



# Leveraging digital technology in healthcare

Research paper

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# Overview

## Key points

**\* Better integrating digital technology into healthcare could save more than \$5 billion a year and ease pressures on our healthcare system.**

- Making better use of data in electronic medical record systems could save up to \$5.4 billion per year by reducing the length of time patients spend in hospital, and up to \$355 million through fewer duplicated tests.
- Up to 30% of the tasks undertaken by the workforce could be automated using digital technology and artificial intelligence (AI); precious time that could be spent caring for patients.

**\* Consumers also stand to gain.**

- Digital innovations such as telehealth, digital therapeutics and remote monitoring are transforming healthcare delivery and enabling patients to access care from the comfort of their own homes.
- Reduced travel time from greater use of telehealth is delivering consumer gains of around \$895 million per year.

**\* While we have made major strides integrating digital technology into healthcare, there are still a lot of unrealised gains that governments can help unlock.**

- Despite a \$2 billion investment in the My Health Record (MHR) system, patient data is still fragmented.
- Telehealth use has exploded since 2020, but uptake of remote patient monitoring and digital therapeutics has lagged behind.
- Although AI is being used to guide decision-making and automate tasks to relieve workforce pressure, we are far from making full use of this powerful new tool.

**\* Governments can better exploit the value of health information by improving information sharing.**

- Sharpening incentives for software providers to make information sharing across systems more seamless would help improve MHR's coverage.
- The useability of MHR (currently described as a 'shoebox of pdfs') needs to improve in tandem with its coverage. Government should work to break down or 'atomise' data in MHR to make it more useful.

**\* Governments can help embed remote care services into mainstream practice.**

- Used well, technologies such as remote patient monitoring and digital therapeutics are highly cost-effective alternatives to traditional forms of care. Targeted support could see these technologies integrated into everyday practice.
- Taking steps to minimise the unintended consequences of restrictions on telehealth subsidies for consumers facing disadvantage would enable telehealth's benefits to be enjoyed more widely.

**\* Governments can harness the power of AI by building trust among users and improving access to data.**

- A more dynamic approvals process could help provide certainty on safe and reasonable uses of AI, and so build trust and confidence amongst patients, clinicians and service providers.
- AI needs quality data. Governments will need to facilitate appropriate data access for AI innovators while ensuring effective safeguards around privacy.

Australia's healthcare sector is one of the world's most productive. Compared to peer countries, we achieve some of the best population health outcomes for our healthcare dollar, once we account for risk and environmental factors.

But these gains largely stem from advances in saving lives, not cost reductions. Our health spending continues to increase, as the burden of chronic disease grows, our population ages, and consumer expectations rise.

At the same time, the lingering effects of COVID-19 and workforce constraints are contributing to longer wait times for care. In hospital emergency departments, the share of high-priority patients seen on time has fallen. And a growing number of Australians say that wait times for general practitioners (GPs) and specialists are unacceptably long.

We need to find ways of containing healthcare spending and easing system pressures without sacrificing the quality of care. Digital technology can help achieve these goals if implemented well. While we've made major strides, we are yet to cash in on all the opportunities.

## **Governments can help unlock the savings from digital technology**

### **Realising the potential of health information**

We're already reaping some of digital technology's benefits through electronic medical records.

Electronic medical records give practitioners ready access to patient information. Around nine in ten GPs now practise digitally, maintaining no paper records. Digital records are also gaining traction in hospitals, where they are being coupled with clinical decision support software and other analytical tools to reduce the risk of errors and enhance workflows. These advanced uses offer substantial benefits. Making better use of data in electronic medical record systems can save up to \$5.8 billion per year in hospital costs (figure 1).

While work is underway to realise the gains from electronic medical record systems, progress is more mixed when it comes to realising the gains of digital information sharing.

At last count there were about 7000 accredited GP clinics and 700 public hospitals. This is in addition to the many other healthcare providers in the system, including specialists, diagnostic imaging and pathology labs, and pharmacies. These providers have invested in different digital systems, each with their own data structures, clinical terminology and standards.

My Health Record (MHR) was intended to be a solution to this siloed data structure, providing a central access point for a patient's most important health data. But despite an investment of more than \$2 billion, it continues to be plagued by incomplete records and poor usability.

Meanwhile, localised information management and sharing solutions have emerged, including state- and territory-backed initiatives. Some of these developments, particularly around information management, are complementary – MHR was never designed to replace comprehensive records maintained by healthcare providers. Other initiatives, however, seek to bridge the same information gaps as MHR: sharing referrals, treatment and discharge summaries, and medication details.

The net result is an uncoordinated, and in some cases, disconnected information management and sharing landscape.

Governments are already investing in interoperable infrastructure, developing data exchange specifications and standards, to better connect these disparate networks. And efforts are also underway to improve MHR's coverage

and usability. The Australian Government has been experimenting with paying practitioners for uploads, and there are moves afoot to upgrade MHR and require uploads of reports from diagnostic tests and imaging.

While welcome, requiring uploads of diagnostic tests and imaging is only a partial fix to a broader problem. Capturing health information outside of these areas relies on MHR being better integrated with workflows in busy clinical settings such as GPs and specialist clinics, hospitals and aged care. Sharpening incentives for software providers to make this more seamless would both increase coverage and encourage interoperability.

And it's critical that efforts to expand MHR's coverage move in tandem with reforms to improve its accessibility. MHR has been described as a 'shoebox of pdfs', contributing to a significant gap between the records that are uploaded to the system and those that are viewed. Data contained in MHR needs to be atomised (reduced to its most basic format) to allow practitioners to efficiently search large volumes of data and display reports in a way that is accessible and easy to read.

While challenging, improving the way in which we manage and share health information would have significant payoffs. In addition to the substantial cost savings it could provide, better data also lays the foundation for other digital health applications, such as remote care and AI.

## **Taking healthcare to the consumer**

Digital innovations that enable care to be delivered remotely such as telehealth, digital therapeutics (DTx) and remote patient monitoring (RPM), accelerated during COVID and are now transforming healthcare. Patients can now use an app to complete stroke rehabilitation or undergo cognitive behavioural therapy, while health professionals can track patients with diabetes and chronic respiratory and cardiovascular conditions in real-time.

Remote forms of care provide significant convenience for consumers. Patients can receive care in the comfort of their own homes, avoiding travel costs and time. And there are system-wide benefits too. Remote technologies allow those with chronic conditions in particular, to play a more active role in their own care and avoid costly deteriorations in their condition.

Providers are experimenting with virtual care in our hospitals and in the Aboriginal Community Controlled Health sector; trialling new service models to bring care to rural and remote communities.

But remote care doesn't fit neatly within broader funding models. While there are instances of case-by-case funding, pathways for funding RPM are limited and the rationale behind what can and cannot be reimbursed is not always apparent.

Gaps in funding RPM and DTx mean that practitioners and patients alike may instead opt for subsidised in-person care or forego care, even if that is more costly for the system as a whole in the long run.

Funding approaches for these new digital innovations need to strike a balance. These technologies can be highly cost effective. But the benefits depend on the diagnosis, as well as the users' digital literacy, motivation and supports.

The ease with which these technologies can be rolled out means that relying on traditional activity-based funding risks a costly expansion of low value services. A portfolio of funding approaches is needed to target the consumers and the contexts where the gains are greatest.

But funding is only part of the solution for increasing uptake. With more than 300,000 consumer health apps now available on app stores, and 200 new ones being added daily, greater guidance by governments and professional bodies would help clinicians and consumers differentiate clinically proven applications from the deluge of products entering the market.

While RPM and DTx are yet to be widely integrated into patterns of care, the use of telehealth has become part of everyday practice. A rarity pre-COVID, today around one in five Medicare-funded GP consultations are delivered via telehealth. Consumers are the big beneficiaries, enjoying savings of around \$895 million per year in reduced travel time.

The Australian Government's existing telehealth subsidies reward continuity of care, by requiring at least one face-to-face service in the 12 months preceding a telehealth appointment to qualify for Medicare rebates (the so-called 12-month rule). This requirement effectively precludes telehealth delivered by virtual-only providers from attracting government support, and dampens competition by making it harder for consumers to switch healthcare providers.

The benefits of convenience mean that many consumers are using non-Medicare subsidised telehealth regardless. And in many cases, their out-of-pocket expenses are no greater. Virtual-only providers often charge prices on par with traditional subsidised providers, as they avoid the bricks-and-mortar costs associated with in-person care, and typically specialise in relatively low-complexity interventions that take less time. But there are risks that consumers facing disadvantage who rely on bulk billing, particularly those with caring responsibilities and/or limited mobility, miss out on valuable forms of care.

Government should take steps to minimise the unintended consequences of restrictions on telehealth subsidies on consumers facing disadvantage. This will require careful calibration to get the incentives right, ensure subsidies only target high-value care, and manage the fiscal exposure of governments. Government-run GP helplines will serve as an important safeguard in the interim.

## **Harnessing the power of AI**

AI is evolving rapidly, and new healthcare applications are emerging everyday.

The amount of health information available to clinicians has been growing exponentially, generating more knowledge than we can leverage. AI can help to unlock this data's potential, by enabling it to be accessed, shared, analysed and interpreted at an unprecedented pace. This information can be used by service providers to help make decisions and workflows quicker and reduce the time patients spend waiting for care.

Although AI is being used to guide some types of decision-making and automate tasks to relieve workforce pressure, we are far from making full use of this powerful new tool. The automation of low-complexity tasks in particular could free up as much as 30% of clinicians' precious time to care for patients.

While AI can provide substantial benefits in healthcare, its use comes with significant risks, culminating in a lack of trust. Although 60% of Australians surveyed support the development of AI in general, this reduces to between 27-43% for health uses.

Government can help to mitigate risks and build trust by bolstering existing regulatory guardrails. AI used in healthcare is only regulated where it provides treatment or replaces the judgement of a clinician. That means that AI that assists and guides clinical decision-making falls largely outside of the regulatory remit, leaving it up to individual clinicians to assess the quality and potentially significant risks, of its use. And unlike other medical technologies, AI is capable of evolving and adapting, such that both the AI process, and its performance, change over time. Revisiting the exemption for clinical decision support and a more formalised post-approval process could help engender trust among users.

To make better use of AI, governments will also need to facilitate appropriate data access for AI innovators while ensuring effective safeguards around privacy. The accuracy of AI relies heavily on quality data. Algorithmic bias can arise where datasets used to train AI models are not comprehensive or are drawn from a different population than the one that AI is applied to. Not all health data is sensitive and we need to

identify parts of government-held data that can be safely shared, and invest in safeguards around privacy to strike a better balance when it comes to data access.

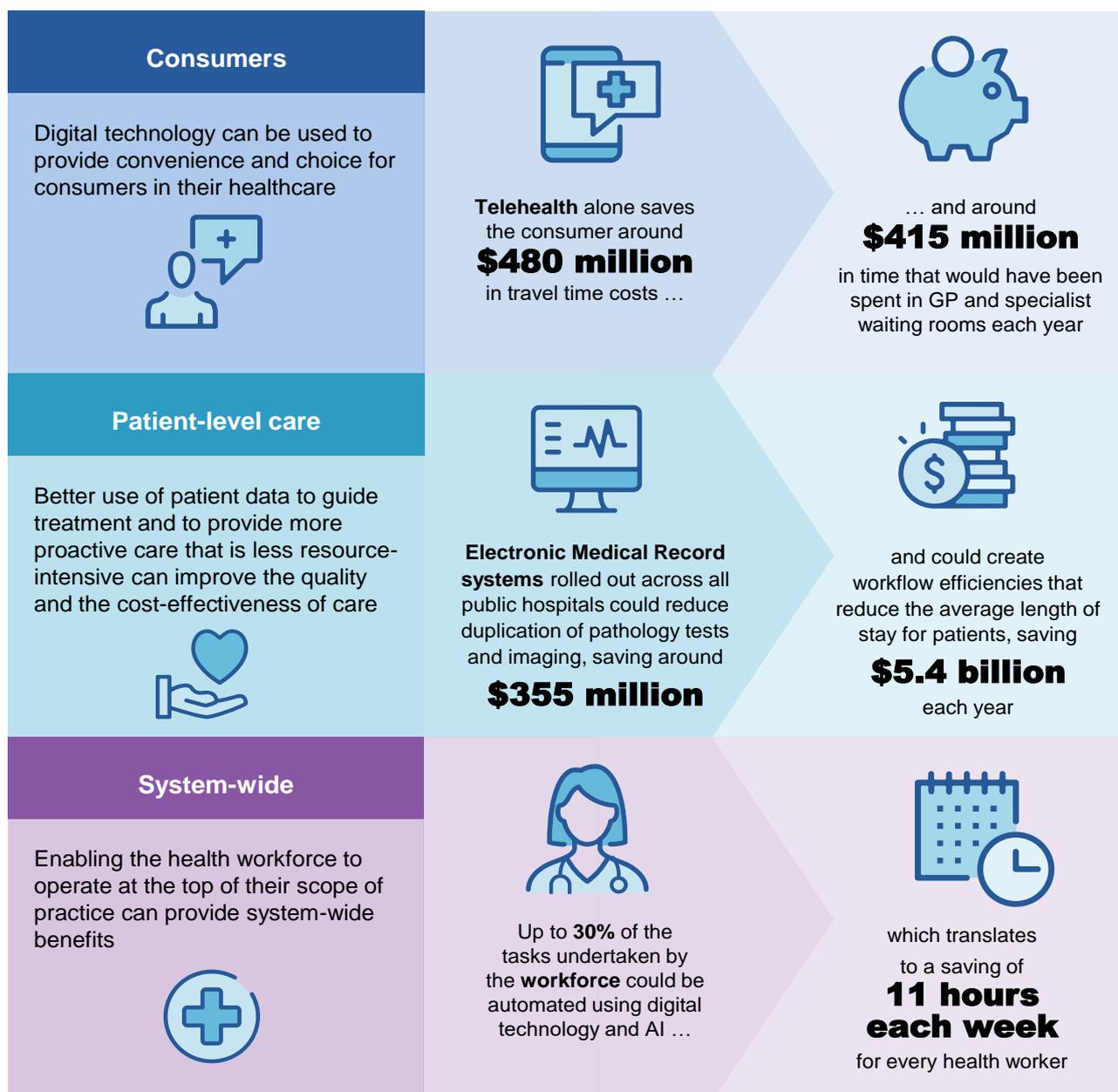
### The benefits will be worth it

Overcoming information-sharing challenges, incorporating remote care into everyday practice and building trust in AI is no small task, but the rewards for doing so are significant.

The OECD has estimated a potential return of \$3 for every \$1 invested in digital strategies, and the Commission’s estimates suggest that digital applications could reduce costs by more than \$5 billion a year (figure 1).

With such substantial cost savings on the table, this is an opportunity Australia cannot afford to miss.

**Figure 1 – There are significant consumer, patient-level and system-wide benefits<sup>a</sup>**



a. The methodology underpinning these estimates is set out in appendix B.

# 1. The digital technology promise in healthcare

## Key points

- ✳ **Digital technology can improve the productivity of the health system.**
  - If implemented well, digital technologies such as electronic health and medical records, telehealth, remote care services and artificial intelligence can make services more efficient, reduce demand for resource intensive services, improve the quality and safety of care, and make care more convenient for patients.
- ✳ **Digital technology can also help address important challenges facing the health system, such as growing health spending, long wait times for treatment, and unequal access to care.**
- ✳ **Digital technology has already made an impact in the health system.**
  - Individual providers are investing in digital tools, and the use of basic digital systems is widespread.
  - Governments have made major investments in digital infrastructure, such as My Health Record at the federal level, and jurisdiction-specific record systems at the state and territory level.
  - Providers are increasingly delivering services virtually. Telehealth use has increased enormously since 2020, and new models of virtual care are emerging.
- ✳ **However, there remains untapped potential.**
  - Improving digital health records and supporting emerging digital alternatives to traditional care could improve efficiency, quality and convenience.
  - Artificial intelligence has the potential to improve productivity in almost all aspects of healthcare.
- ✳ **Governments can help facilitate the digital transformation in health. They can:**
  - help facilitate investment in digital technology by getting regulatory settings right
  - help individual service providers coordinate to achieve collective benefits, and
  - ensure that funding settings provide the right incentives for the adoption of digital technologies that deliver high-value care and provide cost-effective alternatives to traditional services.

## 1.1 The promise of digital technology

### The health system is doing well, though big challenges remain

All things considered, Australia's health system is performing well. Recent research by the Commission found that the health system is delivering a good return on the resources that governments are investing in it. Compared to peer countries, Australia achieves some of the best population health outcomes given how much we spend on healthcare, and controlling for risk factors such as smoking and obesity rates. And while government spending on health has increased, spending growth has been accompanied by payoffs in the form of better patient outcomes (measured in quality-adjusted life years) (PC 2024a).

But our relatively good performance in health is not grounds for complacency. If spending continues to grow, more and more pressure will be placed on government budgets. That pressure is already becoming more pronounced as our population ages, the burden of chronic disease increases, and patient expectations rise. The most recent *Intergenerational Report* projected that Australian Government health spending alone will increase from 4.2% of GDP (its 2022-23 level) to 6.2% in 2062-63 (Australian Government 2023, p. 148).

The health system is facing other challenges too. Patients are waiting longer to receive care throughout the system, which points to major supply-side constraints.

- Wait times have increased for urgent care. In public hospital emergency departments, the share of high-priority patients seen on time has decreased in recent years (figure 1.1, panel a). At the same time, wait times for urgent general practitioner (GP) appointments have increased (figure 1.1, panel b).
- For GP and specialist appointments in general, a growing share of patients say that their wait times are unacceptably long.<sup>1</sup>

A variety of factors are likely contributing to these trends. One major contributor is the COVID-19 pandemic and its lingering effects, which have put unprecedented pressure on the health system. Another key issue is the limited availability of qualified health workers. In recent years, the number of vacancies for key health workers – especially nurses – has increased significantly (figure 1.1, panel c).

