

The typing is on the wall: Australia's healthcare future needs a digitally capable workforce

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Received: 24 July 2023
Accepted: 4 September 2023
Published: 25 September 2023

Cite this:
 Woods L et al. (2023)
 Australian Health Review
 47(5), 553–558. doi:[10.1071/AH23142](https://doi.org/10.1071/AH23142)

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ABSTRACT

Digital health technologies are a proposed solution to improve healthcare delivery and reduce pressures on the healthcare system, but these technologies are new to much of the health workforce. This perspective paper highlights lessons learned from the global experience of rapid digital transformation of health workforces, including fostering a culture of learning, ensuring accreditation and recognition, and adopting a transdisciplinary approach. Evidence-based actions are proposed to address recommendations to (1) ensure foundational workforce digital health capability and (2) build specialist digital health career pathways. Australia must take a national approach and strategically leverage strong collaborations across sectors including healthcare, education and government to ensure a consistent, regulated and sustainable digital workforce capability.

Keywords: capability, clinical informatics, digital, digital health, education, employee, health workforce, medical informatics, skills, training, workforce planning.

Introduction

Australian healthcare workers face multiple, simultaneous pressures: rising demand for care, rising complexity of needs, budget pressures, new models of care and rapid digital disruption.¹ If used effectively, the digital disruption imposed by technologies such as electronic medical records (EMR), virtual care and artificial intelligence offers opportunities to improve outcomes and strengthen health systems.² The digital health capability of healthcare workers is an essential component to the adoption of these technologies to ensure the delivery of high-quality patient care (Box 1). This perspective paper aims to identify existing strategies for enhancing workforce capability in digital health and outline strategy-to-action recommendations to address this critical shortfall in Australia.

The need for upskilling the healthcare workforce with digital skills^{6,7} is well known, and while work has begun,^{8,9} progress has been slow. The coronavirus disease 2019 (COVID-19) pandemic and the associated rapid and forced adoption of digital health technologies¹⁰ has further highlighted the crucial need for education and training. The Australian National Digital Health Strategy outlines plans to implement digital health, with state and federal governments continuing to make significant investments in digital health systems.¹¹ Australian general practices have been early adopters of computerised systems,¹² however public and private hospitals are still on a journey to digitisation due to the complex implementation setting with legacy systems and inter-related services. An overview of large-scale digital health implementations is provided in Table 1, acknowledging the rapidly changing landscape.

Digital health workforce challenges

Problem 1 – lack of foundational digital health capability of the healthcare workforce

Worldwide, digital literacy of healthcare workers remains an issue²⁵ and many healthcare workers are unprepared to leverage the true advantages of digital health

Box 1. Definitions and key concepts

Clinical Informatics is the practice of analysing, designing, implementing, and evaluating information and communication systems that enhance individual and population health outcomes, improve patient care, and strengthen the clinician-patient relationship.³

Digital health capability refers to the ability of the healthcare workforce to confidently use technologies to respond to the needs of consumers now and into the future.¹

Clinical Informaticians are professionals with relevant skills and experience who have a specialist digital health role.¹

Healthcare workforce refers to 'all individuals who deliver or assist in the delivery of health services or support the operation of health care facilities' including health professionals such as nurses, doctors, allied health and extends to all other workers such as administrative assistants and technology professionals.⁴

Digital health workforce can be defined as the workforce tasked with analysing, designing, developing, implementing, maintaining, operating, evaluating, and governing the formats, technologies, systems, and services that mobilise health data, information, and knowledge.⁵

Table 1. Electronic medical record implementations in Australia.

