

# A Time-Driven Activity-Based Costing Analysis of Emergency Department Scribes

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## Abstract

**Objective:** To apply time-driven activity-based costing (TDABC) methodology to determine emergency medicine physician documentation costs with and without scribes.

**Methods:** This was a prospective observation cohort study in a large academic emergency department. Two research assistants with experience in physician–scribe interactions and ED workflow shadowed attending physicians for a total of 64 hours in the adult emergency department. A tablet-based time recorder was used to obtain estimates for physician documentation time on both control (no scribe) and intervention (scribe) shifts.

**Results:** Control shifts yielded approximately 3 hours of documentation time per 8 hours of clinical time (2 hours during the shift, 1 hour following the shift). When paired with a scribe, attending physician documentation decreased to 1 hour and 45 minutes during a shift and 15 minutes of postshift documentation. The physician cost estimate for documentation without and with a scribe is 644 and 488 dollars, respectively.

**Conclusions:** When one looks at the time saved by the provider, scribes appear to be a financially sound decision. TDABC methodology demonstrated that scribes afford a cost-effective solution to ED clinical documentation and serves as a tool to develop an accurate costing system, based on actual resources and processes, and allowed for understanding of resource use at a more granular level.

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Clerical burden associated with use of electronic health records (EHRs) may decrease provider productivity, at least in the short term.<sup>1</sup> Physician documentation of clinical encounters occurs at the same time as—and after—the encounters.<sup>2</sup> Providers describe significant challenges related to EHR use including usability challenges, inefficiencies, and postencounter/end-of-day documentation burdens.<sup>3-5</sup> Documentation by physicians is expensive and limits their ability to see additional patients. EHR documentation requires time from an expensive human resource (physician); however, much of this task can be performed by competent people at a lower rate of compensation.

Scribes—nonlicensed health care team members—offer a potentially lower-cost solution to documentation and clinical inefficiencies. They document the patient history and physical examination contemporaneously

with the encounter. They do not act independently but assist with documentation, retrieve test results, and support workflow to improve physician productivity and patient care.<sup>3,6</sup> Scribes, however, increase the cost of delivering care.

ED operations leaders are faced with a simple but vexing question: Does the cost of paying scribes result in a net gain or loss for the department? The value of scribes can be assessed in a number of different ways: Are providers more efficient when paired with a scribe? Do scribes allow providers to see more patients? Is documentation more complete when scribes are involved, and, subsequently, do charts bill differently? Do scribes decrease clerical burden on providers? Is there an impact on provider burnout? Published literature on scribes, to date, is limited in its ability to answer most of these questions.

To evaluate scribes' cost effectiveness, we assessed scribes' effects on provider documentation and time management using time-driven activity based costing (TDABC). TDABC enables organizations to measure the costs of medical activities accurately, including procedures and treatment of medical conditions. It uses 2 management tools: process mapping from industrial engineering and activity-based costing from accounting.<sup>7</sup> TDABC calculates a cost for each activity by determining the time spent and the actual cost of each resource used for that activity. For instance, if a clinician spends 20 minutes examining a patient, and the cost of that clinician's time is \$60 per hour, the cost of that examination is \$20 in personnel cost. Estimating the cost per time unit of specific activities allows clinical leaders to quantify the complexities of a process, assess cost accurately, and eventually improve its value.<sup>8,9</sup>

### Goals of This Investigation

We applied TDABC methodology to determine ED physician documentation costs with and without scribes.

## METHODS

### Study Design and Setting

This was a prospective observational cohort study, deemed exempt by our Institutional Review Board. It was conducted from April 2016, to May 2016 in the emergency department of an academic tertiary care level-1 trauma center. The emergency department manages 73,000 patient visits annually; 82% of patients are adults (age >17). Thirty-five percent of adult patients and 16% of pediatric patients are admitted. Scribes were deployed in spring of 2015. Attending physicians are employed by the hospital and are salaried. Scribes are assigned to attending physicians, independent of the provider's schedule, for the duration of the attending physician's 8-hour clinical shift. Patients are assessed by nursing staff using a standardized and validated scale: the Emergency Severity Index (ESI).<sup>7</sup> ESI ranges from 1 to 5, with 1 being the most resource-intensive patients. We used this structure to develop process maps for physician documentation.