Challenges accessing care are greater for some groups. This is especially true for people in regional and remote areas, where services are more sparse. There are fewer GPs and specialists per person outside of major cities (figure 1.1, panel d), and people in regional and remote areas often live far away from the nearest hospital (Barbieri and Jorm 2019). People wait longer for care as a result; for example, in the 2022-23 Patient Experiences Survey, the share of people who said that they waited longer than acceptable for a GP appointment was higher in outer regional and remote areas (37.5%) than in major cities (28.0%) (ABS 2023e). These issues affect Aboriginal and Torres Strait Islander people to a greater extent, as they are much more likely to live outside of major cities.<sup>2</sup>

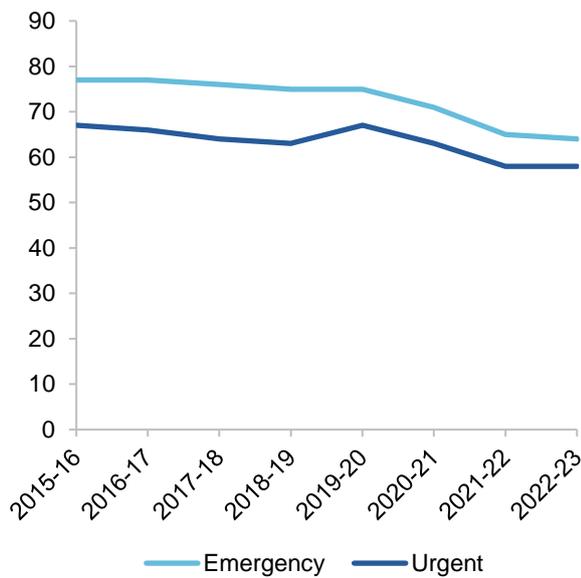
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<sup>1</sup> In the 2022-23 Patient Experiences Survey, 29.6% of those surveyed reported waiting longer than they felt acceptable for a GP appointment; in 2020-21, the share was 16.6%. Similarly, 27.9% of those surveyed in 2022-23 reported waiting longer than acceptable for a specialist appointment; in 2020-21, the share was 21.7% (ABS 2022b, 2023e).

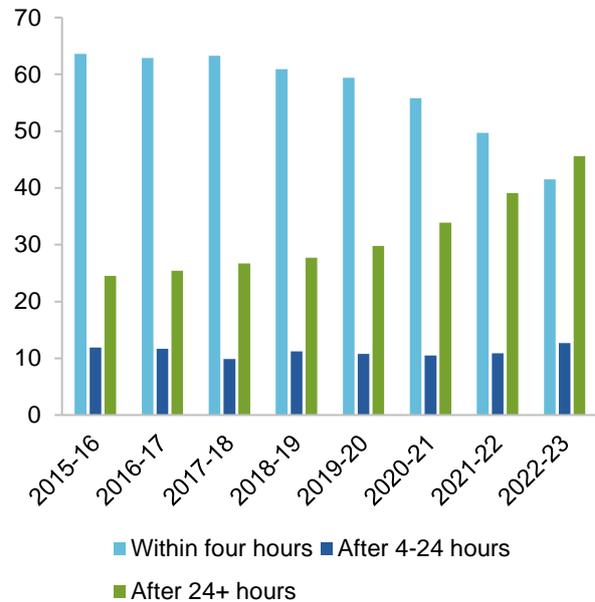
<sup>2</sup> The estimated shares of Aboriginal and Torres Strait Islander people living in regional areas and remote areas are 43.8% and 15.4% respectively. The estimated shares of the rest of the population are 25.2% and 1.4% respectively (ABS 2023c).

**Figure 1.1 – The health system is facing challenges such as rising wait times, workforce pressures and sparse services in some areas<sup>a,b</sup>**

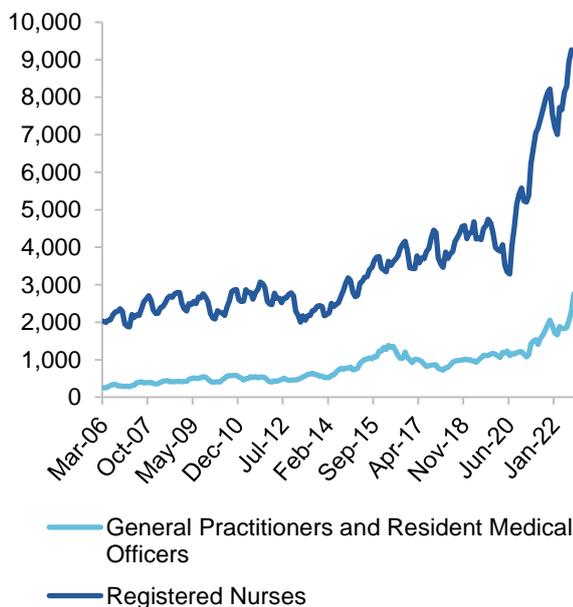
**a) Percentage of patients seen on time in public hospital emergency departments, by triage category**



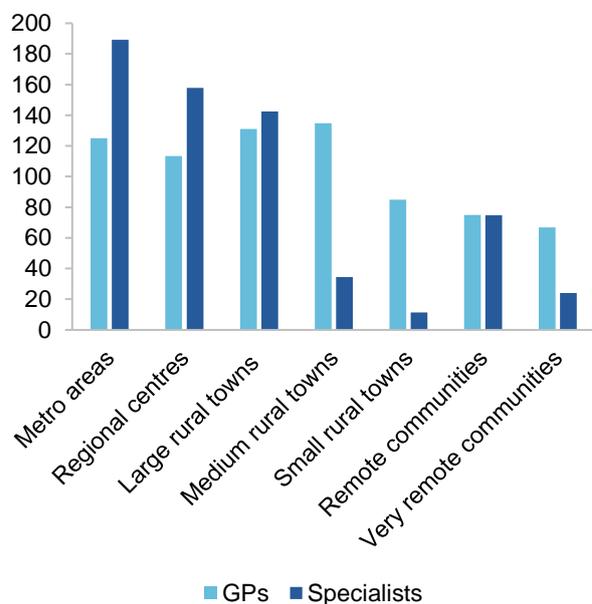
**b) Time taken to get an urgent GP appointment, percentage of patients**



**c) Number of vacancies per month, Internet Vacancies Index**



**d) Registered GPs and specialists per 100,000 people by remoteness, 2021**



**a.** In panel (a), the ‘resuscitation’, ‘semi-urgent’ and ‘non-urgent’ triage categories are not included in the figure. **b.** In panel (c), the data represents the total number of job advertisements on selected online job boards. It does not reflect the total number of job advertisements in Australia (though the index is reasonably comprehensive).

Sources: Panels (a) and (b) – Report on Government Services (PC 2024b); panel (c) – Internet Vacancy Index (Jobs and Skills Australia 2024); panel (d) – Nous Group (2023, p. 36), using data from the Department of Health’s National Health Workforce Dataset.

## Digital technology can improve the productivity of the health system

Given the challenges outlined above, governments need to find ways to make the resources they invest in health go further. In other words, there is a need to continue improving healthcare productivity.

Digital technology is a vital enabler of productivity growth. It has had a major impact in other parts of the economy, and harnessing its full benefit was identified as a policy priority by the Commission in the most recent productivity inquiry (PC 2023).

As in the broader economy, digital technology can lift productivity in the health system.<sup>3</sup> It has many valuable functions in healthcare. This paper focuses in particular on:

- electronic health and medical records
- telehealth
- remote care services such as digital therapeutics and remote patient monitoring
- artificial intelligence (AI) in healthcare.

There are a number of ways in which these technologies can improve productivity.

- *More efficient services*: Some technologies allow services to be delivered more efficiently. For example, electronic health records can save labour by reducing the time that clinicians need to spend asking their patients about their medical history, and can also reduce waste through preventing the duplication of tests.
- *Reduced demand*: Digital-based services can prevent people from having to receive care in resource-intensive settings, and so ease the burden on certain services. For example, remote patient monitoring technology can detect deteriorations in health, particularly for patients with chronic conditions, and prevent them from having to go to hospital.
- *Better quality care*: Digital systems can improve the quality and safety of treatment. Clinical decision support software, for example, gives clinicians ready access to key information on their patient, as well as clinical treatment guidelines. This can reduce the risk of errors, such as prescribing the wrong medication.
- *More convenience*: Technology can deliver benefits to patients and clinicians in the form of greater convenience. In particular, telehealth can allow patients to receive care without attending a clinic in person, which enables them to avoid travel-related costs, and reduces geographical barriers to receiving care.

Importantly, this means that digital technology can improve productivity through both quality improvements *and* cost savings. The Commission's recent research found that parts of the health sector have experienced strong productivity growth in recent years, and that this has come largely from services getting better at saving lives (PC 2024a). While these quality-driven productivity improvements have been welcome, they have done little to ease healthcare's growing fiscal burden. If implemented well, digital technology can enable governments to save money, or at least temper spending growth, without compromising on quality.

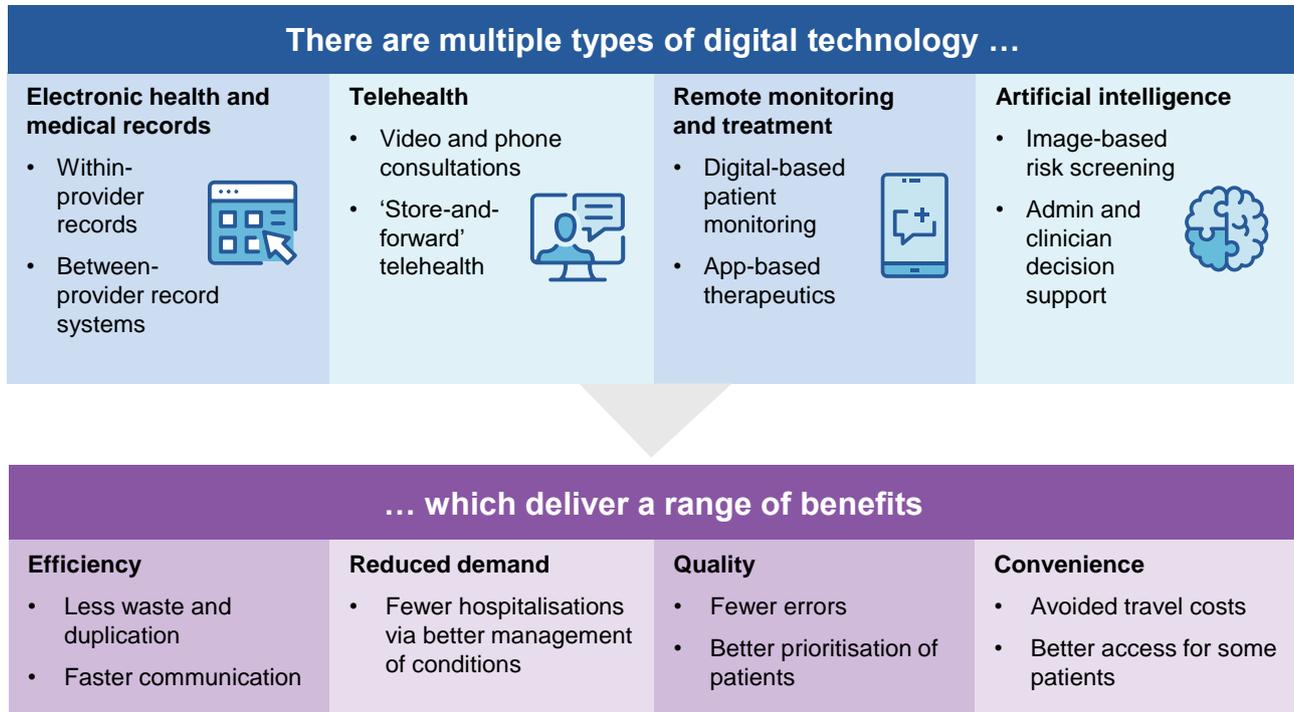
The various types of digital technologies and services, and their benefits, are summarised in figure 1.2.

Estimates exist of the extent of these benefits. The Organisation for Economic Co-operation and Development (2019, p. 44) has estimated that investments in improving how data is used in the health system could have a return of approximately 3 to 1. The Commission has also produced estimates of some of the benefits of digital technology; these are detailed in appendix B.

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<sup>3</sup> For the purposes of this paper, the health system encompasses primary care, specialist services, the hospital sector, mental healthcare and allied health. Areas such as disability and aged care are outside its scope.

**Figure 1.2 – Types of digital technology and their benefits for the health system**



## 1.2 Adoption of digital technology in the health sector

### The health sector is increasingly digital ...

Recent technological advances have made new tools available for the delivery of healthcare, and some of their benefits are already being reaped.

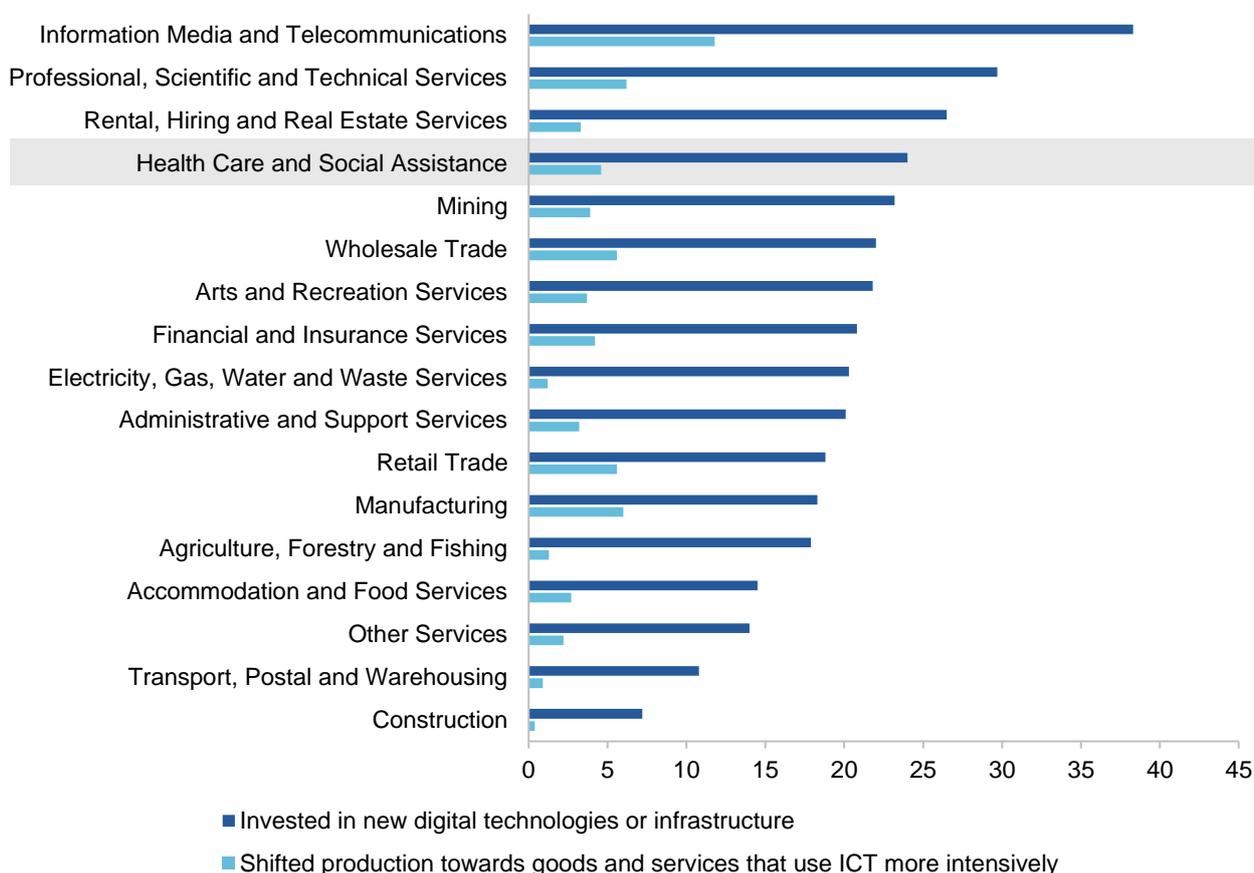
Patients can access general advice at any time via the internet. The proliferation of smartphones means that the vast majority of Australians have a device that can monitor signs such as heart rate and blood pressure, and capture images and video that can be shared with providers in real time.

Individual healthcare providers have been investing in digital tools. Digital information management systems are now widespread in the health system; in 2021, 96% of primary care clinics in Australia used an electronic medical record (OECD 2024b).<sup>4</sup> Computational power is increasing exponentially, and with it is our capacity to generate and analyse health data. And according to recent research, there has also been rapid uptake of cloud computing and AI in the sector: in the 2010s, the share of healthcare firms that had at some point used either technology was about 10%; in 2022, the share was about 40% (Nguyen and Hambur 2023, p. 7). Moreover, healthcare providers appear to be investing in digital technology at a higher rate than providers in other sectors (figure 1.3).<sup>5</sup>

<sup>4</sup> Moreover, in a survey of GPs, 87% said that they practised completely digitally, and maintained no paper records (RACGP 2019a, p. 4).

<sup>5</sup> Many businesses said that their IT use was for general business processes. However, large shares also reported using it for video conferencing or remote consultations (41%) or general service provision (31%) (ABS 2023b).

**Figure 1.3 – Health and social service providers are investing in digital technology**  
**Share of businesses that invested in or shifted towards digital technology in the past year, 2021-22**



Source: Characteristics of Australian Businesses, 2021-22 (ABS 2023b).

