants to ensure the accuracy of coding and of our interpretation of the data. All analyses were conducted in the Dedoose qualitative analysis software (SocioCultural Research Consultants LLC, Los Angeles, CA). Two authors (BDT, KR) independently conducted deductive coding. The results were then compared, and differences were resolved through consensus development meetings. One author (BDT) conducted the inductive coding and the remaining qualitative data analyses.

Throughout both stages of the coding process, we created analytic memos that focused on tentative themes and other relevant information that emerged from the data. After the coding process was

Table 1. Categories of tasks commonly delegated to medical scribes

Task Category	Description
1. Notes-taking and rephrasing and transforming patient–provider conversation into a form suitable for electronic clinical documentation	Taking detailed notes during the patient–provider encounter, and then rephrasing and transforming the notes into formal clinical documentation, usually in accordance with templates predefined in computerized systems.
2. Entering data into computerized systems, structured or unstructured	Entering data in a structured manner, such as coded diagnoses and computerized order entry; and typing in unstructured notes as well as free-text comments accompanying certain types of structured data.
3. Foraging and assembling information from scattered sources	Gathering information about the patient, on behalf of the scribed provider, from a variety of sources, such as past medical records, referral letters, lab test reports, and other members of the care team; and organizing the information into a cohesive manner to facilitate informed decision-making. This process often involves use of multiple noninteroperable health IT systems.
4. Coordinating complex clinical workflow	Tracking the status of pending actions (eg, lab test orders) to facilitate clinical workflow; and informing the scribed provider about abnormal findings in order to expedite care.
5. Brokering information	Informing other care team members for actions instructed by the scribed provider (eg, expedited urine collection); answering questions about the patient on behalf of the provider; and relaying information and requests from the patient.
6. Ensuring compliance and comprehensive documentation	Reminding the scribed provider to perform certain actions based on recommended clinical guidelines; and prompting for comprehensive recording of information in order to meet regulatory (eg, Meaningful Use) or billing requirements.
7. Performing other clerical tasks	Logging into computer systems, printing and faxing, fetching paper forms, distributing food/snacks/drinks, providing work notes and excuses for the patient, and preparing educational materials and templated after-visit instructions.

completed, we conducted a review of the extant codes to identify patterns based on the prevalence, overlap, and absence of codes across the interviews. This process led to the identification of key themes that informed us about the nature of medical scribes' work.

RESULTS

Participant characteristics

A total of 32 medical scribes participated in the study. The majority (23) had their most recent scribing experience in the emergency department (ED). Of them, 2 also previously worked in family medicine and rheumatology clinics. Among the other 9 participants, 8 scribed in specialty clinics including ophthalmology (2), dermatology (2), cardiology (1), pulmonology (1), otolaryngology/rheumatology (1), and urology (1); and one had worked in a family medicine clinic. This distribution is approximately proportional to the employment of medical scribes across different specialties: as reported in the literature, ED and specialty clinics are the clinical settings where most medical scribes are employed.[30] All participants had scribed for more than one provider. The mean length of their scribing experience was 16 months (+/− 10 months standard deviation). Among the 32 study participants, 21 were female; all but one were below age 30.

Categories of delegated tasks

First, through deductive and inductive qualitative data analyses, we identified 7 major categories of tasks that clinicians commonly choose to delegate to medical scribes. These task categories are summarized in Table 1. In the remaining parts of this paper, we use P01, P02, etc, to reference each individual participant.

Task category 1: Notes-taking, and rephrasing and transforming patient–provider conversation into a form suitable for electronic clinical documentation

Not surprisingly, all of our study participants engaged in activities that involved listening to patient–provider conversation, transcribing relevant verbal exchange, and organizing the transcripts into a format ready for being entered into the computer. In this process, they needed to make judgments on the spot based on their interpretation of which parts of the conversation were clinically relevant and warranted documentation and which parts were not. In the ED setting, our participants also commonly noted that they commonly captured data from conversations happening outside the exam room such as consultation with specialists (P07, P08, P14, P15, P17, P21, P22, P26).

