

Artificial Intelligence-Assisted Scoring is Associated with Reduced Time to Treatment Recommendation in Home Sleep Apnoea Testing

Riney HD¹, Thorndike FP¹, Hauser K¹, Ágústsson JS², Edington S¹, Baran AS¹, Cyr S¹, Ong JC¹, McPhee M², Hugosdóttir R², Wickwire EM³

- 1. Nox Research, Nox Health, Alpharetta, GA, USA
- 2. Nox Research, Nox Medical, Reykjavík, Iceland
- 3. University of Maryland School of Medicine, Baltimore, MD USA



Presented at Sleep Europe 2026, Maastricht, The Netherlands

Introduction

Home sleep apnoea testing (HSAT) has expanded access to obstructive sleep apnoea (OSA) diagnosis for millions of individuals worldwide. Even so, OSA remains underdiagnosed, particularly among patients (i.e., women) with mild disease or atypical symptom presentations (e.g., depressed mood, fatigue, and comorbid insomnia).¹ Traditional HSAT often underestimates OSA severity and produces inconclusive or false-negative results.^{2,3} Artificial intelligence (AI)-assisted HSAT scoring using respiratory inductance plethysmography (RIP) and signals has demonstrated acceptable accuracy against gold-standard polysomnography (PSG) in FDA-clearance studies (DeepRESP v2.0-[K252330]). However, it is not yet known if implementation of AI-assisted HSAT can improve operational efficiency in real-world settings.

Study Objective: This study examined the association of AI-assisted HSAT scoring on time to treatment recommendation within a US-based comprehensive telehealth sleep care management program.

Methods

Study Design and Participants

Retrospective pre-post implementation analysis of adult patients with a positive Type III home sleep apnea test (HSAT) in a sleep care program who opted in to treatment within 365 days of test upload. Two 10.5-month periods covering the same calendar months were compared: pre-AI (1 April 2024 to 14 February 2025; n=1,276) and post-AI (1 April 2025 to 14 February 2026; n=1,522). The intervening 1.5 months (15 February to 31 March 2025) was the AI rollout period. The primary outcome was time to treatment recommendation. Time from test upload to treatment initiation (opt-in) and time from test interpretation to treatment initiation (opt-in) were examined as exploratory secondary outcomes.

Data Analysis

Time to treatment recommendation was defined as the number of calendar days from test upload to the physician's treatment recommendation, encompassing scoring, interpretation, and clinical decision-making. Cohorts were compared using t-tests.

