How AI Shapes Health Policy in the US, UK, China, and India

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Abstract

Major economies, including the United States (US), United Kingdom (UK), China, and India, now use Artificial Intelligence (AI) to transform their health policy development and execution processes. This research examines four distinct AI-based health policy models through policy documents and regulatory strategies, and implementation records from 2018 to 2025. The four nations demonstrate different regulatory approaches, but they all understand AI's transformative capabilities. AI health policy success depends on three essential factors, which include equal access to AI healthcare solutions and the combination of innovation promotion with safety measures and effective data management systems. The paper examines how AI technologies influence healthcare decision-making and regulatory systems and governance structures in India and the United States, the United Kingdom and China.

Keywords: Artificial Intelligence (AI), Health Policy, Algorithmic Accountability

Introduction

Modern healthcare practices have truly transformed with the onset of AI, especially with advancements that have made them more intuitive and user-friendly. AI can now analyze unimaginably vast quantities of data, detect patterns over large and sometimes small datasets, and produce predictive insights that are comparable and even surpass human analysis, transforming many major aspects of health policy from clinical operations, medical administration, and resource allocation. The COVID-19 pandemic, in particular, changed the rate of adoption of digital health tools and particularly paved the way for AI to serve as an essential tool for policy making and implementation, disease modelling, and healthcare optimization. This change signified a radical shift from the conventional forms of evidence-based modelling based on human judgement and experience to algorithmic governance systems.

This research particularly looks at the AI adoption policies and their effects on four major economies that have sometimes vastly different economic realities, conventional healthcare outlooks and regulatory environments.

Literature Review

Walt and Glison's policy triangle framework is particularly useful for researchers who attempt to understand how policy content interacts with different actors and contexts. This model is particularly useful for policy makers and scholars who are trying to focus on three essential requirements for AI systems: transparent algorithms, unbiased decision-making, and flexible policy systems.

The healthcare sector now uses digital health technology vigilance to monitor AI systems after market release through adapted pharmaco-vigilance methods that address AI-specific learning and adaptive capabilities. The Total Product Lifecycle (TPLC) framework has started to gain worldwide acceptance as a complete regulatory system for AI, which covers design stages through validation and deployment and ongoing supervision.

Health policy research has traditionally analyzed funding systems and service delivery systems, and performance metrics. AI implementation in healthcare systems requires new policy frameworks to handle data management, algorithm accountability, and innovation promotion. Research shows that nations follow different approaches to regulation through their risk management strategies and implementation structures and their regulatory frameworks.

Methodological Approach

This paper uses the comparative case study methodology to analyse the various official policies, legal frameworks, and implementation strategies used in the US, UK, China, and India. It also closely examines various government documents, regulatory policies, and published vision documents published between 2018 and 2025. This period is particularly important because it analyses the AI-driven acceleration in health policymaking in the post COVID-19 pandemic scenario. The secondary data includes academic publications, policy analysis, and industry assessments. The analysis is structured around five foundational dimensions: regulatory architecture, implementation tools, data governance, innovation policy, and risk management.

Country Case Studies

The United States: Market-Oriented Deregulatory Model

The United States focuses on a market-driven strategy in AI health policy that emphasizes innovation and competition, but at the same time maintains safety measures. The 'America's AI Action Plan' (2025) under the Trump Administration exemplifies this deregulatory vision, treating AI advancement as paramount for both national security and economic prowess.

The FDA has adopted a risk-based approach for AI-driven medical devices, notably through its 'AI/ML-based Software as Medical Device Action Plan' (2021). This introduces 'predetermined change control plans,' allowing certain approved algorithmic changes without requiring fresh authorization for every minor modification. The approach tries to balance ongoing technical improvement with patient safety.

On the state level, over 250 health AI bills were introduced in 34 states in 2025, focusing on transparency, consumer protection, payer use of AI, and clinical applications. States such as California, Colorado, and Utah have enacted sweeping legislation to provide innovation safety nets. The Department of Health and Human Services outlined a Strategic Plan for AI in 2025, identifying opportunities for improving care access, diagnostic precision, and cost efficiencies, while acknowledging risks relating to bias, privacy, and transparency.

The US model faces challenges, including regulatory fragmentation, safeguarding algorithmic transparency without undermining commercial interests, and harmonizing data interoperability across diverse healthcare systems.

The United Kingdom: Principles-Based Collaborative Framework

The UK follows a principles-based strategy, focusing on ethical standards through public-private partnerships. The Medicines and Healthcare Products Regulatory Agency (MHRA) has established an AI regulatory network and launched the innovative 'AI Airlock'—a regulatory sandbox allowing piloting of AI medical devices before wider NHS deployment.