Governments have also made major investments in digital infrastructure. At the federal level, the My Health Record system is now in place, after being rolled out gradually from 2012 (ANAO 2019, pp. 15–19). There have also been investments at the state and territory level. All jurisdictions have developed or are developing state/territory-specific electronic health records<sup>6</sup> to be used in public hospitals, and in some cases in outpatient clinics and community health as well.<sup>7</sup> And the Australian, state and territory governments have collectively invested in digital projects via the *Intergovernmental Agreement on National Digital Health 2023-2027* (National Cabinet 2023, pp. 4–5). One such project is the roll-out of electronic prescribing infrastructure, which has seen 36% of GPs having generated e-prescriptions, and 95% of PBS pharmacies having dispensed them as at 2021 (ADHA 2021, p. 4).

At the same time, digital modes of care are becoming more mainstream. The use of telehealth has grown enormously since 2020, as a result of policy changes that expanded Medicare subsidies for video and phone consultations (ANAO 2023, p. 15). Before the pandemic, less than 1% of Medicare-funded GP and specialist consultations were delivered via telehealth; now, the share is nearly one in five for GP services, and over

<sup>6</sup> Electronic medical records capture information for a single provider. Records which allow information to be accessed across multiple provider organisations are typically referred to as electronic health records.

<sup>7</sup> A detailed summary of this appears in chapter 2.

one in ten for specialist services.<sup>8</sup> Virtual care has also expanded into the hospital sector, where some providers are experimenting with new service models. For example, the Royal Prince Alfred (RPA) Hospital in Sydney has developed 'rpavirtual', a 'virtual hospital' that makes use of telehealth in a range of contexts, and employs digital remote monitoring to enable patients to be cared for at home (rpavirtual 2023). And Aboriginal Community Controlled Health Organisations (ACCHOs) are using digital technology to enable their patients to access support from remote specialists while the patient remains at the ACCHO clinic.

### ... but there remains untapped potential

While there has been progress in digital technology use in healthcare, there remain opportunities to further realise the productivity benefits it can generate.

There is scope to improve the quality of, and access to, information within the health system by increasing the comprehensiveness and interoperability of digital record and communication systems. The Commission has previously noted that that 'despite the increased uptake, [My Health Record] is some way off from being a comprehensive source of data on all healthcare services used by a consumer' (PC 2023, p. 57). Moreover, information sharing between different service providers within the health system is challenging. Many of the IT systems in GP clinics not interoperable with those in hospitals, which makes information sharing between primary care and the hospital sector difficult (PC 2021, p. 118).

Opportunities also exist to further support digital alternatives to traditional care. Though the role of telehealth has expanded significantly in recent years, uptake of other digital-based services has lagged. For example, digital therapeutics and remote patient monitoring are yet to be integrated into normal patterns of care.

Finally, there remains untapped potential in the use of AI in healthcare. Though AI uptake in healthcare has increased, it is not yet embedded in everyday healthcare delivery in Australia (CSIRO 2023, p. 1). There are opportunities to increase the use of AI throughout the health system, from administration through to clinical applications.

## 1.3 Governments can help facilitate the digital transformation in health

For the most part, governments do not directly determine how much digital technology is used in the health system. Decision-making is mostly decentralised; which types of infrastructure to invest in, and which services to opt for, are generally decisions that are made by clinicians, administrators, patients and other actors, who are motivated by a combination of financial incentives and a desire to deliver good health outcomes. Much of the time, these actors have good reasons to invest in digital technology. It can help them deliver better-quality care, save money, and make care more convenient for patients, at a cost that is worth it given the benefits.

However, there are also things that governments can do to help realise the potential of digital technology in healthcare. Though they generally do not directly determine the extent of uptake, governments can be facilitators, and have a range of policy tools available. This is consistent with the Australian Government's *National Digital Health Strategy 2023-2028*, which recognises the role that policy and regulatory settings can play as 'enablers' of positive outcomes for patients in the health system (ADHA 2023d, p. 18).

<sup>8</sup> These figures are based on Commission analysis of data from Services Australia (2024). More detailed analysis appears in chapter 3.

Governments can facilitate investment in digital technology by getting regulatory settings right. Governments play a central role in regulating healthcare, and in ensuring that patients are well-informed about their care. They can use these instruments to provide patients and clinicians with assurance that digital technologies and services are safe and effective. They can also provide a favourable environment for investment, by ensuring that regulations do not place unnecessary burdens on providers, and that regulations keep pace with technological developments.

Governments can also add value by helping individual service providers coordinate to achieve collective benefits. This is particularly important when it comes to information sharing. The benefit of a health or medical record to any individual user depends on there being a broader network of users of that system, or another interoperable system. However, users do not always have an incentive to share information, or invest in a system that is interoperable with others – much of the required coordination needs to be incentivised by government.

Finally, governments can ensure that funding settings provide the right incentives for the adoption of digital technology where beneficial. About 70% of healthcare funding in Australia comes from government (AIHW 2023e), so provider and patient decisions are shaped to a large extent by the particularities of which services attract subsidies, and at what rates. And in some cases, governments are direct purchasers. In deciding on which digital services to support, governments need to consider both whether they deliver high-value care and whether they provide a cost-effective alternative to traditional services.

## 1.4 The contribution and approach of this paper

The nature of the potential productivity benefits, and the role of government in helping realise them, are different for different technologies and services. The remainder of this paper explores specific technology and service types in more detail, each of which is covered in its own chapter (figure 1.4). The chapters discuss the benefits of digital technology, drawing on existing research, case studies of successful innovations, and original Commission analysis that quantifies certain productivity-enhancing effects. They also explore how current policy settings might be changed to realise further benefits.

**Figure 1.4 – This paper is structured around the ways different digital technologies could support the health system**

	<p><b>Electronic health and medical records</b> (chapter 2)</p>
	<p><b>Telehealth</b> (chapter 3)</p>
	<p><b>Remote care</b> (chapter 4)</p>
	<p><b>Artificial intelligence</b> (chapter 5)</p>

## 2. Electronic health and medical records

### Key points

- ✳ **Digital technology has changed the collection and storage of health data for the better.**
  - While gaps remain, particularly for some parts of the hospital system, Electronic Medical Records (EMRs) have been increasingly adopted by healthcare providers.
  - This shift comes with large benefits. EMRs can help providers reduce duplication of procedures (such as pathology tests and imaging), ensure continuity of care, and reduce the risk of adverse events (including medication-related harms).
- ✳ **Important benefits arise from sharing of health information between providers, but health data in Australia is still fragmented.**
  - Breakdowns in information sharing between providers – for example, from a hospital back to a GP clinic – affect continuity of care for many patients.
- ✳ **My Health Record (MHR) was intended to overcome fragmentation by providing a centralised, consumer-controlled repository of information. Despite its progress, more remains to be done.**
  - MHR contains important gaps – not all consumers opt to have a record, and there is no requirement for clinicians to use the system, leading to patchy coverage of health information.
  - These gaps, combined with poor usability, constrain the value of MHR for many clinicians, who are often operating under time pressure. If clinicians do not see the value in MHR, they will not use it.
- ✳ **Significant gains could be made by storing MHR data in an atomised format and sharpening incentives for software providers to make information sharing across systems more seamless. In the meantime, focussing on electronic discharge and medication data could provide some quick wins.**
- ✳ **With states and territories also investing in their own information systems, greater coordination is needed across jurisdictions, and systems must be interoperable with one another to minimise costs.**
  - MHR is not a replacement for systems intended to meet the needs of individual providers, nor for recordkeeping by state and territory governments – these must coexist.
  - But better coordinating investments designed to improve information sharing between state systems and primary care would avoid duplication and minimise costs.

This chapter explores how digital technologies, such as electronic medical records (EMRs), are transforming the way in which practitioners and patients can store, share and access health data.

The benefits on offer are significant. EMRs can better support patient care and reduce waste. They also act as an enabler for other data-driven technologies such as clinical decision support and service optimisation.

But we are yet to fully realise these benefits. To do so, My Health Record will need to evolve to be better integrated with the network of other health information sharing systems, and we will need to overcome significant interoperability challenges.

## **2.1 Digital technology is changing the way we use valuable health information**

### **Digital technology is transforming the way we collect and store data**

Healthcare providers require accurate and timely data to make diagnoses, identify appropriate treatment and ensure continuity of care. EMRs and other systems that digitise health information management allow clinicians to get the right information they need at the right time, and to make use of that information more efficiently.

EMRs are increasingly being used by healthcare providers to document, monitor, and manage the delivery of health services: a process that has, up until recently, been predominantly paper-based. An estimated 96% of Australian primary care physician offices used EMRs in 2021, slightly higher than the OECD average of 93% (OECD 2023).<sup>9</sup>

EMRs are also gaining traction in hospitals, where they are replacing paper-based clinical charts and allowing healthcare professionals to simultaneously access and update patient information.

### **Better access to health information can improve outcomes and reduce costs for service providers**

EMRs within a GP practice, hospital or other service provider can improve quality of care by providing more accurate information to support clinician decision-making. In a hospital setting, implementing EMR systems is associated with a clinically significant decrease in mortality rates (South 2022). There are also administrative benefits for providers: for example, moving from paper to digital records can reduce the risk of loss or damage to paper records (PC 2017a, p. 523).

Improvements in patient outcomes are magnified when EMRs are combined with clinical decision support systems (Bronsoleter et al. 2021; Menachemi et al. 2018). These support systems provide a wide range of tools to help clinicians identify the most relevant facts or recommend appropriate actions (Wasylewicz and Scheepers-Hoeks 2019).

Clinical decision support systems can help practitioners 'use wisely'. For example, one study found that introducing EMR alerts resulted in a statistically significant reduction in four low value care practices (Lawrence et al. 2023). And 'digital guardrails' can encourage adherence to clinical guidelines, issue follow-up and treatment reminders, reduce the incidence of medication and prescribing errors, and alert practitioners to duplicative testing.

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<sup>9</sup> 16 OECD countries had all primary care physician offices using EMRs by 2021 (OECD 2023).

Decision support systems can also improve the quality of the information stored in EMRs themselves by improving the quality of clinical documentation. For example, an obstetric decision support system might include a prompt to document key information, such as estimated foetal weight (Sutton et al. 2020).<sup>10</sup>

In addition to improved patient outcomes and safety, EMRs can reduce healthcare costs. Although there are typically increases in costs in the initial years (due to the fixed costs of setting up a system), evidence from Australia and abroad suggests that digitising health information management can lower treatment, administrative and data storage costs in the long run (Menachemi et al. 2018).<sup>11</sup> For example, one EMR implemented by The Royal Children’s Hospital Melbourne (RCH) generated substantial cost savings (box 2.1). The implementation of EMRs in other public hospitals across the health system may generate similar savings to those experienced at RCH (appendix B).

### **Box 2.1 – Case study: Royal Children’s Hospital EMR**

In April 2016, The Royal Children’s Hospital Melbourne (RCH) implemented a comprehensive EMR system to replace patients’ paper medical records. Clinicians are able to access medical history, clinical notes, assessments, test results and other patient information electronically in one place. The coverage of the EMR system has recently been expanded beyond RCH to also include Royal Melbourne Hospital, Royal Women’s Hospital and Peter MacCallum Cancer Centre.

#### **Impacts**

- RCH reported a 13.4% reduction in medication errors following the introduction of the EMR. There are fewer prescribing errors as the system sends alerts (for example, about medication interactions or when a dose is outside clinical standards). There are also fewer medication administration errors as nurses scan a barcode on the patient wristband and the medication before it is administered (Victorian DH 2020).
- Alerts within the EMR can prioritise clinician’s time. The EMR system can alert nurses and clinicians to let them know if a patient deteriorates, which has helped provide more timely medical review, particularly in intensive care. Clinicians can also check a box when ordering a test to make their phone vibrate when the result is ready to view. This enables clinicians to see results immediately for time critical patients. The system also enables clinicians to review a record from a remote location. For example, a specialist on call can see a patient’s full record.
- Access to an EMR can help avoid unnecessary tests. RCH reported a 6.3% reduction in the number of pathology tests and a 12.5% decrease in diagnostic imaging tests over the two-year period since the introduction of the EMR (Victorian DH 2020).
- The EMR has generated operational and financial benefits, including improvements in bed planning and efficiency, improved data capture and cost savings associated with storage and handling of paper files.
- The system can improve information sharing and engagement with patients. The patient portal allows patients (or carers) to see the medical record, get notified about upcoming appointments, be prompted to undertake care at home and to share the record with relevant health practitioners outside the hospital (such as GPs or private specialist).

Source: Lawrence et al. (2023); South (2022); Victorian DH (2020).

<sup>10</sup> Decision support systems can also aid with early identification and management. For example, Territory Kidney Care is a clinical decision support system that uses analytics to assist with the early identification and management of kidney disease.

<sup>11</sup> Not all studies have shown positive results. Agha (2014) found that the adoption of health information technology by US hospitals did not improve outcomes but did increase costs. However, the Commission heard during consultations that some of the information collected was for legal rather than medical purposes.

Many of these benefits and cost reductions accrue directly to the healthcare provider investing in an EMR. For this reason, many providers have reasonably strong incentives to implement an EMR that meets their direct operational needs (such as recordkeeping or communicating between hospital wards).<sup>12</sup>

## Sharing between providers magnifies these benefits

People interact with different healthcare providers, in different settings, at different times. Better sharing of health information between multiple different providers can improve the accuracy and continuity of the treatment they receive. This is particularly true for people with multiple or complex morbidities, where information management and coordination across providers is important (McCullough et al. 2016).

In a given year around 80% of Australians visit a GP, 38% visit a specialist and 15% visit a hospital emergency department (ED), according to patient surveys (ABS 2023e). And of those that visit a GP more than once, just over one quarter report attending more than one general practice, according to survey data from the RACGP (Wright et al. 2018).

Enabling transfer of records between these healthcare providers can improve the accuracy and continuity of treatment for patients and reduce duplication and inefficiency in the way they receive care. Not only would consumers be able to avoid having duplicative tests and scans, but they would also avoid having to recount their medical history to multiple providers. In 2020-21, 17.8 million Australians accessed 204.1 million Medicare-subsidised pathology tests, imaging scans and other diagnostic services. Many tests are ordered because clinicians either don't know about or don't have access to the results from previous tests – estimates of this range from 7-20%, though the exact rate is difficult to verify (PHA 2023).

Data sharing across healthcare providers can also reduce the incidence of adverse events. The transition between acute and community care, in particular, can be a vulnerable period in a patient's care because of the potential for adverse events, including medication related problems. Poor communication between hospitals and GPs can be a contributing factor. When GPs do not receive hospital discharge summaries, the risk of an individual being readmitted to hospital within seven days increases by 79% (Li et al. 2013). Low-quality discharge communications (that are delayed, unintelligible, lacking detail or inaccurate) have also been shown to have adverse effects on patient outcomes (Kripalani et al. 2007; Schwarz et al. 2019). The cost to the healthcare system of medication-related problems alone is around \$1.4 billion per year, with 50% of this harm considered preventable (PSA 2019a).

Communication of health information from numerous healthcare providers can also play an important role for patients transitioning into new clinical settings or episodes of care, especially in emergency situations. Many patients are able to provide necessary information to a provider upon admission. But for patients who are unable to communicate (including those with language backgrounds other than English), critical information may be missed if existing records are not readily available.

## But health information remains fragmented ...

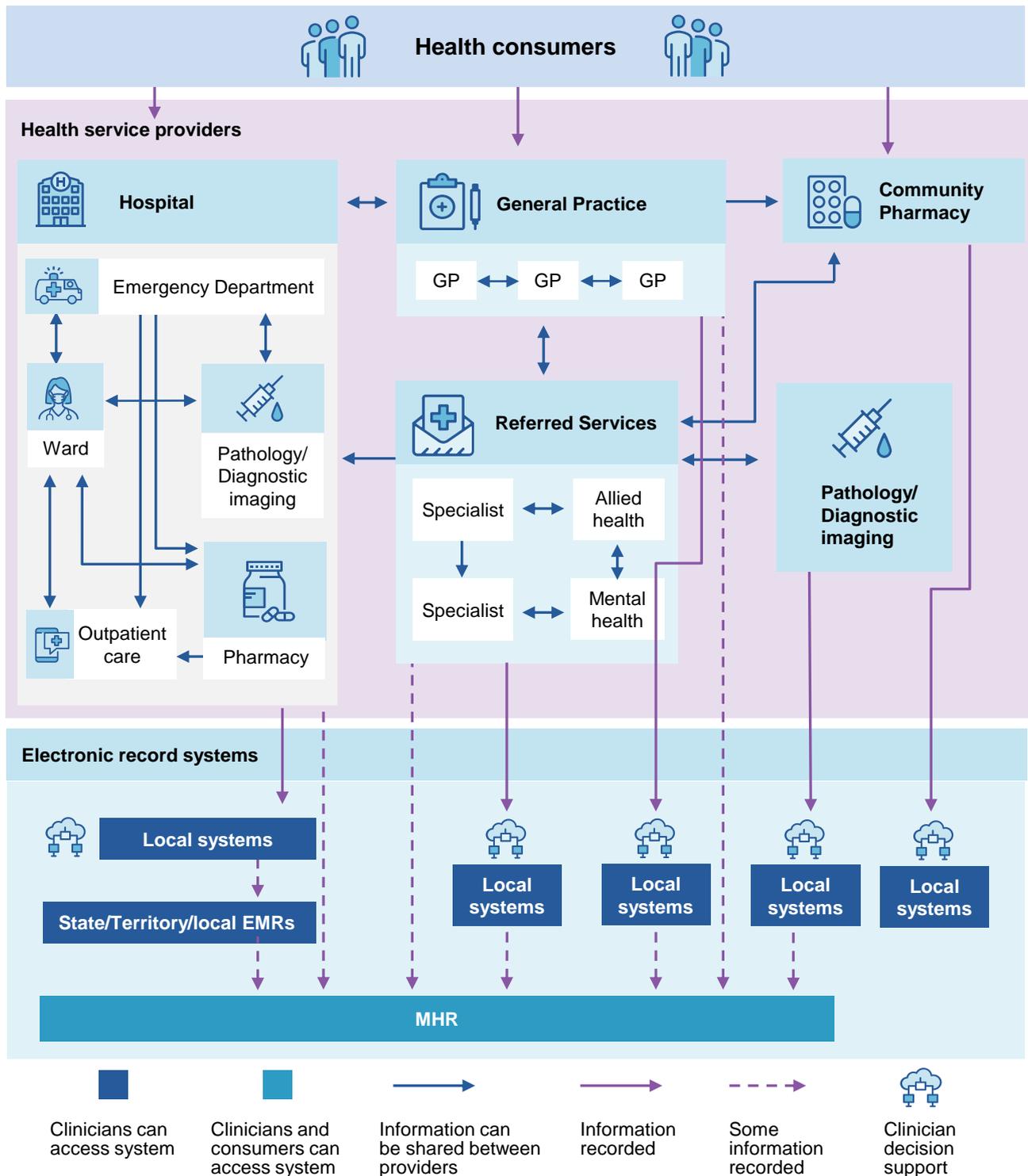
Despite its benefits, information sharing across a complex health system is challenging.

