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The Role of Scribes in Orthopaedics

Permalink

https://escholarship.org/uc/item/70v7b7nc

Journal

JBJS Reviews, 11(3)

ISSN

2329-9185

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Publication Date

2023-03-01

DOI

10.2106/jbjs.rvw.22.00247

Peer reviewed

The Role of Scribes in Orthopaedics

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Abstract

» The rapid increase in the use of electronic medical records (EMRs) has led to some unintended consequences that negatively affect physicians and their patients.

» The use of medical scribes may serve as a possible solution to some of the EMR-related concerns.

» Research has demonstrated an overall positive impact of having scribes on both physician and patient well-being, safety, and satisfaction.

» Adaptation of advances in technology, including remote and asynchronous scribing, use of face-mounted devices, voice recognition software, and applications of artificial intelligence may address some of the barriers to more traditional in-person scribes.

This review article explores the role of medical scribing in clinical practice including its pros, cons, potential future applications, and impact on trainees to guide the modern-day physician on the use of scribes.

How Did We Get Here?

The world of medicine used to be guided by trails of handwritten notes in paper charts. While allowing individual physicians to write notes based on their personal styles and preferences, this form of record keeping can be perceived by some as fragmented and labor-intensive constrained by geographic limits, and with a limited availability to multiple providers at one time. Furthermore, handwritten notes with paper charts can be a security risk because of relatively easy access to the patients' personalized information by those not directly involved in the patient's care, with limited available information regarding whose privacy was breached and to what extent[1]. There was a slight shift toward electronic medical records (EMRs) in the mid-1900s as a few academic medical centers began to build their own health record systems[2]. By the 1980s, the US federal government introduced EMR in the Department of Veteran Affairs[2]. In 1991 and 2000, the Institute of Medicine released reports supporting the implementation of EMR and computerized physician order entry[2]. EMR gained further attention as concerns about the impact and implications of individual health data on public health became more well-known[2]. The use of EMR, although more protected by passwords, is still subject to massive data breaches by hackers.

The Heath Information Technology for Economic and Clinical Health (HITECH) Act was implemented as a part of the American Recovery and Reinvestment Act of 2009 to improve population health[3]. The HITECH Act set policies and programs to evolve toward full electronic health record (EHR) adaptation in the United States[4]. The Act emphasized the implementation of health information technology to address patient privacy and security concerns. It outlined financial incentives based on a series of objectives that met the Act's criteria for meaningful uses[5]. Only 5 years after the HITECH Act, 97% of reported US nonfederal acute care hospitals had acquired certified EHR

Disclosure: The **Disclosure of Potential Conflicts of Interest** forms are provided with the online version of the article (http://links.lww.com/JBJSREV/A927).

technology[6]. One of the unintended consequences is the impact of EHR and the Centers of Medicare and Medicaid Services' EHR incentive program on physicians' health and well-being[7]. The proposed goal of "meaningful use" was to reduce medical errors and improve health information availability and clinical decision making among health care professionals[8]. However, meaningful use incentives have negatively affected physicians by a reduction in efficiency and increase in administrative and clerical burden along with an increased risk of burnout[9].

In response, medical practices and hospitals have increasingly leaned toward the use of medical scribes as one measure to address the negative consequences related to documentation burdens. Medical scribes are defined as "paraprofessionals who transcribe clinical visit information into the EMR in real time under physician supervision"[10].

Staffing Models and Impact of Having Medical Scribes

While there is some overlap, broadly speaking, there are 3 scribing staffing models: a *licensed model*, where medical scribes are directly employed by the medical practice or academic medical center; a *commercial model*, where scribe companies employ scribes and enter a contractual relationship with the medical practice or academic center; and a *student model*, where prehealth professionals or medical students are hired as scribes[11]. Within each of these models, there is the variation of *in-person* vs. *remote* access to the scribe. With coronavirus disease 2019 (COVID-19), remote scribing has become a popular alternative to address concerns of in-person scribing before and during the pandemic.

