The Impact of Leadership on AI Deployment Study Outcomes in Healthcare

Qilu Li, MS[1], Peilin Li, MS[2,3], Haijing Hao, PhD[4], Rema Padman, PhD[5], Hewitt Gao[6], J. Travis Gossey, MD[7], Jiang Bian, PhD[8,9], Yiye Zhang, PhD[2,3,7]

[1]University of Maryland, College Park, MD, USA; [2]Cornell University, Ithaca, NY, USA; [3]NewYork-Presbyterian Hospital, New York, NY, USA; [4]Bentley University, Waltham, MA, USA; [5]Carnegie Mellon University, Pittsburgh, PA, US; [6]Penn State University, University Park, PA, USA; [7]Weill Cornell Medicine, New York, NY, USA; [8]Regenstrief Institute, Indianapolis, IN, USA; [9]Indiana University Health, Indianapolis, IN, USA;

Background

- Artificial intelligence (AI) has rapidly expanded in healthcare, but successful real-world deployment remains challenging.
- Implementation is shaped not only by technical performance but also organizational factors, such as workflow fit, trust, and governance.
- Leadership structure and team composition may strongly influence whether AI achieves clinical impact.
- Guided by Upper Echelons Theory, this study examines how leadership background (clinical vs. technical) in published AI deployment studies relates to reported study impact.

Research Design & Methods

This is an analytical study of 105 AI-deployment studies (96 RCTs + 9 pilots, 2018–2024) from two systematic reviews.

- **Leadership**: last author (Clinician vs Technologist); organizational leaders identified by Director/Dean/Chief titles.
- **Covariates**: AI type/origin, comparison (AI vs routine care / assisted vs unassisted), endpoint, setting, region, team composition.
- **Outcome**: significant impact ($p \leq 0.05$ or equivalent).
- Analyses: descriptive tests + multivariable logistic regression with RCT-only robustness check.
- **Hypotheses**
    - H1. Teams led by a clinical leader have a higher likelihood of demonstrating clinical impact from AI, while adjusting for AI and clinical factors.
    - H2. Teams led by a leader with organizational leadership roles have a higher likelihood of demonstrating clinical impact from AI.

Figure 1. Descriptive statistics of variables considered in the dataset. "Leadership" refers to organizational leadership roles.

Conclusion & Next Steps

- Clinician-led AI deployments were significantly more likely to achieve meaningful clinical impact.
- Clinical expertise and workflow understanding may outweigh technical expertise in driving success.
- Leadership background shaped study design choices (AI vs routine care; assisted vs unassisted).
- Findings highlight workforce implications—upskilling clinicians for AI leadership roles.
- Limitations include publication bias, clinician dominance, and authorship-based leadership assumptions.
- Future work should examine diverse leadership styles and mixed clinician–technologist teams.

Results

- 88% reported statistically significant AI impact.
- Clinical leaders were last authors in 81% of studies.
- Studies with clinician leadership: 94% showed significant impact.
- Studies with technologist leadership: 60% showed significant impact ($p < 0.001$).
- Logistic regression:
    - Clinical leadership was significantly associated with higher likelihood of impact
    - OR = 7.793 (95% CI 1.181–63.533, $p = 0.039$)
- Association held in RCT-only robustness check (OR = 19.898, $p = 0.047$).
- Regional patterns: clinical leadership was more common in North America and Asia.

Table 1. Logistic regression analysis of AI impact (N=105)

Variables	OR	Standard Error	95%CI	P-value
Last Author (ref=Technologist) - Last author is Clinician	7.793	0.995	(1.181, 63.533)	0.039*
First Author (ref=Technologist) - First author is Clinician	0.444	1.174	(0.031, 3.611)	0.490
Centers (ref = Multiple) - Single-center research	0.352	1.078	(0.032, 2.443)	0.332
AI Model Type (reference=Deep Learning) - AI model type is non-deep learning - AI model type is Unspecified	1.274	0.973	(0.191, 9.783)	0.803
	0.234	1.827	(0.005, 10.441)	0.427
AI Origin (ref=Non-Academic) - AI origin is academic	1.244	0.918	(0.204, 8.413)	0.812
Clinical Setting (ref=Others: ED, Inpatient) - Clinical setting is outpatient	0.250	1.292	(0.010, 2.337)	0.284
Team Size	1.028	0.073	(0.895, 1.198)	0.709
Region(ref=North America) – Asia – Others	2.544	1.023	(0.345, 22.931)	0.361
	0.319	0.946	(0.043, 1.946)	0.227
Last Author Health Systems Leadership (ref =non-leadership) -Last Author has health systems leadership	1.079	0.928	(0.164, 5.927)	0.884
First Author Health Systems Leadership (ref=non-leadership) -First author has health systems leadership	2.104	1.171	(0.260, 29.890)	0.525
Comparison Type (ref = Assisted vs Unassisted) -AI vs Routine Care	0.345	0.888	(0.054, 1.938)	0.231

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