

Digital health inequity in Australian primary care



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Background

Digital health interventions have the potential to improve health and wellbeing at both individual and population levels. However, the rapid development of digital health risks reinforcing existing health inequities. Addressing the digital divide is important for the sustainability of digital health innovations.

Objectives

To examine definitions of digital healthcare access, identify challenges for patients, practitioners and the primary healthcare system, and propose practical strategies to reduce digital health inequities.

Discussion

For patients, barriers include limited access to reliable internet and devices, variable digital health literacy and concerns about trust and safety. For practitioners, technologies that are poorly integrated into clinical workflows might disrupt care and increase administrative burden. At a system level, mechanisms for the secure collection, exchange and ethical use of social determinants of health data remain underdeveloped. To realise its potential, digital health must be implemented in ways that reduce, not reinforce health inequities.

TUDOR HART'S INVERSE CARE LAW (1971) stated that availability of good medical care tends to vary inversely with the need of the population served.¹ A corollary to this law, the inverse equity hypothesis (2000) stated that newly introduced health interventions would be initially adopted by the wealthier segments of the population, who likely had the least need for these interventions.² Here we explore how the inverse equity hypothesis is playing out in the rapidly developing field of digital health in Australian primary care.

Understanding digital healthcare

Digital health (also referred to as eHealth and mHealth) interventions use digital technology (eg computers, smartphones, wearables) to improve the health and wellbeing of people at individual and population levels.^{3,4} It encompasses patient-facing solutions, practitioner-/practice-facing solutions, and healthcare system solutions. Examples used in Australia at the time of writing include online searching for health information, online appointment booking systems, telehealth consultations, emailing/texting clinical correspondence, emailing/texting prescriptions, using smartphone apps for primary healthcare (eg monitoring blood sugar levels) and accessing electronic health records (eg pathology and radiology). Artificial intelligence (AI) – encompassing machine learning algorithms,

natural language processing and predictive analytics – is increasingly used for clinical documentation and clinical decision support.⁵

The use of digital health in the COVID-19 pandemic and the introduction of Medicare Benefits Schedule (MBS) telehealth items,⁶ highlighted the need for digital health interventions that could be delivered at pace and scale.⁷ Digital health interventions have the potential to increase equity, efficiency and quality, to empower patients, and to extend the scope of healthcare beyond its conventional boundaries.^{8,9} However, there is little evidence on outcomes related to quality of care, service delivery, benefits or harms for patients, or cost-effectiveness.^{10,11} Further, there is considerable emerging evidence that the use of digital health, including telehealth, has the potential to worsen health outcomes for those with lower income, lower levels of education and employment, older age, disability and culturally and linguistically diverse backgrounds.^{10,12-15} For example, Parker et al's study found that internet-based consultations are more likely to be used by more educated and younger age groups.¹² In their study of digital technologies and determinants of health in Australia, Baum et al concluded that some people are being caught in a vicious cycle whereby lack of digital access reinforces and amplifies existing disadvantage¹⁶ – this is particularly the case for Aboriginal and Torres Strait Islander peoples in Australia, as

the interests of developers and researchers do not coincide with the needs of Indigenous communities,¹⁷ and cultural determinants of health.¹⁸ This might be because digital health innovations are being used as unvalidated and economical substitutes for conventional healthcare. And, consistent with the inverse equity hypothesis, those who would benefit the most from these innovations are also the least likely, or least able, to access them.

Understanding access to healthcare

To understand the drivers of digital health inequity, or the digital health divide (Box 1), it is helpful to understand the definitions and dimensions of healthcare access. Levesque et al define access to healthcare as resulting from the interaction of determinants pertaining to characteristics of individuals (eg where they live, their economic resources and their social status) and of services (eg quantity, location and costs). Variations in access are conceptualised in terms of differences in the perception of needs for healthcare, in seeking healthcare, in reaching and obtaining (or delay in obtaining) healthcare, and in the type and intensity of services received. These sequential steps in the patient experience represent potential barriers to access.¹⁹

Box 1. Definition of the digital health divide

In keeping with the definition of access to healthcare, the digital divide, and digital exclusion, are conceptualised in terms of disparities in:

1. Access to digital connectivity and infrastructure of health technology^{30,37}
2. Digital skills and literacy required to navigate and interact with health technology^{30,37}
3. Engagement with digital platforms³⁷
4. Outcomes from digital technologies³⁰

Aim

As the rapid development of digital health reinforces existing health inequities,^{20,21} our aim is to describe challenges and recommendations for bridging the digital

health divide in Australian primary care. Addressing this divide is important for the sustainability of digital health innovations.

