AIDH
AUSTRALASIAN INSTITUTE
OF DIGITAL HEALTH

Australian **AI** Workforce Insights 2024

Table of contents

Introduction

Throughout 2023, the Australasian Institute of Digital Health (AIDH) actively collaborated with health services, education providers, professional colleges and associations, industry, and key stakeholders to build digital health capability in the healthcare sector, in support of the Capability Action Plan.

This has been a significant initiative aimed at improving the digital capability of the health workforce, which aligns with the Digital Health Blueprint and Action Plan 2023–2033 by the Department of Health and Aged Care (DoHAC) and the Australian National Digital Health Strategy, both emphasising the crucial need to equip the health workforce with essential digital health skills to meet evolving needs.

These initiatives also align with the Global Digital Health Strategy 2020-2025 (World Health Organisation, 2021), emphasising the development of the digital health workforce to achieve a sustainable health system.

The latest frontier for development of the digital health workforce is the ethical and safe adoption of artificial intelligence (AI). Although not a new concept, AI has gained significant prominence, particularly with its increasing use in analysis of medical images and large operational datasets, and the more recent introduction of large language models like ChatGPT.

> OECD has defined an AI system as a "machine-based system that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments. Different AI systems vary in their levels of autonomy and adaptiveness after deployment". (Organisation for Economic Co-operation and Development, 2023)

AI can also be described as systems designed by humans that, given a complex goal, act in the physical or digital world by perceiving their environment, interpreting the collected structured or unstructured data, reasoning on the knowledge derived from this data and deciding the best action(s) to take (according to pre-defined parameters) to achieve the given goal. AI systems can also be designed to learn to adapt their behaviour by analysing how the environment is affected by their previous actions.

More broadly, AI can be described as systems that act by sensing (receiving input), interpreting data, learning through experience, reasoning, and advising on the best course of action in the circumstances.

Numerous bodies, including the Australian Alliance for AI in Health (AAAiH) have called for AI in health to be used ethically, safely and in the best interests of patients. This requires health and care services to exercise caution and prepare holistically to adopt AI, guided by ethical frameworks, regulations, standards and guidelines. This must include upskilling and retraining the health and care workforce to use AI in their clinical workflows.

> It is critical for health and care workers who use AI to understand what it is, the basics of how it works, its limitations including potential for bias and how AI will change how they deliver care.

It is also essential for leaders in the health and care sector to understand their responsibilities to have frameworks for ethical and safe adoption of AI in place, including ensuring the workforce is skilled to understand AI technologies, their shortcomings, and capable of explaining these to patients and consumers of health services and their clinical colleagues.

The health and care sector must prepare now for this changing landscape, embracing the benefits of AI and its potential for delivery of more and better patient care into the future. Upskilling the workforce is crucial to achieve this goal.

The potential of AI is great and will disrupt the current ways of working to allow efficient care that can adapt and grow.

AI and the workforce

The realm of AI in health and care spans various applications, ranging from predictive analytics and patient data management to robotic surgeries and personalised medicine. These technologies hold the promise of improving disease diagnosis, tailoring treatments, and enhancing the efficiency of patient care.

Ensuring that the health and care workforce possesses sufficient digital literacy is crucial for the proper and ethical implementation of these technologies and applications.

A recent initiative by the CSIRO (Commonwealth Scientific and Industrial Research Organisation) (Verspoor, *et al*., 2023), highlighted several areas where AI is currently making an impact:

- Computer vision tools to detect skin lesions
- Predict coronary artery disease from scans
- Data driven robots that guide minimally invasive surgery
- Deep learning methods have been used to model electronic health record data to predict health outcomes and provide early estimates of treatment costs

Medical-grade AI is recognised as a highly transformative technology for healthcare, capable of revolutionising care delivery across all settings. The potential of AI is substantial and has the power to disrupt current work processes, fostering efficient care that can adapt and evolve. As existing health service models face increasing pressure, coupled with constraints in funding and resources, there's a realisation that the health and care sector must reimagine service delivery.