Latest available figures estimate that there are about 7000 accredited GP clinics and 700 public hospitals (SCRGSP 2024). This is in addition to the many other healthcare providers in the system, including referred services, pathology and diagnostic imaging, and community pharmacies (figure 2.1).

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<sup>12</sup> In some cases, there are high fixed costs, which can pose a barrier particularly for small providers. Some incentives exist to assist providers in overcoming these, including the Digital Health Practice Incentives Program (ePIP) targeted at GP practices.

**Figure 2.1 – The large network of providers makes information sharing challenging<sup>a,b</sup>**



**a.** Information is also collected for the MBS from general practice and referred services and for the PBS by pharmacies: only billing data is included. Depending on the type of hospital and patient, information from hospitals and dental services is sometimes also collected by private health insurance providers (PC 2017b, p. 512). **b.** In some cases, red lines indicate where information is exchanged via letters or faxes rather than electronically (PC 2017b, p. 512).

Source: Commission interpretation based on consultation with Australian Government, State and Territory Health Departments.

Each provider can employ different systems and equipment for recordkeeping.<sup>13</sup>

For GPs, among the different types of software available, Best Practice and MedicalDirector have historically had a significant share of the market (PC 2017b, p. 518). For hospitals, large generic IT systems offered by multinational software companies such as Joan Software, CERNER and EPIC, and more bespoke systems tailor-made for individual wards, hospitals or hospital groups, are used (PC 2017b, p. 518).

These systems have different structures and standards, data elements and clinical terminologies, frustrating the health information exchange needed. Many systems also tend to have different interfaces, making it inefficient or impractical for providers to frequently switch between them. The result is that the information stored using the digital record systems adopted by providers tends to fall into same siloes as the analogue system, limiting the ability to view and track a patient's journey across the system.

### **... and information sharing often does not happen on its own**

Providers have good incentives to invest in technologies that allow them to store information and share it within a practice, but this does not always extend to information sharing outside of a practice. Although some sharing is necessary to provide care (for example, making a referral to a specialist), many benefits of system-wide information sharing do not accrue to individual practitioners. For example, while GPs have an obligation to share information with another GP if their patient moves to a new clinic, such sharing does not form part of practitioners' typical workflow. Supporting policy settings are needed to overcome coordination challenges and address system-wide gaps.

Problems with sharing basic information, such as medication requests and clinical summaries are relatively widespread. In 2019, the proportion of Australian GPs surveyed who were able to exchange patient clinical summaries electronically with doctors outside their practice (50%) was lower than in other countries such as the UK (66%) and New Zealand (80%) (Commonwealth Fund 2019).

The consequences of gaps in sharing between providers fall both on the consumer and on future clinicians providing care. For consumers, there can be a lack of transparency around which information is available to their healthcare providers and limited access to records detailing the treatment they have received. Information gaps can also make it more difficult for clinicians treating new patients. For example, a GP treating a new patient may not have full visibility over care delivered by previous providers, and ED staff may not have useful information in an emergency even if it has been provided in the past (especially if a patient is unresponsive).

### **MHR was intended to overcome fragmentation but has not yet been successful**

A key objective of MHR was to help overcome the fragmentation of health information. Indeed, some of its other objectives (such as improving the coordination and quality of care for healthcare users accessing multiple providers and reducing the occurrence of adverse medical events and the duplication of treatment) are downstream benefits of reduced fragmentation.<sup>14</sup>

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<sup>13</sup> Healthcare providers and clinicians are bound by record-keeping requirements and privacy restrictions. The exact nature of these obligations varies by sector (public or private), the type of provider, and across states and territories.

<sup>14</sup> The *My Health Record Act 2012* makes explicit the purposes of the system, which are listed as overcoming the fragmentation of health information; improving the availability and quality of health information; reducing the occurrence of adverse medical events and the duplication of treatment; and improving the coordination and quality of healthcare provided to healthcare recipients by different healthcare providers.

MHR is intended to be a central access point for a subset of the most important information on a patient, such that a patient and any clinicians providing care can easily view it. It is also intended to provide a nationally consistent platform for health information sharing (ACT Health 2023a; McMillan 2020, p. 25; PC 2017b, p. 528).

But MHR's usefulness to date has been hampered by incomplete information and poor usability.

### **The information in MHR is incomplete ...**

There is no requirement for either patients or clinicians to use the MHR system.<sup>15</sup> Gaps in the information available in the system substantially lessen its value for clinicians and consumers. The system will not produce benefits for patients who do not have useful information stored in it. And if the availability of patient information is inconsistent, MHR will not be a reliable source of information for many clinicians.

The types of documents that are currently supported by MHR are broadly appropriate. They give practitioners and consumers alike access to key information, including on previous testing (such as pathology and diagnostic imaging), details about major episodes of care (such as a hospital stay), and any information which is likely to help prevent harm during future care (such as prescription and medication details).

But around one in eleven Australians do not have an active record, creating gaps in the system.<sup>16</sup> And although more than 98% of records contain data, consumers need to link their My Health Record through MyGov to access their records. As at March 2024, 6.7 million (less than one-third) of consumers had done so (ADHA, pers. comm., 26 April 2024).<sup>17</sup>

And although almost all GPs are registered on the system, they can also choose not to enter patient data into MHR, even for individuals that have opted in, meaning the amount of detail contained within an individual's record varies. For example, of the 27 million diagnostic imaging reports produced each year (AIHW 2024), roughly one third are uploaded to MHR (table 2.1). By comparison, some forms of data are automatically uploaded to MHR, leading to complete coverage unless a consumer has opted out or removed that data from their record.

While some information in MHR is of high value to clinicians, including reports from diagnostic tests and imaging, allergies, and medications, other high-value pieces of information cannot currently be uploaded (ACSQHC 2021a, p. xi). For example, ACSQHC (2021a, p. 42) found that ED clinicians wanted MHR to include electrocardiograms, and would also prefer to see actual images rather than just relying on reading diagnostic imaging reports (ACSQHC 2021, p. 79). And some information that is uploaded can be of poor value. For example, in an ED setting:

Practices such as 'copying and pasting' entire clinical notes into a discharge summary can compromise the extraction and application of information. It is known that such practices exist, which results in poor documentation and heightens the risk of adverse ED discharge-related events. (ACSQHC 2021a, p. 99)

<sup>15</sup> This is not necessarily an issue in itself: community wide digital health record systems that operate in some other countries, such as Denmark, achieve almost complete uptake without such a requirement (Hartlev 2014).

<sup>16</sup> ADHA report that there were 23.8 million active My Health Records as at February 2024 (ADHA 2024); Australia's population was 26,821,557 people at 30 September 2023 (the most recent estimates) according to the ABS.

<sup>17</sup> A consumer's record is accessible to registered healthcare providers regardless of whether the consumer has linked their record (unless they have restricted access). Even where records are not currently accessed, they can still provide some future value, for example, where an individual's health status changes.

**Table 2.1 – My Health Record can support a range of content, but coverage varies**  
**Types of documents which can be uploaded to MHR and volume of uploads**

What can be uploaded	What health information does it contain	Who's responsible for uploading <sup>a</sup>	Approximate uploads (Jan-Dec 2023)
<b>Diagnostic imaging reports</b>	Can include reports (but not actual images) from X-rays, CT scans, ultrasounds and other diagnostic imaging examinations	Radiology and Imaging clinics	9 million
<b>Pathology reports</b>	Includes results from blood tests, urine tests and biopsies	Pathology laboratories	114 million
<b>Immunisations</b>	Immunisation information	Drawn from the Australian Immunisation Register	Automatically pre-populated
<b>Discharge summaries</b>	Information about a hospital stay and related health information	Hospitals	6 million
<b>Shared health summary</b>	A clinical record that can include diagnosed conditions and the medicines a patient takes.	GPs, registered nurses or Aboriginal and Torres Strait Islander Health Practitioners.	2 million
<b>Event summary</b>	A clinical document which summarises one or more episodes of care	Healthcare providers	Not reported
<b>Advance care plans and goals of care</b>	A document outlining preferences for future care, in the event the patient is no longer able to communicate.	Individuals and practitioners	9000
<b>E-referrals</b>	Information about an individual's care to be shared with another healthcare provider	Referring practitioners	10
<b>Specialist letters</b>	Provides GPs with information and recommendations that are relevant to care, such as diagnoses, medication changes, and treatment plans	Specialists	1 million
<b>Prescription records</b>	Information about medicines prescribed by a healthcare provider	Prescribers	76 million
<b>Dispense records</b>	Information about medicines dispensed by a pharmacist or dispenser	Pharmacists and dispensers	145 million
<b>Pharmacist shared medicines list</b>	A list of all medicines a person may be taking, including prescribed, over the counter and complementary medicines	Pharmacists	300,000

a. Consumers can upload documents themselves in all cases. However, it is usually more efficient for the provider generating the information to be responsible for uploading it, and relying on consumer uploads can lead to information gaps. Source: ADHA (2024) and ADHA (pers. comm., 26 April 2024).

Further, information that makes it onto the system need not stay there. MHR is consumer controlled, meaning that in cases where consumers do not want a healthcare provider to see aspects of their record, they can either withhold the information or permanently delete it from their record. As the Review of the MHR Legislation noted:

[t]he principle of consumer control differentiates MHR from other health record systems that are structured on a principle of practitioner or organisational control. In those systems the consumer may have no independent right of entry to the system, no control over what personal health information is uploaded to the system, and no access to personal information in the system other than through privacy legislation. That is the operating model, for example, of public sector health record systems established by state and territory governments and instrumentalities. There appears to be general acceptance, both in the health sector and in the broader community, that consumer control should remain the foundation principle of the MHR system. (McMillan 2020, p. 64)

Some contend that consumer control of records would, at worst, not make MHR any riskier than the status quo since patients have always had the right to choose whether to share some or all of their information with health professionals (NHHRC 2009, p. 129). But for practitioners, the ability for consumers to opt out can contribute to a lack of reliability.

Where many patients opt not to share their information, MHR records are less likely to be complete and accurate and so clinicians will be less likely to use the system as a first source of information. And if use among clinicians is low, then healthcare providers may see less value in uploading information to MHR. This can create a negative feedback loop potentially undermining the value of MHR for information sharing.

### ... difficult to access ...

A lack of compatibility between different information system software can mean that healthcare providers looking to upload information onto MHR need to enter data into multiple systems, causing duplicative work.

While some systems used by providers are compatible with MHR, others are not. For example, some GP software is not compatible with MHR making it difficult for some clinicians to upload and access information (PC 2021, p. 119). For public hospitals, compatibility varies across jurisdictions. In 2020, some States and Territories had comprehensive coverage – in others, only 72% of hospital beds were registered to use MHR (ADHA 2023b). A lack of compatibility is more pronounced in the private hospital sector, where many hospitals are not able to view MHR at all – in 2022, only 61% were registered and 55% used the system (ADHA 2023b).

In environments where clinicians are often time-poor and under pressure (PC 2021, p. 116), clinicians will not have strong incentives to upload or access information if their digital information systems require duplicative work or carry high time costs.

The provider's system has to literally be a click of about 10 to 15 seconds. But at the moment, there's this laborious kind of drafting of summary statements. (Burton 2022)

For this reason, some have called for MHR to be embedded in the workflow of busy clinical settings, be they GPs or specialists, hospitals or aged care.

### ... and the information it contains is not easy to use ...

Consumers and clinicians have different needs for information stored on MHR. For consumers, general access to a wide range of their own health information is useful for self-management (for example, checking when their most recent pathology test was taken). For clinicians, the information required usually relates to an event or episode for which a patient is presenting – they may wish to check whether the patient has undertaken a relevant test, has a history of a specific condition, or is currently taking a high-risk medication.

In either case, it is important that the data and interface allow for consumers and clinicians to conveniently locate the information most relevant to them.

However, where information is uploaded to MHR, the form in which data is accessible on MHR compounds the challenges around ease of access. Data is not ‘atomised’ (reduced to its most basic level), meaning that records cannot be clustered and analysed and presented to health workers, as well as consumers, in a meaningful way. Instead, MHR has been described as a ‘shoebox of PDFs’ (Rose 2018), hindering consumers and clinicians from searching for and locating the information they need.

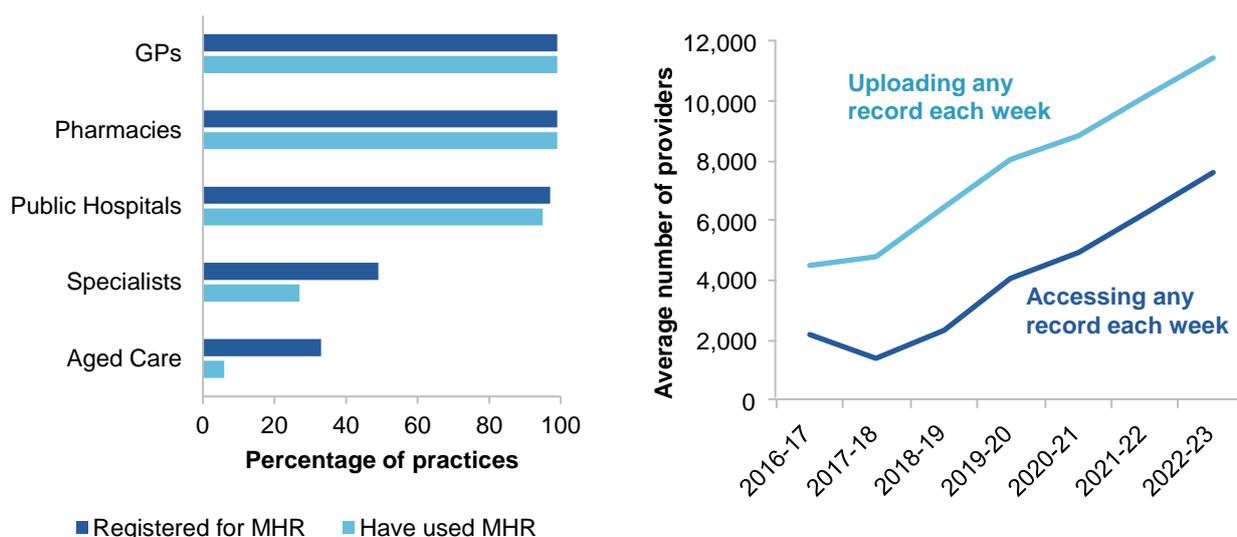
### ... culminating in low levels of use

Lack of content and limited ease of access have contributed to the slow uptake of MHR (PC 2021, p. 119).<sup>18</sup> Although almost all GPs and pharmacies are registered users of MHR, use is very limited among specialists and in aged care (figure 2.2). This variability is likely to persist:

Specialist use of My Health Record is likely to continue to lag behind general practice use as long as lower digital health penetration and the absence of financial incentives persist in this setting. ... Widespread My Health Record use is unlikely to be achieved unless clinical sites ... are incentivised, particularly given the evident limitations of existing software integration. (Tomlinson 2019, p. 34)

For clinicians who do use MHR, it is not clear that they regularly use it as a source of information. The number of MHR documents that are viewed by *other* healthcare providers is significantly lower than the number of records available (ADHA 2023c). Providers are generally more likely to upload information to MHR than they are to actually view it (figure 2.2). Commission estimates suggest that around 2% of documents uploaded by healthcare providers are viewed by other healthcare providers (this does not account for certain ‘non-document’ entries, where data on views is not available, such as immunisation and some medication records).

**Figure 2.2 – MHR use is mixed between providers, and more providers upload records than view them**



Source: ADHA (2024); ADHA annual reporting.

<sup>18</sup> For example, in the case of ED clinicians, one study found that MHR was not regularly accessed as part of patient care because of a lack of content (Miles et al. 2019).

## Meanwhile localised solutions have emerged

Government investment in information sharing is not limited to MHR – state and territory governments have been developing their own systems, particularly for tertiary care. Some jurisdictions are well progressed and have implemented state- or territory-wide systems. Other jurisdictions, however, are in the process of rolling out EMRs (usually for specific parts of the sector, especially hospitals) or are still in the planning stage (table 2.2).