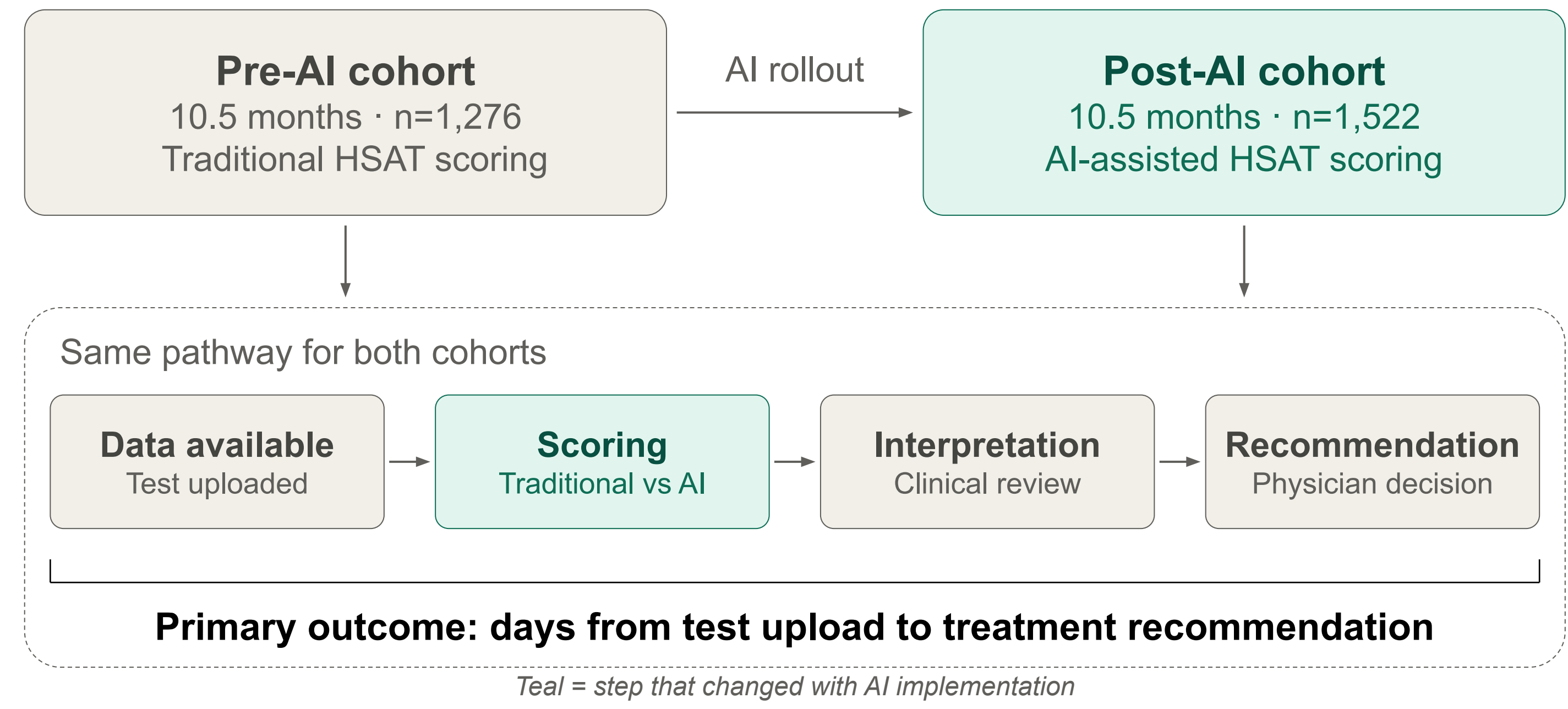


Table 1. Characteristics of the pre-AI and post-AI HSAT cohorts

Characteristic	HSAT without AI (n = 1,276)	HSAT with AI (n = 1,522)
Gender, n (%)		
Female	493 (38.6%)	585 (38.4%)
Male	783 (61.4%)	896 (58.9%)
Unknown	0 (0.0%)	41 (2.7%)
Age group (years), n (%)		
18–25	13 (1.0%)	28 (1.8%)
26–35	151 (11.8%)	186 (12.2%)
36–45	312 (24.5%)	335 (22.0%)
46–55	402 (31.5%)	492 (32.3%)
56–65	348 (27.3%)	432 (28.4%)
>65	50 (3.9%)	48 (3.2%)

Results

Implementation of AI-assisted scoring was associated with a significant reduction in time to treatment recommendation. Mean time was 1.61 days (SD=1.56) pre-AI versus 0.87 days (SD=1.51) post-AI: a mean difference of 0.74 days per HSAT (–46%; t=12.63, p<0.0001). Median time was 1 day in both cohorts; the shift reflects more same-day recommendations (47.8% vs 25.4%) and more within 1 calendar day (84.0% vs 58.3%).