While the implementation of AI has the potential to alleviate strains on health and care services, it also introduces challenges related to ethics, safety, clinical appropriateness, and the transformation of professional roles. As AI progresses, it becomes essential for the health and care workforce to upskill, developing proficiency in AI technologies and understanding the implications of their usage. This is crucial for ensuring the responsible, safe, ethical adoption and effective utilisation of AI technologies into clinical care.

The AI.Care: Advancing Data-Driven Healthcare conference, delivered by the Australasian Institute of Digital Health (AIDH) in November 2023, was a timely opportunity for experts and health and care professionals to gather and deliberate on the work that they are already undertaking with AI, and to present their ideas and thoughts on how Australia can move forward embracing AI in health and care in a safe, effective and ethical way. This paper shares some of the key insights from the conference.

AI.Care Conference

AI.Care was held over two days in Melbourne in November 2023, and featured a variety of workshops and presentations from leading experts in the field. The conference served as a crucial platform to highlight and begin to address the diverse and pressing need for the healthcare workforce to adapt, develop digital proficiency, and ensure the safe, responsible and ethical adoption of AI technologies. Key themes included the necessity for a specialised leadership to be educated and trained, to oversee the integration AI skills and processes into healthcare professions, the pressing need for standards to guide adoption in clinical settings and the benefits of global collaboration.

Several key insights were uncovered from the conference relating to the health workforce. Speakers highlighted the progress being made to automate digital health systems and manual processes using AI, encompassing support for diagnosis, treatment, monitoring, claims management, and quality care delivery. For example, Tina Campbell's presentation demonstrated the potential of generative AI, showcasing the use of conversational voice AI in a multilingual long COVID survey in Western Sydney, reaching 45,000 individuals and relieving workforce strain through automation. The technology provided screening of individuals under the InTouch service to pinpoint those displaying symptoms of long COVID and offer necessary support.

As AI becomes an integral part of healthcare, workforce adaptation and digital proficiency are essential to unlock the benefits. However, challenges such as gaps in workforce capability, and trust in AI systems must be addressed.

Tracey Duffy from the TGA discussed the regulatory controls that the TGA is already using to assess AI and apply rigorous requirements that must be met to be certified under software as a medical device. The TGA is also collaborating with other global regulators to enable regulations to keep pace with advances in AI technologies. Health and care workers should be cognisant of the need for certain AI applications to be regulated, and ensure they only use regulated AI tools for their specific purpose.

The impact of AI on the healthcare workforce also goes beyond automation, by transforming roles and tasks. The introduction of AI innovations in radiology, for instance, are presenting a solution to support timely diagnosis. Prof Catherine Jones showed attendees how AI aids in prioritising the review of patient scans in her workflow, thereby improving patient outcomes through faster detection and notification of more serious conditions.

A keynote presentation from Professor Enrico Coiera FAIDH launched the National Policy Roadmap for AI in Healthcare from the AAAiH. The Roadmap calls for a mature and co-ordinated national approach for the introduction of AI into Australian health and care (Australian Alliance for Artificial Intelligence in Healthcare, 2023). It was a pivotal presentation that helped kick start the conference in a positive and informative way. AIDH is proud to have contributed to development of the Roadmap and looks forward to progressing the recommendations with the AAAiH.

There is also a changing focus on health service delivery and care models where there is a cultural and behavioural shift in the consumer and patient experience, enabled by digital health.

