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Ambient Artificial Intelligence Versus Human Scribes in the Emergency Department

Authors: Morey JD, Jones D, Walker L, Lindor R, Schupbach J, Mullan
A, Heaton H

*Presented by Thomas Hartka, MD, MS, MSDS
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Introduction

Background

Medical documentation have been in increasing and this creates significant challenges for physicians. Human medical scribes have emerged as one solution, reducing the documentation burden by transcribing patient encounters in real-time. However, scribe programs require substantial investment, extensive training infrastructure, and ongoing management resources.

Objective

The goal of this study was to assess if ambient AI technology match the documentation quality of human scribes.

The screenshot shows a computer screen displaying an Electronic Medical Record (EMR) system for the Emergency Department. The main title bar reads "EMR - Emergency Department". Below the title, there is a navigation menu with tabs: Patient Info, Triage Notes, Orders, Medication, Labs, Imaging, and Discharge. On the far right of the menu are three buttons: "Save", "Print", and "Log Out".

The main content area is titled "Patient Intake Questionnaire". It contains the following information:

- Age: 34
- Sex: Male
- Chief Complaint: Chest Pain
- Duration of Symptoms: 2 hours
- History of Present Illness:
Patient reports sudden onset of chest pain, radiating to left arm, associated with shortness of breath and nausea.

Below this section are several input fields and dropdown menus:

- Do you smoke? Yes No
- Do you drink alcohol? Yes No
- Preferred Pharmacy: _____
- Favorite Animal: Dog Cat Other
- Do you prefer: Reaches Likes to sleep Likes to eat
- What's your favorite Color? Blue Red Green Yellow
- Favorite Animal: Dog Cat Other
- Favorite Season: Spring Summer Fall Winter
- Favorite Food: Beaches Mountains Beaches Mountains
- Favorite Movie Genre: Comedy Action Drama
- What's your favorite Food? Pizza Burger Sladd Sussn Japan Aliens!
- What type of music do you like? Rock Pop Jazz Country Classical Rap Other
- Who is your favorite actor? _____
- If you could have any superpower, what would it be? _____

On the right side of the screen, there is a vertical sidebar titled "Patient Vitals" which displays the following vital signs:

- BP: 152/95 mmHg
- HR: 110 bpm
- RR: 24 /min
- Temp: 37.8 °C
- O₂ Sat: 92 %

Below the vitals, there is a section titled "Quick Links" with three buttons: "EKG", "Chest X-ray", and "Lab Results".

At the bottom of the screen, there is a footer bar with the text "Logged in as: Dr. Smith | Room: ED-3 | Patient: Johnson, T." and the time "3:24 PM".

Study Design & Evaluation Framework

01

Study Type

Prospective, observational, single-blind trial

02

Primary Outcome

Note quality assessed using the Physician Documentation Quality Instrument (PDQI-9) by two blinded reviewers

PDQI-9 Assessment Criteria

- **Up-to-date:** Current medical information
- **Accurate:** Error-free and true
- **Thorough:** Includes relevant details
- **Useful:** Aids decision-making
- **Organized:** Logical structure
- **Comprehensible:** Clear and understood
- **Succinct:** Concise, no excess
- **Synthesized:** Integrated narrative
- **Internally Consistent:** No contradictions

Results

710

Total Encounters

Patient visits analyzed across adult and pediatric populations

284

Human Scribed

123 adult + 161 pediatric encounters

426

AI Scribed

271 adult + 155 pediatric encounters

Primary Outcome: PDQI-9 Quality Scores by Population

Adult Patients

AI Score: 38.22

Human Score: 40.59

Adjusted Rate Ratio: -2.37 (95% CI -5.43 to 0.70)

No statistically significant difference — AI performed comparably to human scribes in adult emergency encounters.

