Ambient AI Scribe Adoption and Documentation Time in the Emergency Department

ABSTRACT

Study Objective: To describe real-world adoption of an ambient artificial intelligence (AI) scribe in the emergency department (ED) and compare documentation time and note characteristics between ambient and standard encounters using electronic health record (EHR) audit logs.

Methods: We performed a retrospective observational study of adult ED encounters at a tertiary academic medical center. Attending physicians could optionally use an ambient AI scribe to generate notes from patient–clinician conversations. We included single-attending encounters in core ED zones and excluded visits with human scribes. EHR audit logs provided documentation time during and after the shift, total EHR time, and note length. We summarized adoption by physician, zone, and acuity and compared medians between ambient and standard encounters.

Results: Among 8,740 eligible encounters, 976 (11.2%) used ambient AI. Only 35 of 92 attendings (38%) used the tool, and a small group of high-frequency users accounted for most ambient encounters. Ambient use clustered in telemedicine and vertical-care zones and in lower-acuity patients and those not requiring interpreters. Median on-shift documentation time was 165 seconds for ambient encounters versus 230 seconds for standard encounters (difference −65 seconds; −28%). Median total EHR time was 519 versus 621 seconds (−16%), and ambient notes were shorter overall.

Conclusions: Early ED implementation of ambient AI scribes showed low but highly skewed adoption, with physicians favoring lower-acuity, non-interpreted encounters. When used, ambient AI was associated with shorter on-shift documentation time, total EHR time, and note length.

INTRODUCTION

Background

Clinician burnout has reached crisis levels in emergency medicine, with documentation burden and electronic health record (EHR) time repeatedly cited as major contributors.[1,2] Emergency physicians spend substantial portions of each shift entering data, writing notes, and completing order-related tasks, often continuing EHR work outside of scheduled shifts.[3,4] These pressures are magnified in the emergency department (ED), where high patient volume, frequent interruptions, and time-critical decision making make it difficult to complete documentation during clinical care.[4]

Importance

Ambient artificial intelligence (AI) scribes—systems that passively capture patient–clinician conversations and generate draft notes—have been introduced as a potential strategy to reduce documentation burden.[5,6] Early evaluations in outpatient and primary care settings suggest that ambient AI can decrease after-hours charting and improve perceived documentation efficiency.[6,7] However, little is known about how emergency physicians actually adopt these tools in a complex, multi-zone ED environment, which encounters they choose for ambient documentation, or how ambient use is associated with objective measures such as on-shift documentation time and note length. Understanding these real-world usage patterns is essential for designing implementation strategies and for interpreting any observed time differences, particularly when use is voluntary and selective.[8,9]

Goals of This Investigation

Our goal was to describe early adoption of an ambient AI scribe during ED implementation using objective EHR audit logs. Specifically, we sought to (1) quantify ambient AI adoption at the physician and encounter levels, including variation by clinical zone, acuity, and interpreter use; and (2) compare documentation time and note characteristics between encounters documented with ambient AI and those documented with standard methods.

METHODS

Study Design and Setting

We conducted a retrospective observational study at a high-volume tertiary academic ED using routinely collected EHR data. The health system implemented an ambient AI scribe (DAX Copilot, Microsoft Nuance, Burlington, MA) integrated with the Epic EHR. The study period spanned the first several months of ED deployment (February–October 2025) and followed STROBE recommendations.[10,11] The institutional review board approved this study (#69107).

Participants and Intervention

All attending emergency physicians with access to the ambient AI scribe were eligible. Use of the tool was voluntary and determined on an encounter-by-encounter basis. We included adult (≥18 years) ED encounters in core clinical zones: Traditional Beds (stretcher-based care for non-resuscitation patients), Vertical Care (chair-based ambulatory care), Triage/Lobby (rapid assessment area), and Telemedicine (on-site patients evaluated via video by a telemedicine physician stationed in a command center). We excluded pediatric and resuscitation zones due to distinct workflows. To attribute documentation activity to a single clinician, we restricted analyses to encounters managed by one attending and excluded visits where a human scribe was

used. The comparison group comprised encounters in which attendings used standard documentation (typing and/or speech recognition) without human or ambient AI scribes.

