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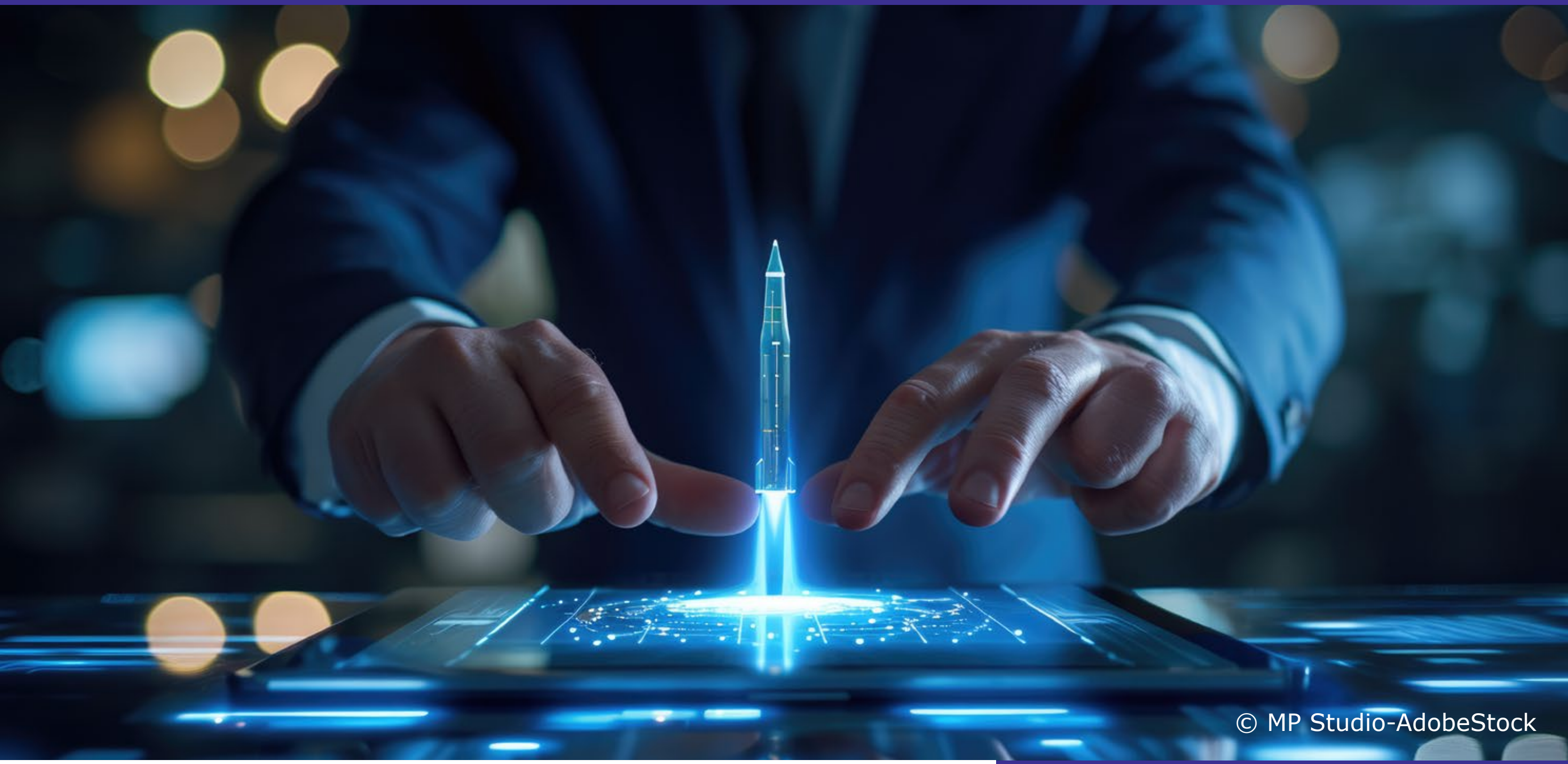

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LIGHTS - Innovation/Entrepreneurship

Exploring the potential impact of artificial intelligence on the redefinition of the value in health equation

ESCP Impact Paper No.2025-13-EN

Sofia MACEDO - Center for National Health Insurance, ESCP Business School
Frédéric JALLAT, PhD - ESCP Business School