While transcribing and organizing data, our participants also needed to rephrase conversational exchange into professional terminologies such as from "heart attack" to "myocardial infarction" (or "MI"); and from "bypass" to "coronary artery bypass graft" (or "CABG") (P06, P08, P10, P13–P15, P18, P19). Further, many of them were required to organize the data into a desirable structure usually according to predefined, provider-specific templates in a computerized system (P04, P07, P11, P14, P15, P18, P25). As to the rephrasing work, some medical scribes also reported that the scribed provider commonly requested the use of specific words or expressions of choice, such as "clear" or "unremarkable;" or "punctate epithelial erosions" or "superficial punctate keratitis" (P01, P05, P07, P08, P26). They also commonly requested the data be organized in a particular order. For example, in the ED, scribes might be asked to order the notes by having history of present illness first, a focus on the past patient information second, followed by treatments and reasons for discharge (P08, P16).

Task category 2: entering data into computerized systems, structured or unstructured

Much of the work that medical scribes conduct involves data entry into computerized systems. As nearly all of our study participants reported (30 out of 33), in addition to typing in free-text notes, they often needed to enter data in a structured manner using drop-down menus, radio buttons, and checkboxes. As one medical scribe described: "most of the subjective portions like the history, the ROS, the physical exam is free-texted. A lot of the other templates for

pertinent procedures, like EKGs, mostly are a template with many drop-down sections within" (P12). Further, multiple scribes were often asked to enter structured orders into a computerized order entry system (P01, P04, P05, P08, P10, P14): "usually we will fill all of the prescriptions out. We fill all the checkboxes and write it down for them, and then the doctor will look at it, like and then sign off on it" (P04). Many study participants were also often asked to insert a structured order as free text into a narrative patient note (P08, P13–P17, P20–P22, P25–P27); or upload documents into the EHR from other non-interoperable ancillary systems: "We'll get CT scans. Once the radiology report comes in will upload those or sometimes if they're negative, the doctor will just give us their read, and we type that in" (P14).

Task category 3: foraging and assembling information from scattered sources

Another set of tasks that medical scribes are often asked to perform involves gathering information from disparate sources (eg, faxed documents, ancillary clinical information systems, or other members of the care team), and organizing the information into a cohesive manner (eg, pre-encounter notes) to facilitate informed decision making by the scribed provider. For example, many of our study participants reported that they were asked to collect information from past medical records prior to the patient encounter (P01, P04, P07, P10, P12, P13, P23, P24, P26–P28). Generally referred to as "precharting," this work helps providers better situate themselves before walking into the exam room. One medical scribe summarized the typical information that they would gather during the precharting process: "I basically look at the schedule for the day, open at each patient's chart, look at their previous encounters, and I basically start populating what needs to be carried over, like any relevant history or any preexisting conditions, things like that, typically goes into the history section so that providers can glance at my precharted note and kind of know what they need to know before they go into the room" (P01).

Conducting such information foraging and assembling tasks usually requires medical scribes to interact with multiple noninteroperable health IT systems on behalf of the scribed provider. For example, a number of our study participants reported that they needed to retrieve past medical charts from the EHR; find communication records regarding the patient in secure clinical messaging systems; fetch images or radiology reports from a PACS system; and gather vaccination records from statewide vaccination registry (P08, P21, P25). In doing so, some participants needed to copy/paste or manually transcribe information between these systems (P15, P17).

Task category 4: coordinating complex clinical workflow

Many of our participants were asked to assist with coordinating complex clinical workflow to a greater degree than what was reported in prior literature.[30] In the ED setting in particular, coordination is a major task that often involved checking for missing data (eg, vital signs) and tracking the status of pending orders (P04, P06, P07, P10, P14, P17–P21, P28). The order tracking process also involves informing the provider as orders are completed and results returned: "we just tell the physicians when things come back, so that they can take care of it in a timely manner" (P04).