Data Sources and Measures

Encounter data were linked to Epic Note Attribution and User Active Log tables. Ambient encounters were defined as those in which the ambient AI scribe populated any portion of the attending's note, as indicated by system metadata; all other eligible encounters were classified as standard. The primary outcome was on-shift documentation time, defined as the total seconds of active EHR time spent in note-related activities while the attending was on a scheduled shift. Secondary outcomes included after-shift documentation time (note-related activity after scheduled shift end), total EHR time for the encounter, and total note character count. Contextual variables included Emergency Severity Index (ESI), clinical zone, interpreter need, and disposition. Interpretation services at our institution are provided by in-person, phone, or video medical interpreters.

Analysis

We performed a descriptive analysis comparing ambient and standard encounters. Patient and encounter characteristics were summarized using medians with interquartile ranges (IQRs) and counts with percentages. Continuous outcomes were compared with Wilcoxon rank-sum tests and categorical variables with chi-square tests. To characterize adoption, we calculated each physician's ambient usage rate (ambient encounters divided by total eligible encounters) and summarized the distribution and concentration of use. Given the voluntary, non-random adoption

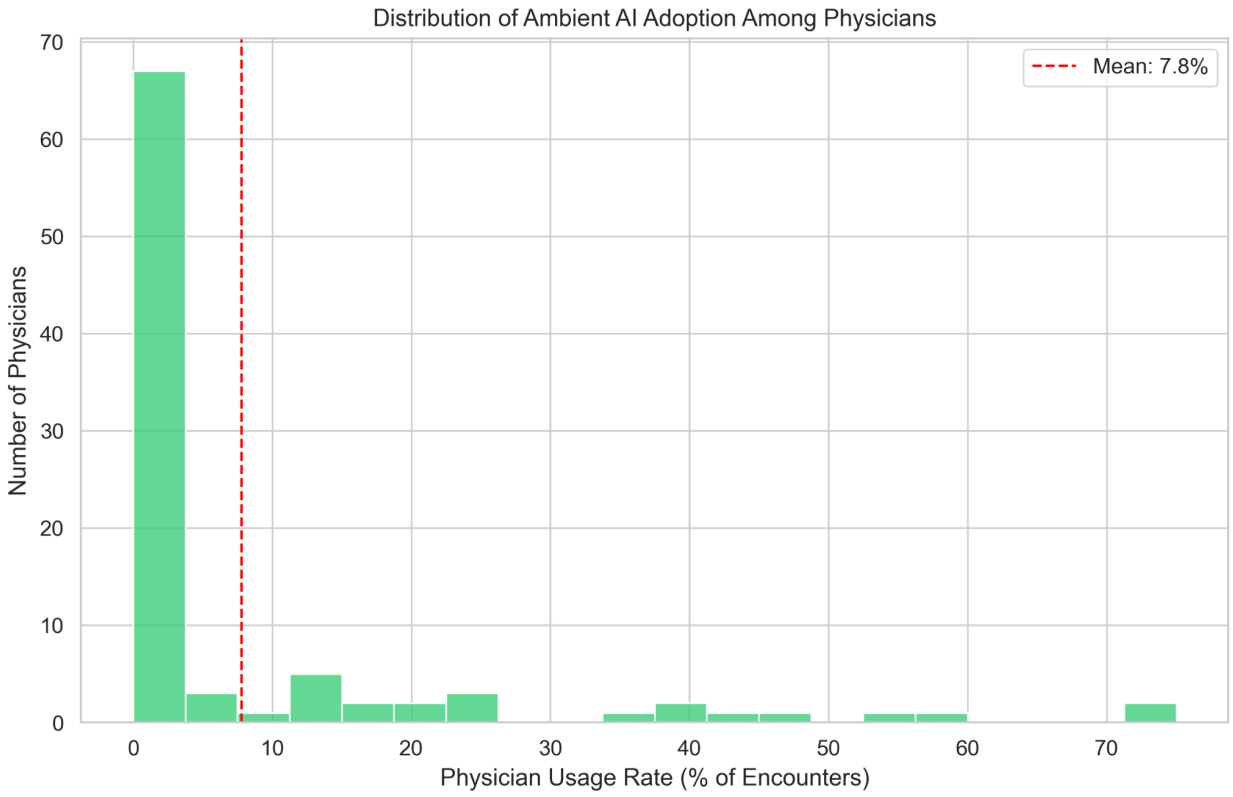
of ambient AI, we interpreted findings as descriptive associations rather than causal effects. All analyses were two-sided with a significance threshold of $P < 0.05$.