ESCP RESEARCH INSTITUTE OF MANAGEMENT (ERIM)

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Sofia Macedo*
Frédéric Jallat, PhD**

ESCP Business School

Abstract

This paper explores how artificial intelligence (AI) is reshaping the foundations of healthcare value creation. Building on the limitations of traditional value-based healthcare (VBHC) models—often restricted to cost-outcome ratios—it argues for a broader and more inclusive "value in health" framework, enriched by real-time, predictive, and personalized AI applications. Drawing on academic literature and applied research findings, the paper highlights how AI facilitates multidimensional definitions of value: from patient-centered outcomes to social determinants of health and system-wide responsiveness. AI-driven analytics, decision support systems, and adaptive models foster an ecosystem where value is not just delivered, but dynamically co-constructed. Beyond technical optimization, the paper examines how AI demands new ethical and regulatory standards, equity-by-design approaches, and transparent governance. It also introduces the concept of *Society 5.0* to frame AI as a socio-technical enabler of inclusive health innovation. Ultimately, AI is not just enhancing healthcare—it is accelerating a paradigmatic shift toward value creation grounded in precision, trust, and societal relevance. The paper concludes with a call for further research into responsible innovation pathways that can reconcile efficiency with equity in the age of intelligent systems.

Keywords: artificial intelligence, value-based healthcare, patient-centered care, predictive analytics, health outcomes

* Health Benefits and Outcomes Advisor, Center for National Health Insurance (CNHI, Saudi Arabia), Global Executive PhD Student, ESCP Business School
**Professor, ESCP Business School

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Introduction

The pursuit of value in health has redefined healthcare strategies in the 21st century. Shifting away from volume-driven approaches, health systems worldwide increasingly prioritize models that align care delivery with outcomes that matter to patients.

Within this framework, value-based healthcare (VBHC) has emerged as a strategic lens to optimize health outcomes relative to cost. Yet, existing frameworks have often struggled to fully capture the multidimensional nature of value, particularly in the face of emerging digital innovations.

Artificial intelligence (AI) offers a transformational opportunity to expand this equation. As algorithms improve diagnosis, predict outcomes, and personalize care, AI is challenging traditional notions of value by introducing new metrics: precision, adaptability, and real-time responsiveness.

This paper examines how AI is actively contributing to a redefinition of healthcare value, particularly by enhancing patient outcomes, enabling predictive interventions, and improving system efficiency. It also explores the ethical, technical, and operational challenges that must be addressed to ensure that AI-driven value remains equitable and sustainable.

From value-based healthcare to value in health

Porter's seminal work on VBHC emphasized the ratio of outcomes to costs across a full cycle of care. While foundational, this approach focused largely on clinical outcomes and direct cost-efficiency (Porter, 2013). Recent critiques argue that such definitions remain overly reductionist in the face of chronic disease burdens, health inequalities, and patient diversity. In contrast, broader 'value in health' frameworks propose incorporating dimensions such as patient experience, environmental sustainability, and system adaptability (Jayakumar et al., 2019; Wicher & Rapp, 2022).

AI can help operationalize these broader frameworks by enabling dynamic, context-sensitive assessments of value. For example, real-time monitoring of treatment efficacy, predictive modelling for proactive interventions, and the personalization of care pathways all reflect a more expansive, fluid understanding of what constitutes value. This expanded scope has profound implications for how we measure, reward, and improve healthcare delivery in the AI era (Varnosfaderani & Forouznafar, 2024).

AI as a catalyst for redefining the value equation

AI's most visible impact is in clinical decision-making. Algorithms trained on vast datasets can now match or exceed human diagnostic accuracy in areas like radiology, dermatology, and ophthalmology. These technologies reduce diagnostic errors, expedite triage, and lower associated costs—an immediate gain in value. Moreover, AI-powered tools enable personalized treatment recommendations based on patient-specific variables such as genomics, comorbidities, and lifestyle factors.

Predictive analytics represent a second major contribution. AI models can identify at-risk patients and anticipate adverse events, enabling early intervention. This not only improves outcomes but reduces avoidable hospitalizations—an area of significant cost in most systems. Such predictive power represents a fundamental shift in the value equation, emphasizing prevention over remediation.