As medical scribes are being used to address some of the unintended consequences of the HITECH Act, research has been performed to study the impact of scribes on physician burnout, patient satisfaction, patient safety, and finances. The industry is also exploring artificial intelligence (AI) options, including the use of ambient technology and wearable devices.

Scribes and Physician Burnout

Physician burnout is not isolated to the United States and correlates with decreased job and patient satisfaction[12]. Several authors have demonstrated a rise in physician burnout associated with the increase in administrative burdens relating to EMR use[13,14]. A study on the impact of health information technology (HIT) and physician burnout revealed double the risk of burnout with excess time spent on EHR at home, with orthopaedic surgeons having the highest reported HIT-related stress among 15 most commonly reported medical specialties[14]. The COVID-19 pandemic has led to higher rates of reported burnout among health care providers in 60 different countries[15]. A systematic review on burnout among surgeons highlighted risk factors including difficulty with work-life balance, longer work hours and nights on call, and surgeons practicing in a private instead of an academic setting[16]. The mounting research and evidence on the consequential nature of the physician burnout epidemic provides a compelling objective to explore effective remedies.

An increase in interactions with the EMR system serves as a contributor to burnout[12]. Pediatric orthopaedic surgeons were found to spend more time on EMR than with patients with an average of 70 mouse clicks to complete a patient encounter[17]. Eighty percent of intensive care unit physicians experience physiological fatigue after 22 minutes of EMR use, with EMR efficiency negatively associated with fatigue[13]. As the impact of EMR begins to compound, the lack of efficiency and likelihood of physician burnout tends to exacerbate each other, negatively affecting the quality of clinical care. As an alternative solution, scribes are delegated EMR-related tasks such as ensuring that documentation requirements are met and entering orders that are reviewed and signed by providers. Physicians reported spending more time with patients face to face and less time charting during and after clinic visits with the use of scribes[18]. Providers felt less burned out and more satisfied as they qualitatively noted that scribes improved work-life balance while also increasing efficiency during clinic hours[19]. As physicians redirect their attention toward patient care, they reported feeling less rushed and more satisfied with their connection with patients as the distraction from the EMR decreased during patient encounters[20].

Scribes and Patient Satisfaction

The positive relationship between physicians and their patients is essential to enhance patient outcomes and satisfaction. The use of EMR during clinic visits has resulted in less time for psychosocial discussions between the patients and their physicians[21]. Compared with physicians working with paper charts, those using EMR demonstrated a greater struggle to physically orient themselves and maintain eye contact with the patient[22]. In fact, patients have labeled the computer as a competitor for the physician's attention[23]. Using medical scribes, physicians can largely delegate medical documentation tasks and give their undivided attention to the patient. In comparative studies, authors have noted improved patient satisfaction with the addition of scribes[24,25].

Patient characteristics can also affect attitudes toward scribes. In a primary care setting, patients aged 18 to 64 years were more likely to note that the physician was more attentive to them when a scribe participated in the clinical encounter[20]. In the presence of scribes, patients were comfortable discussing sensitive topics, except for sexual history, especially among male patients[26]. Despite an increase in the number of patients being seen, patient flow and perception of wait time by patients improved with the implementation of scribes[24]. Most patients held positive or neutral attitudes toward scribes, with one-third noting more attentive physicians providing better education in the presence of a scribe[20].

Scribes and Clinical Care

While scribes present a viable solution toward the unintended consequences of

the HITECH Act, patient care remains a top priority for health care providers. Notes written by the scribe during clinical office visits were of higher quality compared with nonscribed notes with an increase in level 3 documentation[27]. When standard documentation templates are provided, providers, managers, and scribes had more complete and accurate documentation, although these results varied with the scribe's experience level[28]. Providers often spend more time editing notes with new scribes. Standardization of documentation and consistent review of scribed notes may alleviate some of the patient safety concerns related to inaccurate documentation by scribes[28]. Because medical errors are related to the degree of burnout in surgeons, the implementation of scribes may indirectly aid in patient safety by reducing burnout rates[29]. However, there are unfortunate instances where scribes have been involved—directly or indirectly—in patient safety breaches[28]. Because many scribes are aspiring physicians and health care workers, there is a risk of the scribe working outside their acceptable role, presenting a compliance and legal liability concern[28]. With proper training and emphasis on the scribe's current role in enhancing patient care and the need for compliance and supervision, medical scribes may continue to improve patient safety and satisfaction while positively affecting physician well-being.