RESULTS

Cohort Characteristics and Adoption

The final cohort included 8,740 eligible encounters, of which 976 (11.2%) were documented with an ambient AI scribe and 7,764 (88.8%) with standard documentation. Ninety-two attending physicians had access to the tool. Only 35 (38.0%) used ambient AI at least once, and overall usage was low, with a mean physician-level usage rate of 7.8% and a median of 0%. Adoption was highly skewed: the top 10% of users (9 physicians) accounted for 70.5% of all ambient encounters (Figure 1).

Figure 1 Distribution of ambient AI adoption among physicians.



Patient and encounter characteristics are shown in Table 1. Ambient encounters involved slightly younger patients (median 39 vs 44 years) and were less likely to require an interpreter (16.6% vs 19.9%). ESI level 1 encounters were rare (n=10) and none used ambient AI; ESI comparisons therefore focus on levels 2–5. Ambient use varied by ED care area, with greater use in Vertical Care and Telemedicine and less use in Traditional Beds and Triage/Lobby. Across measured encounter characteristics, ambient AI use was more common in ESI 4 encounters, less common in ESI 2 encounters, less common with interpreter need, less common with ambulance arrival, and more common among discharges.

Table 1. Patient and Encounter Characteristics by Documentation Method

Characteristic	Standard (n = 7,764)	Ambient AI (n = 976)	P value
Patient age, median (IQR), y	44 (31–63)	39 (28–58)	0.000
Sex, n (%)			0.194
Female	4,255 (54.8%)	559 (57.3%)	
Male	3,499 (45.1%)	417 (42.7%)	
Race, n (%)			0.140
White	2,646 (34.1%)	291 (29.8%)	
Asian	1,287 (16.6%)	159 (16.3%)	
Black or African American	471 (6.1%)	61 (6.2%)	
Other	2,712 (34.9%)	380 (38.9%)	
Declines to state	436 (5.6%)	57 (5.8%)	
Ethnicity, n (%)			0.196
Non-Hispanic/Non-Latino	4,857 (62.6%)	586 (60.0%)	
Hispanic/Latino	2,657 (34.2%)	365 (37.4%)	
Declines to state	232 (3.0%)	25 (2.6%)	
Language, n (%)			0.145
English	6,026 (77.6%)	783 (80.2%)	
Spanish	1,301 (16.8%)	152 (15.6%)	
Other	428 (5.5%)	41 (4.2%)	
Interpreter needed, n (%)	1,547 (19.9%)	162 (16.6%)	0.015
ESI acuity, n (%)			0.000
Level 2	1,142 (14.7%)	66 (6.8%)	
Level 3	4,611 (59.4%)	585 (59.9%)	
Level 4	1,820 (23.4%)	308 (31.6%)	
Level 5	181 (2.3%)	17 (1.7%)	
Means of arrival, n (%)			0.000
Self-arrival	7,016 (90.4%)	938 (96.1%)	
Ambulance	744 (9.6%)	35 (3.6%)	
Chief complaint, n (%)			0.019
Abdominal pain	656 (8.4%)	63 (6.5%)	
Chest pain	392 (5.0%)	61 (6.2%)	
Back pain	259 (3.3%)	36 (3.7%)	
Shortness of breath	191 (2.5%)	16 (1.6%)	
Headache	196 (2.5%)	33 (3.4%)	
Fall	240 (3.1%)	20 (2.0%)	
Other	5,830 (75.1%)	747 (76.5%)	
Number of ED diagnoses, median (IQR)	1 (1–2)	1 (1–2)	0.027

