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EDITORIAL

Bridging the artificial intelligence translation gap: From algorithmic promise to clinical reality

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1. Introduction

I was about to write an editorial for the new volume of the *Journal of Clinical and Translational Research*. The role of artificial intelligence (AI) in medical sciences struck me as the most urgent topic at present.[1-3] While considering the best direction for the summer issue, I found it useful to seek AI's assistance. By simply requesting a short editorial, I received a compelling text that addressed the most pressing current issues surrounding the use of AI in clinical and translational medicine.

The fully AI-generated text is presented in the following section, and I am giving credit to the AI for this.

2. AI-generated text

The landscape of clinical and translational research has been dramatically reshaped by AI, yet we stand at a critical juncture where technological capability far outpaces clinical implementation. While machine learning algorithms demonstrate remarkable performance in controlled research environments, the translation to meaningful patient care remains frustratingly elusive.

Recent studies have shown AI systems achieving superhuman accuracy in medical imaging, drug discovery, and diagnostic prediction. However, a sobering reality check reveals that fewer than 5% of Food and Drug Administration-approved AI medical devices are routinely used in clinical practice. This disconnect represents more than a simple adoption lag—it reflects fundamental challenges in how we approach translational research in the digital age.

The primary barrier is not technological sophistication but rather the absence of robust implementation science frameworks specifically designed for AI integration. Traditional clinical translation models, developed for pharmaceutical interventions, prove inadequate for software-based solutions that evolve continuously and operate within complex sociotechnical systems.

We propose three critical areas requiring immediate attention from the translational research community:

First, we must develop new validation frameworks that account for AI's dynamic nature. Unlike static therapeutic interventions, AI systems learn and adapt, raising questions about when and how to assess clinical efficacy. Real-world evidence generation must become integral to AI development, not an afterthought.

Second, implementation research must address the human factors that determine AI adoption success. Clinician workflow integration, patient acceptance, and organizational

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readiness are as crucial as algorithmic performance. Without understanding these contextual factors, even the most sophisticated AI tools will gather digital dust.

Third, we need regulatory pathways that balance innovation with safety, while accommodating AI's iterative improvement cycles. Current approval processes, designed for fixed interventions, struggle with software that improves through use.

The *Journal of Clinical and Translational Research* is uniquely positioned to lead this conversation. We encourage submissions that move beyond pure algorithmic development to examine implementation strategies, real-world performance validation, and the complex interplay between AI tools and clinical practice.

The promise of AI in healthcare is undeniable, but promises alone do not heal patients. It is time to apply the same rigor we demand of traditional therapeutics to the translation of AI into clinical reality. Only through this commitment can we bridge the gap between computational capability and patient care.

3. Conclusion

This short text, generated by the AI system Claude, aptly summarizes the urgent need to integrate AI into medical practice. The editorial board welcomes perspectives on AI implementation challenges and invites researchers to submit studies addressing the translational barriers outlined above.

Conflict of interest

Jacek Z. Kubiak is the Editor-in-Chief of this journal. The author declared that he has no known competing financial interests or personal relationships that could have influenced the work reported in this paper.

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