The 'sandbox' facilitates swift validation and iterative refinement of AI technologies, demonstrated in domains such as AI-driven lung diagnostics and personalized oncology. The UK's vision is evident in its founding role in the HealthAI Global Regulatory Network which aims to consolidate global norms while securing domestic innovation.

The NHS has also formulated comprehensive guidance for AI adoption whoch emphasises evidence-based practices and pilot studies. The NHS AI Lab has highlighted General Practice as the major area of impact of AI technologies, forewarning the need for the updation of skills and knowledge.

The UK's strengths lie in international collaboration, novel regulatory frameworks, and systematic capacity building. Principal challenges remain resource constraints, NHS integration issues, and the tension between agile innovation and GDPR-compliant data governance.

China: State-Led Comprehensive Integration Model

China has implemented an integrated, state-directed approach to AI health policy. The 'Healthy China 2030' blueprint positions AI as central to the nation's healthcare transformation, backed by extensive public investment and coordinated multi-level government action.

The National Health Commission's 'Smart Hospital National Initiative' (2024) meticulously outlines AI deployment in 84 specific contexts, from medical services management to clinical efficiency metrics. This centralized model enables large-scale synchronization and resource allocation.

China's regulatory regime for AI medical devices is anchored in existing standards, supplemented by expedited protocols through the National Medical Products Administration and locally customized plans. Beijing's AI Data Training Base stands as a pioneering regulatory sandbox dedicated to healthcare.

AI technologies feature prominently in administration—algorithms support fraud detection, drug procurement optimization, and epidemic forecasting. The National Healthcare Security Administration applies AI for billing surveillance; provincial Centers for Disease Control deploy predictive modeling.

Partnerships with technology giants such as Huawei, Tencent, Alibaba, and Baidu spark rapid innovation, yielding advanced platforms for multi-modal diagnostics and virtual care.

China's strengths include inclusive policy design, extensive public investment, and robust execution. Weaknesses centers on data privacy, uneven regional deployment, and challenges in algorithmic transparency.

India: Federated Inclusive Development Strategy

India focuses on an AI for All policy that emphasises the use of AI in an ethical and inclusive manner that does not worsen the existing social and economic inequalities. The Ayushman Bharat Digital Mission (2021) gives us a vision of national AI adoption, supported by the National Digital Health Blueprint's federated architecture that integrates healthcare entities while maintaining privacy and security.

India's policy approach examines AI's effects on targeted healthcare functions, enabling responsive, sensitive regulation. Notable examples include collaboration between the National Health Authority and IIT Kanpur for AI research, the use of AI-based clinical decision support in the national telemedicine system (eSanjeevani), and frameworks for assessing digital health technologies.

Strengths of India's model include inclusive growth philosophy, digital infrastructure, and innovative governance. Challenges persist in bridging urban-rural disparities (despite the call for AI for All), capacity building, and balancing privacy with innovation under resource constraints.

Comparative Analysis

Regulatory Philosophy and Approach

The four nations embody distinct regulatory cultures. The US foregrounds market incentives and deregulation, seeing AI primarily as an economic catalyst. The UK advances a harmonized, principles-based model balancing innovation and safety. China orchestrates policy through centralized planning, while India tailors federated development to a heterogeneous national landscape.

These philosophies manifest in diverse operational choices. The US refines existing frameworks, the UK develops instruments such as sandboxes, China invents comprehensive architectures, and India invests in foundational infrastructure.

Implementation Mechanisms and Governance Structures

Mechanisms for implementation differ radically. The US federal system enables state-level innovation but risks regulatory inconsistency. The UK's centralized governance streamlines coordination but contends with resource and integration challenges. China leverages hierarchical coordination for seamless deployment, and India adapts interventions for local diversity under broader integration.

Data Governance and Privacy Frameworks

Data governance remains a universal challenge. The US model is oriented towards data utility and innovation, framed by HIPAA and state-level variation. The UK emphasizes rigorous privacy standards under GDPR, marrying transparency and innovation. China focuses on leveraging aggregated data for population health, with privacy and consent shaped by local values. India prioritizes consent management and federated data architecture, reflecting democratic norms.

Innovation Policies and Economic Incentives

Innovation agendas reflect local context. The US incentivizes competitive innovation with light regulation. The UK seeks global leadership via collaboration and standards. China coordinates large-scale, state-driven innovation using partnerships with major tech firms. India emphasizes low-cost, inclusive solutions driven by development priorities.

Risk Management and Safety Regimes

Risk management regimes align with regulatory philosophies. The US attaches oversight to risk levels, with tools like predetermined change control. The UK stresses ongoing monitoring and real-world validation, leveraging sandboxes. China integrates risk concerns into its planning, while India pursues ethical, people-centered strategies and application-specific governance.