ED care area, n (%)			0.000
Traditional beds	2,877 (37.1%)	151 (15.5%)	
Vertical care	2,205 (28.4%)	370 (37.9%)	
Triage/lobby	2,085 (26.9%)	188 (19.3%)	
Telemedicine	597 (7.7%)	267 (27.4%)	
Disposition, n (%)			0.000
Discharge	6,136 (79.0%)	850 (87.1%)	
Admit	1,495 (19.3%)	115 (11.8%)	
Transfer	53 (0.7%)	0 (0.0%)	
Other	48 (0.6%)	7 (0.7%)	

ESI, Emergency Severity Index. P values were calculated using Mann–Whitney U test for continuous variables and chi-square test for categorical variables. ESI level 1 encounters were excluded (n = 10; 0 ambient).

Documentation Time and Note Characteristics

Documentation outcomes are summarized in Table 2. Median on-shift documentation time was 165 seconds for ambient encounters compared with 230 seconds for standard encounters (P<0.001). Median total EHR time per encounter was also lower with ambient AI (519 vs 621 seconds; P<0.001). Ambient notes were shorter (median 9,233 characters vs 10,142 characters; P<0.001). After-shift documentation time had a median of 0 seconds in both groups, with mean values of 49 seconds for ambient and 62 seconds for standard encounters (P=0.004). Distributions of on-shift documentation time by acuity and documentation method are shown in Figure 2. Zone-stratified documentation time patterns are provided in the online supplement (eFigure 1).

Figure 2. Distribution of on-shift documentation time by Emergency Severity Index (ESI) acuity and documentation method.

