編者言

當 AI 走入診間：臺灣智慧醫療輸出正當時

從古代的草藥療法與把脈問診，到現代抗生素與疫苗的廣泛應用，人類對健康的追求始終推動著醫學持續演進。進入 21 世紀，AI 人工智慧、雲端資料庫與遠距診療不再只是實驗室裡的創新，而是逐步走入日常診間、偏鄉社區、甚至跨越國界，重新定義了看病與行醫的方式。這波由科技驅動的醫療革新，讓智慧醫療從想像化為現實，也為全球健康治理開啟新局。

今日的智慧醫療，不僅在診斷效率、疾病預測與照護模式等面向展現突破性潛力，更被視為協助開發中國家強化公共衛生體系、提升醫療可近性的重要工具。AI 輔助篩檢、電子病歷自動生成、行動健康系統等應用，正快速擴散至全球各地。然而，當 AI 真正「走入診間」，諸多挑戰也隨之而來，包括技術落差、資料治理架構不足、在地醫療人力的數位落差，以及倫理規範尚未建立等結構性門檻，都是智慧醫療全球推廣擴散過程中不可忽視的課題。

臺灣在這波浪潮中扮演日益關鍵的角色。憑藉堅實的 ICT 產業基礎、完整的健保資料庫與高品質醫療體系，再加上長年推動國際合作的經驗，我國積極推動智慧醫療援外計畫，協助多國導入 AI 技術與健康資訊系統，建立永續運作的在地照護模式。無論是在貝里斯與史瓦帝尼導入 AI 視網膜影像診斷，或是在巴拉圭及索馬利蘭推動電子病歷與醫療資訊整合系統，皆展現了臺灣智慧醫療輸出的軟硬實力，也實踐「Taiwan Can Help」的全球健康貢獻承諾。

在後疫情時代，全球衛生治理轉向數位導向與集體協作。世界衛生組織（WHO）已延長《全球數位健康策略》至 2027 年，並積極倡議 AI 倫理準則與跨境資料互通的治理機制。正如 WHO 秘書長譚德塞所言：「數位科技若能公平使用，將成為實現全民健康覆蓋最強大的工具。」臺灣的智慧醫療援外經驗，不僅是技術輸出，更涵蓋制度共創、在地人才培力與長期能力建構的承諾，讓臺灣在全球舞臺上展現獨特的價值。

因此，本期《當季專論》以〈全球智慧醫療發展探究〉為主題，邀請學者及實際參與智慧醫療工作的專家，從理論與實務的不同視角，深入剖析智慧醫療在全球的發展的趨勢，探討其如何推動健康照護轉型，並分享我國醫療院所在開發中國家進行智慧醫療相關計畫的案例。

而在《焦點企劃》單元，則以〈從 WHA 到全球智慧醫療布局，臺灣以實力打開合作新局〉為題，專訪今 (2025) 年參與世界衛生大會（WHA）的國合會李志宏副秘書長與國衛院邱弘毅所長，探討臺灣如何透過智慧醫療展現援外軟實力，並深入解析全球數位健康政策的脈動與未來趨勢。

然而，我們也必須正視科技本身並非萬靈丹。AI 在健康領域的應用潛力與風險並存，特別是在資料基礎薄弱、制度尚未完備的開發中國家，如何在創新與倫理之間取得平衡、在效率與

公平之間尋求共識，將是智慧醫療能否永續發展的關鍵挑戰。

正如比爾．蓋茲所言：「科技的終極目的是改善人類的生活。」唯有從人的需求出發，並建構兼具在地化與包容性的智慧健康架構，科技創新才能真正轉化為實現健康平權的助力。期盼透過本期內容，引發讀者對全球醫療轉型的未來發展更多的想像與思辨。