Discussion and Implications

Convergent Trends and Divergent Approaches

Despite divergent strategies, common themes arise across all four countries. Each nation recognizes AI's transformative impact and the urgent need for effective governance. Key challenges include algorithmic transparency, bias mitigation, privacy and security, and workforce preparation.

However, responses are shaped by local culture, government structure, and policy priorities, underscoring the necessity for bespoke national models.

Policy Learning and International Coordination

Comparative analysis reveals opportunities and obstacles for transnational policy learning. The UK's leadership in international AI regulatory networks suggests a capacity for cooperative standard-setting. The US's emphasis on competition signals a more reserved approach to international coordination.

China's holistic model offers lessons in scaling adoption, though its portability to other systems is debatable. India's federated approach demonstrates how to operationalize diversity and inclusion within AI policy.

Future Research Directions

Further inquiry should track long-term policy outcomes and comparative effectiveness. Cross-national studies probing implementation barriers, determinants of policy success, and the intersection of AI health policy with broader technology governance are essential. Future research should consider the evolving role of global institutions in standard-setting and policy coordination.

Conclusions and Policy Recommendations

This comparative study identifies four distinct paradigms for integrating AI into health policy, each rooted in divergent regulatory philosophies, governance models, and social priorities. The US model prioritizes innovation but faces fragmentation; the UK's coordinated approach leverages international collaboration and creative regulatory tools; China's comprehensive strategy enables scale but grapples with transparency and privacy; India's inclusive development model is attuned to diversity and equity.

Key policy recommendations emerge:

- Develop adaptive governance structures—such as regulatory sandboxes and planned change control—to accommodate rapid technological innovation.
- Invest in robust, interoperable data infrastructure that enables both privacy and innovation.
- Promote international cooperation and collective standard-setting for safety, ethics, and technical frameworks.
- Center efforts to advance equity and mitigate access disparities.
- Build workforce capacity and invest in organizational change management for effective AI integration.

Ultimately, sound AI health policy demands the reconciliation of conflicting imperatives—innovation with safety, efficiency with fairness, competitiveness with collaboration, and technological advancement with ethical stewardship. The evolution of AI-driven health policy will require ongoing research, learning, and responsive regulation to ensure benefits are shared widely and risks judiciously controlled.

References

Government Documents and Policy Reports

- "Artificial Intelligence and Machine Learning in Software as a Medical Device." U.S. Food and Drug Administration, 24 Mar. 2025.
- "Artificial Intelligence-Enabled Device Software Functions: Lifecycle Management and Marketing Submission Recommendations." U.S. Food and Drug Administration, 7 Jan. 2025.
- "Artificial Intelligence/Machine Learning (AI/ML)-Based Software as a Medical Device Action Plan." U.S. Food and Drug Administration, Jan. 2021.
- Augenstein, Jared. "Health AI Policy Tracker." Manatt Health, 30 July 2025.

- "Ayushman Bharat Digital Mission - Building Digital Health Ecosystem." National Health Authority, 2021.
- "Ayushman Bharat Digital Mission's Integrated Digital Health Ecosystem is the Foundation of Universal Citizen-Centered Health Care in India: Case Study." World Bank, 20 Jan. 2025.
- Changsan, L. S., et al. "National Health Authority and IIT Kanpur sign MoU for AI Research Platform." Press Information Bureau, 31 Jan. 2024.
- "Digital Health Assessment Framework (DHAF)." ORCHA, 13 June 2023.
- "FDA Releases Artificial Intelligence/Machine Learning Action Plan." U.S. Food and Drug Administration, 12 Jan. 2021.
- "ICER-PHTI Assessment Framework for Digital Health Technologies." Institute for Clinical and Economic Review, Sept. 2023.
- "Impact of AI on the regulation of medical products." UK Medicines and Healthcare products Regulatory Agency, May 2024.
- "National Digital Health Mission Strategy Overview." NITI Aayog, Feb. 2023.
- "National Strategy for Artificial Intelligence." NITI Aayog, June 2018.
- "Total Product Lifecycle Considerations for Generative AI." U.S. Food and Drug Administration, 2024.
- "UK MHRA leads safe use of AI in healthcare as first country in new global network." UK Government, 23 June 2025.