**Table 2.2 – Progress in rolling out EMRs varies across states and territories**

### State or territory Progress in EMR rollout

ACT	Rather than having a hospital-specific EMR system, information from ACT public hospitals and other public health services are connected by the Digital Health Record system. This system includes clinical records including clinical observations, medications, patient monitoring data, treatment history, and diagnostics, imaging and pathology results.
NSW	NSW has already implemented EMRs with consistent functionality across 187 hospitals. The Single Digital Patient Record is now being rolled out in NSW to capture medical, pathology and administration records in one place across public hospitals, community health centres, pathology laboratories and collection centres.
Northern Territory	The NT has implemented EMRs in some hospitals, including Katherine hospital. A summary of information (including medication, discharge summaries and pathology reports) is currently shared via My eHealth Record across all public hospitals in the NT remote health centres, and Aboriginal Community Controlled Health Services. However, the NT is now transitioning towards using My Health Record in its place.
Queensland	The Integrated Electronic Medical Record is replacing paper-based clinical charts across Queensland hospitals. It connects medical records across QLD hospitals and digitises communications including ordering and reporting pathology tests, medical imaging, discharge documentation, medications management and prescribing. It currently covers 14 sites, with two additional sites using an intermediate version of the system and rollout expected to 12 further sites.
South Australia	The Sunrise EMR is used across many South Australian hospitals. It connects patient information in hospitals and health facilities including medical information, clinical notes and diagnostic tests, which can be ordered electronically.
Tasmania	Tasmania is rolling out an EMR across hospitals under their Digital Health Transformation Roadmap. In addition, they are also rolling out a health record to improve visibility across primary, community, mental and child health including clinical notes and observations, orders and results, medication management and electronic prescribing.
Victoria	Many hospitals in Victoria already have EMRs. The <i>Health Legislation Amendment (Information Sharing) Act 2023 (Vic)</i> will allow for the establishment of an integrated system which shares patient details, patient hospital visits, clinical documents, and diagnostic information across the public health system.
WA	WA are rolling out a statewide EMR, with a focus on all public hospitals and select ICU units in the first stage. This will replace paper-based records currently used in some public hospitals.

Source: ACT Health (2019, pp. 33–35, 2020, 2023a, 2023b); eHealth NSW (2023a, 2023b); Nadel (2022); NT Health (2023b); Oracle Cerner (2023); Queensland Audit Office (2018); Queensland Health (2023); SA Health (2023); Rockliff (2022); Tasmanian Department of Health (2022, p. 28); Parliament of Victoria (2023); Weber (2023).

State and territory governments have good reason to make these investments in the tertiary care sector. As the providers of public hospital infrastructure, it makes sense for them to invest in EMRs that benefit patients and reduce costs in the long-term. Some jurisdictions are opting for a uniform system, with consistent functionality across hospitals. There are scale economies to be gained from uniformity, including bargaining power in purchasing and reducing need for retraining when moving staff across hospitals. An added benefit of a uniform system is that it allows for improved sharing of patient records across hospitals.

MHR is often complementary to these state- and territory-specific EMRs. For example, the ACT's Digital Health Record is a record of all interactions a person has with the public health system in the ACT and is much more detailed than MHR, which is not intended to be detailed enough to provide care in a hospital or community health setting (ACT Health 2023a). However, there is some blurring of lines. One of MHR's key purposes is to provide a central portal for consumers to access a subset of their own health data, but some EMRs are also building in consumer portals, where consumers can access similar information.

State and territory investment in information-sharing infrastructure is not restricted to tertiary care. Since MHR was first introduced, many localised information management and sharing solutions have emerged (box 2.2).<sup>19</sup> For example, some jurisdictions have progressed initiatives to share information between hospitals and GPs and, although there is a national-level electronic referrals system, some jurisdictions have also invested in their own.

### **Box 2.2 – Beyond tertiary care: State and territory localised platforms**

Since MHR was first introduced, state and territory governments have developed and introduced many of their own information sharing platforms. This extends beyond platforms intended for use within the public hospital system.

Examples include:

- **iRAD (NSW):** a software that connects real-time patient information between GPs and hospitals with patient consent within the South Western Sydney PHN. GPs in this PHN also have access to Lumos, which provides insights into their patients' care across multiple providers.
- **Chronic Conditions Management Model (NT):** collects patient data from health centres and correctional facilities managed by NT Health (for a population of about 28,000) which is turned into automated reports for the prevention and management of chronic conditions.
- **The Viewer (QLD):** an online portal that provides GPs, specialists and nurses access to real-time public hospital health records including appointment records, radiology and laboratory results, treatment and discharge summaries, and demographic and medication details.
- **Integrated Care Platform (TAS):** a patient record viewer being set up for public and private healthcare providers to access across all settings including medical history and results, medications, care plans and upcoming appointments. Tasmania has also developed their own electronic referrals system.
- **Shared Care Platform (WA):** enables real-time health information sharing and communication (including sending referrals) between community-based physicians, allied health professionals, hospital specialists and patients.

Source: McDonald (2022); NSW Health (2021); PC (2021, pp. 123–124, 133); PHN South Western Sydney (2023); Rockliff (2022); Tasmanian Department of Health (2022, p. 30); WA Health (2020, p. 16).

<sup>19</sup> MHR commenced operation in 2012, originally as the Personally Controlled Electronic Health Record (PCEHR).

In many cases, jurisdictional systems are useful initiatives and performing well. However, the fact that MHR also provides similar functionality in some cases, has resulted in some duplication, and state and territory developments have captured some of MHR's intended gains. The net result is an uncoordinated, and in some cases disconnected, digital information management landscape.

## 2.2 Creating a network of networks

MHR, State and Territory EMRs and other localised initiatives will need to co-exist.

While jurisdiction-specific initiatives are welcome, they aren't a comprehensive fix. Leaving aside their lack of national coverage, MHR will continue to have a role in ensuring all consumers can access their own health data and that clinicians can access key information when treating patients who do not have an ongoing relationship with a GP or have unexpected care needs. Critically, MHR will provide a conduit when privacy legislation or other requirements would otherwise limit the sharing of key health information across sectors or states (box 2.3).

The ongoing need for MHR, alongside State and Territory EMRs and other localised initiatives, raises four policy considerations:

- how to maximise MHR's benefits and better track progress towards achieving those benefits
- how to encourage interoperability
- which information sharing initiatives can be usefully prioritised in the near term
- how to better coordinate digital investments to minimise overlap including for users.

### Box 2.3 – Privacy and health information across jurisdictions

The sharing of health information is strictly regulated. This is intended to balance personal risks of harm arising from the misuse or inappropriate disclosure of private data against the benefits of information sharing. The relevant privacy regulation differs both by jurisdiction and by sector (that is, whether a provider is publicly or privately owned).

In all jurisdictions, the *Privacy Act 1988* (Cth) plays an important role in the regulation of private sector health information. This is the primary piece of Australian legislation concerned with the collection, use, storage and disclosure of personal information in the private sector and the federal public sector. Any organisation that provides a health service (as defined in the *Act*) and hold health information (other than an employee record) is bound by it.<sup>a</sup>

In some jurisdictions (including the ACT, NSW, Victoria, and WA), there is additional private sector regulation – for example, the *Health Records Act 2001* in Victoria. Regulation around health information sharing for the public sector is more complex, and each jurisdiction has their own legislation.

The result is a complex landscape which can make information sharing challenging.

**a.** A health service in this context is not restricted to hospitals and other providers in the health system; it also includes (for example) disability care, weight loss clinics and some schools.

## **There are clear fixes for many of MHR's ills**

It takes time for the benefits of an information sharing system to take effect, a point made by the Australian National Audit Office in its review of the implementation of MHR (ANAO 2019).

But time alone will not cure MHR's ills. Government needs to address MHR's two related shortcomings – lack of coverage and usability – if it is to realise returns on its sizeable investment.

### **Plans to expand coverage need to go hand in hand with efforts to improve usability**

The Australian Government has already signalled that it expects legal obligations to upload diagnostic imaging and pathology results onto MHR to be in place from December 2024. This is a significant development with the potential for sizeable gains (O'Connor et al. 2023).

But getting the information onto the system is only half the challenge – clinicians also need to draw on this valuable information. If this is to occur, mandatory uploading will need to be accompanied by changes that allow practitioners to efficiently search large volumes of data and display reports in a way that is easy to read and accessible. Some GPs have described the MHR interface for viewing test results within their clinical information systems as 'clunky, hard to navigate, and slow' (Woodley 2023), saying that it is particularly difficult to see each result where multiple test reports are available, and that it is difficult to access images.<sup>20</sup>

Governments should ensure that information management systems are co-designed with clinicians wherever possible. Co-designing information systems with clinicians helps ensure they are easy to use and align with clinician workflows, as well as focused on collecting and sharing information that is clinically useful, practical, efficient and reusable, instead of adding noise (Rowlands et al. 2022, p. 9). Co-design can also provide a mechanism for continuous feedback on what is, and is not, working and make it clearer to practitioners the value of health information sharing systems (PC 2021, p. 128).

### **Atomised data would make the system more usable for practitioners**

There are already plans to improve MHR's usability. Shifting towards storing data in an atomised format would help. Atomisation would involve storing individual pieces of information at their most basic level, rather than in a format that is more difficult to reduce. For example, a pathology test report would currently be stored as a PDF document detailing (among other things) the name of the ordering physician, the relevant test, and the result. But this data could easily and more usefully be stored in terms of each of these individual pieces of data. Doing so would make it easier for a clinician to look through the information on MHR without having to open and read several separate documents. It would also enhance searchability, so that users can more quickly and easily find and access the information they are looking for.

Atomised data could also make it easier to incorporate information contained in MHR within each clinician's own system for recording information and managing workflow. For example, rather than having to log in to MHR and their own local software, a mental health specialist could access data on the timing of prescriptions being filled from MHR and combine this with their own electronic records that detail when medicines were prescribed to enhance their consultation with a patient and inform future treatment plans. In doing so, they would be able to compile a more comprehensive patient record.

The greatest potential benefits of this change are realised if MHR information is capable of being used by other digital systems. As the volume of information on MHR increases, it expands the potential for this data

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<sup>20</sup> Images themselves are not stored on MHR – only reports from diagnostic imaging. Within a single hospital, some MHR viewing platforms (such as HealtheNet) allow diagnostic images to be viewed (ACSQHC 2021a, p. 105). But this is not consistent across platforms.

to be applied in a productivity-enhancing way and incorporated into existing clinician workflows, for example, by applying decision support technologies to identify the information in a record that is most relevant to a clinician or provide automated warnings or suggested actions.<sup>21</sup>

### **Enlisting software providers would help improve both coverage and usability**

To date, governments have relied on incentive payments to encourage clinicians to upload information (McMillan 2020).<sup>22</sup> However, this has several drawbacks. It is both resource intensive and does not necessarily achieve universal coverage, since even practitioners who are aware of the incentives that are in place may still choose not to upload. The quality of uploads might also be poor if practitioners upload only the minimum amount of information for the purposes of receiving the subsidy.

Removing duplicative processes to upload information into different systems can also increase use. Requiring that the systems developed by software providers allow for automatic uploads to MHR would remove many of the practical barriers to clinician uploads (including human error).<sup>23</sup>

There are already some incentives for software providers to offer products that are useful in an Australian context (including those that connect with key digital infrastructure). For example, some software vendors already have software that is conformant with MHR, allowing healthcare providers to access a patient's MHR directly from their clinical software (PC 2017b, p. 529).

However, many software providers operate internationally, and may be focussed on designing solutions for a global rather than local market. In these cases, regulation can play a role. The Commission previously recommended that the Australian Government set conformance standards that require all health practice software to be compatible with MHR to enable uploading relevant records to MHR and extraction of patient data in an easy-to-use, secure and transferable format, alongside publishing a register of health practice software that is integrated with MHR (PC 2023, p. 60). Ultimately, the cost of compliance with regulation would be reflected in the price software providers charge to software users.

### **Tracking MHR's progress is critical**

It will likely take time to fully address MHR's limitations and for the system to show significant benefits. In their review of the implementation of MHR, the ANAO (2019) concluded that:

The intended benefits for the My Health Record system are estimated to take at least ten years to be realised. Where the intended benefits of a program are projected to be realised over a relatively long period, entities should not only describe what the intended benefits are and how they could be measured, but also make clear delivery plans showing how and when the benefits will be measured, evaluated and reported.

MHR is a substantial and ongoing government investment. Data which is comparable over time and relative to some benchmark (for example, a target of what coverage should be achieved for different types of providers and for each type of document) would help monitor its progress.

<sup>21</sup> For example, there would be significant system-wide cost reductions if practitioners were encouraged to check for recent results before ordering new tests. State and territory experience with EMRs provide key learnings on how to encourage this kind of behavioural change, including by providing auto-alerts.

<sup>22</sup> These incentive payments also play the role of encouraging providers to adopt software that is interoperable with MHR.

<sup>23</sup> Even if uploads are automatic, consumer's decision to opt out of the system could be preserved – that is, uploads should be made automatic for those who have opted in.

Currently, the ADHA has two reporting mechanisms: a small number of key statistics (such as the number of total records accessed in a financial year) which they are required to provide as part of their annual reporting, and additional information which they are not currently required to report (such as the specific types of documents uploaded) provided via their website. Even taken together, the information provided is not enough to provide a reasonable view of the performance of MHR.

Improving reporting and transparency will likely have other benefits – reporting credible data could help increase use if clinicians, hospitals and the public see the potential value of the system.

## Creating an interconnected system

While it is critical that private and state- and territory-specific information sharing systems can interface with MHR, it is only one component of a larger system. As other new systems emerge, these must be developed such that they are also interoperable with one another.

## Addressing the lack of interoperability

The systems that providers, hospitals and state and territory governments have invested in will not realise their full benefits unless their systems are able to communicate with one another.

Infrastructure needs to be in place that allows information to be shareable to providers across different parts of the health system. This requires interoperability, the ‘ability of a system or product to transfer meaning of information within and between systems or products without special effort on the part of the user’ (GDHP 2023). Interoperability of information sharing infrastructure requires:

- health information to be digitised
- transmission channels that allow systems to exchange information<sup>24</sup>
- common terminology, data rules and specifications that allow for ‘semantic interoperability’ where data inputted and stored can be understood and transferred across different systems
- identification processes so that information about the right patient and health provider is exchanged securely (Grieve 2014; PC 2017b, p. 518)
- processes to ensure the right subset of a consumer’s health information is being shared with the receiver of information.

Australian, state and territory governments have already been investing in interoperable infrastructure, which would benefit MHR and localised solutions alike. Under the National Healthcare Interoperability Plan, governments are working to promote the use of standardised application programming interfaces as transmission channels between different systems (ADHA 2023a, p. 32). The Plan notes the current lack of a nationally consistent approach to interoperability standards:

Australia has no centralised approach to using standards. This leads to a proliferating number of standards, which inhibits information sharing and integration, and leads to a lack of interoperability. (ADHA 2023a, p. 25)

Governments are working with the health sector to develop and incorporate data exchange specifications and standards (such as the HL7 Fast Healthcare Interoperability Resources standard) and terminology

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<sup>24</sup> Currently, standardised transmission channels are being built into health software systems including application programming interfaces (APIs) that enable information systems to communicate and transfer data among each other (ADHA 2023a, p. 28).

standards (such as SNOMED CT-AU) as well as requirements for their use in procurement processes (ADHA 2023a, pp. 31–32, 40).<sup>25, 26</sup>

Although the government has a role in requiring consistent use of interoperability standards, there are also risks to being too prescriptive or inflexible. Interoperability standards can become outdated as new technology is developed (ADHA 2023a), and governments should be cautious of committing themselves to standards which could become obsolete.

## Near term priorities

Noting that system-wide interoperability will take time to develop, there are areas where governments can also encourage quick wins in system-wide information sharing. The Government has introduced reforms in relation to pathology and imaging uploads, which could generate substantial benefits (Appendix B). Other potential areas where a comprehensive record could generate significant benefit are electronic discharge communication and medication information. Prioritising government effort to strengthen incentives to upload information automatically in these areas would enhance the quality of information on MHR, which reinforces its value and use for clinicians.

### Electronic discharge could offer health benefits in the near term ...

When used appropriately, e-discharge summaries can significantly improve quality of care and reduce readmission risks.

In 2016, 23% of Australians aged 45 and over who visited a hospital ED reported inadequate sharing of information back to their usual GP or usual place of care (AIHW 2019, p. 17). This problem is worse among some groups: for example, people in remote areas are more likely to say their GP was not informed of visits to other providers (AIHW 2019, pp. v–vi).

Simply requiring hospitals to upload e-discharge could lead to a proliferation of more low-quality discharge summaries (for example, through the copying and pasting of clinical notes outlined above). As noted by the Australian Commission on Safety and Quality in Health Care:

While a well implemented and designed EDS [Electronic Discharge Summaries] system can improve the clinical handover process, it also has the potential to adversely impact the safety and quality of patient care if not properly implemented or poorly designed.

While low-quality content is a concern, the existence of a discharge summary is useful information of itself given it indicates a recent hospital episode.

Some jurisdictions issue guidance on patient discharge documentation protocols. In NSW, for example, guidance makes clear that discharge summaries must be sent, electronically (if available), to a patient's nominated GP and other relevant primary care providers and shared electronically with a patient's My Health Record.<sup>27</sup>

Discharge summaries are already able to be uploaded to MHR but not all hospitals do so. There were around 6.8 million public hospital separations (including psychiatric hospitals) in 2021-22 (SCRGSP 2024), and around

<sup>25</sup> Action 3.1 of the National Healthcare Interoperability Plan states that '[t]he Agency [the Australian Digital Health Agency (ADHA)], 'health departments and Services Australia will specify interoperability requirements in procurement requests where they meet business objectives. This will leverage existing national infrastructure, terminology and standards' (ADHA 2023a, p. 40).

<sup>26</sup> Promoting the use of national healthcare identifiers in health information sharing systems and service directories is also a priority (ADHA 2023a, pp. 15–22).

<sup>27</sup> Unless the patient has withdrawn their consent.

4 million discharge summary reports were uploaded over the same period (ADHA 2022b).<sup>28</sup> While the number of discharge summaries uploaded is growing (table 2.1), significant gaps remain.

