Orthopedic Surgeon Time Allocation During the Clinical Encounter

Andrew Wohler MD[1, 2,3] Susan Odum PhD[1] Katie Roberts BS[1, 2] Michael Paloski DO[1, 2]
Virginia Casey MD[1, 2]
1) Atrium Health Musculoskeletal Institute, Charlotte, NC. 2) Dallas Foot and Ankle Surgery, Dallas, TX. 3) Forté Sports Medicine and Orthopedics, Carmel, IN.

Introduction: The Centers for Medicare and Medicaid Services recently launched "Patients over Paperwork", an initiative to reduce the burden of documentation. Physician time allocation has been reported within medicine subspecialties, but data is lacking within surgical specialties. The purpose of this study is to determine the amount of time orthopedic surgeons spend on direct patient care compared to administrative tasks.

Design: Prospective Observational Time-Motion Study.

Main Outcome Measurements: Subspecialties included foot/ankle, hand, adult reconstruction, pediatrics, spine, and sports. Tasks were categorized as administrative or direct patient care. Provider status (independent, with resident, with advanced practice provider), encounter type, and dictation method were also documented.

Results: Fifteen surgeons were observed during 1,248 encounters over three days, and time devoted to tasks was recorded. The median duration of direct patient care was 7 minutes and 52 seconds per patient (IQR: 5:10-11:49), compared to a median of 4 minutes and 18 seconds (IQR: 2:20-7:57) for administrative tasks. Orthopaedic subspecialty ($p<.0001$), provider status ($p=.0001$), and encounter type ($p=.0214$) were significantly associated with the percentage of time dedicated to direct patient care. Spine surgeons spent the lowest percentage of time on direct patient care (54%), while foot/ankle and hand surgeons spent the highest (69%) ($p<.0001$). Surgeons with an APP spent 74% of their time on patient care, compared to 65% for independent surgeons and 59% for those involved in teaching. Post-operative patients received the highest percentage of direct care (70%), whereas workers' compensation patients received the lowest (56%).

Conclusions: 30-46% of the surgeon's time was spent on administrative tasks, while 54-69% was dedicated to direct patient care. With a significant portion of time devoted to administrative duties, there are opportunities to improve efficiency, reduce the administrative burden, increase patient interaction, and enhance healthcare quality.

Level of Evidence: Level IV – Prospective observational cohort study.
Key Words: Time-motion study, Physician workflow, Administrative burden, Direct patient care, Clinical efficiency

INTRODUCTION

The advent and widespread adoption of electronic health records (EHR) have dramatically impacted the physician-patient interaction and relationship. Multiple studies have evaluated physician time allocation in the ambulatory setting within primary medicine specialties. These studies highlight an increase in the time physicians spend performing administrative tasks, with less time involved in face-to-face patient care (1-3). Unintended consequences of the rapid adoption of the EHR, including increased time spent on documentation (4, 5), impaired communication with patients, as well as increased physician dissatisfaction and burnout, are increasingly recognized (3, 5-7).

Table 1. Day level details.

Subspecialty		
Foot & Ankle	6	(13.6%)
Hand	6	(13.6%)
Hip & Knee	8	(18.2%)
Pediatrics	9	(20.5%)
Spine	6	(13.6%)
Sports	9	(20.5%)
Location Type		
Central Office	39	(88.6%)
Satellite Clinic	5	(11.4%)
Weekday Shadowed		
Monday	6	(13.6%)
Tuesday	10	(22.7%)
Wednesday	10	(22.7%)
Thursday	10	(22.7%)
Friday	8	(18.2%)

The Centers for Medicare and Medicaid Services launched “Patients over Paperwork” in fall 2017, an initiative to reduce the burden of documentation, improve inefficiencies, and allow clinicians to spend more time with patients. The initiative is a response from the federal government to growing physician concerns regarding the unintended consequences of EHR. Since it is still early in implementation, the effects of the program have yet to be realized; however, its recognition has raised provider awareness regarding the negative implications of EHR adoption.