### Selection of Participants

To perform our study, 2 research assistants shadowed attending physicians in our emergency department for a total of 64 hours of observation. We measured the 3:00-pm to 11:00-pm shift, as it is consistently busy. Rather than switch between adult and pediatric shifts and introduce a source of variability, we only measured adult ED shifts.

### Intervention

During the spring of 2016, research assistants observed 2 types of shifts: (1) those with attending physicians caring for patients managed by a "traditional" care team (without a medical scribe), in which attending providers used personal preference to construct their documentation in the EHR through transcription, voice recognition software, or self-entry and (2) those with attending physicians caring for patients managed by a team that included a medical scribe who entered data into the EHR.

### Methods and Measurements

Two research assistants with experience in physician-scribe interactions and ED workflow observed providers on 4 control shifts (no scribe) and 4 scribe shifts. No physician was shadowed twice. A tablet-based time recorder was used for real-time recording of activities. Continuous observation by the research assistants took place in a single pod that includes 9 patient rooms. Research assistants recorded each phase of the documentation process, including prearrival documentation, initial-interview documentation, documentation that takes place throughout the patient's stay, and disposition documentation.

### Analysis

We averaged the duration for each documentation phase. Using the times recorded by the research assistants through direct observation, we were able to construct a typical patient load with varying patient acuity. We used these average values for our analysis.

## RESULTS

### Documentation Time

Table 1 summarizes the documentation time range for each phase of the documentation process for both the intervention (scribed)

TABLE 1. Physician Documentation Time Ranges by Patient Emergency Severity Index Level

ESI	Preamival	Initial Interview Plus Additional		Disposition/Double Check	Total Documentation Time
		Documentation (Procedures, Re-evaluations)			
1	No scribe	1-3 minutes	3-10 minutes	30 seconds-1 minute	4.5 minutes-14 minutes
	Scribe present	30 seconds-1 minute	3-6 minutes	1-4 minutes	4.5 minutes-11 minutes
2	No scribe	1-3 minutes	3-8 minutes	30 seconds-1 minute	4.5 minutes-12 minutes
	Scribe present	30 seconds-1 minute	3-6 minutes	1-4 minutes	4.5 minutes-11 minutes
3	No scribe	1-3 minutes	3-8 minutes	30 seconds-1 minute	4.5 minutes-12 minutes
	Scribe present	30 seconds-1 minute	3-6 minutes	1-4 minutes	4.5 minutes-11 minutes
4	No scribe	1-3 minutes	3-7 minutes	30 seconds-1 minute	4.5 minutes-11 minutes
	Scribe present	30 seconds-1 minute	3-5 minutes	1-3 minutes	4.5 minutes-9 minutes
5	No scribe	1-3 minutes	3-7 minutes	30 seconds-1 minute	4.5 minutes-11 minutes
	Scribe present	30 seconds-1 minute	3-5 minutes	1-3 minutes	4.5 minutes-9 minutes

and control (nonscribed) groups. Table 2 summarizes the total documentation time per shift for both groups (mean). When working as part of a traditional care team (without a scribe), our physicians spent nearly 2 hours documenting during each clinical shift. Furthermore, our providers averaged an hour or more documenting patient encounters after the completion of the clinical shift. For every 8-hour shift, our providers averaged 3 hours of documentation. When paired with a scribe, attending-physician documentation during a shift decreased to 1 hour and 45 minutes, and after-shift documentation decreased to 16 minutes. Therefore, scribes decreased our documentation time by 33%, or an hour, on average.