Some key themes related to presentations at AI.Care were:

1. **AI Implementation and Impact on Healthcare Efficiency:**
   - 'A story from the frontier of AI in Healthcare: Transforming clinical coding with an AI co-pilot.'
   - 'Clinical Perspectives | The potential of AI in health – AI Implementation within the Virtual Hospital'
2. **Global Standards and Governance in Health AI:**
   - 'Setting Global Standards for Health AI Innovation'
3. **Public Perception and Informed Decision-Making:**
   - 'How should artificial intelligence be used in healthcare? Recommendations from an Australian citizens' jury'
4. **Health Workforce and Professional Development:**
   - 'Implications of AI for the health workforce'
   - 'Positioning generative artificial intelligence for the nursing profession in Australia – A position paper'
5. **Surveillance and Adverse Events Monitoring:**
   - 'AI-based Triaging Adverse Events of Special Interest (TRAESI) for Surveillance of Adverse Events Following Vaccination in the Community (SAEFVIC)'
6. **Multimodal Medical Language Modelling:**
   - 'The current state of multimodal medical language modelling'
7. **Ethics, Standards, and Legal Considerations:**
   - 'Ethics and Standards for AI in Medicine on behalf of Royal Australian and New Zealand College of Radiologists'
   - 'Medico Legal Considerations'
8. **AI for Public Health Concerns and Communication:**
   - 'VaxPulse: Machine learning health system to address public vaccine concerns in Australia'
9. **Application of Generative AI in Primary Care:**
   - 'Revolution in practice: A quick dip into generative AI in Australian primary care and beyond'

During the AI.Care conference, a presentation highlighted the Royal Perth Hospital's involvement with Health in a Virtual Environment (HIVE). This system provides a remote hospital patient monitoring system that has been assisting doctors and nurses since 2021. Patient data is analysed and relayed to the team at the hospital, if there are any anomalies, the HIVE team can promptly alert the attending healthcare professional to provide medical care by a two-way audio-visual unit.

Dr Emily Kirkpatrick spoke on the Calvary-Amplar Health Joint Venture Virtual Hospital. This model can streamline patient care and allow patients to be monitored and receive treatment in an alternative facility or at home. It is expected that this would result in a reduced hospital bed occupancy rate, allowing those who need acute care to be admitted faster, alleviating some of the strain on the hospital system.

The AI.Care conference also highlighted the growing awareness of the necessity for a digital health capability uplift of the workforce and specific training pathways for individuals. Currently various approaches are being adopted internationally to build capability and capacity within the workforce, and support individuals with transferrable skills if they choose to work in other countries.

To achieve the goal of consumer-centric healthcare, it is vital to inspire and bring the workforce along the digital health journey, standardise the language, and steer the evolution of healthcare in a digital and AI enabled society.

It is also important for clinicians and health and care workers to understand their roles and responsibilities when using software that incorporates AI. Users are the ones responsible for the outcomes produced by the software.

Dr Sarah Anderson provided some key questions a clinician should ask before using an AI tool:

- Does it help make a diagnosis or identify a test result?
- What does it do, does it address a need?
- Do I upload, or does it upload patient information?
- Do I have consent?
- How accurate and reliable is it?
- Does it consider bias and the Australian context?

Querying these and understanding the responses that are provided will assist users with the use of AI within their work context.

To be capable of considering those questions, health and care workers must not only have digital health literacy but also the ability to critically analyse the functionality of the technology and determine its suitability for the intended purpose. Elevating the digital health literacy of the workforce is imperative to facilitate this. Verspoor, et al states that clinicians and health and care workers will need to be given the tools so that they can understand where AI is being used in the device or software, where the data has been sourced and how the algorithm has been trained. It will be essential for there to be an understanding of what is in the 'black box'.

It is also important for users to educate themselves on the ethical risks when using AI and the bias that AI can provide. Knowing where the AI training data has been sourced from and what cultural group(s) have contributed to the data is a key component in the use of AI.

Neville Board, in his "Safe clinical use of generative AI" presentation touched on the importance of training data and the bias that arises based on the training. Selection bias is one form of bias that AI can have.

> "[Selection bias] happens when the data used to train an AI system is not representative of the reality it is meant to model. It can occur due to various reasons, such as incomplete data, biased sampling, or other factors that may lead to an unrepresentative dataset. If a model is trained on a dataset that only includes male employees, for example, it will not be able to predict female employees' performance accurately" (Chapman University, n.d.).