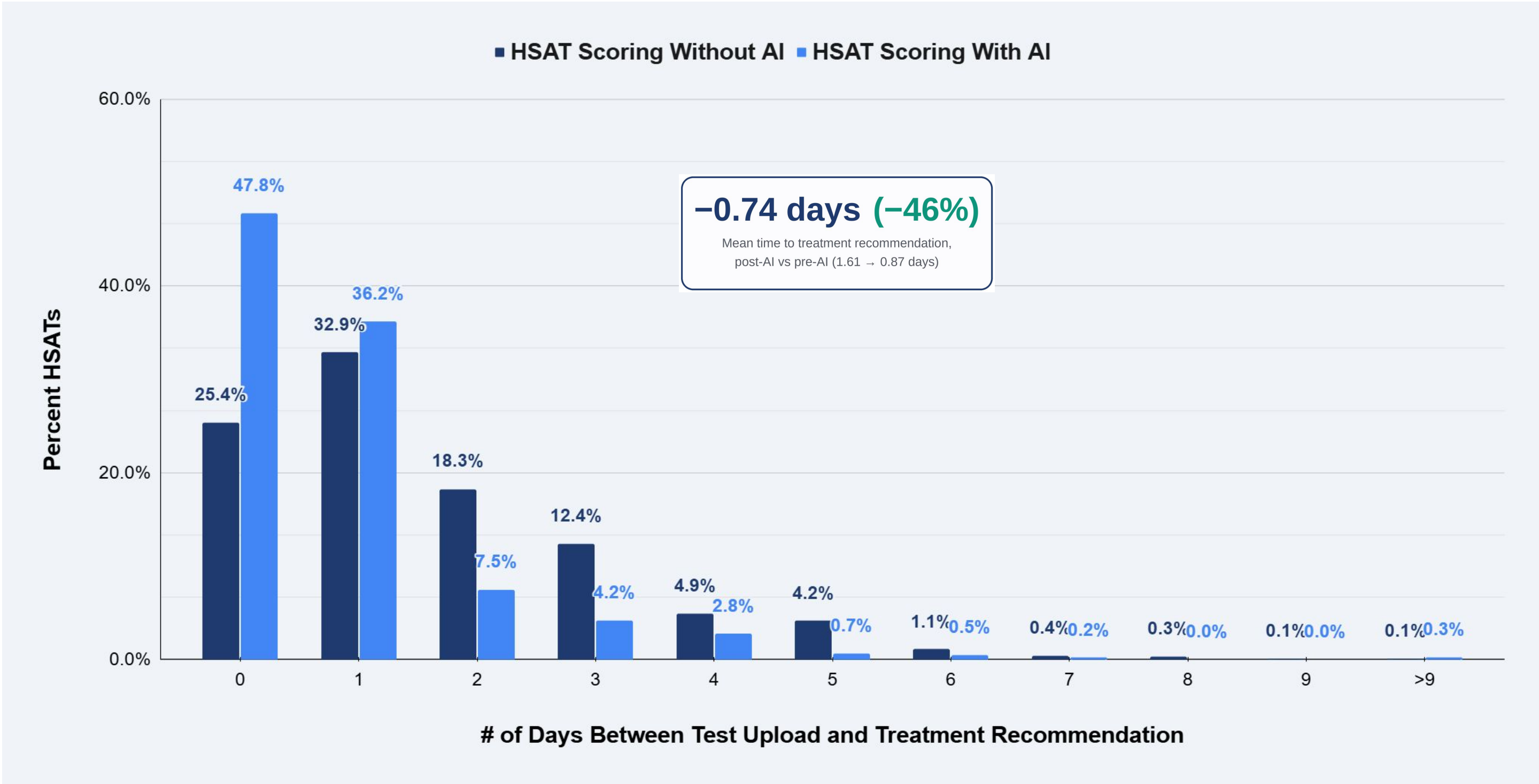


Figure 1. Distribution of time from test upload to treatment recommendation, pre- vs post-AI. Percent of HSATs by calendar days to physician treatment recommendation, before (n=1,276) and after (n=1,522) AI-assisted scoring.