Challenges for bridging the digital health divide

Patients

There are countless complex and interconnected challenges for patients. Here we consider three of the more prominent barriers: access to internet and devices (1), digital health literacy (2) and trust (3).

1. Access to internet and devices

Access to internet (including publicly available internet with adequate bandwidth), and high financial costs of devices (including maintenance and repairs), are well-established barriers to healthcare access.^{15,22} Internet access is itself considered a social determinant of health.²³ Findings from the 2025 Australian Digital Inclusion Index showed that while access has improved, 20.6% of Australians are excluded or highly excluded, with marked gaps for Aboriginal and Torres Strait Islander peoples, rural and remote areas, and people with disability.²⁴ Notably, by focusing on *how* people are using the internet ('non-users', 'sporadic users', 'social media and entertainment users', 'instrumental users', and 'advanced users'), rather than just *who* is using it, digital inclusion programmes can be tailored to the specific needs of different user groups.²⁵

Even with internet access, digital exclusion is reported. For some, while providing free or subsidised internet and mobile devices will improve access to digital health, for others, this is a superficial offering when the key underlying barrier is persistent general socioeconomic inequality (eg due to domestic and family violence or mental ill health).²² Socioeconomically disadvantaged groups might be less likely to identify as 'instrumental users' or 'advanced users' of the internet who access digital healthcare in supportive or empowering ways.

2. Digital health literacy

Digital health (or eHealth) literacy is the set of skills required to effectively engage information technology for health.²⁶ As an almost prerequisite to digital health

literacy, Levesque et al describes the perception of need for healthcare, which is determined by health literacy, knowledge and beliefs about health.¹⁹

Low digital health literacy,^{13,27} together with low self-efficacy and confidence in using digital health,²² are barriers to digital healthcare access. Text-to-voice/voice-to-text technology is an example solution for those with linguistically diverse background and/or visual impairment. Susceptibility to socioculturally compatible online misinformation is also a barrier.²⁷ Despite this, a systematic review of digital health interventions targeted at socially disadvantaged groups showed that digital health literacy was generally overlooked in the development of the interventions.²⁸

3. Trust

Lack of trust in digital health services, and/or practitioners and healthcare systems that endorse them, is another barrier to digital healthcare access.^{22,27,29} This is particularly the case for socially disadvantaged groups, together with a strong patient preference for human-based health services.^{22,27} There is also lack of trust in digital health tools that are accessing, storing and commoditising confidential healthcare data. Digital health developers are responsible for transparency regarding credibility of information, use of healthcare data, and use of AI (eg algorithm-driven digital marketing technology).³⁰

Most digital health tools are not co-designed by end-users, increasing the risk of bias and neglecting the needs of socially disadvantaged groups.³¹ Similarly, most digital health studies lack the measurement of social determinants of health, and the representation of socially disadvantaged groups, for equitable effectiveness.³¹

Practitioners

Practitioners, and practices, are also potentially increasing the risk of bias and inadvertently a source of digital health inequity. A longitudinal study in the UK identified large practice size, lack of practice resources, high absorptive capacity (ie ability to identify, assimilate, transform and apply valuable external knowledge), strong leadership and good intra-practice relationships favoured innovation.³²

However, other studies identified lack of practice resources (ie staff, access to internet and devices, IT support), particularly for rural and remote practices, as a barrier to implementing digital health tools.³³ When technologies were poorly integrated into clinical workflows, inefficiencies and ‘techno-stress’ resulted, with compromises to patient access and quality of care.³² These studies highlight the need for implementation planning, including training for practitioners and patients, and mitigating patient inequities. Challenges specific to AI are considered in Box 2.