The diversity of Australia's cultural and health landscape will require health and care workers to understand the bias of the AI being used to ensure that relevant outcomes are recommended for the patient/consumer. If AI were to be applied to all patients/consumers without understanding the bias, diagnosis, treatment, and management may be affected and cause harm to the patient/consumer.

(AI.Care conference presentations are available to purchase through AIDH to watch on demand.)

Patients and consumers

Patients and consumers must receive safe, effective, and ethical care from AI health and care services (Australian Alliance for Artificial Intelligence in Healthcare, 2023). They must be kept informed and engaged in decisions about the development and use of AI and its implications for them.

A citizens' jury was convened by the University of Wollongong to provide an Australian consumer perspective on AI in health and care. The question posed to the group was, "under what circumstances, if any, should AI be used in Australian health systems to detect or diagnose disease?" The jurors were also questioned further about the information provided to them.

The jurors produced 10 categories from which they made 15 recommendations (Carter, 2023).

1. Charter for AI in Australian health systems and services, overseen by an independent body with independent and diverse representation
2. Continuous evaluation to ensure that benefits to patients and healthcare professionals outweigh harm
3. Access to AI in healthcare as a universal right for all Australians
4. Guideline for patient rights that is inclusive and not discriminatory
5. Training for healthcare workers before AI implementation
6. Oversight by relevant professional bodies, including training

7. Mandatory monitoring, auditing, and reporting processes
8. Regulators should scrutinise systems regarding their purpose, efficacy, training datasets, flaws, and limitations
9. AI systems should only be approved if they perform equal to or better than current standard healthcare practice
10. AI training datasets should capture Australia's multiculturism and diversity
11. Encourage and consider free and open source software (FOSS)
12. AI systems should be underpinned by peer-reviewed, unbiased, independent, robust, evidence-based, and representative Australian data, with international data used only when justified
13. Well-designed trials with relevance to real-world clinical settings, transparent analysis and reporting, and conclusions that reflect system performance
14. Comprehensive, fully funded community education program that brings the community along with developments in AI
15. Within a broader program of digital health literacy, recognising community needs such as age, gender, ethnicity

It will be imperative as we move forward with AI in health and care that patients and consumers are taken along the journey. Patients and consumers should be consulted, educated, and have an opportunity to co-design solutions being implemented.

Supporting workforce capability uplift

Throughout 2023, AIDH in partnership with the Australian Digital Health Agency, delivered various tools focused on addressing national education and workforce priorities in alignment with the National Digital Health Strategy. This includes resources such as the Australian Digital Health Capability Framework, workforce readiness assessment framework and tools for individuals and organisations, Digital Health Career pathways model, Data Quality in Connecting Care guideline and the digital health workforce hub.

These resources, generic in nature, translate across the health and care spectrum, also encompassing all data, technology and platforms including those incorporating AI. They were created to support the digital uplift of the health and care workforce and support the development of digital health specialised career pathways, acknowledging the changing dynamic of interactions between consumers, patients, and practitioners, and the range of innovative and emerging uses of digital technology and its transformative impact on health and care services.

The Digital Health Blueprint and Action Plan 2023 – 2033 was released by the DoHAC in December 2023. The workforce actions identified will build momentum, leveraging the foundational activities completed by AIDH under the Capability Action Plan (CAP) in 2023.

Conclusion

AIDH is committed to the goal of ensuring **Australia's health workforce is digitally empowered to provide connected care with confidence, whenever or wherever it is needed,** including ensuring that the digital health workforce is well-positioned to meet the evolving demands of a digital and AI-enabled health and care landscape.

AI has already been implemented in various technology solutions and settings within the health and care domain. While this brings both opportunities and risks, it highlights the necessity for a digitally enabled health and care workforce.

This highlights the importance of forums such as AI.Care to further the agenda nationally to ensure AI is incorporated safely into health and care settings and workforce digital capabilities keep pace.