State/context	EMR	Implementation year	EMR details
General practice ¹³	Best Practice; Medical Director; Communicare (Telstra Health); Zedmed	Various	Three most used clinical information systems (Medical Director, Best Practice and Zedmed) have an estimated 90% coverage in Australian general practice.
NSW ¹⁴	Electronic Medical Record 2 (eMR2)	2013	EMR first implemented in 2007 (limited functionality). eMR2 staged rollout of functionality from 2013 to 2015. Planned statewide single digital patient record with Epic.
Vic. ^{15, 16}	Various EMRs	2016	Health services can choose their own EMR vendor, which must meet standard guidelines for applications and interoperability. Cerner EMR implemented at Alfred Health in 2016, Calvary Health uses Vitro, and Royal Children's Hospital Melbourne has Epic as a vendor. A new system for health information exchange has been proposed for Victoria in 2023.
WA ^{17, 18}	Limited EMRs	2016	Digital Medical Record (BossNet Core Medical Solutions) first implemented at Fiona Stanley Hospital in 2016 followed by Fremantle hospital. Investment in 2020 to build statewide integrated EMR system.
Qld ¹⁹	Integrated Electronic Medical Record (ieMR)	2017	Statewide integrated system with Cerner vendor. First implemented 2017 at Princess Alexandra Hospital, Brisbane.
SA ²⁰	Sunrise EMR	2019	State based EMR system first implemented in 2019 with ongoing rollout to health services across South Australia.
NT ^{21, 22}	Acacia	2022	Acacia is a single, territory-wide electronic patient record implemented in 2022. Acacia EMR vendor is InterSystems TrakCare.
ACT ²³	Digital Health Record (DHR)	2022	Digital Health Record system went live November 2022. Statewide integrated system between all ACT public health services with Epic vendor.
Tas. ²⁴	Nil	–	Recent investment to implement an integrated statewide system in the next 4 years. Digital medical record (electronic filing system) implemented in 2006.

technologies.^{26,27} The majority of the current workforce were never trained in digital healthcare^{28,29} and, with limited opportunities for upskilling, most attempts to address this capability gap involve reactive, brief and inadequate on-the-job training.³⁰

Digital health is not routinely included in undergraduate degrees for healthcare workers^{27,31} fuelled by the absence of digital health capabilities in professional accreditation standards.^{32,33} The current medical accreditation framework omits digital health capability,³⁴ and digital health is seen as a major gap in accreditation and competency frameworks

for the allied health professions.³⁵ The nursing profession has the national informatics accreditation standards,⁹ recommending digital health training within undergraduate programs, although adherence to this recommendation is unknown.

Problem 2 – lack of a specialised post graduate digital health workforce

Insufficient value has been placed on building a readily recognisable, professional, specialised healthcare workforce to manage and govern digital health.³⁶ There are no

nationally-agreed pathways for specialised digital health roles and formal qualifications are lacking in Australia.^{29,33,37} Currently, only specialist non-clinical roles such as health information management are recognised.³⁸ Broad roles and associated functions have been outlined in the Role Profiles Framework,⁴ and an action plan was recently developed,¹ however without a formalised and agreed position description, almost anyone can claim to be an expert in digital health.

Digital health workforce strategies

Specialised informatics training pathways and certifications are observable advancements internationally. In the USA, more than 50 accredited university programs provide clinical informatics fellowship training for physicians³⁹ and certification for nursing informatics specialists is also available.⁴⁰ In the UK, the Topol Digital Fellowship Programme and Digital Pioneer Fellowship⁴¹ offer professionals from clinical and non-clinical backgrounds advanced education for specialised qualifications in digital health.

In Australia, there has been a combined effort in developing strategies to build digital health workforce capacity⁴ (Box 2).

Lessons learned

Several lessons learned have been identified in the literature.

Lesson 1 – culture of learning

Embedding training and support in digital capability at all levels of the health system is seen as a high priority worldwide.^{4,10,27,41} Traditional models of ‘train once’ education are no longer fit for purpose in an evolving digitally-enabled healthcare environment.⁴⁷ Education needs a continuous, lifelong learning approach with dynamic and tailored learning experiences, requiring collaboration from all sectors and national professional bodies.⁴ Novel, flexible, agile training opportunities are essential,^{4,41} enabling responsive training opportunities (e.g. micro-credentialling) that can help enhance sustainability.

Lesson 2 – ensuring accreditation and recognition

Australia can learn from the USA, where formal training of clinical informaticians is offered as a fellowship program for doctors in their speciality training.^{48,49} Board certification by an accredited body ensures recognition of qualifications. Despite the UK also offering a fellowship program, this is not embedded in an academic framework or accreditation platform and therefore the program struggles with scale and credibility. Australia offers a growing number of digital health post-graduate coursework qualifications^{50–52} but there is a need to develop a specialist digital health accreditation system to sustain professional legitimacy.