During the pandemic, as demand for remote scribes soared, it became increasingly more difficult to hire aspiring health care workers. Scribe companies across the country experienced unprecedented turnover rates of scribes and subsequent quality and retention issues. Another solution may be to work with companies that employ offshore "career" scribes with higher retention rates, although safety and legal liability implications need to be considered.

Financial Impact of Scribes on Clinical Practice

To assess the viability of scribes as a potential solution to the increase in administrative burdens, the financial impact of scribes on clinical practice needs to be evaluated. The direct financial benefit of scribes was demonstrated in a study where cardiologists with scribes saw 9.6% more patients per hour and had a 10% higher productivity rate with an annual revenue of $1,372,694 at a cost of $98,588[30]. The increase in revenue seen with the use of scribes was believed to be a result of increased productivity rather than an increase in the level of coding[24]. Comparing prescribe and postscribe cohorts, scribes aided in productivity and helped increase total work relative value units per hour by allowing physicians to maintain a more efficient workflow[31]. In addition, scribes can help alleviate the economic cost of burnout by reducing burnout rates and premature retirement rates among physicians[19]. Turnover expenses includes cost of physician recruitment, lost revenue during recruitment, and training and adjustment time for the new recruit[32]. The turnover of any member of a health care team also increases the risk of burnout among other members of the team[33] and can also impair academic productivity[34]. Another potential application of scribes is with providers who have physical disabilities or injuries that may prevent the effective use of EHR[19].

Costs to consider when implementing a scribing system include scribe salary/benefits, payments to companies that are leasing the scribes, need for additional computer workstations and tablets, and hiring additional staff for potentially increased patient volume[24]. In our experience, the scribing system also requires other nonclinical staff to oversee the program's operations and information technology services to support internet connectivity. These additional administrative needs and costs should be considered when deciding on the optimal scribe staffing model.

Nuances in Scribing Technology

The implementation of telemedicine in the United States increased dramatically with the COVID-19 pandemic. Before COVID-19, the hiring of remote scribes was primarily driven by enhanced information technology and the lack of staffing in rural areas[28]. Use of scribes was associated with decreased time to complete documentation before and during the pandemic in both in-person and telemedicine visits[35]. In an outpatient dermatology clinic, patients reported no change in their level of trust with the use of face-mounted technology, such as Google Glass, to allow for remote scribes to document the visit in real time[36]. Because remote scribes are not physically present, patients were often less aware of the scribe's presence through the technology[36]. Remote scribing could also address the discomfort some patients feel with a third party present during their clinical visits.

In our clinic, we often employ remote scribes using an iPad. On request, the scribe can share their screen during the clinic visits to allow the physician to review the patient's clinical records, including radiographic findings, with the patient and their caretakers (Fig. 1). Based on anecdotal experience, we found that this ability to display on-screen data in real time has improved accuracy of documentation and enhanced physician communication and shared decision making that is appreciated by patients and their caretakers. For example, physical examination findings, such as range of motion and radiographic measurements, are documented in the EMR and carried over in the subsequent note with each follow-up visit to compare trends over time. When the scribe shares their screen on mobile devices, the family and patient can view the patient's present and past findings. Although using an examination room computer may be an option, in our setting, it does not allow the scribe to concurrently share his/her screen with the live entry of notes. In addition, having iPads or other mobile devices allows the provider to move around naturally and add dictations or other recordings after the visit.