當期論文摘要

全球智慧醫療發展趨勢、關鍵議題與對策

（郭年真，國立臺灣大學公共衛生學院健康政策與管理研究所副教授）

智慧醫療正重新定義全球醫療服務模式。遠距醫療、人工智慧（AI）、穿戴式裝置與區塊鏈等技術快速進展，不僅改善病患治療效果，也提升醫療可近性。COVID-19 疫情催化遠距醫療普及，AI 則提升診斷精準度、個人化治療與行政效率，穿戴裝置則促進健康監測與預防醫學。世界衛生組織呼籲各國制定發展策略，聚焦治理、投資與基礎建設。但智慧醫療發展亦面臨五大挑戰：一是健保制度下缺乏財務誘因，需轉向價值導向照護；二是跨機構資料運用涉及隱私與法規議題；三是欠缺具實證力的成本效益資料；四是安全性與監管標準待建立；五是民眾與醫療人員對新科技的信任與接受度不足，須同步提升健康與數位素養。在臺灣高齡化與資源不均情勢下，智慧醫療是促進健保永續與健康公平的重要契機。應鼓勵科技創新與跨域合作，在保障民眾權益的前提下，打造高效率、創新且具國際競爭力的醫療服務體系。

智慧醫療應用於開發中國家之挑戰與展望

（洪子仁，新光吳火獅紀念醫院行政副院長）

隨著資訊科技與醫療的結合，智慧醫療在全球蓬勃發展，涵蓋遠距醫療、行動健康、數位病理及人工智慧輔助診斷等多項技術。在已開發國家，遠距醫療已形成成熟市場，但在開發中國家因投資報酬率低、預算有限及基礎建設落後，投入相對不足。惟遠距醫療在偏遠地區和島國，為提供基本照護、縮短城鄉差距之重要途徑，COVID-19 疫情更凸顯其必要性。行動健康方面，行動通訊普及使手機成為開發中國家重要醫療工具，透過應用程式和簡訊，能有效提供預防保健資訊。人工智慧輔助診斷被視為改變開發中國家醫療面貌之關鍵技術，有助於彌補人力短缺、提升診斷準確性。然設備成本高昂、網路不穩定及人員信任度不足，將限制其應用。

為使智慧醫療援助更具成效與永續性，提出以下政策建議：一、建立區域示範中心，擴大影響範圍；二、深化公私協力，建構跨域合作平臺；三、強化後續維運與人才培訓支持；四、協助制定政策與標準，促進永續發展。

AI 在開發中國家健康領域管理中的應用

（鍾采璇，賓汐法尼亞大學華頓商學院營運資管博士候選人）

人工智慧（AI）正迅速成為提升醫療與公共衛生服務的關鍵技術，尤其是在醫療資源有限的開發中國家。本文先整合國際報告與學術研究，梳理 AI 在疾病預防、遠距醫療、醫療資

源分配與健康教育四大領域的核心應用；再透過作者於非洲獅子山共和國與索馬利蘭的實務經驗，說明決策感知式機器學習（Decision-Aware Learning）、大型語言模型（LLM）及強化學習（RL）等 AI 相關技術如何實質提升醫療服務效率與公平性。儘管前景可期，資料不足、基礎設施薄弱、資金與人才匱乏，以及法規倫理框架的不完善，仍限制了 AI 在資源有限環境下的落地實現。要收穫 AI 技術的紅利並避免資料隱私侵犯、演算法偏見與醫療不平等擴大等風險，未來發展應聚焦於強化基礎建設、培育在地人才、制定合適的監管政策，確保 AI 技術的倫理性與普惠性，實現健康公平與永續發展的目標。

人工智慧帶動數位浪潮下的全球健康轉型

（黃兆聖，臺灣先進醫資總經理）

隨著人工智慧、遠距醫療、電子病歷與可穿戴裝置等智慧醫療技術快速發展，數位健康正成為全球健康轉型的重要驅動力。然而在開發中國家，智慧醫療的導入並非單純的技術輸出，而是一場深刻的制度重構與人力轉型，尤以護理人員為關鍵角色。本文以早期與國合會於馬拉威、南非等合作經驗，進而複製擴散到馬紹爾群島，並成功商轉至泰國，做為智慧醫療實踐案例為基礎，另一部份也將探討護理人員如何在資源有限的環境中，成為推動數位健康服務的第一線實踐者，從電子病歷建置、遠距診療操作，到 AI 輔助篩檢與健康數據管理，從傳統照護者轉變為資訊協作者與系統介面設計參與者。本文進一步分析其在基礎設施、語言文化、教育訓練與倫理壓力等面向所面臨的挑戰，發展能力建構、在地共創與永續經營的必要性，以做為國際開發援助應將智慧醫療導入與護理體系強化作為整合策略，實現以人為本的數位健康轉型。