Australian health and care providers require policies and procedures, ethical use, and legal guidelines to integrate AI solutions seamlessly, securely, and safely into health and care.

AIDH is excited to progress the Digital Health Blueprint and Action Plan, particularly in relation to furthering the workforce digital health agenda in 2024. We will be collaborating on a series of engagement activities such as the AIDH Workforce Summit. The focus is related to developing detailed career pathways, leveraging existing programs, and consolidating information and resources through the digital health workforce hub.

This approach will be in collaboration with government, industry, education providers, professional bodies, and research, emphasising the collective effort required to advance the digital health workforce agenda.

Australasian Institute of Digital Health (AIDH)

The Australasian Institute of Digital Health (AIDH) represents a diverse and growing community of professionals at the intersection of healthcare and technology. The Institute has more than 250 distinguished Fellows who are experts or pioneers in digital health, and has a growing membership of professionals comprising doctors, health informaticians, nurses, midwives, allied health, other clinicians, administrators, and health technology business leaders.

The Institute provides objective, non-partisan, and independent advice on the use of technology and health informatics to improve consumer outcomes and solve the most pressing challenges facing our healthcare system. The Institute's unique composition and reach brings together an extraordinary network of Australia's leading digital health experts across the private, public and community sectors to advance our nation's transition to a digital health future.

Contact details

For further information on the AIDH digital health workforce programs please contact:

Sonya (Nya) Hilberts (Workforce Director)

AIDH
AUSTRALASIAN INSTITUTE OF DIGITAL HEALTH

Works Cited

Agency, A. D. H., n.d. Strategies and Plans. [Online]

Available at: https://www.digitalhealth.gov.au/about-us/strategies-and-plans

[Accessed 05 01 2024].

Agency, T. A. H. P. R., 2023. Continuing professional development. [Online]

Available at: https://www.ahpra.gov.au/Registration/Registration-Standards/CPD.aspx

altexsoft, 2022. Semi-Supervised Learning, Explained with Examples. [Online]

Available at: https://www.altexsoft.com/blog/semi-supervised-learning/

Ankers, D., 2018. Types of Artificial Intelligence: A Detailed Guide. [Online]

Available at: https://certes.co.uk/types-of-artificial-intelligence-a-detailed-guide/

Australian Alliance for Artificial Intelligence in Healthcare, 2023. A National Policy Roadmap for Artificial Intelligence in Healthcare, s.l.: s.n.

Biswal, A., 2023. 7 Types of Artificial Intelligence That You Should Know in 2024. [Online]

Available at: https://www.simplilearn.com/tutorials/artificial-intelligence-tutorial/types-of-artificial-intelligence

Carter, S., 2023. How should artificial intelligence be used in healthcare? Recommendations from an Australian citizens' jury. Melbourne, s.n.

Clements, W. et al., 2022. A Prospective Study Assessing Patient Perception of the Use of Artificial Intelligence in Radiology. Asia Pacific Journeal of Health Management.

Coiera, E. W., Verspoor, K. & Hansen, D. P., 2023. We need to chat about artifical intelligence. The Medical Journal of Australia.

Organisation for Economic Co-operation and Development, 2023. Updates to the OECD's definition of an AI system explained. accessed 08 February 2024 https://

Great Learning Team, 2023. What is Artificial Intelligence in 2024? Types, Trends, and Future of it?. [Online]

Available at: https://www.mygreatlearning.com/blog/what-is-artificial-intelligence/

Hurwitz, J. & Kirsch, D., 2018. Machine Learning For Dummies. Hoboken, NJ: John Wiley & Sons, Inc..

IBM Data and AI Team, 2023. Understanding the different types of artificial intelligence. [Online]

Available at: https://www.ibm.com/blog/understanding-the-different-types-of-artificial-intelligence/

IBM, n.d. What is artificial intelligence (AI)?. [Online]

Available at: https://www.ibm.com/topics/artificial-intelligence

[Accessed 11 January 2024].