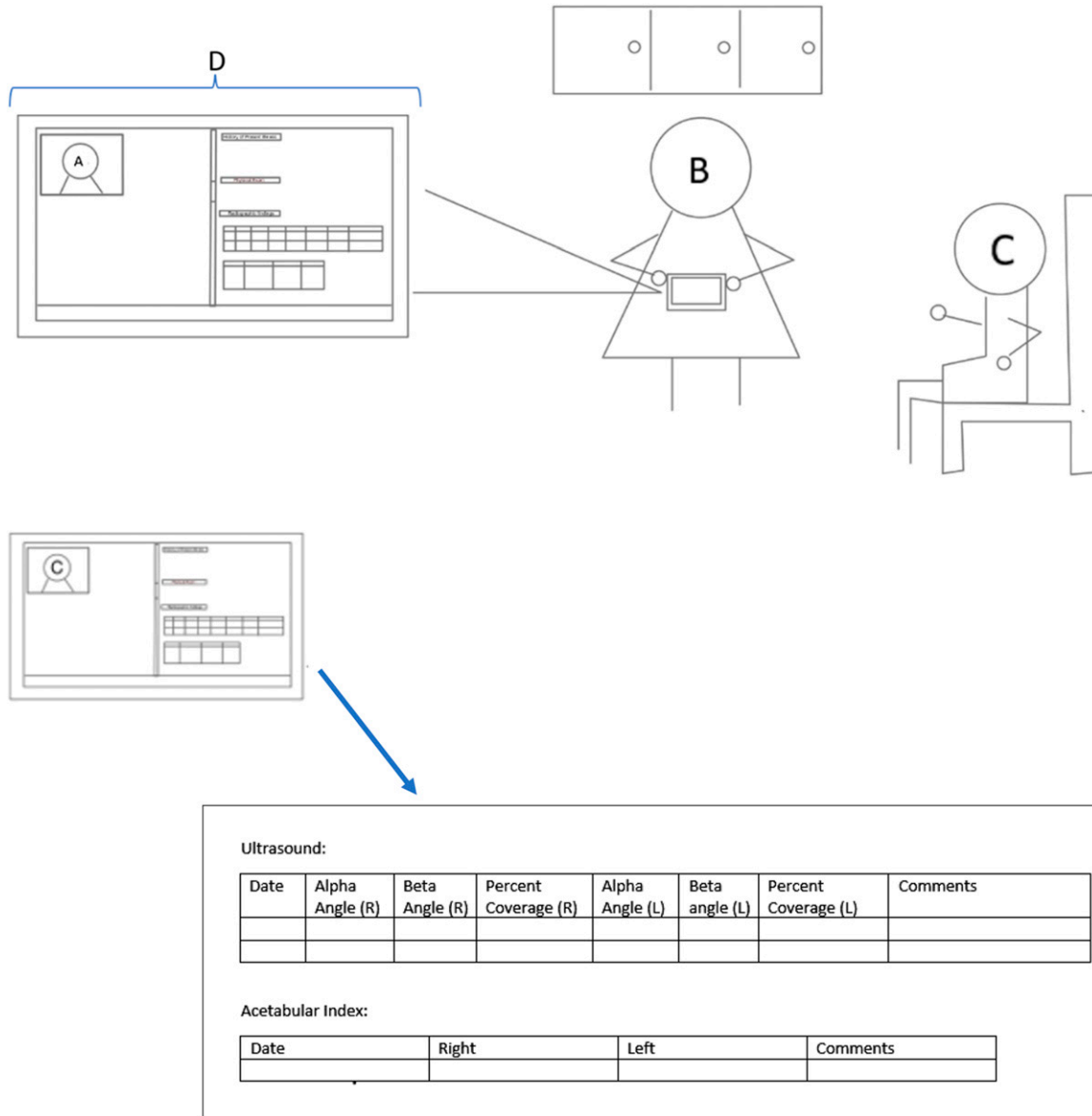In our experience, the implementation of remote scribes reduced

Fig. 1-A An example of a telescribe during a pediatric orthopaedic visit for a child with developmental dysplasia of the hip (DDH). The handheld device (D) shows a telescribe (A) sharing their screen (also see **Fig. 1-B**) as they provide live documentation of the clinical visit. In this image, the physician (B) is holding a handheld device (D) to share imaging findings with the pediatric patient's caretaker (C) to communicate trends in patient's findings over time. **Fig. 1-B** Illustrative example of tables for documenting imaging findings for DDH, shared by the telescribe (A) during clinical visits with the physician and patient's caretaker/parent, to facilitate shared medical decision making.

documentation time by the physician after the clinical encounter. Although this may not be generalizable to all practice settings, in the authors' opinion, the presence of scribes enables better quality of care and allows for more patients to be seen per session as medical documentation is appropriately shared among 2 individuals with complementary roles. Trends between time spent with each patient with and without a scribe in orthopaedics have not been well studied, but hopefully, future research may explore these relationships with more granularity.

