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Sustaining Family Medicine core values and ethos in the age of artificial intelligence

Ngiap Chuan Tan[1,2] *MMed (Fam Med)*, Robert Morris[3,4,5] *PhD*, Rick Siow Mong Goh[6] *PhD*, Teck Yee Wong[7,8] *MMed (Fam Med)*

ABSTRACT

Family Medicine (FM) is a discipline grounded in a distinctive generalist ethos that has shaped general practice in Singapore. FM core values centre on providing continuous, comprehensive, coordinated, and person-centred care to people dwelling in the community. In recent years, artificial intelligence (AI) has rapidly evolved to support clinicians, including family physicians, in managing their clinical practice. The level of sophistication of multimodal generative AI in healthcare has grown tremendously—it understands, processes, and acts to help doctors to deliver potentially more accurate, contextual, and comprehensive care to their patients. Likewise, a digitally health-literate population can leverage these AI tools to manage their health and medical illnesses. The concern that AI is replacing doctors is escalating in general practice. This commentary highlights the ways in which family physicians can instead use AI to sustain FM core values and continue to deliver holistic and coordinated care to their patients.

Keywords: artificial intelligence, core values, Family Medicine, general practice, primary care

INTRODUCTION

Artificial intelligence (AI) has begun to transform healthcare globally, including in Singapore. AI has demonstrated precision and efficiency in screening and risk prediction for disease-related complications, enhancing patient care.[1] The advent of generative AI (GenAI) further expands the capabilities of clinicians in diagnostics, prognostics, and therapeutics. Multi-agent, multimodal AI enables clinicians to personalise care for patients and may help with earlier disease detection.[2] AI agents are currently being tested for their effectiveness in raising the health and disease literacy of patients, in health promotion, and in providing information on treatment options. The high penetration of mobile technology among Singapore adults enables them to readily access AI tools and obtain healthcare information with a simple click on their smartphones anytime and anywhere. Against this background, the authors argue that AI should be used to support selected tasks but should not substitute for the accountable, relational, and contextual role of the family physician (FP). AI has the power to absorb large amounts of information, whether drawn from patient history, cumulative models of the evolution of diseases within a population, or medical literature, including published guidelines and research studies. The critical roles of accountability (including responsibility), relational skills (e.g. building trust to encourage patient behaviours such as treatment adherence), and contextual understanding (through interactions with patients and elicitation of additional relevant patient information) rely on uniquely human attributes and abilities that must be preserved.

Family Medicine's role in Singapore's healthcare

Family Medicine (FM) has evolved as a medical discipline to counterbalance increasing specialisation and care fragmentation.[3] It pivots Singapore's primary health care (PHC) system towards the principles of the 2018 Astana Declaration, which defines FM as a medical specialty characterised by its life-course and whole-person orientation, rather than one focused on a specific disease or health domain, and which considers individuals in the context of their families and communities.[4,5] FM was officially recognised as a medical specialty in Singapore in November 2025.[6] Its core values emphasise that patients should receive first-contact, continuous, comprehensive, and

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[1] Department of Research, SingHealth Polyclinics, Singapore
[2] Family Medicine Academic Clinical Programme, Duke-NUS Medical School, Singapore
[3] MOH Office for Healthcare Transformation, Singapore
[4] Yong Loo Lin School of Medicine, National University of Singapore, Singapore
[5] Consortium for Clinical Research and Innovation, Singapore
[6] Institute of Advanced Intelligence and Computing (IAIC), Agency for Science, Technology and Research (A*STAR), Singapore
[7] Tan Tock Seng Hospital, NHG Health, Singapore
[8] Lee Kong Chian School of Medicine, Nanyang Technological University, Singapore
Correspondence: Dr Ngiap Chuan Tan, SingHealth Polyclinics, 167 Jalan Bukit Merah, Connection One, Tower 5, #15-10, Singapore 150167.
Email: tan.ngiap.chuan@singhealth.com.sg
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coordinated care from their FPs, who serve as long-term advocates for their health and well-being through timely preventive interventions and effective disease management.