When AI Enters the Clinic: A Golden Opportunity for Taiwan's Smart Healthcare to Go Global

From ancient herbal remedies and pulse diagnosis to the modern widespread use of antibiotics and vaccines, humanity's pursuit of health has continuously propelled medical progress. In the 21st century, artificial intelligence (AI), cloud databases, and telemedicine are no longer confined to laboratories—they are entering everyday life through clinics, reaching remote communities, and even crossing national borders. These innovations are redefining how we practice and experience medicine. Driven by advances in technology, smart healthcare is opening new frontiers in global health governance.

Today, smart healthcare shows groundbreaking potential in areas such as diagnostic efficiency, disease prediction, and personal care models. It is increasingly regarded as a crucial tool for helping developing countries strengthen public health systems and improve access to medical services. AI-assisted screening, automatic generation of electronic medical records, and mobile health systems are rapidly spreading worldwide. However, as AI "enters the clinic," a range of challenges has surfaced, including technological disparities, inadequate data governance, digital skill gaps among local healthcare workers, and the lack of established ethical standards—all of which present structural barriers to the global diffusion of smart healthcare.

Taiwan is playing an increasingly vital role in this wave of innovation. Leveraging its robust ICT sector, comprehensive National Health Insurance database, high-quality healthcare system, and long-standing experience in international cooperation, Taiwan has actively promoted smart healthcare initiatives abroad. These efforts have helped numerous countries adopt AI technologies and health information systems to build sustainable, community-based care models. From implementing AI-powered retinal screening in Belize and Eswatini to advancing electronic medical records and integrated health information systems in Paraguay and Somaliland, Taiwan has showcased its strengths in both software and hardware. These efforts also embody Taiwan's global health commitment and the spirit behind the slogan "Taiwan Can Help".

In the post-pandemic era, global health governance is shifting toward digitalization and collective action. The World Health Organization (WHO) has extended its Global Strategy on

Digital Health through 2027 and is actively promoting ethical guidelines for AI and cross-border data governance frameworks. As WHO Director-General Dr. Tedros Adhanom Ghebreyesus noted, "When digital technologies are used equitably, they become the most powerful tools to achieve universal health coverage." Taiwan's experiences in exporting smart healthcare are not limited to technology—they also encompass system co-creation, local talent cultivation, and long-term capacity building, offering unique value on the global stage.

In this issue, we explore the topic of global smart healthcare development. Experts and scholars engaged in smart healthcare work have contributed insights from both theoretical and practical perspectives, examining global trends, the transformative potential of these technologies, and Taiwan's field experiences in implementing smart healthcare projects in developing countries.

This issue's special report, titled *From the WHA to Global Smart Healthcare Strategies: Taiwan's Emerging Role in International Collaboration*, features an in-depth interview with TaiwanICDF Deputy Secretary-General Stephen J. H. Lee. In the report, Director Hung-Yi Chiu of the National Health Research Institutes' Institute of Population Health Sciences also highlights Taiwan's participation in the 2025 World Health Assembly (WHA), and its growing influence in shaping global digital health policy through smart healthcare initiatives.

Yet, we must also acknowledge that technology is not a cure-all. The application of AI in healthcare carries both potential and risk—particularly in developing countries where data infrastructure is weak and regulatory frameworks are incomplete. The sustainability of smart healthcare depends on our ability to strike a balance between innovation and ethics, and between efficiency and equity.

As Bill Gates once said, "The ultimate goal of technology is to improve people's lives." Only by starting from human needs and building localized, inclusive smart health systems can we ensure that technological innovation becomes a force for health equity. We hope this issue sparks imaginative and thoughtful discussion about the future of global healthcare transformation.