Several of our participants reported coupling this tracking activity with periodical checks for delays, keeping an "internal clock" before prompting the provider about potential delays such as in urine collection by nurses, imaging, and lab tests (P06, P10, P13, P17,

P19, P20, P23, P28). As one medical scribe described: "once the labs or imaging reached a critical point of say, 30 minutes, if something was ordered, and after 30 minutes it hadn't been done, we'd have to go investigate why it hasn't been done" (P06). In a similar vein, some participants were also tasked with monitoring out-of-range lab results that warranted immediate attention in order to expedite patient care (P04, P06, P28). One medical scribe emphasized the importance of such workflow coordination tasks: "it was a lot more than just the documentation. It was really about keeping everybody in the patient care team efficient and working towards either admitting or discharging patients" (P06).

Task category 5: brokering information

Medical scribes, particularly in the ED setting, may also act as a "middle person" to broker communications between the scribed provider and other members of the care team. As several of our study participants reported, these information brokerage tasks usually included informing nurses, medical assistants, and technicians for actions instructed by the scribed provider (P06, P10, P13, P17, P18, P20, P23, P28). For example, "my interaction with the nurses is mostly it's kind of like a middleman role. If the doctor's really busy, they'll go, 'hey, we still need a urine sample on this patient. Can you tell the nurse to get one?'" (P28).

Another common information brokerage role reported by some by medical scribes is to answer questions about the patient on the scribed provider's behalf, especially when the scribed providers are busy and cannot be interrupted (P10, P19, P23). One participant noted, "if the physician's on the phone or they have to go do something but nurses wanted to communicate something really quick. They'll often just tell me to tell them, or they'll ask me 'what do you think he's going to do with bed 5?' And then I'll say that we are planning on doing this and this, and that way the nurse has a better idea of what's going on. And so that way it speeds everything up a little bit" (P19).

Task category 6: ensuring compliance and comprehensive documentation

Another important task that medical scribes perform is to help providers adhere to recommended care guidelines as well as regulatory and billing requirements. Many of our participants reported that they took an active role to maximize compliance (P01, P05–P07, P09, P10, P13, P14, P16–P18, P22–P27), such as by reminding the scribed provider to ask guideline-based questions that might have been initially missed in the patient interview (P13, P22). One medical scribe provided a detailed account: "let's say [the provider] is talking one-on-one with the patient, and let's say they forgot [a question]. I would be like, oh, "you forgot to ask this question" and they'll ask that question in front of the patient. Because I had an outline of what the chart should look like, I would just ask them in case they forgot a certain part of it" (P13).

Additionally, several of our participants reported that they also played a role of prompting the scribed provider to ensure comprehensiveness of documentation in order to justify billing (P01, P06, P07, P09, P14, P18, P25). For example, one participant described: "We have medical billers that will basically read over all of our charts and then make sure that everything matches up. So then if we have a diagnosis in the assessment and plan section but there's no correlating physical exam, then, the doctor gets a nicely worded e-mail [from the billing department], saying, "you forgot this," or if there are any sort of inconsistencies, then they [the doctor] have to

go back and amend the notes so, I try to catch those errors before they happen" (P01).

Task category 7: performing other clerical tasks

Medical scribes may also conduct some other tasks for the scribed provider that may or may not be clinically relevant such as logging into computer systems, printing and faxing, fetching paper forms, and distributing food/snacks/drinks (P06, P14, P17, P24, P26, P28). Many of our participants also reported handing out patient education materials and after-visit instructions (P01, P03, P04, P06, P14–P22, P25, P28). As one participant commented: "Sometimes it's like make copies, fax these, do office things" (P09).

Common reasons for delegating

The second stage of our qualitative data analyses focused on uncovering the common reasons underlying clinicians' decision to offload certain tasks to medical scribes. Five themes emerged from the data, pointing to some common characteristics shared among these delegated tasks: (1) time-consuming to perform; (2) difficult to remember or keep track of; (3) disruptive to clinical workflow, clinicians' cognitive processes, or patient–provider interactions; (4) perceived as low-skill "clerical" work; and (5) deemed as adding no value to direct patient care.