### **... and medication information could reduce errors**

As noted previously, medication-related problems impose a large burden on the health system, and roughly half of this harm is considered preventable. For this reason, populating medication data in MHR should be a priority.

Transactional data from the Pharmaceutical Benefits Scheme (PBS) is automatically uploaded to MHR, regardless of whether or not a pharmacist chooses to upload a dispense record (PSA 2019b). For consumers setting up a new record, the last two years of PBS data are also uploaded automatically.

This is a useful source of data, but gaps remain. Dispense records for non-PBS items are not part of this automatic upload process. Governments should consider options to require the automatic upload of all pharmaceutical dispenses to MHR (where a consumer has not opted out).

The benefits of more complete medication data are potentially large. For example, South Australia has developed a medicine risk review program using AI to detect potential medication issues. Each year, this is estimated to save up to 58,000 hours of pharmacists' time annually and prevent over 1,300 readmissions (Patrickson et al. 2022).

### **Greater coordination of effort could save cost and amplify benefits**

The investment in record-sharing by different levels of government is substantial and greater coordination would maximise its impact.

There is a need to better coordinate investments to improve information sharing between state-based systems and federally-funded primary care. As noted above, both the Australian and state and territory governments have, or are putting in place, architecture that seeks to bridge the same gaps. These initiatives target common information, such as sharing of referrals, radiology and laboratory results, treatment and discharge summaries, demographic and medication details.

Capturing the full benefits of system-wide information sharing at minimum cost and reducing duplication requires action by both the Australian and state and territory governments. For its part, the Australian Government needs to improve the functionality of MHR so that it becomes a viable alternative for information sharing. States and territories meanwhile need to consider the marginal benefit that local initiatives might provide over and above the functionality of MHR in their cost-benefit considerations. If MHR falls short of meeting their information sharing needs, exploring whether a single national fix is possible, before embarking on state-based solutions would result in a more efficient and effective information sharing architecture.

But coordinating digital information sharing investments across the health system is inherently difficult. Agencies such as the ADHA and Digital Health Cooperative Research Centre already play an important role in facilitating coordination. Raising the profile of this issue would help. The Health Ministers' Meeting and future intergovernmental agreements provide potential avenues.<sup>29</sup>

States and territories that are planning large investments in EMRs could learn from the jurisdictions that have already invested. All parties, as well as the public, would benefit from greater transparency around 'what

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<sup>28</sup> Discharge summary report uploads have grown since this figure was reported. However, comparable admissions data from the same period are not available.

<sup>29</sup> Although the National Agreement on Digital Health 2023-27 is already in place, there is room to use implementation plans under the current agreement to support coordination and more explicitly embed information sharing investments in a future agreement.

works' and progress in implementing information sharing systems. There is a need for governments to commit to share their evidence base in developing EMRs and other infrastructure, as well as for greater transparency around implementation progress (especially in the hospital sector). There may even be scope to replicate a system (and share costs across jurisdictions). This does not apply to publicly funded projects alone – there is also a need to understand information-sharing developments among private providers.

Sharing of evidence and implementation progress could also help make innovative investments in information-sharing infrastructure more diffuse. This is a perennial challenge in the healthcare sector:

In health, as in the non-market sector more broadly, the 'system' for innovation and diffusion of ideas can be patchy and incomplete ... Innovation and diffusion are also frustrated by major structural flaws, including uncoordinated actions of governments and agencies that share overlapping roles, siloed services, clashing funding incentives and risk averse cultural norms, which tend to work against experimentation. (PC 2023, p. 36)

While this coordination will be challenging to achieve, improving the way in which we manage and share health information would have significant payoffs. Not only can improvements ensure continuity of care, minimise testing duplication and reduce adverse events, but better data also paves the way for other digital health applications, such as the use of Artificial Intelligence (chapter 5), and the health benefits they can generate.



## 3. Telehealth

### Key points

- ✳ **Though uncommon before 2020, telehealth is now a large part of the Australian health system.**
  - Nearly one in five Medicare-funded GP consultations now take place over the phone or by video, as do more than one in ten Medicare-funded specialist consultations.
  - Uptake of telehealth increased enormously because of policy changes that took place during the COVID-19 pandemic, which expanded Medicare subsidies for video and phone consultations.
- ✳ **At the same time, the ‘direct-to-consumer’ (DTC) telehealth industry has emerged, which is made up of online-only companies that offer a range of telehealth services.**
  - Rules around telehealth funding mean that most DTC telehealth does not attract Medicare funding. Nonetheless, several of these companies’ characteristics enable them to charge prices that are on par with traditional, subsidised providers.
  - There is limited visibility of the volume of care that DTC companies provide. However, data made available to the Commission suggests that the DTC sector is a small but significant share of the overall primary care telehealth market. And the investment flowing into the sector suggests that it will continue to grow.
- ✳ **Telehealth cannot replace in-person care in every context. Where patients need to be physically examined, clinicians cannot provide the same quality of care via phone or video. But when telehealth *is* used appropriately, it achieves similar clinical outcomes to in-person care.**
- ✳ **Telehealth eliminates costs associated with receiving care in person – principally travel-related costs such as commuting time. This can deliver large savings to patients, and improve access to care. Commission estimates suggest that, in 2023, telehealth saved about 27.3 million hours of patient time. This represents a benefit to patients of about \$895 million.**
- ✳ **In light of telehealth’s expanded role in the health system, some policy settings need to be changed. Governments should:**
  - consider expediting the development of virtual care standards, and ensure that they apply to DTC telehealth companies
  - take steps to minimise the costs of the ‘12-month rule’, which restricts Medicare subsidies to consultations between patients and general practitioners that have seen each other in person in the past year
  - consider whether policy settings around advertising and bundled clinician and pharmacist services remain fit for purpose given the rise of the DTC sector
  - monitor the impacts of telehealth on regional and remote medical practices.

## 3.1 The telehealth transformation

### Telehealth has entered the healthcare mainstream in Australia

Today the use of telehealth is widespread in the Australian health system. Millions of Medicare-funded telehealth consultations now take place yearly (table 3.1), and in a recent survey, nearly three in ten people (27.7%) reported having had a telehealth consultation in the past 12 months (ABS 2023e).

Uptake has increased enormously in recent years. In 2023, nearly one in five Medicare-funded general practitioner (GP) consultations took place over the phone or by video, as did more than one in ten Medicare-funded specialist consultations (table 3.1). Prior to 2020, the share of Medicare-funded GP and specialist consultations that took place via telehealth was less than 1% (figure 3.1).

**Table 3.1 – Telehealth is a large part of the Medicare-funded sector<sup>a,b</sup>**

**Number of telehealth consultations and share of all Medicare-funded consultations that took place via telehealth, 2023**

	Number of Medicare-funded telehealth consultations, 2023	Telehealth share of all Medicare-funded consultations, 2023
<b>GP consultations</b>	28.0 million	19.4%
<i>Phone</i>	26.7 million	18.4%
<i>Video</i>	1.3 million	0.9%
<b>Specialist consultations</b>	3.5 million	11.7%
<i>Phone</i>	1.8 million	6.0%
<i>Video</i>	1.7 million	5.7%

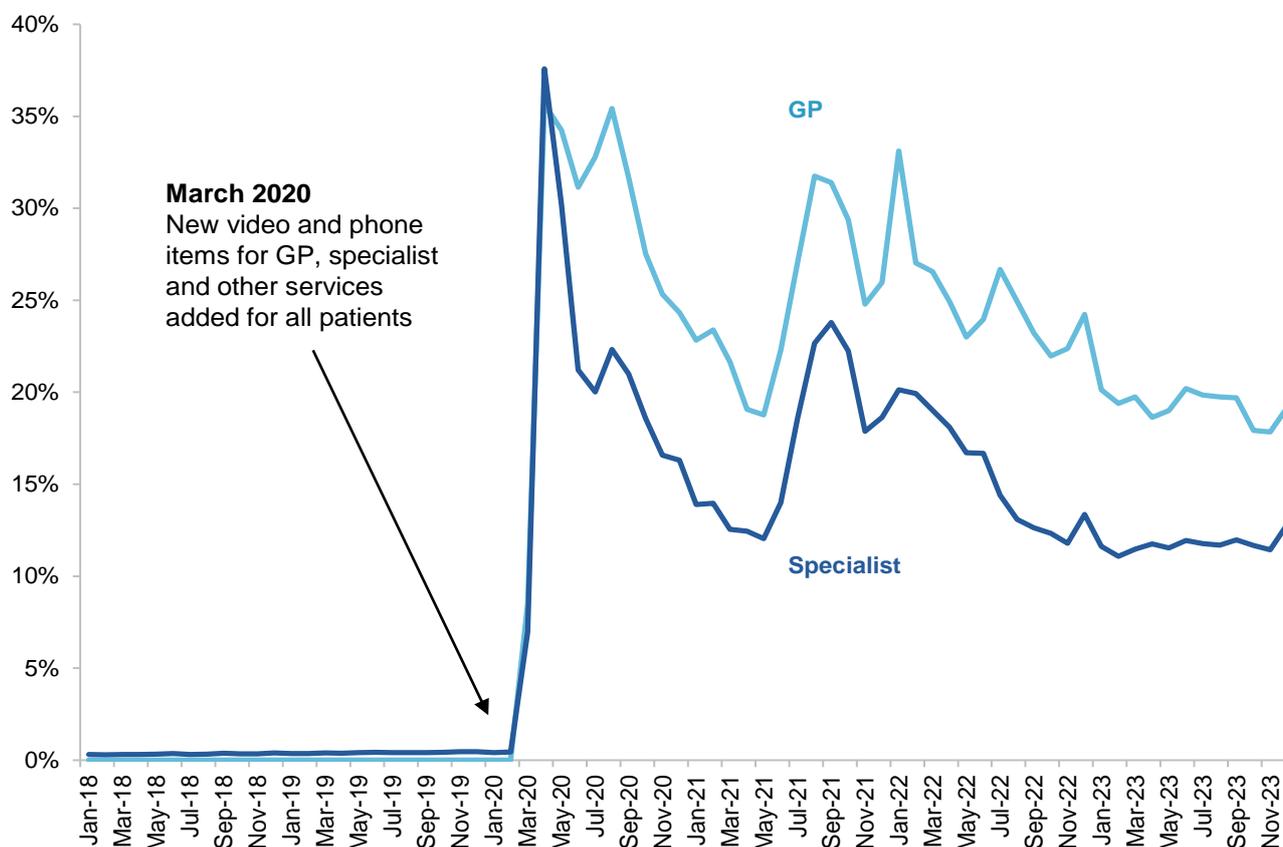
**a.** Dental, obstetric and public health physician services were not included in the ‘specialist’ category. **b.** Some cells do not add to the total due to rounding.

Source: Commission analysis of Services Australia Medicare Item Reports (Services Australia 2024).

This increase is mainly the result of the COVID-19 pandemic and policy responses to it. Prior to the pandemic, telehealth was only subsidised by Medicare under highly restrictive conditions. There were Medicare items for both specialist video consultations (created in 2011) and GP video consultations (created in 2019). However, these were generally only available for patients in rural and remote areas, and in many cases patients also needed to have seen their doctor face-to-face at least three times in the previous year. (ANAO 2023, p. 15; DoH 2019).

In March 2020, Medicare subsidies for telehealth were expanded. New video and phone items were added for GP, specialist, psychologist and other services. These were made available to all patients, regardless of geography, and requirements for in-person contact between patients and clinicians were also relaxed (DoH 2021a, 2021b). Though initially temporary, they were eventually made permanent (DHAC 2023b, 2024a).

**Figure 3.1 – There has been a huge increase in telehealth usage in recent years<sup>a</sup>**  
**Share of all Medicare-funded GP and specialist consultations that took place via telehealth, 2018–23**



a. Dental, obstetric and public health physician services were not included in the 'specialist' category.

Source: Commission analysis of Services Australia Medicare Item Reports (Services Australia 2024).

Medicare is not the only avenue through which telehealth has been subsidised by government. The federal and state and territory governments have established Healthdirect, a national company that provides a range of telehealth and other services. And though the company has existed since 2007 (Healthdirect 2024b), there has also been a large increase in usage of its services in recent years (box 3.1).

### **Box 3.1 – Case study: Healthdirect**

Healthdirect is a national service that is owned and funded by the federal and state and territory governments. It is both a provider of healthcare information, and a telehealth provider.

Healthdirect operates a ‘virtual front door’ service: it triages patients, provides advice on how they can manage their condition on their own (‘self care’), and connects them to health services. Triage occurs either through digital triage on the Healthdirect website, or their phone-based nurse helpline, both of which are available 24 hours a day, 7 days a week. Patients are triaged according to their symptoms and health risk factors, and can obtain advice on health issues, as well as information on how to access other health services matched to their needs. Patients who need to consult with a GP may be offered a phone or video call through Healthdirect’s GP helpline, if there are no other providers available.

Healthdirect’s website also provides broader information, including about specific health conditions, and self care advice.

#### **Impacts**

- Healthdirect’s services are improving access to healthcare. Use of Healthdirect virtual services has increased significantly – by about 49% – since the COVID-19 pandemic (Healthdirect 2023, p. 4). In 2022-23, there were 53 million visits to its website and 5.6 million calls to its helplines (Healthdirect 2023, p. 9). About 63,000 patients accessed GP consultations through the Healthdirect GP helpline between March and December 2023, and 37% of those calls were from people in regional centres and rural or remote areas (Healthdirect, pers. comm., 26 April 2024).
- These services are reducing pressure on the hospital emergency departments. The virtual GP service contributed to a 20% reduction in referrals from Healthdirect to emergency departments in New South Wales, and 60% of people who reported using the service said that they would have gone to an emergency department had telehealth not been available (Healthdirect 2023, p. 19).

Sources: Healthdirect (2023, 2024a).

## **Telehealth is enabling innovation in how care is delivered**

Telehealth is changing the Australian healthcare sector in other ways as well. New providers have emerged whose presence is wholly online. And established providers such as hospitals and Aboriginal Community Controlled Health Organisations (ACCHOs) have developed innovative telehealth-based models of care.

### **The rise of direct-to-consumer telehealth**

At the same time that telehealth has become a much larger part of traditional primary care, a new class of providers has emerged: ‘direct-to-consumer’ (DTC) telehealth companies. These are online-only providers that offer a range of services – mainly phone consultations, video consultations and asynchronous care (Foo et al. 2023).<sup>30</sup>

<sup>30</sup> Asynchronous care refers to interactions in which patients provide information via a web form or messaging platform, and receive advice or documents such as medical certificates.

Rules around telehealth funding mean that most of these services are not funded by Medicare (section 3.4). Nonetheless, DTC companies are able to charge prices that are on par with traditional, subsidised providers. This is because of several of their characteristics.

- DTC providers are online-only, so they avoid the bricks-and-mortar costs associated with in-person care.
- Some firms specialise in relatively low-complexity, routine interventions, which take less time than the average medical consultation.
- Some firms offer bundled services and/or have partner pharmacies, which allows them to economise and in some cases cross-subsidise. For example, some companies offer bundled weight management programs, through which patients can consult with doctors and also access pharmacists.<sup>31</sup>

In addition to these supply-side factors, DTC companies' services are more convenient than in-person care (as is telehealth generally). Many patients have shown that they are willing to pay out-of-pocket for this convenience.

Because the sector operates largely outside of the Medicare system, there is limited visibility of the volume of care that DTC companies provide. However, what data has been made available to the Commission suggests that the sector is a small but still significant share of the primary care telehealth market. For instance, one major DTC telehealth company told the Commission that they provide about 100,000 consultations per month in total. By way of comparison, there are about 2.3 million Medicare-funded GP telehealth consultations per month.<sup>32</sup> This one player alone is therefore more than 4% of the size of the Medicare-funded GP telehealth sector.

Moreover, the DTC sector is growing, and its growth is expected to continue. This is evident in the investment that is flowing into the sector; multiple DTC providers have been purchased by larger companies in recent years, and some firms' valuations have been in the hundreds of millions of dollars (Foo et al. 2023, p. 344).

## Innovation in the hospital sector

Further, some established providers have developed innovative, telehealth-based service offerings.

Hospitals are experimenting with new models of care. Basic telehealth consultations have been a part of outpatient care for a number of years.<sup>33</sup> But recently, some hospitals have developed more innovative services based on telehealth.

- Multiple jurisdictions have developed 'virtual emergency departments' (virtual EDs), which triage patients via telehealth. For example, in 2020, Northern Health launched a virtual ED (Northern Health 2020), which was eventually rolled out Victoria-wide following investment from the state government (Victorian Government 2022). The service enables patients to consult with an ED nurse when they have a potentially urgent issue, and get advice on whether they need further emergency care. It aims to prevent unnecessary attendances at the (physical) ED.
- Some hospitals have begun using telehealth in novel ways in outpatient care. For example, the Royal Prince Alfred (RPA) Hospital in Sydney has developed 'rpavirtual', a 'virtual hospital' that makes use of telehealth and other digital technology (box 3.2).

<sup>31</sup> These points are based on discussions with research participants and the Commission's own desktop research.

<sup>32</sup> This is the average monthly number of GP telehealth consultations in 2023, based on the data presented in table 3.1.

<sup>33</sup> Moreover, there is some evidence that uptake increased in the last decade. While there is little publicly available data on the extent of telehealth use for outpatient care, one analysis found that government spending on outpatient telehealth in Queensland grew roughly four-fold between 2013 and 2018 (Snoswell et al. 2020, p. 3).