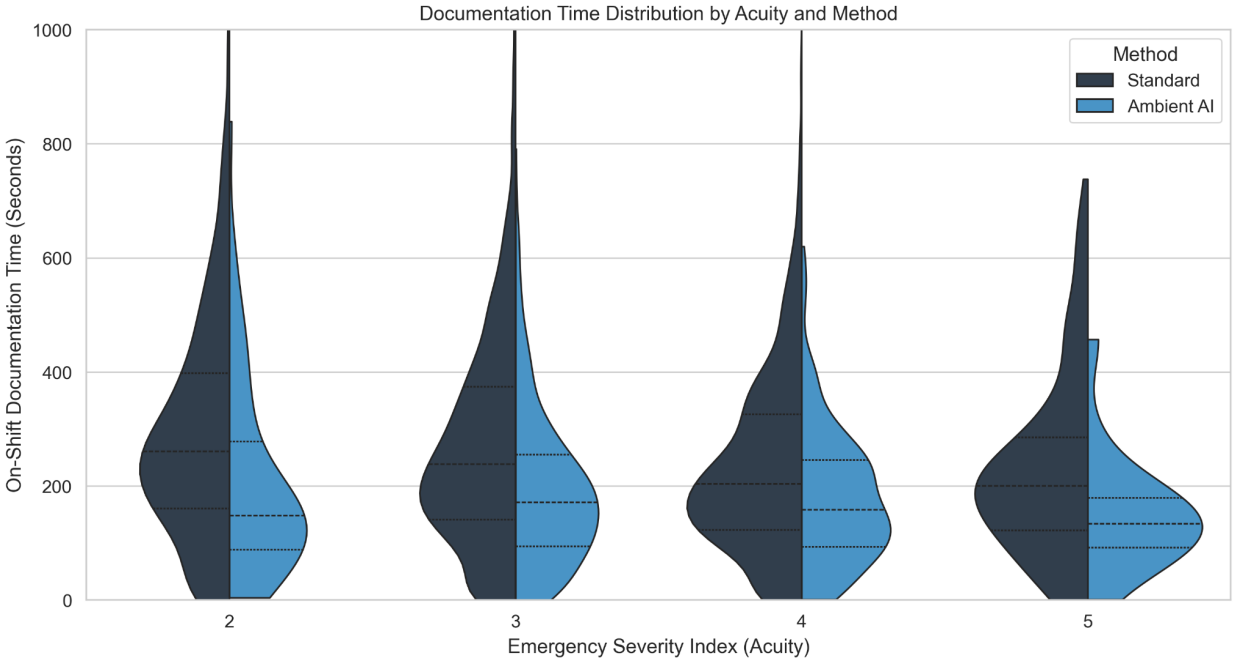


Table 2. Documentation Outcomes by Method

Outcome	Standard (n = 7,764)	Ambient AI (n = 976)	Difference	P Value
On-shift documentation time, median (IQR), s	230 (142–365)	165 (97–250)	-65 (-28%)	<0.001
Total EHR time, median (IQR), s	621 (412–914)	519 (349–751)	-102 (-16%)	<0.001
Note length, median (IQR), characters	10,142 (6,276–15,777)	9,233 (6,107–12,544)	-909 (-9%)	<0.001
After-shift documentation time, mean (SD), s	62 (131)	49 (105)	-13 (-21%)	0.004

LIMITATIONS

This study has limitations. First, it was conducted at a single tertiary academic ED, which may limit generalizability to other settings and documentation workflows. Second, ambient AI use was voluntary and encounter-specific, with low overall penetration (11.2% of encounters) and highly skewed adoption among a subset of physicians; therefore, comparisons should be interpreted as descriptive associations reflecting early real-world use rather than causal estimates of the effect of universal ambient AI adoption. Because ambient encounters were uncommon in some strata (e.g., higher-acuity presentations), we did not perform multivariable adjustment, and residual confounding by case mix, workflow, physician experience, and local conditions is likely.

Third, outcomes were derived from EHR audit logs, which estimate active EHR time but cannot fully distinguish focused documentation from multitasking, interruptions, or concurrent clinical activity. Misclassification of on-shift versus after-shift work is possible when physicians extend beyond scheduled shift end or document remotely. Finally, we did not directly assess documentation quality, coding accuracy, patient experience, or financial impacts, which are important dimensions of ambient AI evaluation.

DISCUSSION

In this single-center evaluation of early ambient AI scribe implementation in the ED, we found two primary results. First, ambient AI adoption was low and highly concentrated among a small subset of attending physicians, with substantial variation in use across ED care areas and encounter characteristics. Second, in encounters where ambient AI was used, audit-log measures

showed shorter on-shift documentation time and lower total EHR time, along with shorter note length, compared with standard documentation. These findings provide objective data describing early real-world use of ambient AI documentation in an ED setting, extending prior work that has largely focused on ambulatory care.[6,7,12]

Adoption patterns provide essential context for interpreting these findings. Ambient AI was used in a minority of encounters and was preferentially deployed in certain areas and patient contexts—notably in lower-acuity zones (Vertical Care, Telemedicine) and among patients not requiring interpreter services. These patterns likely reflect both workflow factors (e.g., ambient AI may be more easily integrated into shorter, less-interrupted encounters) and physician judgment about which encounters are best suited for AI-assisted documentation. Similar selective adoption has been observed in other ambient AI implementations, where a minority of high-frequency users account for the majority of system use.[6]

The observed differences in documentation time—approximately one minute shorter on-shift time for ambient encounters—are consistent with the direction and general magnitude of time savings reported in ambulatory settings.[12,13] However, these descriptive differences cannot be interpreted as causal effects attributable to ambient AI, given the non-random selection into ambient use. Physicians may have preferentially chosen ambient AI for encounters they anticipated would be faster or simpler, and unmeasured encounter-level factors could explain some or all of the observed time difference.

The finding that ambient notes were shorter contrasts with some ambulatory studies reporting increased note length with AI-assisted documentation.[13] This may reflect differences in documentation norms between ED and ambulatory settings or the removal of templated text when using ambient AI. Further study is needed to understand whether shorter notes reflect efficiency gains, loss of clinical detail, or changes in documentation style.