Primary healthcare system

Digital health technologies – particularly those requiring substantial system-level change – often falter due to non-adoption, abandonment and limited scale-up, spread and sustainability.³⁴ Moving forward, an important consideration is not only what digital health interventions including AI offer, but also what they replace. We may be headed toward a system where those who can afford it consult with a clinician, while those who cannot are directed to AI. In such a system, the inequity shifts from who has access to internet and devices,

to who must depend on them for their health and wellbeing.

Addressing digital health inequity in Australian primary care will require establishing how social determinants of health data, such as housing stability, education and employment, can be securely exchanged and used across diverse healthcare settings. A possible approach is a scoring strategy to convert social-behavioural determinants of health data for: (1) primary use at point-of-care; (2) secondary use with analytics; and (3) for population health (eg produce total scores that reflect social and behavioural determinant burden across populations).³⁵ This could also include data on access to, and benefit from, digital health technologies.

Box 2. Digital health inequity related to artificial intelligence (AI)

Clinician characteristics (eg demographics and digital health literacy, experience and exposure), preferences and perceptions (eg belief in the ability and security of a digital health intervention to improve patient outcomes), guide the adoption and continuous improvement of digital health interventions.³⁸

It is difficult to identify high-value digital health interventions, and there is limited guidance on how practitioners and practices should incorporate AI into their workflow. Survey studies in the UK and the US indicated that while general practitioners and primary care practitioners were cautiously optimistic about generative AI, particularly for documentation and data collection, scepticism persisted regarding technology (ie accuracy, safety, bias), workflow, reimbursement, empathy and equity.^{39,40} Comparably, a systematic review of AI as a catalyst for health equity in primary care settings identified significant challenges, including the digital divide excluding vulnerable groups, algorithmic bias amplifying existing inequities, and insufficient representation in training datasets.^{37,41} These studies highlight the need for primary care clinician input into digital health interventions.

Recommendations for bridging the digital health divide

What resonates from the digital health inequity literature is that

*Simply giving people the right equipment or access to it is not enough ... The solutions have to involve human intervention, commitment, and care.*²¹

What is needed, are

*intensive, long-term support networks to help people acquire the digital know-how they lack ... People helping people.*²¹

Recommendations for digital health equity in Australian primary care are synthesised in Table 1. It has also been proposed that governmental policies increase access to internet and devices; and vendors collaborate with patients and practitioners from diverse socioeconomic and cultural backgrounds in design and evaluation of digital health interventions.^{30,36}

Conclusion

There is a risk of disconnectedness between digital health interventions and patient-centred clinical care. We urgently need to ask whether digital health interventions including AI will enhance clinical care, or whether they will cheapen it for those who already have the least. The rapid digitisation of healthcare can be an opportunity to build more inclusive,

Table 1. Recommendations for digital health equity in Australian primary care

Patients	<ul style="list-style-type: none"> • Embed co-design of user-friendly digital health interventions with diverse patient groups – those with lower income, lower levels of education and employment, older age, disability, culturally and linguistically diverse background, regional and remote areas and Aboriginal and Torres Strait Islander peoples • Provide non-digital alternatives wherever digital options are introduced, to avoid excluding patients who cannot or prefer not to engage digitally
Practitioners	<ul style="list-style-type: none"> • Routinely assess digital access and capability in social history taking, and document this in the clinical record where relevant • Actively connect patients with supports when digital access barriers are identified • Advocate within practices and Primary Health Networks for technologies that are interoperable, culturally safe, accessible and adaptable to different patient needs
Primary care	<ul style="list-style-type: none"> • Provide clear, accessible information to patients and clinicians about how health data are stored, shared and used, including the role of artificial intelligence, and publish evidence-based summaries outlining benefits, limitations and known risks of new technologies prior to implementation • Measure and address social and cultural determinants of health in development and implementation of digital healthcare, and in decision making around adoption and endorsement

equitable systems, or a pathway to deepen structural divides. To realise its potential, digital health must prioritise quality, safety, collaboration and social responsibility.

Key points

- The rapid development of digital health in Australian primary care risks disproportionately benefiting already advantaged populations.
- It is difficult to identify high-value digital health interventions, and there is limited guidance on how practitioners and practices should incorporate AI into their workflows.
- There is a risk of disconnectedness between digital health interventions and patient-centred clinical care.
- Practitioners can advocate within practices and Primary Health Networks for technologies that are interoperable, culturally safe, accessible and adaptable to different patient needs.

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