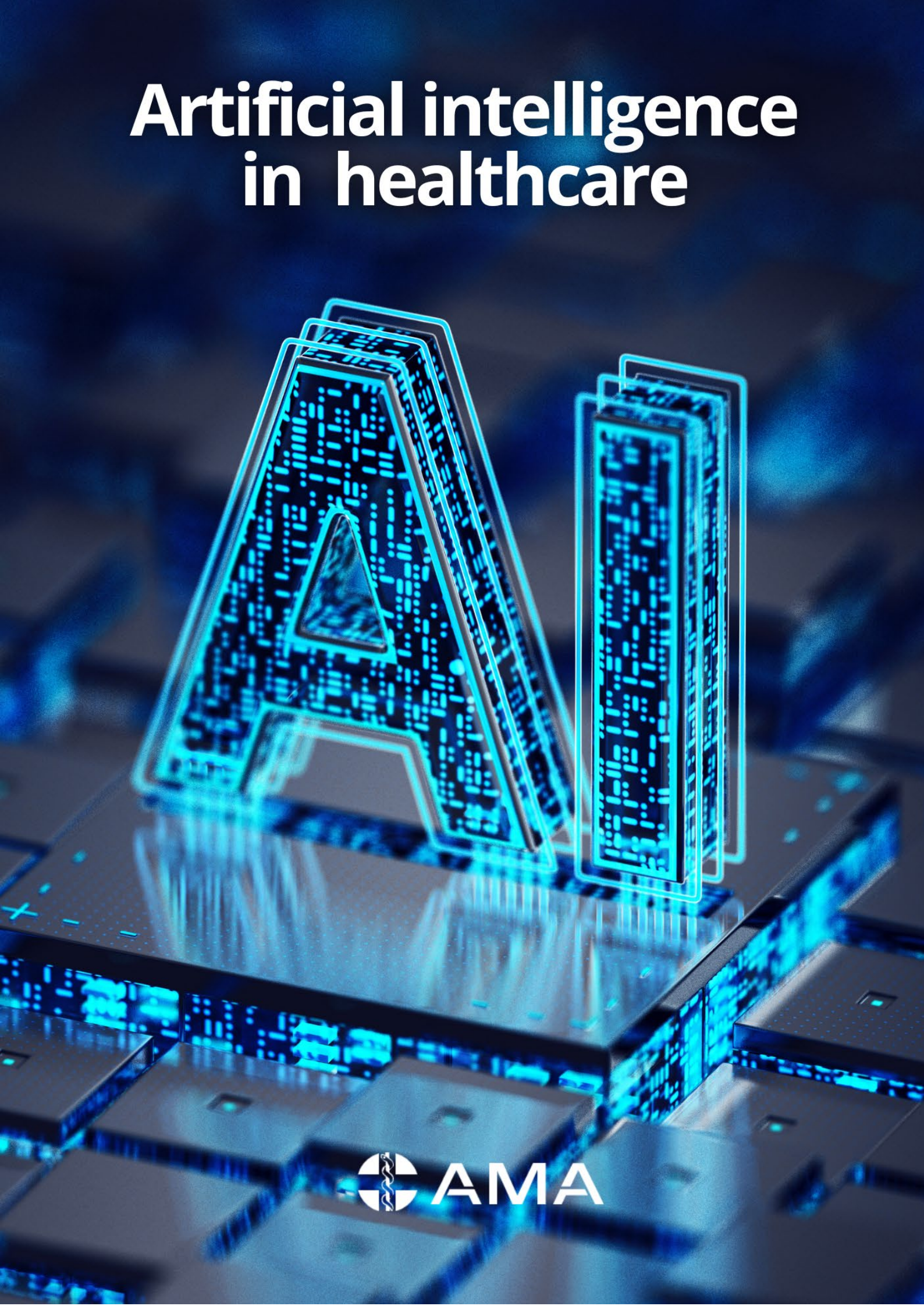
Artificial intelligence in healthcare



AMA

Artificial Intelligence

Following the Australian Government's response to the Safe and Responsible AI in Australia discussion paper,[i] the then Minister of Industry and Science, Ed Husic, announced the establishment of a new Artificial Intelligence Expert Group in February 2024. The group is comprised of 12 members, including experts in law, ethics, and AI technology. The group will advise the Department of Industry, Science and Resources on the transparency, testing, and accountability of Artificial Intelligence (AI) guardrails in high-risk settings to ensure the safety of AI systems.