Third, operational optimization via AI has become a critical enabler of value. AI tools streamline resource allocation, reduce appointment no-shows through automated reminders, and support workforce planning via capacity modelling. These efficiency gains, while less visible to patients, are integral to sustaining care quality amid rising demand.

A fourth, equally important domain is patient empowerment, which reflects a move toward shared decision-making and personalized self-management. AI-enabled mobile apps and wearable technologies allow patients to track chronic conditions, access real-time recommendations, and understand treatment impacts on their own terms. For instance, digital coaching platforms powered by AI can support diabetic patients in managing glucose levels, physical activity, and diet with dynamic feedback loops, enabling greater autonomy and adherence. Similarly, oncology patients can use symptom-tracking tools that adjust supportive care recommendations while flagging critical alerts to care teams. These tools are not merely augmentative; they represent a reallocation of agency to the patient, contributing meaningfully to the expanded value equation.

Several institutions and companies have illustrated these contributions:

- Babylon Health, a digital-first health service provider, uses AI to triage symptoms, direct patients to appropriate care pathways, and empower users through continuous health monitoring.
- Mayo Clinic has developed AI algorithms to predict patient deterioration in intensive care units, triggering rapid response protocols that reduce morbidity and improve survival.
- Roche, a major pharmaceutical firm, applies AI for personalized oncology treatments through its Foundation Medicine platform, integrating genomic insights into clinical practice and thereby enhancing value by tailoring therapies to individual patient profiles.

These examples highlight how AI tools are reconfiguring the structure and experience of value—not only in clinical performance but also in accessibility, responsiveness, and patient ownership of care.

To synthesize these shifts, the following table presents an overview of how conceptions of healthcare value evolve with AI.

Table 1: Evolution of the Conception of Value in Healthcare with AI

From Traditional VBHC	To AI-Enhanced Value in Health
Outcome per cost (clinical focus)	Multidimensional outcomes (clinical + Real-World Evidence - RWE)
Retrospective data analysis	Real-time and predictive analytics
Standardized treatment protocols	Personalized, adaptive care pathways
Provider-driven decisions	Patient-clinician-AI co-decision
Episodic, reactive care	Continuous, proactive engagement
Efficiency in service delivery	Efficiency + patient experience + equity
Individual health outcomes	Individual + population + societal outcomes

This evolution underscores a paradigmatic transformation: AI is not just a tool to optimize existing systems; it is a vector for cultural change, shifting the locus of value creation toward co-produced, ethically grounded, and societally relevant healthcare.

Ethical, technical and policy challenges

Despite its promise, AI integration into value frameworks is not without risk. One major concern is algorithmic bias. Models trained on unrepresentative datasets can reinforce systemic inequities, leading to sub-optimal care for under-represented populations. If AI is to truly enhance value in an inclusive way, developers must adopt equity-by-design principles and ensure diverse training data.

Second, explainability remains a critical issue. Many high-performing AI models, especially those using deep learning, function as 'black boxes'. For healthcare professionals to trust and act upon AI recommendations, tools must provide interpretable outputs that clinicians can understand and defend.

From a policy perspective, regulatory frameworks have struggled to keep pace with AI innovation. Questions about liability, data ownership, and accountability remain unresolved. Furthermore, the rapid commercialization of healthcare AI raises concerns about market-driven distortions of value, where optimizing financial returns may take precedence over patient outcomes.

Finally, technical limitations such as interoperability barriers and data silos hinder the integration of AI into routine workflows. Without seamless connections between electronic health records, analytics platforms, and clinical operations, the full potential of AI-enhanced value creation remains unrealized.

Practical applications and case insights

AI deployment varies across countries and contexts, yet certain applications stand out.

In the UK, the National Health Service (NHS) has piloted AI tools to reduce diagnostic backlogs in radiology. Early evaluations suggest improved throughput and reduced patient waiting times—key dimensions of system value.

In the US, AI is increasingly embedded in chronic disease management platforms. These tools provide real-time feedback, enhance medication adherence, and support lifestyle changes, resulting in measurable improvements in quality-adjusted life years (QALYs). Such platforms are also being evaluated for their ability to reduce health disparities by tailoring interventions to social determinants of health.