Literature suggests physicians within medical specialties spend a substantial portion of their clinical day, often several hours at the end of the day, completing administrative tasks. However, there has been a paucity of data published on the burden of administrative tasks within orthopaedic surgery. This study seeks to characterize the amount of time orthopaedic surgeons spend performing administrative tasks compared to direct, face-to-face patient care during the orthopaedic clinic day.

METHODS

Internal review board approval was obtained prior to the initiation of data collection. Fifteen orthopaedic surgeons within a large private orthopaedic practice were approached for participation, and all agreed. A research assistant shadowed the physicians, recording the time devoted to daily tasks. Surgeons were shadowed for a minimum of three non-consecutive days during clinic hours between January 16, 2018, and May 2, 2018. Days of surgery or on-call days were excluded. The participating physicians represented various orthopaedic subspecialties, including foot and ankle, hand, adult reconstruction, pediatrics, spine, and sports medicine.

Tasks were stratified based on direct care time (face-to-face patient care) and indirect care time (administrative tasks, dictating, charting, and billing). The physicians used two dictation methods: MModal and iScribes. MModal is a microphone-based software that transcribes voice to text in real-time directly into an open note document. iScribes is an application where each physician has a personal transcriptionist who records the clinical encounter in full, then creates a note based on salient points from the patient's history, remarks about physical exam, and the dictated assessment and plan discussed with the patient. Sometimes, templates are used in the process.

All data were managed and analyzed statistically using SAS version 9.4 (SAS Institute; Cary, NC). Descriptive statistics were computed, and Chi-square or Fisher’s exact tests were used for categorical data, while t-tests were applied to normally distributed data. Wilcoxon rank-sum tests handled non-normal data, with significance set at an alpha level of 0.05.

Study Sample and Setting

Fifteen physicians were shadowed over a total of 44 clinical days. All physicians were shadowed for three days, except for one who was shadowed for two days due to illness. Multiple physicians within each subspecialty were represented: foot and ankle (2), hand (2), adult reconstruction (3), pediatrics (3), spine (2), and sports (3). A total of 1,452 patient encounters were observed, with established and new visits making up the majority of encounters, with test follow-up, post-operative, and workers' compensation accounting for fewer encounters (Figure 1). Encounters occurred on all days of the week and across multiple clinic locations (Table 1). Physicians were accompanied by a fellow or resident in clinic for 23 of the 44 clinic days (52.3%). An in-room procedure was performed in 119 patient visits (8.2%), and 568 visits (39.1%) generated additional orders after the visit.

Table 2. Absolute time spent on direct and indirect patient care tasks

	Direct Time Median (min) (Q1,Q3)	Indirect Time Median (min) (Q1,Q3)	
Subspecialty			P-value
Foot and Ankle	8:32 (5:56, 11:44)	3:59 (2:01, 7:23)	<.0001
Hand	6:06 (4:01, 8:30)	2:37 (1:10, 5:57)	<.0001
Hip and Knee	8:51 (6:07, 13:15)	4:34 (2:23, 7:28)	<.0001
Pediatric	6:51 (4:17, 10:29)	3:16 (1:59, 5:50)	<.0001
Spine	10:02 (7:35, 14:59)	8:59 (5:53, 12:44)	0.0356
Sports	8:27 (05:33, 11:41)	5:00 (3:21, 8:55)	<.0001
Patient Type			
New Visit	9:39 (6:49, 14:04)	4:53 (2:51, 9:15)	<.0001
Established Visit	7:05 (4:36, 10:22)	3:59 (2:15, 7:17)	<.0001
Post-Operative	6:33 (4:14, 9:30)	2:29 (1:04, 6:36)	<.0001
Test Follow-up	9:47 (6:43, 12:54)	6:34 (4:09, 12:33)	0.0525
Workers Compensation	15:25 (9:33, 16:51)	13:27 (4:28, 16:02)	0.6015
Provider Status			
Provider Only	8:17 (5:33, 11:57)	4:25 (2:27, 7:54)	<.0001
Provider with APP*	5:09 (3:07, 08:09)	1:56 (0:53, 5:02)	<.0001
Provider with Learner**	6:49 (4:14, 10:16)	4:40 (2:26, 9:18)	<.0001