Defining the metric of "success" for each organization can help guide scribe implementation. At our institution, scribes are primarily implemented to increase physician satisfaction and reduce provider burnout. Our internal data have shown that the by-product is often increased efficiency and productivity.

Alternatively, clinics can also implement asynchronous virtual scribe services for documentation into the

EHR[37]. Advantages of an asynchronous scribe service include limited physician interaction with the EHR, especially when compared with voice recognition dictation tools, and cost savings related to more efficient use of the scribe's time. Disadvantages include inconsistent timing of note return, which may affect billing, variability in quality of notes, and a greater need for subsequent editing[37]. These shortcomings can be potentially addressed with prior contractual arrangements to have the scribed note returned the same day, minimizing the negative impact on patient care and billing.

Specialties which necessitate the disclosure of sensitive information including sexual history and encouragement of psychosocial discussion may also benefit from the less intrusive remote scribing model. However, more studies need to be performed comparing different scribing models in various specialties and their resulting outcomes on patient safety and satisfaction.

Challenges and Potential Solutions

The in-person scribing experience may be improved further with better ergonomics that help the scribe blend into the office and be less intrusive. One study observed that examination rooms were not designed to accommodate in-person scribes with some instances of scribes seen sitting on hampers, sinks, and trash cans[28]. Another disadvantage is the high turnover rate among scribes. Many scribes use the scribing experience to obtain medical experience and letters of recommendation before applying to professional and graduate schools. Therefore, as experienced scribes resign and new scribes are hired, large variability in the quality of documentation is seen because it takes up to 6 months for most new scribes to achieve competency[28]. The use of video-based EHR simulation to standardize structure and accuracy in clinical documentation can help in the transition and onboarding of new scribes[38]. With new scribes, the speed of detailed documentation and accuracy may be hindered. Requesting

scribes to prechart and prepare notes ahead of clinical visits was shown to be overwhelmingly beneficial[39]. Precharting should be viewed as a tool to help the scribe familiarize and prepare for the upcoming visits. From removing past findings to inputting new laboratory results or radiology reports, these precharting tasks may bolster productivity for the scribe, help familiarize them with the clinical history, and minimize inaccurate charting. At our institution, some physicians have switched exclusively to precharting services only because they find it more valuable than having live scribes. In fact, we have spun off a "chart prep only service" from the Scribe Program to offer this as a standalone service. Scribes are often trained to use "dot phrases" that expand to a preformatted text as an aid in documentation of EMR. While such shortcuts were not shown to have a substantial impact on time to note completion, the Current Procedural Terminology coding level was higher with the use of such dot phrases[40]. Creating dot phrases to input commonly used phrases and tables can enhance charting speed while ensuring that the patient visit is captured in its entirety. The advantage of using dot phrases lies in its ability to allow the scribe to quickly input verbiage that recreates the "voice" of the physician in an efficient manner while ensuring that all details of the visits are accurately captured rather than increasing the coding level. To avoid inaccurate charting, routine use of generic dot phrases that are created to reflect the positive findings of a particular diagnosis should be avoided. The variability in provider preferences and workflow presents challenges for hiring models that depend on a pool of scribes for cross-coverage. This type of model works best when all providers agree on a standardized note template for documentation[11].