Summaries

Global Smart-Healthcare Development Trends, Key Issues, and Strategies

(Dr. Raymond N. Kuo , Associate Professor, Executive MBA Program in Health Policy and Management, College of Public Health, National Taiwan University)

Smart healthcare is redefining the global landscape of medical services. Technologies such as telemedicine, artificial intelligence (AI), wearable devices, and blockchain are advancing

rapidly—not only improving treatment outcomes, but also enhancing accessibility. The COVID-19 pandemic accelerated the adoption of telemedicine, while AI has boosted diagnostic accuracy, personalized treatments, and administrative efficiency. Wearable devices have promoted preventive care and real-time health monitoring. In response, the World Health Organization (WHO) urges countries to develop smart healthcare strategies that prioritize governance, investment, and infrastructure. However, five major challenges remain: 1) the lack of financial incentives in health insurance systems, prompting calls for a shift to value-based care; 2) privacy and regulatory concerns related to data-sharing across institutions; 3) limited evidence on cost-effectiveness; 4) absence of safety and regulatory standards; and 5) low trust and acceptance of new technologies among healthcare workers and the public. In the context of Taiwan's aging population and uneven resource distribution, smart healthcare offers a vital opportunity to strengthen health equity and sustainability. Policymakers should encourage innovation and cross-sector collaboration to build a high-performing, competitive, and rights-based healthcare system.

Challenges and Prospects for Smart-Healthcare Applications in Developing Countries

(Dr. Tzu-Jen Hung, Deputy Superintendent, Shin Kong Wu Ho-Su Memorial Hospital)

As information and medical technologies merge, smart healthcare is flourishing globally, encompassing telemedicine, mobile health, digital pathology, and AI-assisted diagnostics. While telemedicine has matured in developed countries, investment in developing countries remains limited due to low returns, budget constraints, and poor infrastructure. However, for remote and island regions, telemedicine plays a crucial role in delivering basic healthcare and reducing urban-rural disparities—especially highlighted during the COVID-19 pandemic. The widespread use of mobile phones in these regions makes them a vital tool for delivering preventive care through apps and SMS. AI-assisted diagnostics are viewed as a game changer for healthcare systems in low-resource settings, addressing workforce shortages and improving diagnostic accuracy. Nonetheless, high equipment costs, unstable internet access, and limited trust from local personnel hinder widespread adoption. To enhance the effectiveness and sustainability of smart healthcare aid, the author recommends: 1) establishing regional demonstration centers; 2) strengthening public-private partnerships; 3) ensuring long-term maintenance and capacity-building support; and 4) assisting in policy and standards development.

AI Application in Health Management in Developing Countries

(Tsai-Hsuan Chung, Ph.D. Candidate, Operations, Information and Decisions Department, The Wharton School, University of Pennsylvania)

AI is becoming a pivotal tool in advancing healthcare and public health services, particularly in resource-limited developing countries. Drawing from international research and personal field experience in Sierra Leone and Somaliland, the author outlines four key application areas: disease prevention, telemedicine, healthcare resource allocation, and health education. Specific AI technologies such as decision-aware learning, large language models (LLMs), and reinforcement learning (RL) have shown promise in improving service efficiency and equity. However, real-world implementation is constrained by data scarcity, fragile infrastructure, limited funding and talent, and insufficient regulatory and ethical frameworks. To unlock AI's full potential while safeguarding against data privacy violations, algorithmic bias, and increased health inequality, future development must focus on strengthening infrastructure, cultivating local talent, and establishing ethical and inclusive regulatory systems that promote health equity and sustainability.

Global Health Transformation Under the Digital Wave of AI

(Dr. Johnson Huang, General CEO, AdvMeds)

Spurred by rapidly evolving technologies like AI, telemedicine, electronic medical records, and wearable devices, digital health is becoming a major driver of global health transformation. In developing countries, however, the introduction of smart healthcare is not just a matter of technological transfer—it requires deep structural reform and workforce transformation, with nurses playing a particularly critical role. Drawing on the TaiwanICDF's early smart healthcare collaborations in Malawi and South Africa, and subsequent expansions to the Marshall Islands and Thailand, the article highlights practical examples of digital health implementation. It further explores how nurses, in resource-constrained environments, evolve from traditional caregivers to information collaborators and system interface co-designers—managing tasks from EMR setup and teleconsultations to AI-assisted screenings and data processing. The article also discusses challenges related to infrastructure, language and culture, training, and ethical stress, emphasizing the need for integrated strategies that link smart healthcare with nursing system strengthening. This people-centered approach is essential for sustainable digital transformation in international development aid.