* *advanced practice provider*
** *resident or fellow*

RESULTS

Overall, the median time spent on direct patient care was 7 minutes 52 seconds per patient (IQR: 5:10-11:49), compared to a median of 4 minutes 18 seconds (IQR: 2:20-7:57) on indirect patient care tasks. Of the time allocated to indirect patient care, dictation and review of previous documentation and test results were the two most time-consuming tasks, with median times of 1:07 (IQR 0:00-2:15) and 1:08 (IQR 0:29-2:10), respectively. (Table 2).

Spine surgeons spent the lowest percentage of time (54%) on direct patient care (Table 3). In comparison, foot/ankle and hand surgeons both spent the highest percentage of time (69%) on direct patient care (p<.0001). Surgeons with an advanced practice provider spent 74% of their time directly engaged in patient care, compared to surgeons who were independent (65%) and those involved in teaching (59%) (p=0.0001). Post-operative patients received the highest percentage of direct patient care time (70%), while workers' compensation patients received the lowest (56%) (p=0.021). There was no difference in the percentage of time spent on direct patient care based on primary dictation method, with 64.2% for iScribes and 64.3% for MModal (p=0.1164).

DISCUSSION

We conducted a prospective study that observed orthopedic surgeons in the clinic to describe and compare the time spent on administrative tasks versus direct face-to-face patient care. During clinic hours, surgeons spent an average of 64.7% of their time on

direct patient care, while 35.3% was devoted to administrative tasks such as dictation, placing orders, and reviewing charts and radiographs. Most visits were relatively short, with the median time for direct patient care being 7 minutes and 52 seconds. Dictation and review of documentation or test results were the two administrative tasks that occupied the largest time spent on indirect patient care.

There were notable differences in time allocations among orthopaedic subspecialties. Hand and foot/ankle specialists spent the highest percentage of time on direct patient care, with 69% of clinic time dedicated to direct patient care while spine specialists had the lowest at 54%. This disparity may be due to the increased use of advanced imaging needed to diagnose and manage spine conditions compared to the lower time burden to review smaller imaging series needed in managing extremity conditions. Additionally, spine surgeons spent the most total time on both direct and administrative tasks (10:02 minutes and 8:59 minutes respectively), potentially indicating the complexity of pathology that is commonly encountered, increased incidence of multiplanar imaging, and the prevalence of chronic complaints encountered in the spine clinic.

Independent providers spent more time (8:32 minutes) with their patients than when they were accompanied by a resident or fellow (6:49 minutes) or an APP (5:09). The percentage of direct to indirect care time was significantly higher for providers with APPs, at 74.0% compared to 59.4%. This is likely due to the decreased absolute time spent on administrative tasks when the provider was accompanied by an extender (1:56 minutes) and the additional time allocated to teaching fellows and residents when they are present in the clinic. No difference was observed in direct patient care between the two dictation methods, with 64.2% for iScribe and 64.3% for MModal.

Overall, the findings are similar to what has previously been reported within the medical literature. Gottschalk performed a time-motion study on primary care physicians and found that direct face-to-face patient care accounted for 55% of their workday (2). Similarly, Arndt et al. observed that family medicine physicians spend an average of 5.9 hours out of an 11.4-hour workday using the EHR for clerical and administrative tasks, which do not involve patient care (1).