Not surprisingly, across all categories, delegated tasks tend to be arduous and time-consuming to perform. For example, some of our participants noted that the precharting process, which involved gathering data from many disparate sources and organizing the data in a cohesive manner, required extensive time and effort (P04, P13). In fact, one scribe talked at length about the onerous nature of it, which "usually took longer than the actual physician–patient interaction time" (P13). In addition, listening to patient–provider conversation while creating lengthy and well-organized clinical notes was also time-consuming and mentally challenging. As one scribe commented: "the consult list was, literally, like a foot long. So that's like honestly one of the jobs of the scribe too is you have to document all of the consults like in real time. And if you're able to do it in real time, that's what makes you a good scribe because that means you're able to go in and out and you can kind of eavesdrop on the doc to kind of figure out what they're discussing or what's the treatment plan going to be" (P30).

Some of the delegated tasks also share the nature of being difficult to remember or keep track of, particularly of those related to ensuring compliance and documentation comprehensiveness. As mentioned earlier, scribes frequently play the role of prompting the scribed provider to perform certain clinical actions and/or document certain types of information in order to meet quality improvement or regulatory requirements, or to justify billing. Nearly half of our participants mentioned that they maintained a detailed checklist to help them remember all of these requirements (P04, P06–P08, P10, P13, P14, P17, P18, P20, P21, P25, P26). Such checklists may be routinely audited: "at the end of the night we turn in our sheets to a quality assurance specialist who goes over all of our charts" (P21). Several participants also said that they often carried with them a "cheat sheet" for each patient to remind themselves of various things that they need to keep track of, such as the status of pending orders: "As we see the patient, I make remarks on what we're still waiting for. So, as we take CT, imaging, or x-rays, or we're waiting on labs for the patient, I will take note of that on the paper beside their [barcode] sticker and as we get the results back, I like cross them off and stuff. Finally, when I'm done with the patient chart

and I've signed it off to the provider, I will just like cross out what we had" (P07).

Further, medical scribes' work also contributes to reducing disruption to providers or to patient–provider interaction. For example, through the information brokerage role, medical scribes help to relay information to other members of the care team, which improves communication and avoids interrupting and taking time away from busy providers: "part of what we do is not directly in our job description, but there are times when the nurses don't want to bother the doctors, and they come to us with a diagnosis of that patient. You know, 'what does the doctor want for this patient, what's the plan?' As a scribe, you're supposed to really listen to what the doctor is saying in the room, so we can reiterate that to all the members who are just wondering and trying not to bother the doctor" (P23).

Another common reason for task delegation is that certain aspects of clinical work may be deemed by clinicians as "clerical" which, in addition to being tedious and time-consuming, may not require sophisticated clinical skills to perform. For example, our participants mentioned that they were commonly asked to take provider instructions (eg, medication orders), transcribe them verbatim into the order entry system, and then pass the information on to other care team members: "So usually we will fill all the prescriptions out so you get like 10 of Norco. We fill, like all the checkboxes and write it down for them, and then the doctor will look at it, and then sign off on it, and then we drop the aftercare instructions for the nurse to give to the patient" (P19). Similarly, certain tasks, especially those that are of administrative and compliance-conforming natures, may not be deemed by clinicians as adding much value to direct patient care, and thus are commonly delegated to scribes or other healthcare workers. One of our participants portrayed the frustration of documenting to meet regulatory or billing requirements: "it did definitely add on extra time and it was annoying and completely useless too. My provider really wanted it. I think the other doctor in the office was like, 'nah, I'm going to lose money, I don't care.' It was really complicated. It was a waste of time. Not useful at all" (P09).