Evidence has long shown that a strong FM-driven PHC system leads to a healthier population, higher patient satisfaction, greater health equity, and lower overall healthcare costs.[7] Hence, Singapore residents are encouraged to enrol with an FP of their choice and develop a long-term partnership to coordinate their care throughout their lives under Healthier SG, Singapore's national preventive health initiative.[8] Nonetheless, FPs face increasing challenges in fulfilling this mission due to growing care complexity, especially in a super-aged society. AI offers a valuable tool to support them in addressing these challenges.

The repertoire of AI in healthcare and how it can help us

AI is not new to healthcare. Basic AI techniques, such as risk estimation, rule-based nudging, and question-answering, are already widely used, while newer tools such as GenAI chatbots have more diverse applications (Table 1). Many of these applications have been assessed and documented in a recently published book on AI adoption in Singapore and globally.[9]

AI in primary healthcare: Benefits and risks

AI's role in improving diagnostic precision, automation of routine tasks, and treatment personalisation holds the potential to improve PHC. Its increasingly accurate predictive analytics can help identify high-risk patients for preventative interventions, potentially making it a valuable tool for FPs.

GenAI still presents risks in healthcare. Large language models (LLMs) may generate plausible but incorrect medical information, resulting in erroneous medical decision-making and subjecting patients to the risk of mismanagement.[12] Biases in the training datasets used to train AI models may perpetuate or create new healthcare disparities and raise ethical concerns.[12] Over-reliance on AI could diminish foundational clinical judgement among clinicians, leading to litigation risks and potential harm to patients.[12] A recent non-peer-reviewed preprint evaluated 20 notable LLMs and 4 widely used retrieval-augmented generation-based clinical AI tools using a benchmark comprising 1100 primary care-to-specialist consultation cases across 10 specialties.[13] In this benchmark, direct application of AI recommendations carried potential for severe harm in up to 24.6% of cases, with errors of omission accounting for over 80% of severe errors.

Table 1. Summary of diverse AI roles in healthcare.

	Tools	Commentary and examples
1.	Systems providing automation and summarisation	These automate some of the more routine tasks, such as speech-to-text transcription and summarisation of clinical encounters. Well-known examples include Microsoft Dragon Copilot (formerly Nuance DAX Copilot; Microsoft Corporation, Redmond, WA, US) and Abridge (Abridge AI, Inc, Pittsburgh, PA, US). Although the generated transcripts and summaries still require review and editing, these tools allow clinicians to focus on patients rather than screens and can substantially reduce documentation time.
2.	Rule-based systems	Automated question-answering systems, such as Ada, are used by millions of people and have demonstrated a diagnostic accuracy of 70.5%, with safety levels considered acceptable in some evaluations.[10,11] Rule-based nudging systems may also support home monitoring and the delivery of reminders to encourage adherence to recommended health behaviours.
3.	Machine learning for prediction based on risk analysis	Based on learning from both the local population and particulars of the patient, these models may aid in care by giving predictions of disease onset or progression.
4.	Machine learning for medical imaging analysis	Machine learning-based diagnostic systems have achieved performance comparable to that of experienced radiologists in certain chest X-ray and mammography tasks, with performance in other imaging modalities continuing to improve. Although these systems are not substitutes for human clinical expertise, they can complement radiologists by serving as second readers or reviewers. They can also help prioritise imaging studies for urgent radiological review, for example when a pneumothorax is suspected.
5.	GenAI systems (e.g. ChatGPT, Gemini, Claude)	These tools can serve as reminders and provide support for potential diagnoses and treatment options. Although their performance is improving, results remain variable, and GenAI systems are known to produce occasional errors. Many clinicians already use LLMs to answer clinical questions; however, because these systems can generate inaccurate or fabricated information (often referred to as "hallucinations"), their outputs must be carefully verified before informing diagnostic or treatment decisions.