Two studies including orthopaedic surgeons as part of the study cohort were identified, and they found that these physicians spent a higher percentage of time on administrative tasks compared to the current study. Sinsky et al. found that for every hour spent on face-to-face clinical care, nearly two hours are spent in the EHR or performing desk work (3). This cohort, however, was not solely composed of orthopaedic surgeons; it also included internal medicine, family medicine, and cardiology, and specific time data for each specialty was not individually reported. Patterson et al., in a pilot study examining time utilization by pediatric orthopaedic surgeons, found that only 35% of their clinical day was spent with patients (9). As a pilot study, it was limited in scope by the number of days and number of physicians observed.

The burdens of the EHR and increased administrative tasks and the cumulative effects they impose on physicians, are well documented. Numerous studies have shown unintentional deleterious effects of EHR, including decreased professional satisfaction, increased physician burnout, and a higher likelihood of physicians reducing or leaving clinical practice (5-7, 10). As we continue working in the digital era, it is imperative that physicians proactively find ways to minimize administrative burdens and maximize efficiencies in the EHR to maintain the quality of care for our patients.

Table 3. Percentage of time spent on direct vs indirect patient care tasks

	Median (Q1,Q3)	P-Value
Subspecialty		<0.0001
Foot and Ankle	68.7% (53.3%, 78.5%)	
Hand	69.2% (53.3%, 83.1%)	
Hip and Knee	65.0% (50.2%, 81.3%)	
Pediatric	67.1% (51.7%, 79.5%)	
Spine	54.1% (44.0%, 64.5%)	
Sports	61.0% (46.6%, 73.2%)	
Encounter Type		0.0214
New Visit	65.7% (50.5%, 77.7%)	
Established Visit	63.7% (47.8%, 78.0%)	
Post-Operative	70.1% (51.7%, 86.0%)	
Test Follow-up	59.1% (44.0%, 71.2%)	
Workers Compensation	55.6% (37.3%, 56.3%)	
Provider Status		0.0001
Provider Only	64.7% (49.6%, 78.0%)	
Provider with APP	74.0% (55.9%, 89.4%)	
Provider with Learner	59.4% (45.2%, 73.5%)	
Dictation Type		0.1164
iScribe	64.2% (48.9%, 75.5%)	
mModal	64.3% (48.5%, 80.8%	

* advanced practice provider
** resident or fellow

Maximizing efficiencies in the workplace and decreasing administrative tasks for physicians often requires a team-based approach with advanced teamwork models. Sharing documentation and order entry tasks has been shown to boost productivity, increase physician time, and improve patient and provider satisfaction (11). Teamwork models have highlighted the importance of inter-team communication (12-14). Simple initiatives such as team meetings and huddles, standing orders, and team agreed upon workflow can decrease the burden on physicians and empower nurses and medical assistants within the clinic. Verbal orders to staff for therapy prescriptions, braces, and non-opioid prescriptions, along with preparation of injections, allow physicians to move more efficiently through the clinic. Utilizing medical scribes or transcription services facilitates documentation of encounters with less need to take charts home for dictation after a long clinic day. Many EHR software platforms offer the ability to create templates for notes, implement quick phrase shortcuts, and save order favorites, all of which can enhance clinic efficiency. By leveraging the teams around us and systems already integrated within the EHR, orthopaedic surgeons can mitigate some of the unintended negative consequences of EHR implementation.

The study has several limitations. There was no attempt made to capture additional time that was spent

within the EHR outside of clinic hours. Multiple studies support that a quantifiable amount of EHR review occurs outside of regular clinic hours (1, 3, 15). This time may have been "missed," potentially leading to artificially high direct patient care times. Furthermore, observation bias (Hawthorne effect) must always be considered as a possible influence on behavior due to physicians' awareness and direct observation during their clinical workday. Although the study was conducted across multiple subspecialties, which enhances the generalizability of the findings, it also provides increased granularity for time allocation within each subspecialty. Each physician was observed on multiple days to reduce the impact of outliers within an individual provider's practice. Research assistants were consistent across locations, reducing variability in data collection.