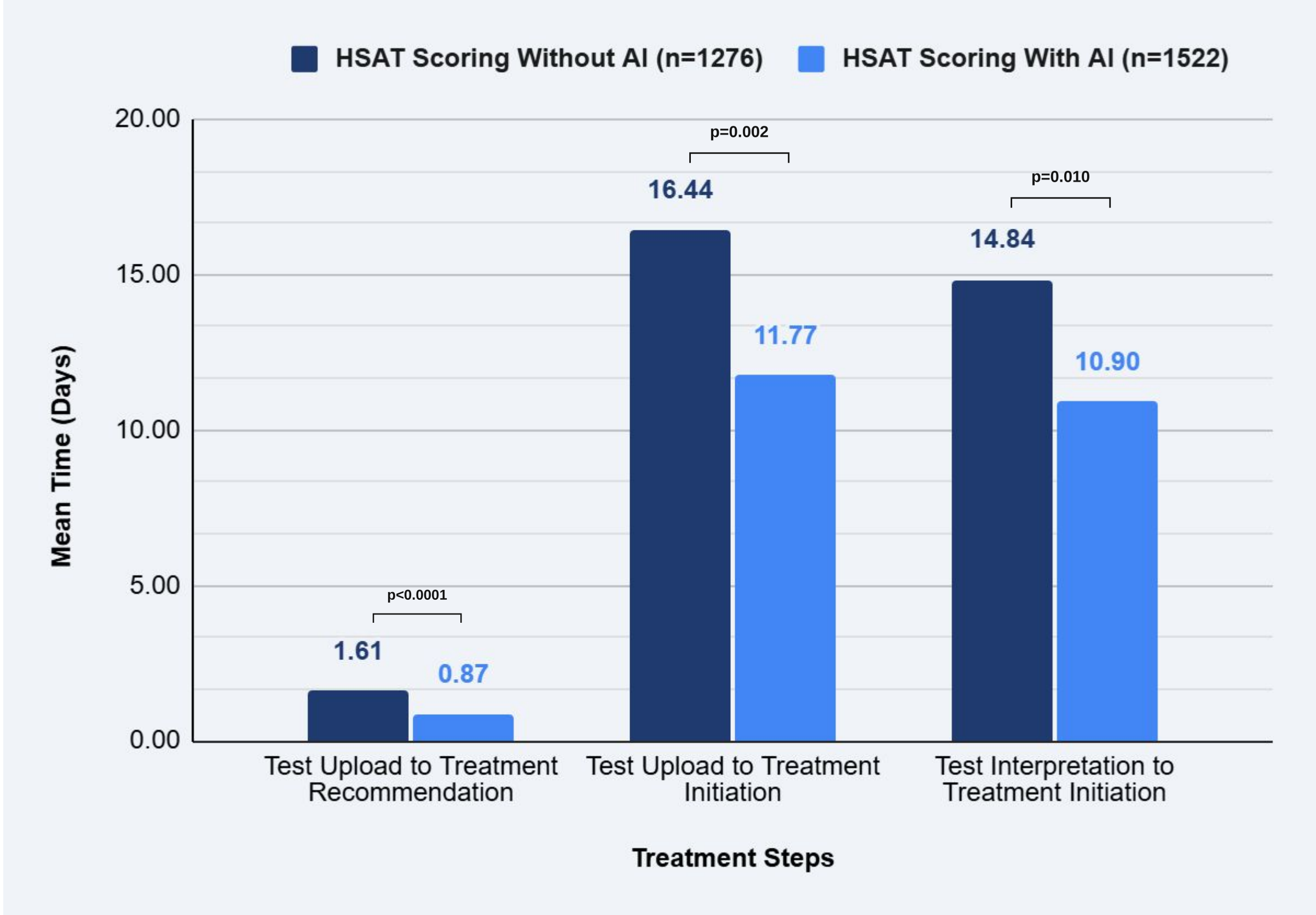


Figure 2. Mean time between treatment steps, pre- vs post-AI. Time from upload to treatment recommendation (–0.74 days, p<0.0001), upload to treatment initiation (opt-in; –4.67 days, p=0.002), and interpretation to opt-in (–3.94 days, p=0.010) were each shorter post-AI. Observed ranges, without vs with AI: 0–14 vs 0–28, 0–362 vs 0–356, and 0–361 vs 0–356 days.

Conclusions

AI-assisted HSAT scoring was associated with a significantly shorter time to treatment recommendation in a real-world sleep care program (–0.74 days, –46%), driven by more same-day recommendations, suggesting it may improve operational efficiency. Exploratory analyses also showed shorter time to opt-in, mostly after the recommendation, so the contribution of AI scoring versus concurrent workflow changes cannot be determined. Controlled or prospective studies should evaluate time to opt-in and adherence. **Study Limitations:** Retrospective observational design; results show an association, not causation, and concurrent workflow changes cannot be excluded. Only patients with a positive HSAT who opted in within 365 days were included, from a single US-based program, limiting generalizability. Analyses were unadjusted, so residual confounding is possible.

Funding: Internal quality-improvement project funded by Nox Health. These operational data were generated following implementation of AI-assisted HSAT scoring and were not part of the evidence submitted in support of the device's 510(k) clearance. Findings should be interpreted in the context of the study design and stated limitations.

COI Disclosures: Authors HR, FT, KH, SE, AB, SC, and JO were employed by Nox Health, the company which delivers the sleep care management program where the AI-assisted HSAT scoring was implemented. Authors JA, MM, and RH were employed by Nox Medical, the company that developed the AI-assisted scoring software. EW's institution has received research funding from the AASM Foundation, Department of Defense, Merck, NIH/NIA, ResMed, the ResMed Foundation, and the SRS Foundation. EW has served as a scientific consultant to Axsome Therapeutics, DayZz, Eisai, EnsoData, Idorsia, Merck, Nox Health, Primasun, Purdue, and ResMed and is an equity shareholder in WellTap. *External companies had no role in this work.*

References: 1. Bouloukaki I, Fabozzi A, Schwarz EI, Schiza SE. Advances in the diagnosis and treatment of obstructive sleep apnea in women. *Pulm Ther.* 2026;12:181-199. doi:10.1007/s41030-026-00350-52. Pitkanen M, Nath RK, Korkalainen H, et al. Respiratory event index underestimates severity of sleep apnea compared to apnea-hypopnea index. *Sleep Adv.* 2024;5(1):zpad054. doi:10.1093/sleepadvances/zpad054 3. Malhotra RK. Arousal-based scoring of obstructive hypopneas. *Curr Opin Pulm Med.* 2021;27(6):491-495. doi:10.1097/MCP.0000000000000820