Definition of AI

For the purposes of this report, the following AI-related definitions apply:
(a) AI is defined as the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings.[1]
(b) Automated decision making means any technology that either assists or replaces the judgement of human decision-makers.[2]
(c) Large Language Models refer to AI models that generate convincing natural language text outputs after being trained on large amounts of data.[3,4]
(d) Machine Learning is an approach to artificial intelligence in which computers analyse large amounts of data to infer how to perform tasks, rather than being explicitly programmed to do them.[5]

AI in healthcare

Over the past decade, AI has gained significant momentum in healthcare, promising to transform the medical industry and the way health providers interact with their patients. Within the healthcare sector, interoperable Machine Learning (ML) tools and artificial intelligence (AI) have the real potential to enhance and save lives. AI is already being used to streamline medical processes through image classification.[ii] AI can instantly analyse and review medical images, demonstrating its capacity to detect medical issues, including cancer. This enables quicker diagnoses, improves timely intervention, and enhances patient outcomes.[iii] Furthermore, AI and deep learning can extract information from multiple medical images to help healthcare providers — for example, radiologists — identify high- and low-priority X-rays, making the process, easier, quicker, and more accurate.[iv] In the UK, researchers have developed AI capable of diagnosing scans for heart disease and lung cancer, allowing these diseases to be detected much earlier and saving billions of pounds through the use of this technology.[v] With advancements in AI within healthcare, significant system changes will need to take place and be continuously updated to keep pace with AI's evolving capabilities. It is crucial to consider the roles of doctors and other healthcare professionals, as well as the current medical system, to ensure they are adequately equipped to keep pace with the rapid advancements in AI. This will enable them to effectively integrate AI into their practice and maintain high standards of patient care.

The key link between interoperability and AI is that digital interoperability can provide high-quality data, which can be used to train AI for diagnostic purposes and treatment options. Given this, Australia should develop sovereign AI capabilities, leveraging the high-quality data provided by interoperability systems. In this way, data interoperability combines the expertise of the treating doctor with AI to provide patients with the best possible care. As well as optimising and accelerating the diagnosis of critical illnesses, interoperability could also help healthcare services providers improve care, reduce costs, enhance patient experiences, and minimise the risk of medical error. AI can reduce misdiagnosis or misinterpretation of medical scans. AI can also detect subtle defects in human tissue that the human eye cannot.[vi] Missing an important diagnosis — for example, an early cancer diagnosis or a subtle bone fracture — can have serious consequences for patients. In this regard, AI can assist radiologists in interpreting

[1] Encyclopedia Britannica. Artificial Intelligence.
[2] Government of Canada. Directive on Automated Decision Making.
[3] Microsoft Learn LLM AI.
[4] Examples include, but are not limited to, ChatGPT, Google Bard and Bert.
[5] Oxford Dictionary. Machine Learning.

multiple images, improving both accuracy and patient outcomes. Beyond this, AI can also boost productivity by increasing the volume of work that healthcare professionals can efficiently handle.

Furthermore, AI tools have the potential to revolutionise patient support for chronic diseases, frailty, and home-managed conditions, such as gastroenteritis, mild hypotension, or poor appetite. These advanced systems can offer personalised guidance on managing medications — including diuretics, antihypertensives, and diabetic treatments — by integrating real-time physiological data from wearable devices or home monitoring systems. By analysing this data, AI can help patients make informed decisions about whether to adjust or skip medications to minimise side effects. This is particularly beneficial for individuals with limited health literacy or early cognitive decline, as the AI can provide clear, actionable advice and prompt them to contact their GP when necessary. Additionally, these tools can be tailored to the patient's first language, ensuring accessibility and comprehension. By enhancing the patient's ability to manage complex health regimens with interactive support, language assistance, and continuous monitoring, AI tools can significantly improve health outcomes while complementing the role of healthcare professionals.