Pediatric Patients

AI Score: 40.36

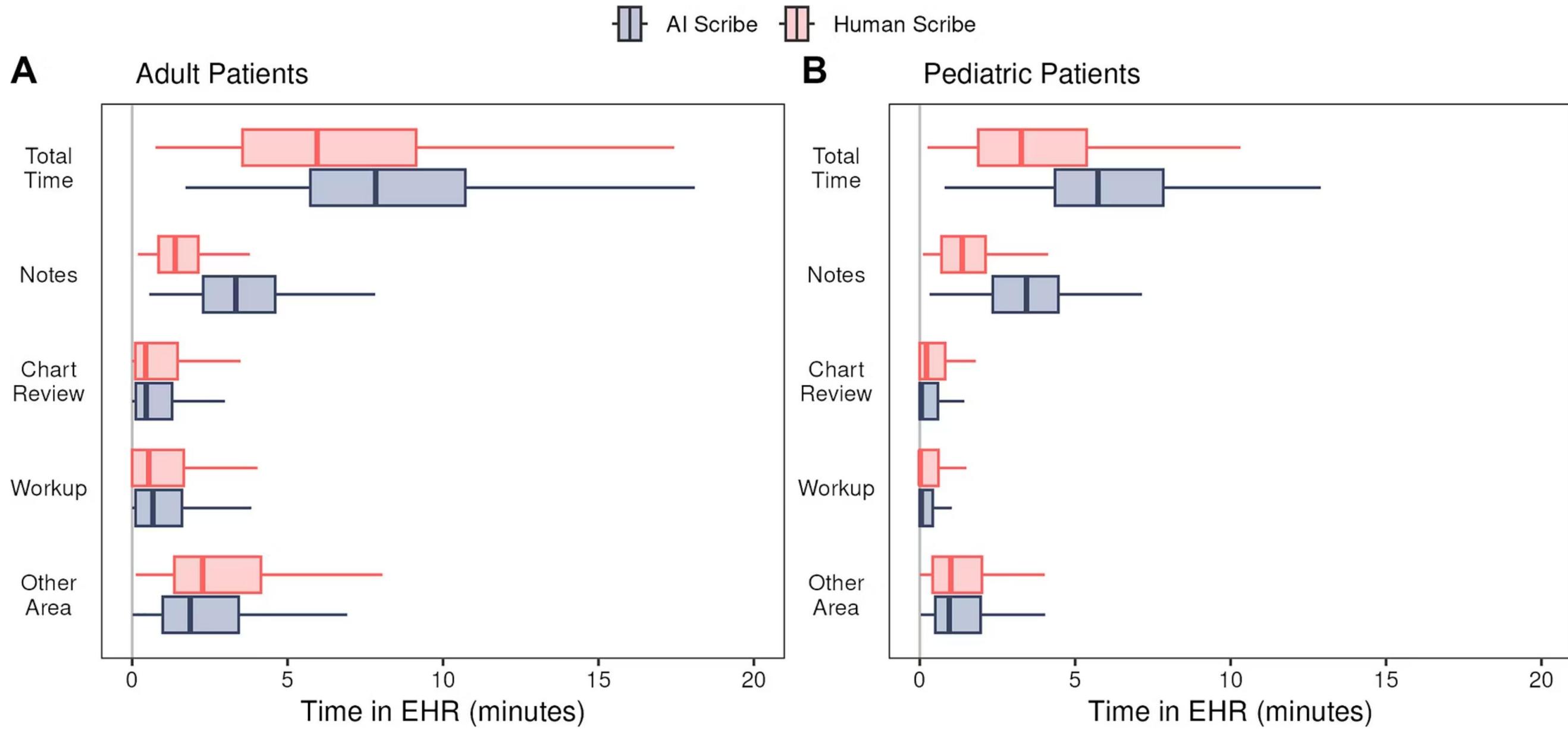
Human Score: 42.25

Adjusted Rate Ratio: -1.89 (95% CI -3.58 to -0.20)

Statistically significant difference — AI documentation quality was lower in pediatric encounters, suggesting room for improvement.

Secondary outcome

Time spent in electronic medical record



Conclusions

"Conclusion: In comparison to human scribes, AI scribes were associated with more time spent in the electronic health record notes section, more physician note contribution, and similar to lower quality notes."

Thoughts

Cost Analysis Missing

The study didn't evaluate economic factors.

Learning Curve Effect

Physician proficiency with ambient AI tools will improve over time.

Rapid Technology Evolution

Ambient AI systems are improving rapidly through machine learning.