Lesson 3 – transdisciplinary approach

Clinical informatics is a transdisciplinary profession.³⁷ Strategies and programs rely on collaborations between sectors as well as ongoing flexibility and innovation.⁴¹ Despite this, in the USA certification pathways have developed independently for each discipline.^{53,54} The UK offers an interprofessional approach to education and training through the Topol Fellowship program.⁵⁵ Program evaluation highlighted the poor representation of nursing staff in comparison to workforce numbers with nursing contribution considered vital in digital health leadership.⁵⁶ With diversity in the specialised digital health workforce across roles and people,^{1,11} training needs to extend beyond healthcare professionals to data scientists, computer scientists, engineers and bioinformaticians.⁴¹

Strategy to action – recommendations

Although strategic guidelines exist, building digital health workforce capability in Australia’s healthcare and education sectors remains an ongoing challenge. Translating lessons learned into workforce initiatives is the next step. The following recommendations require the health sector, education sector and professional bodies to take measures to ensure the successful digital transformation of the health workforce. The future of the healthcare workforce relies on this convergence of sectors and it is fundamental to recognise this opportunity.¹

Box 2. Sample Australian workforce strategies

The *Australian Health Informatics Competency Framework*⁴² by the Australian Institute of Digital Health (AIDH) provides contemporary guidelines and consensus on the competency domains for clinical informaticians in Australia.

The *Capability Framework for Digital Health in Medicine*⁴³ by the Australian Medical Council highlights the fundamental requisite of a digitally capable medical workforce.

The *National Nursing and Midwifery Digital Health Capability Framework*⁴⁴ by the AIDH in partnership with the national nursing and medical colleges, outlines the core skills, knowledge and behaviours required for professional practice.

Jurisdiction-level capability frameworks to upskill both the current and future workforce with digital skills, often via collaboration between universities and state health departments.^{45,46} The Digital Health Cooperative Research Centre’s (DHCRC) Education and Capability Program supports the operationalisation of these frameworks.

Box 3. Example workforce training program

In response to the growing need for workforce training, the Queensland Digital Academy opened in 2019 within the Clinical Skills Development Service at the Royal Brisbane and Women's Hospital Campus, offering a centrally coordinated hub for staff training in digital healthcare across the state.^{4,46} The specially fitted training rooms help target new technology implementations such as the integrated electronic medical record.

Aim: The Academy offers support for digital health capability, leadership and digital transformation across Queensland Health.

Considerations: In addition to hands-on training, the Academy also supports the academic-led Queensland Digital Health Grand Rounds and Journal Clubs, providing an opportunity for virtual attendees to network with colleagues interested in health informatics and research from all over Queensland.

Box 4. Example specialised training program

The AIDH, in partnership with the DHCRC, is currently developing a Clinical Informatics Fellowship program, an internationally recognised program for healthcare staff to develop specialised knowledge across the areas of digital technology in healthcare, leadership and service innovation.⁴²

Aim: To provide a combined academic and applied pathway for the development of the next generation of digital health leaders and opportunity for accreditation as an AIDH Clinical Informatics Fellow.

Considerations: Development of the fellowship program should consider key aspects such as accreditation and a transdisciplinary approach, providing flexible opportunities and supporting a culture of learning at all levels.

Recommendation 1 – ensure foundational workforce digital health capability

Evidence-based actions include:

- Professional accreditation¹ requirement to incorporate digital health into undergraduate health degree curriculums based on standardised capability and competency frameworks
- Adaptive digital health curriculums that can evolve in response to the emergence of novel technologies, changing workforce needs and learner feedback⁴
- Multi-disciplinary team learning to enable staff across disciplines to adopt new technologies and lead to sustainable change⁴¹

An example education program embedded in a health service is provided in [Box 3](#).

Recommendation 2 – build specialist digital health career pathways

Evidence-based actions include:

- Standardised national post-graduate clinical informatics competencies⁴
- Defined career pathways for clinical informaticians including recognition of digital health as an occupational group^{1,4}
- Programs with a focus on transformational change, including navigating the workforce through changes to tasks, functions and new ways of working¹
- Proactive rather than reactive learning activities^{1,41}
- Accreditation of post-graduate clinical informatics by professional bodies¹

A specialised post-graduate digital health workforce initiative is provided in [Box 4](#).

Conclusion

Education of the health workforce is necessary to realise the benefits of digital transformations, but implementation is challenging internationally. Australia can strategically leverage strong collaborations across sectors including healthcare, education and government to ensure a consistent, regulated and sustainable national approach to digital workforce capability. This will ensure the healthcare workforce is adequately equipped with the necessary skills and knowledge to meet the increasing demands of contemporary healthcare delivery.

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Data availability. Data sharing is not applicable as no new data were generated or analysed during this study.

Conflicts of interest. The authors declare that they have no conflicts of interest.

Declaration of funding. This research did not receive any specific funding.

Ethics. Ethical approval for this research was not required.

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