IBM, n.d. What is machine learning?. [Online]

Available at: https://www.ibm.com/topics/machine-learning

javaTpoint, n.d. Artificial Intelligence in Healthcare. [Online]

Available at: https://www.javatpoint.com/artificial-intelligence-in-healthcare

javaTpoint, n.d. Artificial Intelligence in Medicine. [Online]

Available at: https://www.javatpoint.com/artificial-intelligence-in-medicine

javaTpoint, n.d. Subsets of Artificial Intelligence. [Online]

Available at: https://www.javatpoint.com/subsets-of-ai

Joshi, N., 2019. 7 Types Of Artificial Intelligence. [Online]

Available at: https://www.forbes.com/sites/cognitiveworld/2019/06/19/7-types-of-artificial-intelligence/?sh=676fee41233e

Khan, H., 2021. Types of AI | Different Types of Artificial Intelligence Systems. [Online]

Available at: https://www.researchgate.net/publication/355021812_Types_of_AI_Different_Types_of_Artificial_Intelligence_Systems_fossgurucomtypes-of-ai-different-types-of-artificial-intelligence-systems

Lateef, Z., 2023. Types Of Artificial Intelligence You Should Know. [Online]

Available at: https://www.edureka.co/blog/types-of-artificial-intelligence/

McCarthy, J., 2007. What is artificial intelligence?. [Online]

Available at: https://www-formal.stanford.edu/jmc/whatisai.pdf

Microsoft and the Tech Council of Australia, 2023. Australia's Generative AI opportunity, s.l.: s.n.

Ministry of Health NSW, 2020. Future of Work - understanding the impacts of technology on the healthcare workforce. [Online]

Available at: https://www.health.nsw.gov.au/workforce/horizons/Documents/future-of-work-healthcare-workforce.PDF

[Accessed 05 January 2024].

Oakden-Rayner, L., 2017. Artifical intelligence won't replace a doctor any time soon, but it can help with diagnosis. [Online]

Available at: https://theconversation.com/artificial-intelligence-wont-replace-a-doctor-any-time-soon-but-it-can-help-with-diagnosis-83353

Tableau, 2023. [Online]

Available at: https://www.tableau.com/data-insights/ai/history#history

TGA, n.d. Is my software regulated?. [Online]

Available at: https://www.tga.gov.au/sites/default/files/my-software-regulated.pdf

Verspoor, K., Hansen, D. & Coiera, E., 2023. AI is already being used in healthcare. but not all of it is 'medical grade'. [Online]

Available at: https://www.csiro.au/en/news/all/articles/2023/june/ai-in-healthcare

World Health Organisation, 2021. Global strategy on digital health 2020-2025. [Online]

Available at: https://www.who.int/publications/i/item/9789240020924

[Accessed 05 January 2024].

Mohammed, M. A., Mohammed, M. A., & Mohammed, V. A. (2022). Impact of artificial intelligence on the automation of digital health system. International Journal of Software Engineering &Amp; Applications, 13(6), 23-29. https://doi.org/10.5121/ijsea.2022.13602

Sapci, A. H. and Sapci, H. (2020). Artificial intelligence education and tools for medical and health informatics students: systematic review. JMIR Medical Education, 6(1), e19285. https://doi.org/10.2196/19285

Raha, D. and Seetharaman, A. (2022). Framework for understanding the impact of machine learning and artificial intelligence in healthcare industry. Artificial Intelligence, Soft Computing and Applications. https://doi.org/10.5121/csit.2022.122315

Chen, Y., Stavropoulou, C., Narasinkan, R., Baker, A., & Scarbrough, H. (2021). Professionals' responses to the introduction of ai innovations in radiology and their implications for future adoption: a qualitative study. BMC Health Services Research, 21(1). https://doi.org/10.1186/s12913-021-06861-y


AIDH
AUSTRALASIAN INSTITUTE
OF DIGITAL HEALTH