### Documentation Costs

To formulate a physician cost estimate, we used the national physician rate of \$200 per hour.<sup>10</sup> At a salary cost of \$200 per hour, the average cost of charting per shift is \$600 (\$200 per clinical hour × 3 hours). If the physician uses professional transcription services, the cost of documentation is even higher. Considering the national scribe hourly rate of \$11 per hour,<sup>11</sup> scribes decrease documentation costs to an average of \$488 per shift (\$200 per physician clinical hour × 2 hours + \$11 per scribe hour × 8 hours) by decreasing the physician time needed for these tasks and

eliminating transcription needs. The rates used for cost calculations are purely hourly salary rates for both care-team members and not inclusive of overhead costs related to benefits, training, and so forth.

### Time Allocation

When provider documentation time on shift decreases, the reclaimed 10-minute clinical time difference on shift can allow providers to do things only a provider can do: educate resident learners and spend more time at the patient bedside. Furthermore, providers on scribed shifts saw an additional patient per shift when compared with nonscribed shifts.<sup>12</sup> In addition, the 50 minutes of documentation time at the end of the shift can be reallocated to more clinical care or tasks that typically go uncompensated: signing charts from previous shifts, authenticating nurse protocol orders, or responding to e-mails, for example. Similarly, for some settings in which postshift documentation is paid time, elimination or reduction of the postshift time translates to even greater savings.

## DISCUSSION

### The Cost of Documentation

As noted previously, the estimated cost of documentation without scribes is \$600—plus transcription costs if used—compared with \$488 when paired with scribes. This reduction

TABLE 2. Physician Documentation Time per Shift

	Documentation During Shift	Postshift Documentation	Total Documentation Time
Control (no scribe)	115.2 minutes	67.1 minutes	182.3 minutes
Intervention (scribe)	105.6 minutes	16.25 minutes	121.85 minutes
Difference	9.6 minutes	50.85 minutes	60.45 minutes

is calculated from decreased provider time needed for these tasks. Additional cost savings are realized if transcription service needs are eliminated and if postshift documentation is paid. For settings in which physicians are paid at an hourly rate, decreasing time spent on clerical tasks serves employers. The documentation costs may not always be realized by the institution employing the physician; often, these physician-documentation hours postshift are unpaid. However, the impact of these hours undoubtedly contributes to provider burnout. For facilities in which physicians are hourly, and these costs are covered, there are savings to be had.

### The Value of a Scribe

Previous research demonstrates the ability of the scribed provider to see additional patients.<sup>12</sup> We suspect that the scribe cost is nearly covered by the additional revenue generated by the patients seen by physicians paired with scribes. Also, scribes provide benefit from a documentation-completion perspective; charts done by scribes often result in positive effects on relative value units in adult patients.<sup>13</sup> The impact of scribes on metrics such as door-to-disposition is yet to be understood; however, we suspect that scribes provide economic advantages to the practice beyond documentation time savings only.

### LIMITATIONS

There are several notable limitations with our study. First, our research assistants shadowed providers for a limited number of clinical hours owing to funding constraints. As there are marked practice differences among providers, it is difficult to know the number of clinical hours needed to power a study of this sort adequately. The specific durations for each piece of the documentation process varied widely based on patient acuity and how the provider chose to document in the EHR (manual entry, voice recognition

software, transcription services) in the absence of a scribe. In addition, we did not have funding to staff the emergency department 24 hours a day by scribes. We chose afternoon shifts for several of reasons including ability to have scribe staffing at that time and the predictable busy time in the emergency department. Although emergency departments are increasingly busy around the clock, this analysis was limited to afternoon times. This study is intended as a pilot study; no power calculation was conducted. Our hope is these early results can be used as preliminary data to power a future study adequately.

### CONCLUSIONS

Value-based health care delivery offers a transformational opportunity to deliver improved patient outcomes at lower total costs.<sup>14,15</sup> TDABC allows a much more accurate determination of the true cost of providing care. When one looks at the time saved by the provider, the elimination of dictation expenses, and previously demonstrated increased revenue associated with accurate documentation and throughput, the employment of scribes is a financially and clinically sound decision. The TDABC scribe project served as a tool to develop an accurate costing system based on actual resources and processes and allowed for understanding of use of resources at a more granular level. With a scribe, opportunities are created for a physician to work at the top of his or her license and do what only a physician can do.

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