Academic Articles and Journals

- Ardito, Vittoria, et al. "Machine Learning-Assisted Health Economics and Policy Reviews: A Comparative Assessment." CERGAS Working Paper, 27 Mar. 2025.
- Bamiro, Adeola. "AI for Equity: Developing Adaptive Bias Detection Frameworks for Healthcare Algorithms." Advances in Health Sciences, vol. 8, 2025, pp. 1074.
- Cavallaro, Ludovico, et al. "Bias recognition and mitigation strategies in artificial intelligence healthcare applications: a comprehensive review." Nature Digital Medicine, vol. 12, 2025, article 1503-7.
- Chen, Helen. "How can we achieve a healthy China by 2030?" World Economic Forum, 2 June 2025.
- Gilson, Lucy, and Nkosana Raphaely. "Building on the Health Policy Analysis Triangle." International Journal of Health Policy and Management, vol. 6, no. 12, 2017, pp. 308-319.
- Horvath, Kimberly, et al. "The states are stepping up on health AI regulation." American Medical Association, 8 June 2025.
- "Mitigating Racial and Ethnic Bias and Advancing Health Equity in Clinical Algorithms." Health Affairs, vol. 42, no. 10, Oct. 2023, pp. 1377-1385.

- "Using the health policy triangle framework to describe local, regional and national healthcare policy changes within Ireland's diverse healthcare settings." University College Cork, 2020.
- Walt, Gill, and Lucy Gilson. "'Doing' health policy analysis: methodological and conceptual reflections and challenges." Health Policy and Planning, vol. 23, no. 5, Aug. 2008, pp. 308-317.

Policy Analysis and Comparative Studies

- "AI & Health in China: An Essential Overview." China Health Pulse, by Ruby Wang, 5 June 2025.
- "AI Horizons in Indian Healthcare: A Vision for Transformation." Indian Association of Preventive and Social Medicine, 29 Dec. 2024.
- "AI: A Use Case for Global Health." LSE Public Policy Review, 3 Nov. 2024.
- "Algorithmic accountabilities and health systems: A review and analysis." SAGE Health, 2 June 2025.
- "Algorithmic impact assessment: a case study in healthcare." Ada Lovelace Institute, Feb. 2022.
- "Artificial Intelligence in Healthcare: A New Era for India." IndiaAI, 5 Oct. 2024.
- "Artificial Intelligence Policies in India- A Status Paper." Technology Information, Forecasting and Assessment Council, 2023.
- "Bias Mitigation in Primary Health Care Artificial Intelligence Models." JMIR, 6 Jan. 2025.
- "China's AI Healthcare Market (Part II): Investment Strategies and Tips." China Briefing, 9 July 2025.
- "Health technology assessment for digital health Technologies in India." PMC, 3 Nov. 2024.
- "How the Healthy China 2030 Policy Promotes the Construction of a Rural Telemedicine Chronic Disease Management Service System." Paradigm Press, 26 Mar. 2025.

Regulatory and Technical Frameworks

- "AI-Enabled Medical Device Design Standards." Vantage Medtech, 24 Aug. 2025.
- "FDA Guidance on AI-Enabled Medical Devices (2025 Updates)." Operon Strategist, 10 July 2025.
- "FDA issues Artificial Intelligence-Enabled Device Software Functions guidance." DLA Piper, 7 Jan. 2025.
- "FDA Publishes Action Plan for Oversight of Artificial Intelligence/Machine Learning-Based Software as a Medical Device." Ropes & Gray, 8 Feb. 2021.
- "MHRA Guidance on Software and AI as a Medical Device." RegDesk, 24 July 2025.
- "MHRA 2025 Reforms: Faster AI Radiology & Imaging Access." AZmed, 22 July 2025.
- "MHRA Outlines New Strategic Approach to Artificial Intelligence." Inside EU Life Sciences, 30 Apr. 2024.
- "Principal Approaches to Policy Formation." Health Knowledge, 31 Dec. 2008.

- "Reimagining Healthcare in India with AI-Driven Innovation." Aksha, 31 Dec. 2024.
- "State Series: AI Legislation." KPMG International, Aug. 2025.
- "UK MHRA sets out its strategy on AI and the regulation of medical products." Freshfields Bruckhaus Deringer, 18 June 2024.
- "US state AI legislation: Reviewing the 2025 session." International Association of Privacy Professionals, 15 July 2025.

Specialized Technical Documents

- "FDA Action Plan for AI/ML in SaMD (Software as a Medical Device)." Starfish Medical, 1 Apr. 2025.
- "FDA Releases Draft Guidance on AI-Enabled Medical Devices." Greenberg Traurig, 14 Aug. 2025.
- "Health Policy Triangle: In-Depth Understanding for Medical Students." Medical Club, 2030.
- "Modelling the Health Policy Process: One Size Fits All or Horses for Courses?" International Journal of Health Policy and Management.

Organization and Think Tank Reports

- "Ayushman Bharat Digital Mission (ABDM) - Revolutionizing India's Healthcare System." Manorama Healthcare, 27 May 2025.
- "NITI Aayog - AI Strategy and Healthcare." IndiaAI, 13 Aug. 2019.