Moreover, AI tools can significantly enhance human resource management in the medical field, particularly staff rostering. At present, a considerable proportion of senior staff spend substantial time trying to schedule personnel according to their preferences. In comparable countries, such as the United States, AI applications like RosterLab AI are used. These applications eliminate the tedious and time-consuming process of manually creating healthcare schedules by factoring in all business requirements, union regulations, staffing coverage, and staff preferences. This enables essential healthcare workers to focus on their primary clinical duties.

While AI has the potential to significantly benefit healthcare, its clinical and social implications in this environment remain largely unknown and uncertain. AI technologies — including large language models — are being rapidly deployed, sometimes without a full understanding of their performance. This leads to situations that could either benefit or harm end-users, including healthcare professionals and patients. Currently, in most businesses, human decision-making is being assisted by AI. However, as AI accuracy and capabilities improve, the level of human oversight is expected to decrease.[vii] Evidence suggests public trust in AI systems is low, particularly in terms of how they are being designed, developed, deployed, and used safely and responsibly. Surveys indicate only one-third of Australians agree that the country has adequate guardrails to ensure AI is developed and implemented safely.[viii]

Beyond the benefits to patients and doctors, recent advancements in AI are expected to create opportunities for innovation in publicly provided services such as healthcare. Healthcare not only accounts for a significant part of the nation's economy, but has also traditionally exhibited low productivity growth.[ix] With the capability of machine learning systems to process and analyse large amounts of data, including patients' genomic sequencing, these systems can uncover patterns and insights that would otherwise remain undetected. This increase in productivity and transformation enhances research and development capacity, leading to more rapid innovation and medical discoveries.

While AI has the potential to create new medical insights and transform Australian healthcare and research, ethical considerations — such as patient privacy and surveillance, bias and discrimination, and the philosophical challenge of human judgement versus AI systems[x] — must be thoroughly investigated before its application in healthcare. Furthermore, in such a rapidly changing environment, the development and implementation of AI technologies must involve appropriate consultation, transparency, and accountability. This process should include regular, ongoing reviews to assess their clinical and social impact, ensuring they continue to benefit — rather than harm — patients, healthcare professionals, and the wider community. Additionally, as AI systems will have access to sensitive personal information, robust legal and regulatory frameworks must be globally established to safeguard privacy, security, and integrity.

The AMA maintains that the application of AI in healthcare must only occur with appropriate ethical oversight. This is particularly important in relation to patient privacy, as well as concerns about bias and discrimination that can arise from data provided to machine learning systems that have trained on biased datasets. Such biases can lead to misdiagnosis, especially among underrepresented groups, making ethical oversight vital.

There should be an acknowledgement that the use of AI in healthcare is a rapidly evolving field, with varying degrees of understanding among clinicians, other healthcare professionals, administrators, consumers, and the broader community. AI in healthcare should remain patient-centred and be used solely to benefit patients' health and well-

being, as well as the health of the wider community. The health interests of patients and the community must be the primary, guiding focus of all AI applications in healthcare. AI should support doctors and other healthcare professionals in serving the healthcare needs of patients and the general public. It should enhance — but not replace — clinical decision-making, while contributing to quality improvement and the optimisation of clinical care. AI must uphold patients' right to make their own informed healthcare decisions. In healthcare, AI should never compromise medical practitioners' clinical independence or professional autonomy and must always remain a complementary tool. While the AMA advocates for the development and application of AI in healthcare, accountability must remain with the clinician or clinical team. The application of AI in treatment and diagnosis must have clearly defined accountability lines established within frameworks, outlining ultimate responsibility for any misdiagnosis or mistreatment. The AMA maintains the final decision on patient care should always be made by a human.