AI: artificial intelligence; DAX: Dragon Ambient eXperience; GenAI: generative artificial intelligence; LLMs: large language models

While top-performing AI systems were observed to produce fewer harms than general practitioners operating without tools, these findings remain preliminary. They do not establish prospective clinical safety, generalisability to routine primary care, or readiness of these tools for autonomous deployment, but rather highlight the critical need to check outputs and explicitly evaluate omission risks before clinical use.[11]

Clinical safety is not adequately predicted by general AI benchmarks. Indeed, multiple recent reports of AI alone outperforming "AI plus human" suggest an opportunity to improve medical training and practice so that AI and human skills can become more complementary.

Advanced models are most readily accessed through cloud-based services. Whenever data are entered into such systems, there is a risk of unauthorised access, leakage of personally identifiable information, and misuse—these are potential hazards if robust technical and governance safeguards are not in place. Modern GenAI systems may also be at risk from nefarious attacks such as prompt injections and data poisoning—these can alter model behaviour and lead to incorrect clinical recommendations, potentially rendering systems unsafe for clinical use.[14]

AI systems often operate as black boxes, where clinicians may not fully understand how a model reaches a diagnosis, predicts risk, or recommends treatment. This opacity can affect clinician trust, complicate explanation of recommendations to patients, and may hinder the quality of real-world practice.[15] Other risks, including automation bias, deskilling (the erosion of skills due to excessive reliance on technology), and dethrilling (the loss of professional fulfilment when technology transforms skilled clinical work into more repetitive tasks), have yet to be adequately evaluated or remediated.

AI foundation models designed for primary care

To mitigate potential harm to patients and reinforce trust in the doctor–patient relationship, AI foundation models are now being designed to be more explainable, transparent, and grounded in evidence-based clinical practice guidelines. The Singapore Ministry of Health, through the National Research Foundation, initiated the Singapore Medical Foundation AI model (SIMFONI) programme in 2025.[16] SIMFONI focuses on the development and safe deployment of AI in healthcare settings to support Singapore healthcare professionals and empower patients, including a PHC-centric foundation model tailored for FPs. All tools are carefully co-designed by clinicians working closely with AI researchers. Through FP-led validation and real-world pilot settings, the goal is to create trustworthy and easy-to-use tools to support Singapore FPs, regardless of their clinical practices.

Return to FM core values and ethos

FPs must adapt to the evolving AI-enabled capabilities to optimise patient outcomes. They need to understand both AI-related benefits and risks to harness AI safely and effectively. Establishing new, and maintaining existing, doctor–patient relationships will be a prerequisite for FPs to stay relevant to their patients in this AI era. FM core values centred on providing first-contact, continuous, comprehensive, and coordinated care will guide FPs in the following ways as more AI applications are introduced into general practice.

Comprehensive and continuous care

Multi-agent AI systems are being developed to address complex problems by coordinating multiple AI agents in a collaborative, team-like structure. These agents may be assigned specialised roles, such as data analysis, reasoning, and task execution, and can exchange information through structured communication and coordination mechanisms to manage complex, multi-step tasks across domains.[17] For example, a multiagent AI system in healthcare could be trained in various medical specialties or in subjects ranging from medications to reimbursements. However, human subjects present far greater complexity than many other AI applications, arising not only from the complexities and uncertainties in human biology but, more importantly, from the diversity of individuals and cases—from early or late life, including people with impaired decision-making capacity. FPs remain the main guide and supporter to manage a huge variety of health and disease challenges across many a life journey—AI, properly and fully developed, can help both patient and doctor with increased access to information and expertise.

Institution-based residency training includes a wide spectrum of curricula to cover the breadth and depth of FM, enabling FPs to deliver continuous patient care from cradle to grave. FPs are a patient's life-long health manager, applying paediatric, adult, geriatric, and preventive medicine. In Singapore, FPs provide care for neonates following hospital discharge, including the assessment and management of neonatal jaundice, monitoring of developmental milestones, and administration of vaccinations against common childhood infectious diseases. AI-enabled mobile phone applications, such as BiliSG (Singapore General Hospital, SingHealth Polyclinics, and Synapxe, Singapore), have been developed to enable parents to monitor neonatal jaundice remotely.[18] FPs also engage parents to assess their child's developmental milestones, adhere to their vaccination schedule,

address challenges in breastfeeding and childhood nutrition, advise on family planning, and manage maternal postnatal depression. Such stewardship roles in delivering comprehensive yet personalised care encompassing ethical duty, management, and responsibility will never be replaced, but can be aided, by AI.