### **Box 3.2 – Case study: The Royal Prince Alfred ‘virtual hospital’**

The RPA virtual hospital (rpavirtual) offers telehealth and other digital-based care to patients. Services are run out of a multi-disciplinary Virtual Care Centre (VCC), which operates from the RPA Hospital campus.

rpavirtual was established in February 2020 in order to address growing demand for hospital care. It quickly scaled up in response to the COVID-19 pandemic, and delivered care for COVID-19 patients outside of hospital. Since then, its scope has broadened to encompass a broad range of telehealth and other services. rpavirtual has delivered virtual care to over 90,000 patients thus far (rpavirtual, pers. comm., 23 April 2024).

Examples of telehealth services provided by rpavirtual include:

- a virtual trauma clinic, in which patients with physical traumas are assessed via video by a clinician at the VCC, and provided with telehealth-based follow-up care to help them recover
- virtual fracture and wound clinics, in which patients forward images of their fracture or wound to a VCC clinician, have it assessed, and receive follow up care.

rpavirtual also has a virtual emergency department, which aims to reduce the number of ED presentations.

#### **Impacts**

- rpavirtual’s telehealth services enable patients to receive care without having to travel, which delivers time and travel savings and improves access. For example, virtual fracture clinic patients – of which there have been over 1,300 so far – save significant amounts of time by using the service. rpavirtual has estimated that the dollar value of saved patient travel in a two-year period was about \$19,000 (rpavirtual, pers. comm., 23 April 2024).
- Some services reduce costs. For example, because it has a lower per-episode cost than traditional orthopaedic care, the virtual fracture clinic saved an estimated \$325,000 in a two-year period (rpavirtual, pers. comm., 23 April 2024).

Source: rpavirtual (2023).

## **Telehealth in ACCHOs**

Providers in the ACCHO sector are also using telehealth in innovative ways, which helps them deliver culturally appropriate healthcare. The Commission heard from multiple participants with experience in the sector that many ACCHO clinics use telehealth to enable their patients to get advice from external specialists. A common model is one where patients attend their local ACCHO clinic, and consult with another clinician (typically a specialist) in a different location while being supported in person by an Aboriginal or Torres Strait Islander Health Worker.

In some cases, this model makes use of innovative digital technology. The Commission heard that some clinics employ ‘store-and-forward’ telehealth, which involves ACCHO staff capturing images with specialised equipment and forwarding these to remote specialists, who diagnose the issue and come up with a treatment plan. This is used for issues such as rheumatic heart disease, eye care, ear care and diabetes. Another example of how telehealth is being used to support Aboriginal patients is the diabetes-related foot disease (DFD) service run by the Royal Adelaide Hospital (RAH) (box 3.3).

### **Box 3.3 – Case study: A telehealth service for diabetes-related foot disease**

The RAH DFD telehealth service is a multidisciplinary service run out of RAH Vascular Surgery and Podiatry. It uses real-time video-based telehealth to deliver multi-disciplinary DFD care to people in rural and remote communities, including many Aboriginal people who attend their local ACCHO clinic or a Local Health Network service. In 2023, 156 of the 465 patients reviewed by the Central Adelaide Local Health Network multi-disciplinary foot service had at least one telehealth consultation, and 15% of patients accessing the service identified as Aboriginal or Torres Strait Islander (McMillan 2024).

DFD is a major cause of diabetes-related hospitalisation and is implicated in about 75% of all lower extremity amputations globally (Graham et al. 2023, p. 2). However, early identification and management of wounds reduces the likelihood of amputation and greatly improves healing. Aboriginal and Torres Strait Islander people are disproportionately affected by DFD, with higher rates of amputation compared to non-Indigenous Australians.

#### **Impacts**

- The RAH DFD service is reducing patients' travel burden. The service provides assessment and triage, as well as post-procedure follow-up care – all via telehealth. This reduces travel time, associated travel costs and inconvenience for the patient.
- The service allows Aboriginal and Torres Strait Islander patients to receive care from their local clinic, with an emphasis on cultural safety. Local health professionals typically support patients while they have their telehealth appointment; in many cases, patients receive specialist care from the RAH team while attending their local clinic in person. There is also an Aboriginal Health Practitioner based at the RAH, who assists in providing care that considers cultural needs.
- The service is trialling innovative ways to use technology. With partners, they are developing software for 'augmented reality' headsets ('smart glasses'), which are intended to improve the quality of video conferencing between specialists and rural/remote clinics. The headsets are designed to be worn by local health professionals, who use them to capture close-up images of their patients' feet and wounds (Stanley 2023). This innovation was developed in response to some of the challenges faced by the service, including poor wound image quality in some cases, and is currently undergoing refinement in collaboration with Local Health Networks.

Sources: Graham et al. (2023, 2024).

## **3.2 Is telehealth a high-quality mode of care?**

### **Telehealth is clinically effective when used in the right context**

Telehealth cannot replace in-person care in every context. There are many situations in which patients need to be physically examined, and so clinicians cannot provide the same quality of care via phone or video. But clinical evidence shows that, when telehealth *is* used appropriately, it achieves broadly similar clinical outcomes to in-person services (box 3.4).

### **Box 3.4 – The clinical effectiveness of telehealth**

Clinical research on telehealth shows that it can be a high-quality alternative to in-person care.

Evidence from multiple reviews suggests that it can be an effective medium for information exchange between patients and clinicians.

- One review assessed clinicians' diagnostic accuracy when using telehealth. It found that, in cases where only a verbal description and medical history is needed, diagnoses via telehealth are as accurate as in-person diagnoses. Unsurprisingly, telehealth is less accurate when a diagnosis requires a physical examination (Scott et al. 2023, pp. 33–38).
- A review of patient experience studies found that patients generally reported being able to communicate effectively with clinicians virtually (Orlando et al. 2019).

Moreover, reviews of telehealth's effectiveness in specific contexts have found generally positive results.

- Scott et al. (2023, pp. 6–11) concluded that, in a wide range of clinical contexts, telehealth achieves similar clinical outcomes to in-person care.
- Snoswell et al. (2023) found that telehealth can deliver clinical outcomes that are at least equivalent to in-person care in a range of specialities, including cardiovascular care, endocrinology and nephrology.
- Shigekawa et al. (2018, p. 1978) found that telehealth is generally equivalent to in-person care in mental health treatment, rehabilitation and dermatology.

Of course, it is likely that, in the trials that these reviews drew on, telehealth was being used more-or-less optimally. Nonetheless, the reviews demonstrate that, when used in the right way, telehealth can be an equally effective alternative to in-person care.

Consistent with this research, guidelines published by the Medical Board of Australia (MBA) endorse telehealth as an effective alternative to in-person care on the condition that it is used appropriately. They state that 'the Board supports the responsible and safe use of telehealth', though they also note that 'it is not appropriate for all medical consultations' and that 'the standard of care provided in telehealth consultations may be limited by the lack of in-person interaction and capacity to carry out physical examinations' (MBA 2023, p. 2).

### **Patients are generally satisfied with the quality of telehealth**

Data from patient experience surveys provides another perspective on the quality of telehealth. These are imperfect sources; though many patients are well-informed about their healthcare, it can be difficult for them to judge the quality of care they receive. Nonetheless, these surveys contain valuable insight; and overall, they paint a positive picture of the quality of telehealth as it is currently practiced in Australia.

Patients generally report that clinicians perform well in telehealth consultations. In one recent survey, telehealth users rated their experience of telehealth as on par with or better than that of GP and specialist care in general (table 3.2).

**Table 3.2 – Patients' experience of telehealth is as good as or better than that of care in general<sup>a</sup>**

Share who ...

	Telehealth	GP consultations in general	Specialist consultations in general
... were always listened to carefully	80.7%	71.3%	77.9%
... were always shown respect	83.9%	80.3%	82.8%
... always had enough time spent with them	79.1%	70.8%	78.9%

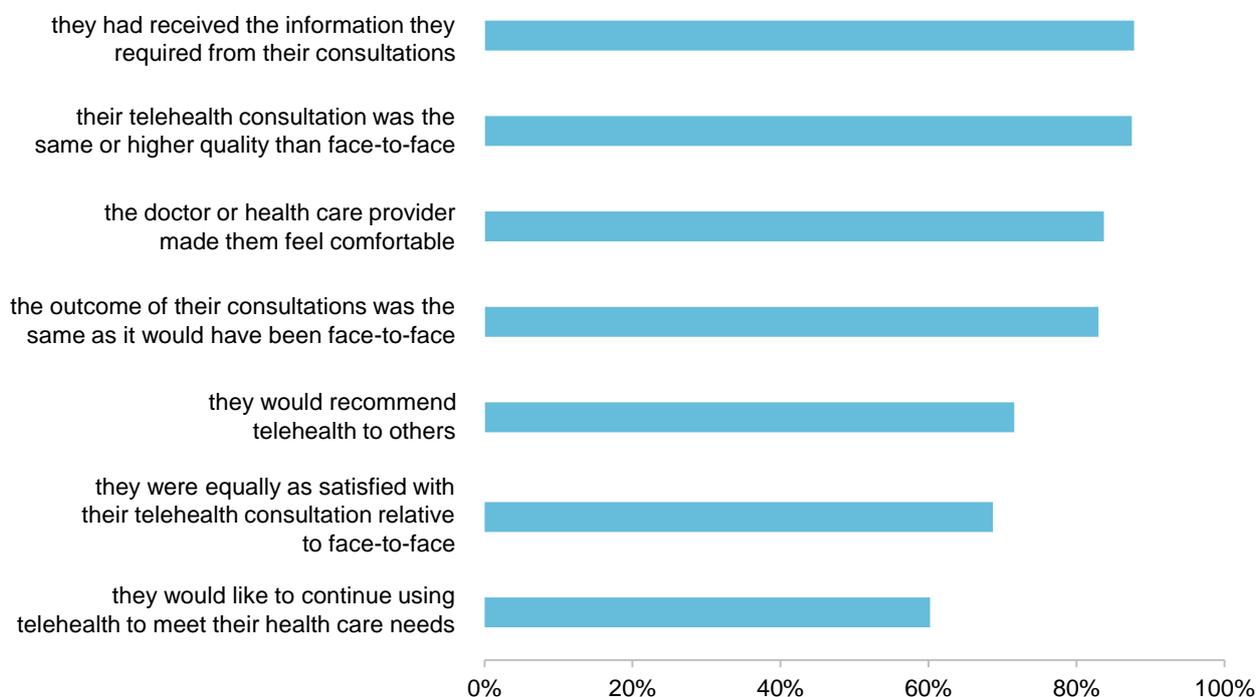
a. The percentages in each column represent the share of people who had used each type of service that agreed with the statement.

Source: Patient Experiences Survey, 2022-23 (ABS 2023e).

Another recent survey also had mostly positive findings. Of people who had used telehealth in the past 12 months, a majority said that they had a good experience, that they were able to communicate effectively with their clinician, and that they felt the consultation to be of a high quality (figure 3.2).

**Figure 3.2 – Most people who use telehealth are satisfied and consider it high-quality<sup>a,b</sup>**

Share of telehealth users who agreed that ...



a. 'Telehealth users' are survey respondents who reported having used telehealth for a consultation in the past year.

b. The data represents the share of respondents who stated that they 'agree' or 'strongly agree' with the statement.

Source: Thomas et al. (2023, pp. 6–7).

### **3.3 The impact and benefits of telehealth**

#### **Telehealth has delivered large savings to patients**

Telehealth reduces the cost to patients of receiving care, mainly through eliminating travel-related costs. Patients therefore receive a significant benefit when they substitute a telehealth appointment for an in-person one.

Most telehealth consultations in recent years seem to have been substitutes for what would otherwise have been in-person care. Since March 2020, the total volume of Medicare-funded GP and specialist care has not increased much. The main effect of the COVID-19 policy changes has been an increase in the number of telehealth consultations, and a nearly equal decrease in the number of in-person consultations (figure 3.3).

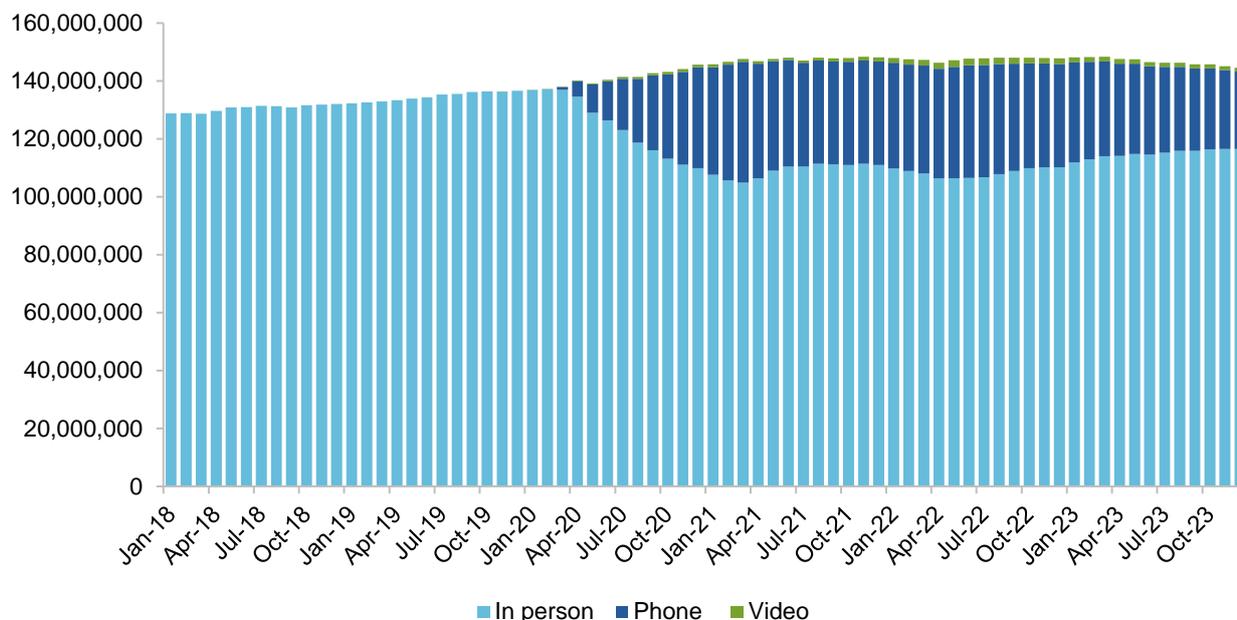
If DTC telehealth is factored in (which it should be, because the markets for DTC and Medicare-funded telehealth are related) then the total volume of care has likely increased. However, this increase is only a slight one, as the DTC sector is still relatively small (section 3.1).

The main benefit that patients gain from substituting telehealth for in-person care is the time they save from not having to commute, and from not having to wait in doctors' waiting rooms. And calculations by the Commission indicate that the recent expansion of telehealth in the Medicare-funded sector has delivered large time savings to patients. In 2023, there were about 28 million Medicare-funded GP telehealth consultations, and about 3.5 million specialist telehealth consultations (section 3.1). If it is assumed that telehealth saves patients about 65 minutes per appointment, and that 80% of telehealth consultations would otherwise have been in-person visits, then telehealth saved about 27.3 million hours of patient time that year. If the dollar value of patients' time is equal to the average earnings of full-time workers (adjusted for labour force participation) then telehealth delivered a total benefit to patients in 2023 of about \$895 million.

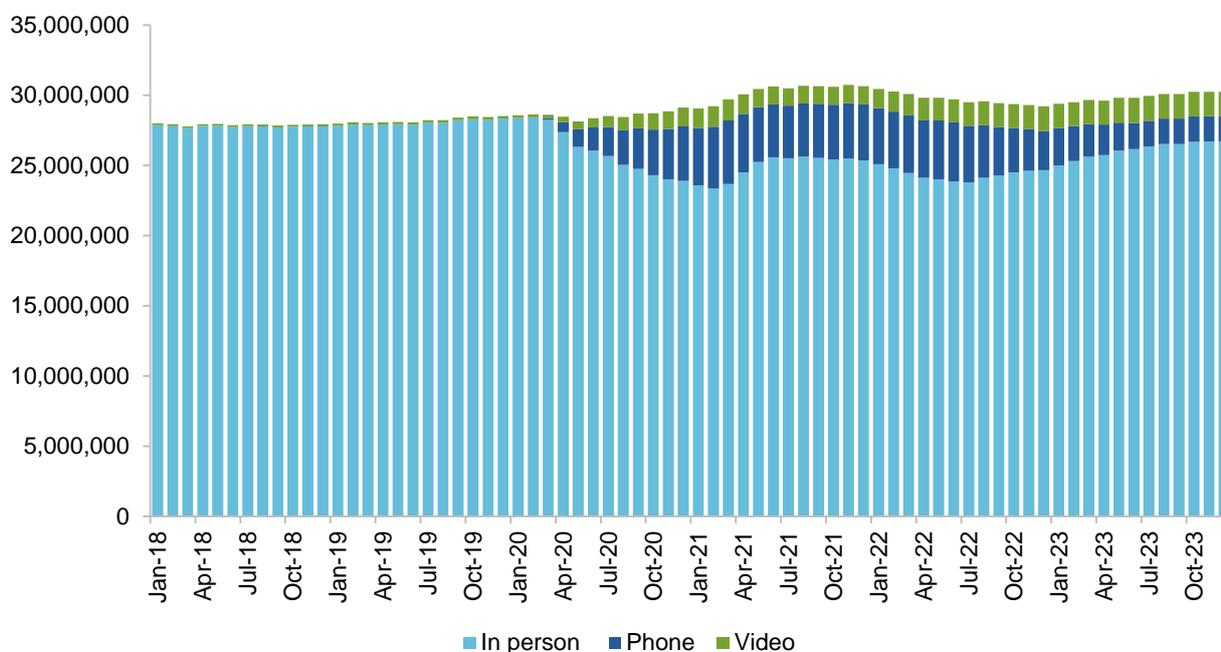
Details about the assumptions and methodology behind this estimate are outlined in appendix B. The appendix also presents estimates of the benefits of telehealth under alternative assumptions about the degree of substitution between it and in-person care.