DISCUSSION

Our interview study revealed several categories of tasks that clinicians commonly choose to offload to medical scribes, many of which involve delegated use of health IT. We also identified some common characteristics shared by these tasks that may explain why clinicians would rather outsource them to others rather than do them on their own.

First, medical scribes' main job responsibility is scribing: that is, recording data during the patient–provider encounter, transforming the data into formal clinical documentation, and then entering the data into computerized systems. These tasks are labor intensive. They can also be cognitively disruptive and detrimental to the quality of patient–provider interaction. The challenging nature of these tasks is well documented in the informatics literature. For example, prior studies have reported that after the mandate of EHRs, providers spend a significantly increased amount of time on clinical documentation,[33,34] face numerous cognitive challenges due to the demand of organizing information into required formats,[35,36] and struggle with using the computer in the exam room while talking to patients.[37,38] Further, medical scribes shoulder much of the burden of entering data into computerized systems, particularly through structured data entry forms. As noted in prior research, the usability

of health IT in supporting structured data entry is often considered suboptimal,[16,39] with outstanding issues such as requiring a large number of mouse clicks to complete even a simple task, high cognitive load associated with breaking up patient stories into fragmented pieces in order to enter the data into rigid structured forms,[16,40–43] and redundant data entry with the same patient information being required to be entered multiple times in different locations in the EHR and in different formats (eg, structured vs free-text).[43]

Second, we found that some other tasks, much beyond scribing, are also commonly delegated to medical scribes. Our study participants reported that, even if not in their job description, they were often asked to forage and assemble information (eg, precharting), coordinate workflow (eg, tracking patient statuses), broker information (eg, providing information to other care team members on behalf of the scribed provider), and run other errands that are not clinically relevant. These roles extended beyond what was described in prior studies, which only alluded to scribes possibly playing a limited patient concierge role.[30] Each of these tasks can be tedious and time- and mentally consuming. Information foraging, for example, is a challenging endeavor that often requires searching through disparate sources and identifying relevant information from a large volume of irrelevant or duplicative medical records data, a problem that has been exacerbated with the use of computerized systems (eg, due to copying/pasting and automated generation of templated text).[44–46] Similarly, in busy clinical environments, it is difficult to keep track of the status of each and every patient and it is cognitively consuming with the need to constantly monitor updated information (eg, returned lab results) in order to reconcile patient stories in multipatient environments.[16,47]

Third, the medical scribes that we interviewed were also commonly asked to conduct administrative duties as demanded by a wide range of reporting and auditing requirements. These duties are often tedious, time-consuming, and are believed by many clinicians as adding no or limited value to direct patient care. Recent discussions on the relationship between clinician burnout and health IT have highlighted the role that computerized systems play in mediating or magnifying the increased amount of administrative work in order to meet regulatory compliance requirements or to justify billing,[14,15] which is directly associated with increased odds of clinician burnout.[48]

As our results show, the health IT tasks that clinicians frequently offload to medical scribes share some common characteristics. These include being time-consuming and disruptive to clinicians' workflow and cognitive processes, and detrimental to the quality of their interaction with patients. Some of these tasks are also considered low-skill clerical work or administrative errands that present little to no value to direct patient care, which can be potentially linked with moral distress.[49] All of these have been found to be contributing factors to clinician burnout.[16] We believe that, as medical scribes are only available in very few resourceful healthcare settings such as the ED and specialty clinics due to the cost,[19,20] many of these delegated health IT tasks, and their associated burden, would inevitably fall onto the shoulders of clinicians, which could in turn act as a major source of clinician burnout.