CONCLUSION

In conclusion, 30-46% of the orthopaedic surgeons' time was spent on administrative tasks, while 54-69% is dedicated to direct patient care. This is the largest study thus far that examines physician time allocation during orthopedic encounters, analyzing over 1,200 patient visits. Given the significant amount of time spent on administrative duties, there remain opportunities to improve efficiency and change practice dynamics to reduce administrative burdens, increase time with patients, and enhance healthcare quality.

REFERENCES

1. Arndt BG, Beasley JW, Watkinson MD, et al. Tethered to the EHR: Primary Care Physician Workload Assessment Using EHR Event Log Data and Time-Motion Observations. *Ann Fam Med*. 2017;15(5):419-426. doi:10.1370/afm.2121

2. Gottschalk A, Flocke SA. Time spent in face-to-face patient care and work outside the examination room. *Ann Fam Med*. 2005;3(6):488-493. doi:10.1370/afm.404

3. Sinsky C, Colligan L, Li L, et al. Allocation of Physician Time in Ambulatory Practice: A Time and Motion Study in 4 Specialties. *Ann Intern Med*. 2016;165(11):753-760. doi:10.7326/M16-0961

4. Jamoom E, Patel V, King J, Furukawa MF. Physician experience with electronic health record systems that meet meaningful use criteria: NAMCS physician workflow survey, 2011. *NCHS Data Brief*. 2013;(129):1-8.

5. Woolhandler S, Himmelstein DU. Administrative work consumes one-sixth of U.S. physicians' working hours and lowers their career satisfaction. *Int J Health Serv Plan Adm Eval*. 2014;44(4):635-642. doi:10.2190/HS.44.4.a

6. Rao SK, Kimball AB, Lehrhoff SR, et al. The Impact of Administrative Burden on Academic Physicians: Results of a Hospital-Wide Physician Survey. *Acad Med J Assoc Am Med Coll*. 2017;92(2):237-243. doi:10.1097/ACM.0000000000001461

7. Ehrenfeld JM, Wanderer JP. Technology as friend or foe? Do electronic health records increase burnout? *Curr Opin Anaesthesiol*. 2018;31(3):357-360. doi:10.1097/ACO.0000000000000588

8. Patients-Over-Paperwork-fact-sheet.pdf. Accessed January 26, 2020. https://www.cms.gov/About-CMS/Story-Page/Patients-Over-Paperwork-fact-sheet.pdf

9. Patterson M, Silver J, Armstrong D, Hennrikus W. Pediatric Orthopaedic Surgeon Time Utilization in Clinic: A Pilot Study. *J Pediatr Orthop*. 2021;41(5):319-321. doi:10.1097/BPO.0000000000001786

10. Shanafelt TD, Dyrbye LN, Sinsky C, et al. Relationship Between Clerical Burden and Characteristics of the Electronic Environment With Physician Burnout and Professional Satisfaction. *Mayo Clin Proc*. 2016;91(7):836-848. doi:10.1016/j.mayocp.2016.05.007

11. Salzberg L. Physician Well-Being: Improving Office Efficiency. *FP Essent*. 2018;471:16-19.

12. Markova T, Mateo M, Roth LM. Implementing Teams in a Patient-Centered Medical Home Residency Practice: Lessons Learned. *J Am*

Board Fam Med. 2012;25(2):224-231. doi:10.3122/jabfm.2012.02.110181

13. Hopkins K, Sinsky CA. Team-based care: saving time and improving efficiency. *Fam Pract Manag*. 2014;21(6):23-29.

14. Ghorob A, Bodenheimer T. Share the Care™: building teams in primary care practices. *J Am Board Fam Med JABFM*. 2012;25(2):143-145. doi:10.3122/jabfm.2012.02.120007

15. Young RA, Burge SK, Kumar KA, Wilson JM, Ortiz DF. A Time-Motion Study of Primary Care Physicians' Work in the Electronic Health Record Era. *Fam Med*. 2018;50(2):91-99. doi:10.22454/FamMed.2018.184803