With sufficient considerations and strict frameworks, as outlined above, interoperability and the implementation of AI and machine learning for high-dimensional data can not only create new medical insights, but also facilitate the pooling of existing data sources, enabling more efficient and robust analyses. This can advance translational medicine and help move research findings to the point of care. Globally, data interoperability can drive evidence-based research findings to inform the development and implementation of optimal public health policy.

Existing AI laws in Australia

In Australia, businesses and individuals who develop and use AI are already subject to various laws.[xi] These include regulations covering privacy, online safety, corporations, intellectual property, and anti-discrimination, which apply across all sectors of the economy.[xii] There are also sector-specific laws that impact certain aspects of AI development and deployment, particularly in areas such as medical devices, motor vehicles, airline safety, and financial services.[xiii]
The AMA maintains the Australian Government should use a risk-based framework to ensure the safe use of AI and prevent potential harms. This includes assessing the obligations of AI developers and deployers based on the level of risk associated with its use, deployment, or development.

The international response to AI

The United States has sought voluntary commitments from a group of 28 healthcare providers and payer organisations to promote the safe, secure, and trustworthy purchasing and use of AI technologies, underscoring safety, security and trust.[xiv] These companies are committed to:

- vigorously developing AI solutions to optimise healthcare delivery and payment by advancing health equity, expanding access, making healthcare more affordable, improving outcomes through more co-ordinated care, enhancing patient experience, and reducing clinician burnout
- working with their peers and partners to ensure outcomes are aligned with fair, appropriate, valid, effective, and safe (FAVES) AI principles, as established and referenced in HHS's Health Data, Technology, and Interoperability: Certification Program Updates, Algorithm Transparency, and Information Sharing (HTI-1*)* rule
- deploying trust mechanisms that inform users if content is largely AI-generated and not reviewed or edited by a human
- adhering to a risk management framework that includes comprehensive tracking of applications powered by frontier models, as well as identifying potential harms and implementing steps to mitigate them.
- researching, investigating, and developing AI swiftly but responsibly.[xv]

Beyond this, the United States has issued a comprehensive executive order on AI safety, introducing new standards for transparency and security. It also mandates testing and notification requirements for companies developing foundation models under the domestic Defense Production Act.[xvi]
Singapore has introduced standardised self-testing 'AI Verify' tools, enabling businesses to check AI models against a set of internationally recognised governance principles through standardised tests.[xvii] These assessments also evaluate whether AI models align with global AI governance frameworks, including those from the European Union (EU), the OECD, and Singapore's Model AI Governance Framework.[xviii]
Canada and the EU aim to make commitments mandatory for higher risk AI systems — such as self-driving cars — through new legal frameworks.[xix] These countries have also sought voluntary commitments from companies ahead of the enactment and enforcement of these proposed regulations. For instance, in December 2023, the EU

announced the establishment of an AI Pact to encourage early implementation of obligations that will be mandated under the European Commission's Artificial Intelligence Act.[xx]

Australia is committed to maximising the benefits of AI. The 2023–24 Federal Budget contains $75.7 million of funding for AI initiatives to help realise these opportunities. This includes:

- $17 million for the AI Adopt program, which will establish new centres to provide small and medium enterprises (SMEs) with support and training to help them make more informed decisions about using AI to enhance their businesses.
- $21.6 million to expand the remit of the National AI Centre, supporting essential research and providing leadership for the AI industry across Australia. This builds on the existing funding of $8 million from the 2021–22 Federal Budget, including $2.6 million allocated for 2023–24).
- $34.5 million of continued funding for the Next Generation Artificial Intelligence and Emerging Technologies Graduates programs, aimed at to attracting and training the next generation of job-ready AI specialists.

While Australia is committed to maximising the benefits of AI, progress in actualising this commitment has been limited. The government should consider making certain obligations mandatory, following the example set by comparable regions, such as the EU.

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