Another compelling example lies in the domain of oncology, where AI is being used to optimize chemotherapy dosing and predict toxicities, thus enabling more personalized and safer treatment. These applications demonstrate that AI's impact extends beyond diagnostics and into care planning, safety, and long-term outcomes—all of which redefine value.

Conclusion and future outlook

Artificial intelligence is not merely enhancing existing definitions of value—it is prompting a foundational rethinking of what value in health truly means. Its capacity to deliver precision, prediction, and personalization aligns with the most urgent needs in healthcare systems today. However, realizing this potential demands more than technical prowess: it requires ethical rigor, interdisciplinary collaboration, and policy foresight.

This paper has illustrated the breadth of AI's contributions to redefining value, from operational efficiency to patient empowerment. Yet, many questions remain. Future research should explore how AI-derived value can be equitably distributed, how to govern its use without stifling innovation, and how to ensure that the pursuit of value remains rooted in patient dignity and societal good.

Ultimately, the redefinition of value in healthcare is not only technological—it is cultural, philosophical, and political. AI offers a powerful lens to accelerate this shift, but its direction must be consciously shaped by collective intent.

In addition to its clinical benefits, AI also brings transformative potential to the organizational and strategic layers of healthcare systems. AI's ability to harmonize vast datasets, draw inferences in real-time, and personalize treatment at scale contributes to a new era of healthcare value creation. According to the research, the value equation must now include dimensions such as patient-reported outcomes, societal impact, and sustainability.

Moreover, AI enables the integration of social determinants of health (SDOH) into value-based assessments. Rather than limiting value to clinical or economic outputs, this broader conception allows for a more equitable distribution of care. AI-powered tools facilitate risk stratification, personalized engagement strategies, and community-level insights that support proactive health policies.

These features of AI mark a departure from static, retrospective healthcare management, and a move towards adaptive, predictive, and participatory frameworks. In doing so, they address key limitations identified in legacy VBHC models—chiefly, their inability to scale equitably and inclusively. By capturing and integrating granular patient-level insights with system-wide data, AI fosters a holistic and ethically sound redefinition of value in health.

From a policy standpoint, the emergence of Society 5.0 reinforces the idea that AI is not an isolated innovation, but a core component of a broader sociotechnical transformation. In this vision, digital technologies are mobilized not just to improve technical performance but to serve societal wellbeing. The expanded definition of value thus incorporates dimensions of digital equity, ethical governance, and civic empowerment—all essential to ensuring trust and legitimacy in future health systems.

References

Alowais, S. A. et al. (2023). Revolutionizing healthcare: The role of artificial intelligence in clinical practice. *BMC Medical Education*, 23(689).

Crowson, M. G., & Chan, T. C. (2020). Machine learning as a catalyst for value-based healthcare. *Journal of Medical Systems*, 44(139).

Henrich, J., Ritz, E., Hofmann, P., & Urbach, N. (2024). Capturing artificial intelligence applications' value proposition in healthcare – a qualitative research study. *BMC Health Services Research*, 24(420).

Jayakumar, P., Moore, M. L., & Bozic, K. J. (2019). Value-based healthcare: Can artificial intelligence provide value in orthopaedic surgery? *Clinical Orthopaedics and Related Research*, 477(7), 1777–1780.

Klumpp, M. et al. (2021). Artificial Intelligence for hospital healthcare: Application cases and answers to challenges in European hospitals. *Healthcare*, 9(8), 961.

Kumar, P., Dwivedi, Y. K., & Anand, A. (2023). Responsible AI for value formation and market performance in healthcare. *Information Systems Frontiers*, 25(6), 2197–2220.

Matheny, M. E. et al. (2025). Artificial intelligence in health and healthcare: Priorities for action. Health *Affairs*, 44(2), 163–170.

Porter, M. E., & Lee, T. H. (2013). The strategy that will fix health care. *Harvard Business Review*, 91(10), 50–70.

Varnosfaderani, S.M. & Forouzanfar, M. (2024). The role of AI in hospitals and clinics: Transforming healthcare in the 21st century. *Bioengineering*, 11(4), 337.

Whicher, D., & Rapp, T. (2022). The value of artificial intelligence for healthcare decision making: Lessons learned. *Value in Health*, 25(3), 328–330.