Future research should examine adoption and outcomes across multiple sites, assess the impact on documentation quality and patient safety, and explore strategies to broaden engagement beyond early adopters. In particular, understanding barriers to adoption in higher-acuity settings and among non-users will be important for realizing the potential of ambient AI to address documentation burden at scale.

REFERENCES

1. Rotenstein LS, Molina M. Exploration of Electronic Health Record Patterns of Emergency Physicians-Charting the Digital Burden. *JAMA Netw Open*. 2024;7(8):e2429749. doi:10.1001/jamanetworkopen.2024.29749

2. Shanafelt TD, West CP, Sinsky C, et al. Changes in Burnout and Satisfaction With Work-Life Integration in Physicians and the General US Working Population Between 2011 and 2023. *Mayo Clin Proc*. 2025;100(7):1142-1158. doi:10.1016/j.mayocp.2024.11.031

3. Eschenroeder HC, Manzione LC, Adler-Milstein J, et al. Associations of physician burnout with organizational electronic health record support and after-hours charting. *J Am Med Inform Assoc JAMIA*. 2021;28(5):960-966. doi:10.1093/jamia/ocab053

4. Iscoe MS, Venkatesh AK, Holland ML, Krumholz HM, Sheares KD, Melnick ER. Benchmarking Emergency Physician EHR Time per Encounter Based on Patient and Clinical Factors. *JAMA Netw Open*. 2024;7(8):e2427389. doi:10.1001/jamanetworkopen.2024.27389

5. Coiera E, Kocaballi B, Halamka J, Laranjo L. The digital scribe. *NPJ Digit Med*. 2018;1:58. doi:10.1038/s41746-018-0066-9

6. Tierney AA, Gayre G, Hoberman B, et al. Ambient Artificial Intelligence Scribes to Alleviate the Burden of Clinical Documentation. *NEJM Catal*. 2024;5(3):CAT.23.0404. doi:10.1056/CAT.23.0404

7. Owens LM, Wilda JJ, Hahn PY, Koehler T, Fletcher JJ. The association between use of ambient voice technology documentation during primary care patient encounters, documentation burden, and provider burnout. *Fam Pract*. 2024;41(2):86-91. doi:10.1093/fampra/cmad092

8. Shah SJ, Crowell T, Jeong Y, et al. Physician Perspectives on Ambient AI Scribes. *JAMA Netw Open*. 2025;8(3):e251904. doi:10.1001/jamanetworkopen.2025.1904

9. Duggan MJ, Gervase J, Schoenbaum A, et al. Clinician Experiences With Ambient Scribe Technology to Assist With Documentation Burden and Efficiency. *JAMA Netw Open*. 2025;8(2):e2460637. doi:10.1001/jamanetworkopen.2024.60637

10. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement: Guidelines for reporting observational studies. *Int J Surg*. 2014;12(12):1495-1499. doi:10.1016/j.ijsu.2014.07.013

11. Rule A, Kannampallil T, Hribar MR, et al. Guidance for reporting analyses of metadata on electronic health record use. *J Am Med Inform Assoc JAMIA*. 2024;31(3):784-789. doi:10.1093/jamia/ocad254

12. Haberle T, Cleveland C, Snow GL, et al. The impact of nuance DAX ambient listening AI documentation: a cohort study. *J Am Med Inform Assoc JAMIA*. 2024;31(4):975-979. doi:10.1093/jamia/ocae022

13. You JG, Dbouk RH, Landman A, et al. Ambient Documentation Technology in Clinician Experience of Documentation Burden and Burnout. *JAMA Netw Open*. 2025;8(8):e2528056. doi:10.1001/jamanetworkopen.2025.28056

eFigure 1 (Online Supplement). Mean on-shift documentation time by clinical workflow zone and documentation method. Bar chart comparing documentation time across Telemedicine, Traditional Beds, Triage/Lobby, and Vertical Care zones.