

## EDITORIAL

# WILL ARTIFICIAL INTELLIGENCE REPLACE DOCTORS AND TEACHERS BY 2035? EVIDENCE-BASED ANALYSIS FROM MEDICINE AND EDUCATION

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Artificial intelligence (AI) continues to provoke vigorous debate about the future of the health and education professions. Enthusiasts and sceptics alike have predicted that within a decade, machines may replace many roles currently held by doctors and teachers. This claim, while provocative, does not fully reflect the nuanced and evidence-based positions developed in recent literature from medical science, policy, and educational research. Instead, a careful reading of current sources suggests a future shaped not by wholesale replacement, but by evolving collaboration and task redistribution between AI and human professionals.

Several comprehensive analyses have charted the expanding use of AI in medicine over the last five years, noting the rapid improvement in the performance of deep learning algorithms and other machine learning tools for specific diagnostic and predictive tasks. In a landmark review, Topol describes the convergence of human and artificial intelligence, showing that sophisticated computational models are capable of expert-level performance in pattern recognition, especially in radiology, pathology, and cardiology, as well as in genomics and population health.<sup>1</sup> Esteva and colleagues reinforce these findings, demonstrating that neural networks trained on large datasets can match or exceed specialist accuracy in image-based diagnosis across several domains, including dermatology and ophthalmology.<sup>2</sup> Implementation studies by He and others emphasize that while performance in the laboratory is impressive, real-world use introduces additional complexity; clinical workflows, variable data quality, and the need for human oversight all affect the integration of AI tools into routine patient care.<sup>3</sup>

The promise of AI-driven health care extends beyond diagnosis. As Davenport and Kalakota point out, artificial intelligence is already accelerating workflows, improving operational efficiency, and reducing administrative burdens.<sup>4</sup> Rajpurkar and co-authors highlight how AI-powered triage, risk prediction, and even some elements of patient communication have become feasible, especially in settings with large volumes of structured data.<sup>5</sup> In cardiovascular medicine, deep learning applications have produced automated assessments that support decision-making in imaging and risk stratification, although clinicians are cautioned

to interpret such results within the broader context of individual patient needs.<sup>6</sup>

However, none of these advances suggest that clinicians are close to being replaced. All authoritative reviews in this period stress the indispensable role of human expertise, particularly where judgment, contextual understanding, or interpersonal skills are essential.<sup>1,3,4,6</sup> Amann *et al.* draw attention to explainability, warning that the so-called “black box” character of many AI models remains a barrier to full clinical integration. For physicians to safely trust and rely on AI recommendations, systems must provide clear rationales that can be interrogated and validated by human users.<sup>7</sup> Price and Cohen extend this critique to the ethical and legal realms, arguing that data privacy, patient consent, and the security of personal health information must be at the core of any AI-driven transformation.<sup>8</sup> The legal landscape is equally unsettled, as Gerke and colleagues note: Questions of liability, accountability, and transparency have yet to be resolved, especially in cases where algorithmic error results in patient harm.<sup>9</sup>

As the World Health Organization’s recent guidance on AI in health stresses, new technologies must be governed in a way that advances public good, safeguards equity, and respects human dignity.<sup>10</sup> The focus, in this view, should not be on eliminating physicians, but on designing human-AI partnerships that elevate standards of care while retaining essential ethical and social dimensions. The evidence does not support predictions of obsolescence, but rather the transformation of professional roles to take advantage of complementary strengths. In education, the conversation runs in parallel. Holmes, Bialik, and Fadel chart the promises and implications of AI in teaching and learning, documenting a wide range of tools that personalize curriculum delivery, automate grading, and support adaptive assessment.<sup>11</sup> The policy and technical guidance issued by UNESCO emphasizes both the opportunities and risks of AI for education systems, highlighting the potential to close learning gaps, support at-risk students, and facilitate administrative efficiency.<sup>12</sup> However, UNESCO and other researchers consistently underscore that effective learning depends on human relationships, ethical values, and the irreplaceable role of

teachers in fostering critical thinking, creativity, and socio-emotional growth.<sup>12,13</sup>

A systematic review by Zawacki-Richter and colleagues finds that most research and implementation of AI in higher education to date has centered on administrative tasks, resource allocation, and automated feedback.<sup>12</sup> Despite the growing capacity of AI to process student data and optimize instruction, the review concludes that educators remain central, especially in higher-order learning, mentorship, and the modelling of social skills. The World Health Organization's broader guidance on AI ethics offers similar caution, noting that algorithmic solutions in any human-centered domain should be transparent, inclusive, and aligned with local values and needs.<sup>14</sup> In their analysis, Williamson and Eynon discuss how educational AI research has sometimes overpromised and underdelivered, often neglecting the complex realities of classroom life and the enduring necessity of direct human engagement.<sup>12</sup>

The Organization for Economic Cooperation and Development (OECD) situates these issues within a wider social context, arguing that AI should be seen as a "general purpose technology" that reshapes societies in profound but unpredictable ways. Their report calls for public dialogue, robust governance frameworks, and lifelong learning initiatives to prepare professionals and communities for new forms of collaboration between humans and machines.<sup>15</sup> Evidence from multiple international sources suggests that the most promising and sustainable future for both medicine and education lies in human-AI partnership, rather than the full automation of core professional roles.

When the evidence is weighed, several themes emerge. First, the technical capacity of AI is real and expanding, especially in domains defined by large, high-quality datasets and clearly specified tasks.<sup>1,2,4,6,11,13</sup> Second, persistent limitations remain in areas requiring nuanced judgment, complex social interaction, and the exercise of values—capacities that are central to both medicine and teaching.<sup>1,7–10,12,13</sup> Third, the legal, ethical, and regulatory questions raised by the deployment of AI in these critical fields are not merely peripheral; they are fundamental, and most are not yet resolved.<sup>8,9,12,13</sup> Finally, there is broad agreement among leading organizations that AI is best deployed as an augmenting technology, expanding professional capacity and freeing human experts to focus on the relational, ethical, and creative aspects of their roles.<sup>3,5,10,12,13</sup> The future of

doctors and teachers in an age of intelligent machines will depend on continued vigilance, robust regulation, and deliberate professional adaptation. While AI will transform what it means to practice medicine or teach, and while some routine functions will be automated, the core of both professions is defined by human abilities that are not currently amenable to algorithmic replication. The available literature supports a vision in which professionals and machines work together, not one in which the most vital and human elements of care and learning are left to code.

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