The findings of this study also offer several insights into potentially alleviating clinician burnout through policy change, practice redesign, and health IT improvements. As our results suggest, performing administrative tasks is a major type of health IT work that clinicians choose to delegate to medical scribes. While deregulation efforts to cut down unnecessary billing and quality reporting requirements have been taking place, such as those undertaken by the "Patients over Paperwork" initiative of the US Centers for Medicare & Medicaid Services,[50] it is reasonable to assume that the administrative tasks-associated burden will not be completely eliminated in the foreseeable future. Therefore, healthcare institutions should seek out pragmatic solutions, such as automating this work to the extent possible, or outsourcing it to dedicated health information management companies that may provide more cost-effective services for billing coding and quality reporting. Further, our findings underscore the need for health IT redesign, particularly for improved usability toward reducing time, effort, and cognitive disruption for documentation and coordination tasks. This could include streamlining the design of cumbersome structured data entry forms; avoiding unnecessary redundancy in clinical documentation requirements so that the same patient information does not need to be entered multiple times in different locations; reducing double data entry by generating structured data from free-text notes, or vice versa, to the extent possible;[43] providing effective information retrieval and data summarization tools using natural language processing and machine learning to facilitate information foraging;[51,52] reengineering clinical workflow and improving the integration of health IT with the workflow;[53] and developing better exam-room layout and more targeted training strategies to help clinicians better accommodate the use of computer systems during patient–provider encounters.[38]

Our findings may also inform the opportunity for developing future technologies that can automatically perform some of these delegated health IT tasks. An example of such technologies is intelligent documentation assistants, or "digital scribes," which refer to ambient technologies that leverage conversational speech recognition and natural language processing to automatically generate clinical documentation based on patient–provider conversations that take place in the exam room.[30,54,55] These technologies perform a similar role as their human counterparts to shield clinicians from certain time-consuming documentation tasks, thus potentially contributing to the reduction of clinician burnout.

This research has several limitations. Since it was an interview study, the number of participants that we could speak with was limited. While we continued recruiting new participants till theoretical saturation was reached, our study sample might not be representative of all medical scribes working in all types of healthcare organizations or medical specialties. In particular, the majority of our participants worked in the ED or specialty clinics. Even though these are the 2 clinical settings that employ most medical scribes,[30] this limitation could limit our ability to identify unique scribing practices that may only exist in some other medical specialties. Further, we recruited our interview participants through word-of-mouth and snowballing sampling, which may also lead to self-selection biases. Second, this study was based on self-reported data from the interviewees, which may be subject to recall errors and other cognitive biases. It will be valuable to supplement this approach with other empirical methods such as field observation, video ethnography, and chart review and computer log analysis. Further, use of the semistructured interview protocol informed by the scribing tasks that we identified from an earlier systematic literature review might limit the scope of information that we were able to solicit from the participants. Third, while the fact that clinicians' offloading of "unwanted" work to medical scribes could contribute to reducing clinician burnout, this linkage is not explicitly addressed in this study. Future work may consider studying clinicians who have benefited from having access to medical scribes to better understand their perceptions on how medical scribes contribute to alleviating

their burden of electronic documentation and of other clinical or administrative tasks. Future work is also needed to better understand the milieu of tasks that clinicians commonly delegate to others, which may help to identify the technical and sociotechnical requirements for improving the design of current technologies and developing future technologies to reduce clinician burnout.

CONCLUSION

This research aimed to improve our understanding of what medical scribes do and how their work contributes to the reduction of clinician burnout. The results show that the tasks commonly delegated to medical scribes, including delegated use of health IT, are often time-consuming, disruptive to clinicians' workflow and cognitive processes, and detrimental to the quality of patient–provider interaction. Some tasks are also considered low-skill clerical work or administrative errands that present no or little value to direct patient care. Because most healthcare practices in the US do not have the luxury of affording medical scribes, such tasks would inevitably fall onto the shoulders of clinicians, which could be a major source of clinician burnout.

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AUTHOR CONTRIBUTIONS

BDT and KR recruited participants, conducted the interviews, and analyzed the data. BDT and KZ designed the study and drafted the manuscript.

SUPPLEMENTARY MATERIAL

Supplementary material is available at *Journal of the American Medical Informatics Association* online.

DATA AVAILABILITY STATEMENT

The data underlying this article will be shared on reasonable request to the corresponding author.

CONFLICT OF INTEREST STATEMENT

None declared.

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