The disadvantages of scribes may also be minimized by hiring scribes with excellent communication skills as a priority trait, given that the scribe-provider interaction is important for effective teamwork[41]. General character traits,

such as openness when receiving feedback and making appropriate changes regarding charting errors and workflow, willingness to ask questions during moments of uncertainty in documentation, and embracing errors as a learning opportunity, were criteria for adaptable scribes who worked well with their providers with varying styles and preferences. In addition, the scribe's commitment for accuracy of documentation and willingness to learn new terminologies are imperative in the success of the scribe in the clinical setting. Arguably, while the fundamentals of scribing may be learned with experience, appropriate attitude grounded in patient safety and professionalism may be harder to instill. Scribe hiring and successful provider-scribe pairing may be improved with a re-evaluation of scribe hiring criteria to prioritize interpersonal skills, desire to learn, and concern for patient care. At our institution, we use multiple scribe vendors with a variety of services such as asynchronous vs. synchronous scribes, chart preparation only, and human scribes vs. AI scribes. These options accommodate individual providers who may only need help with "additional tasks" (pending orders, completing after visit summary) and address the needs of other providers, some needing only chart preparation versus others preferring real-time complete coverage.

Providers can also improve scribing documentation by being more organized in presenting information and willing to teach and provide constructive feedback to the scribes[41]. Owing to varying individual styles of communication and the preferred level of interactions with the scribe among providers, we recommend the provider and the scribe establish a systematic method for relaying clinical information, including the option of asynchronous scribing in case the physician feels that having a "live" scribe is less preferable. Establishing a consistent system of communication and workflow should help manage expectations from both parties and aid in improved documentation in the EMR.

Alternatives to Traditional Scribes

Speech recognition (SR) technology allows providers to verbally transcribe their clinical notes into the EMR in real time without the need for a third party such as a scribe. An improvement in provider satisfaction, documentation quality, and efficiency was reported with the direct use of SR technology[42]. Despite limited research on the impact of SR use in nonradiology settings[43], a systematic review revealed an overall increase in SR accuracy over time. However, reported inaccuracies with SR include incorrect patient information and medical discrepancies with errors in spelling and acronyms[44].

Digital scribe technology is another potential alternative to the use of in-person scribes. Digital scribe technology "uses voice-to-text software to convert ambient listening to meaningful medical notes"[45]. With hopes to fully automate the documentation process, the digital scribe relies on "advances in speech recognition, natural language processing and artificial intelligence"[46]. Advances in AI may soon lead to fully AI-generated notes for providers without the need for human scribes, although currently, human editors are needed while the AI technology gets more advanced and reliable. Ongoing research is also currently being performed to address potential barriers to incorporating this evolving technology, such as the ability to adjust to linguistic differences between providers, variability in clinical encounters, and medical jargon[45].

Given the high turnover rate of scribes and consequently the adjustment period between providers and new scribes, machine learning offers an appealing alternative. However, scribes remain a viable option for providers who prefer human interaction with opportunity for live communication and completion of additional tasks and pending orders compared with the technological challenges associated with the present EMR system and upcoming enhancements in transcription technology services.

Impact on Scribes and Other Trainees

Medical students and residents, including the scribes themselves, may also be affected by the implementation of scribing programs. Scribes who matriculate to medical school often note that their scribing experience solidified their decision toward a career in medicine and taught them skills in communication, professionalism, and clinical reasoning[47]. Students with scribing experience noted an easier transition to medical school as well. One study observed a positive correlation between formal medical experience, including scribing before matriculation and step 1 and 2 scores[48]. In addition, the use of scribes positively affected residents' perceptions of their education in an emergency department program[49]. Residents noted an increase in face-to-face teaching and faculty supervision. When compared with preintervention, after scribe intervention, both medical students and residents noted increased bedside teaching, likelihood of being given feedback, and identification of learning objectives[18].

Conclusion

The importance of addressing the unintended consequences of EMR use and the policies motivating its growth is highlighted by its impact on the medical community and their patients. Presently, scribes offer one of many potential solutions to enhance patient safety, satisfaction, physician well-being, and clinical efficacy of health care delivery. The use of scribes should complement EMR redesign for better usability and availability of health data to fully meet the original goal of meaningful use of health information technology. Furthermore, exploring new technology including the digital scribe may offer a viable alternative to some of the disadvantages of having a more conventional scribe.

Source of Funding

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