Coordinated care

Over the course of their lives, patients often require care from specialists, allied health professionals, or community health partners. Increasingly, they are turning to AI tools to learn about surgical procedures and specialist-led therapies, yet may still struggle to evaluate the available options and make informed decisions. Some may become overly reliant on AI, while others may have limited digital literacy, hindering their access to AI tools and other digital health services. FPs play a critical role in guiding their patients in shared decision-making to select the appropriate specialists, investigations, and treatments.

Compassionate and patient-centred care

Compassionate care is a caring attitude towards patients and their families, which is an attribute commonly found in FPs. End-of-life care for patients with terminal illness requires compassionate care from FPs, who often coordinate care with multidisciplinary healthcare providers and non-medical professionals. Their coordinating role in palliative care serves to minimise mental anguish and social impact on their families, a task which is not easily fulfilled by AI. Extending the human touch, empathy, compassion, and solace to dying patients and managing the grief of relatives by FPs is irreplaceable by AI.

Strong communication skills are essential for building trusting relationships with patients. However, communication practices and effectiveness may vary among FPs, a challenge further compounded by Singapore's multi-ethnic and multilingual population. Younger doctors are often brought up in a bilingual environment but face challenges communicating with older patients using dialects. AI-enabled tools that can translate multiple languages and even dialects are now available to assist them. However, Lee et al.[19] have shown that patients tend to select FPs who can speak their language for better understanding of their care needs. While ambient AI tools can help FPs in taking comprehensive patient histories and contextualising care for patients towards shared clinical decision-making, upskilling in effective communication is an essential strategy for FPs to better relate to their patients.

A patient-centred approach also requires FPs to understand patients' work, family relationships, and social circumstances, which can shape their health and care preferences. Looking after 3 generations in a family is common among Singapore FPs. Understanding patients' family and occupational backgrounds enables FPs to better appreciate how social circumstances and work-related factors affect their physical and mental health. FPs will have to rely on their expertise to contextualise and individualise care plans for their patients while assisted by ambient AI tools.

FPs often manage complex issues with their patients and families using the biopsychosocial model.[20] They use their skills to conduct family meetings and to navigate through complicated psychosocial issues with patients' relatives. AI tools have yet to replicate the human judgement, empathy, and adaptability required to engage patients across diverse and sensitive clinical settings, and it remains unclear whether they can ever earn the same degree of trust as human clinicians. Although LLMs can listen to consultations and offer suggestions, patients may prefer to discuss matters that are most important to them directly with their FPs, particularly when these involve emotionally difficult or stigmatised topics such as sexual health.

Evidence on the real-world impact of AI in FM remains limited, as its adoption and implementation vary across countries, cultures, and communities.[21] The pursuit of AI application in the Singapore FM domain of healthcare should follow a cautious path as AI tools are gradually integrated into primary care practices. Constant stakeholder engagement, surveillance, feedback, guidance, refinement, and vigilance are vital to ensure that the core values of FM are not eroded over time and that FPs' clinical roles are augmented rather than substantially displaced by AI.[22]

CONCLUSION

AI is reshaping FM and changing general practice. When thoughtfully implemented, AI can reinforce the core values of FM, enabling FPs to deliver continuous, comprehensive, compassionate, coordinated, and personalised care more effectively and with less effort. With the emergence of explainable, transparent, and evidence-based AI foundation models for primary care, FPs must remain the anchor, interpreter, and advocate for their patients, to build a more equitable and resilient healthcare system.

Ethics statement

Not applicable, as no study participant was recruited.

Declaration

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