**Figure 3.3 – Medicare-funded telehealth consultations have mostly substituted for in-person services<sup>a,b</sup>**

**a) GPs – number of Medicare-funded consultations by medium, rolling 12-month sum, January 2018 – December 2023**



**b) Specialists – number of Medicare-funded consultations by medium, rolling 12-month sum, January 2018 – December 2023**



**a.** Dental, obstetric and public health physician services were not included in the 'specialist' category. **b.** For each month, the chart represents the number of consultations that had taken place in the past 12 months. For example, the December 2023 column in panel (a) shows that, from January 2023 to December 2023, there were about 116 million in-person GP consultations and about 28 million GP consultations via telehealth.

Source: Commission analysis of Services Australia Medicare Item Reports (Services Australia 2024).

## Telehealth has also improved access for some patients

By reducing travel-related costs, telehealth can also allow patients to receive care where otherwise they would go without altogether; in other words, it can improve access to care. And though most telehealth thus far has been substitution, it also appears to have had a positive effect on access.

Several participants told the Commission that the expanded role of telehealth has led to better access to some patients. They emphasised the access benefits for people in regional and remote areas, where services are more sparse and travel-related costs are higher.<sup>34</sup> Some also said that telehealth improves access for other groups, such as people with caring responsibilities and those with limited mobility (for whom the cost of travelling to appointments is also relatively high).

Multiple participants emphasised the access benefits for Aboriginal and Torres Strait Islander people in particular. Participants involved in the ACCHO sector said that the use of telehealth in ACCHOs has improved access to specialist care. Instead of facing a large journey for an in-person appointment, many patients can, where appropriate, access care remotely while attending their ACCHO in person (section 3.1). This helps address travel-related barriers, which are often an issue for Aboriginal and Torres Strait Islander people in regional areas. For example, in one qualitative study, a Queensland-based Aboriginal health worker said:

One of the biggest reasons [for Aboriginal and Torres Strait Islander people missing out on healthcare] is the cost of travel; it's a very challenging issue here for most of the community members. A trip to Toowoomba or Brisbane, you're away for three days, it's extremely difficult for the community (Caffery et al. 2018, pp. 678–679).

Another benefit of the use of telehealth in ACCHOs (though not strictly 'access') is that it allows Aboriginal and Torres Strait Islander patients to stay at their local ACCHO instead of attending a mainstream service. Participants argued that this is a way of enabling patients to receive culturally appropriate care.

Moreover, by leveraging the presence of Aboriginal and Torres Strait Islander health workers, telehealth can lead to better communication and information sharing between patients and clinicians, particularly if English is not the patient's first language. Health workers bring detailed knowledge of patients' context and personal circumstances, which they can relay to clinicians where relevant; they can also help ensure that patients fully understand clinicians' advice and its implications. The latter benefit was emphasised in the study by Caffery et al. (2018, p. 679); one health worker said:

When they [the community member] talk, they don't know how to – sometimes when doctors talk to them, they can't understand what's being asked. It's good to have someone, a worker, with you. If they don't understand you can explain to them. You have to have that worker that has that rapport with the person.

## 3.4 The policy landscape needs to evolve

Despite the benefits that telehealth has delivered in recent years, there is room to improve multiple policy settings that affect it. Of these:

- some need to be acted on by government as a priority
- some need to be resolved, but may take time, and
- some should be monitored, but are not a problem now.

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<sup>34</sup> On average, there are fewer GPs and specialists in regional and remote areas, and patients tend to wait longer for care. This is explored in more detail in chapter 1.

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## **Governments should take action now to improve quality controls**

Like all forms of healthcare, telehealth is governed by quality and safety standards. These apply both at the level of individual clinicians, and at the provider level. Standards exist to incentivise clinicians and providers to adopt good practice, as healthcare can be quite technical, and patients may find it difficult to accurately judge the quality of the care they receive. Standards can also give governments assurance that services that receive public subsidies are high-quality.

In some cases, the regulatory regime has kept up with telehealth's expanded scale and scope. However, in others, it may be lagging behind.

### **There has been progress on practice standards for clinicians**

Not all consultations lend themselves to telehealth. Some by their nature require the 'laying of hands' – for example, the assessment of an orthopaedic injury. There are also situations where a clinician might want to directly observe a patient for safety reasons.

Guidance on how and in which situations clinicians should use telehealth is key. And in recent years, progress has been made on clinician-level guidelines.

Multiple sets of telehealth practice standards have been developed. In 2023, telehealth guidelines were published by the MBA. They set out the standards of practice expected of doctors in relation to telehealth (MBA 2023); serious or repeated failure to meet MBA standards can have consequences for a doctor's medical registration (MBA 2020, p. 3). In addition, some medical colleges have developed specific telehealth guidelines for their clinicians; for example, in March 2020, the Royal Australian College of General Practitioners (RACGP) published a telehealth guide for GPs (RACGP 2020a). Deviation from medical college guidelines does not always lead to formal consequences – their role is more about setting professional norms of good practice. In some cases, however, college guidelines do help define clinicians' legal obligations in relation to the quality of the care they provide (Pakchung et al. 2019).

### **Existing provider standards may not be appropriate for the regulation of DTC telehealth**

While there has been good progress on the development of clinician-level standards, there may be a regulatory gap at the provider level. Specifically, it is not clear whether DTC providers fall within the scope of relevant provider standards and accreditation schemes.

There are multiple sets of provider standards that apply in the Australian health system (table 3.3). Most of the major ones were developed by the Australian Commission on Safety and Quality in Healthcare (ACSQHC), though some were developed by other bodies; for example, the RACGP has national standards for GP clinics. Each set of standards is the basis for a corresponding accreditation scheme; providers can be assessed against the standards, and if they are found to meet them, they become accredited.

**Table 3.3 – Selected provider standards and their scope**

	Main types of in-scope providers	Developed by...	Is accreditation compulsory or voluntary?
<b>National Safety and Quality Health Service Standards</b>	<ul style="list-style-type: none"> <li>Hospitals</li> <li>Day procedure services</li> <li>Public dental services</li> <li>Certain other acute-type services such as ambulance services</li> </ul>	ACSQHC	<ul style="list-style-type: none"> <li>Compulsory for hospitals, day procedure services and public dental services</li> <li>Voluntary for other in-scope providers</li> </ul>
<b>Standards for General Practice</b>	GP clinics (however, some clinics that might be considered general practices in an everyday sense do not fit the RACGP definition of a GP clinic)	RACGP	Voluntary (though certain government payments are conditional on accreditation against the standards) <sup>35</sup>
<b>National Safety and Quality Primary and Community Healthcare Standards</b>	<ul style="list-style-type: none"> <li>Allied health services</li> <li>GP clinics that do not meet the RACGP definition of a GP clinic</li> <li>Other primary and community care providers such as publicly provided community health services</li> </ul>	ACSQHC	Voluntary
<b>National Safety and Quality Digital Mental Health Standards</b>	Providers that deliver digital mental health services	ACSQHC	Voluntary

Sources: ACSQHC (2020, 2021b, 2021c); RACGP (2020). The table's contents are also based on discussions between the Productivity Commission and the ACSQHC.

DTC telehealth providers do not fit neatly into this landscape. DTC services are, broadly speaking, a form of primary care, but it is not clear that existing primary care standards cover them.

For the purposes of the Standards for General Practice, DTC providers do not meet the definition of a GP clinic, and therefore cannot be accredited.<sup>36</sup>

Moreover, there is some ambiguity about whether DTC providers are within the scope of the National Safety and Quality Primary and Community Healthcare (NSQPCH) Standards.

On the one hand, at least one major DTC provider perceives there to be a gap in regulatory coverage. In a recent submission, the telehealth company Eucalyptus suggested that DTC providers are not covered by existing standards and accreditation schemes. They said:

Telehealth is still to some extent an emerging industry in Australia and it is clear that regulations in various areas have not yet caught up with it. While telehealth provided from a traditional GP clinic may

<sup>35</sup> The Practice Incentives Program Quality Improvement Incentive is a payment available to GP clinics 'to encourage practices to participate in quality improvement activities' (RACGP 2020b, p. 1). To be eligible for the payment, practices must be accredited against the Standards for General Practice (RACGP 2020b, p. 1).

<sup>36</sup> General practices need to meet a set of conditions to be considered as such under the RACGP's definition. Among other things, they must offer care that is 'comprehensive' (RACGP nd, p. 4). The RACGP explicitly states that this rules out DTC providers. They note that 'services that provide limited and/or non-continuous care are not eligible for accreditation'; in this category are 'telehealth-only services (including on-demand telehealth services), where continuous care may be provided but scope of care provided is limited (ie physical assessment is not possible)' (RACGP nd, p. 5).

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be the indirect subject of accreditation (as part of the GP clinic's accreditation), telehealth provided by an online-only platform such as Eucalyptus presently will not (Eucalyptus 2023, p. 42).

To fill this purported gap, the company argued that 'telehealth-specific accreditation standards should be developed and they should – ultimately – be made compulsory' (Eucalyptus 2023, p. 42).<sup>37</sup>

On the other hand, advice from the ACSQHC (pers. comm., 17 April 2024) notes that the NSQPCH Standards do not exclude DTC providers from their scope. And so, at least in theory, DTC providers can seek to be assessed against the standards.

The source of this uncertainty could be that there is a difference between what is theoretically and practically possible. Even though DTC providers are not *explicitly* excluded from the scope of existing standards, it might be that they are *effectively* outside of their coverage, because it is unrealistic for them to meet the conditions necessary for accreditation. For example, the NSQPCH Standards have a 'comprehensive care' requirement (ACSQHC 2021c, p. 25). This may make it difficult for providers that have a specialised service offering – as DTC telehealth companies often do – to fall within their scope.

This apparent regulatory gap may already be on its way to being filled via the ACSQHC's project on virtual care standards. Currently, there is a pilot study underway which is an 'anticipated first step towards national safety and quality standards for the broad range of virtual care services [including telehealth] across Australia' (ACSQHC 2024). These will be adapted from the National Safety and Quality Digital Mental Health Standards, and thus will likely be analogous to them (ACSQHC 2024).

Given that the DTC telehealth sector has grown significantly in recent years, and that its growth is expected to continue, it is important that governments take steps to resolve any potential regulatory gap. Governments should consider expediting the development of standards for virtual care and an associated accreditation scheme. They should ensure that these standards apply to DTC telehealth companies. DTC providers will have good incentives to seek accreditation against the standards, as they will want to signal that they have strong quality controls in place.

## **Governments will need to address particular regulatory and funding issues going forward**

### **Governments may need to examine regulatory settings in light of the emergence of DTC telehealth**

The DTC telehealth sector is delivering new services in new ways. Governments will need to consider whether other aspects of the regulatory framework remain fit for purpose in light of the emergence of these new providers and practices.

For example, some DTC providers offer access to both GP and pharmacist services as part of a bundled package of care – such as in bundled weight management programs – that patients can purchase. It is not clear whether this is creating problematic incentives. The Australian Medical Association (2019, p. 1) has noted, for instance, that 'real and perceived conflicts of interest may develop' where a doctor owns a pharmacy, via 'the creation of a potential incentive for the doctor to prescribe or recommend those treatments based on increasing the pharmacy's profit'. Moreover, any poor incentive structures may have

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<sup>37</sup> Their argument was that provider standards are a better alternative than the regulatory approach of the MBA, which was to regulate aspects of DTC telehealth companies' business models through clinician-level rules (Eucalyptus 2023, p. 40).

implications for government, such as where the medications in question are subsidised by the Pharmaceutical Benefits Scheme.

Greater guidance on managing any potential conflicts of interest could help preserve confidence, ensure transparency, and continue to foster choice for patients in deciding which pharmaceutical provider to use.

Another example is the case of advertising rules. Advertising prescription-only medications to the general public is not permitted in Australia (TGA 2024, p. 5). However, the capacity of DTC telehealth providers to specialise means that they can offer a targeted range of services. Often, this is accompanied by advertising with specific solutions, sometimes based around medicines, but without naming any particular prescription medicine.

Governments should consider whether policy settings around bundled clinician and pharmacist services and advertising remain fit for purpose given the rise of the DTC sector.

### **Governments should take measures to minimise the costs of the 12-month rule**

Governments also need to address the costs of the 12-month rule, which restricts Medicare subsidies for telehealth consultations between patients and GPs that have had an in-person appointment in the past year (box 3.5).

This rule is intended to promote continuity of care. Continuity can have a positive impact on health outcomes; for example, one systematic review found that patients who have more continuity in their care have lower rates of mortality on average, holding other relevant factors constant (Pereira Gray et al. 2018).

#### **Box 3.5 – Restrictions on Medicare subsidies for telehealth**

The 12-month rule determines what kind of telehealth is subsidised by government. Under the rule, a patient can generally only have a Medicare-reimbursed telehealth appointment with a GP if they have an 'established relationship' with them; this means that the GP must have provided 'at least one face-to-face service to the patient in the 12 months preceding the telehealth attendance', or be at a medical practice at which the patient had a face-to-face appointment in the past 12 months (DHAC 2023, p. 3).

There are a number of exceptions to the 12-month rule. It does not apply to urgent after-hours consultations, mental health appointments or pregnancy counselling, recognising that telehealth can be valuable in situations where a patient has a sensitive issue, or needs timely medical service. Some types of patients, such as those attending an ACCHO clinic and people in disaster-affected areas, are also exempt from the rule (DHAC 2024a, p. 4).

Currently, the 12-month rule is for GP services only. However, recently, the Medicare Review Advisory Committee (MRAC) recommended that the rule, or a similar requirement, be extended to specialist, nurse practitioner and midwifery services. Specifically, MRAC (2023, pp. 31–32) proposed that:

- an equivalent rule be applied for nurse practitioners and midwives, such that appointments are only reimbursed if the patient has seen them in person in the past 12 months, and
- a variant of the rule be applied for specialist consultations, such that only subsequent telehealth appointments get a subsidy (that is, the patient needs to have seen the specialist in person for their first consultation, though not necessarily in the past 12 months).

However, there are costs to the 12-month rule.

The rule is a barrier to access in some cases. For example, a patient might want timely medical advice, but not be able to get an appointment with their normal GP. In some circumstances, the 12-month rule prevents patients in these circumstances from accessing Medicare-funded telehealth. The growth of the DTC telehealth sector has helped mitigate this problem to some extent, as some providers offer relatively low-cost alternatives (section 3.1). However, many patients cannot afford out-of-pocket expenses,<sup>38</sup> and for these patients, bulk billed services are key to access. It is not clear exactly how many patients forego medical consultations as a result of the 12-month rule. However, in one recent survey, 14% of those surveyed said that the rule had, at some point, prevented them from using telehealth (Healthengine and Australian Patients Association 2023, p. 28). This suggests that the number missing out could be significant (though of course, it is unclear whether these respondents missed out on care altogether, or later saw a doctor in person in lieu of a telehealth appointment.)

The 12-month rule can also dampen competition. There may be situations in which a patient wants to consult with a doctor other than their normal one, about an issue that does not require a physical examination. However, the 12-month rule creates an effective financial penalty for switching providers in such cases. Again, some patients may be willing to pay out of pocket to see a non-subsidised provider; but for others, minimal out-of-pocket costs are key to access.

However, relaxing the rule would also carry risks. Doing so would potentially mean that most DTC telehealth services are within the scope of Medicare subsidies. These services can scale up quickly, because they are not bound by geographical constraints, and have relatively low marginal costs; subsidising them could lead to a large increase in the total volume of services funded by government. Moreover, though much DTC telehealth is healthcare as traditionally understood, much is not. For example, many providers offer specialised services for issues that are mainly cosmetic such as hair loss and skin care (Foo et al. 2023, p. 345). These are services which governments may not deem to be of a sufficiently high health value to warrant their support.

Over the long term, governments should take measures to minimise the impacts of the 12-month rule on access and competition. But they should only do so if they can find ways to salvage its main benefits – these being that it promotes continuity of care and targets subsidisation to higher-value care (and as a corollary manages fiscal costs).

- The continuity benefits of the 12-month rule will not be as significant if and when a comprehensive system of electronic health records is developed. In a world where clinicians have ready access to a range of relevant health information on their patients, it will be easier to maintain continuity when patients switch providers. And there are a number of actions that governments can take to make improvements to Australia's health information sharing landscape (chapter 2).
- The fiscal costs of relaxing the rule could be mitigated by limiting subsidies to the subset of patients who rely most heavily on low-cost care for access. For example, the rule could be relaxed, but only for patients eligible for certain other government concessions. This would improve access and open up competition for these patients. At the same time, it would ensure that the subsidy is not extended to patients who are able and willing to pay out of pocket for the convenience of a telehealth consultation with a doctor other than their normal one.
- Subsidies could be targeted to higher-value services by creating restrictions that specify which types of care, or portfolios of services, are of a high value and eligible for subsidies.

The process of relaxing the rule while preserving the benefits will take time. Expanding the role of the Healthdirect GP help line while this work is underway could improve access for those that need it most. Governments could directly control the fiscal cost, given that Healthdirect is a government owned company

<sup>38</sup> In the 2022-23 Patient Experiences Survey, 7% of those surveyed said that cost had been a reason for delaying or not using a GP service at some point in the past year (ABS 2023e).

(section 3.1). They would also have more control over the type of care provided, and thus could target higher-value services. However, this option would not have the same positive competition effects as relaxing the 12-month rule – when seeking out a government-subsidised telehealth appointment, a patient's only extra option would be Healthdirect.

## **Government should monitor risks around the sustainability of regional and remote services**

People in regional and remote areas are among the groups with the most to gain from telehealth. And though people in these areas use telehealth at a lower rate than people in major cities, the gap appears to be narrowing. According to the Patient Experiences Survey, people outside of major cities are now only marginally less likely to use telehealth; in 2022-23, of people surveyed in outer regional, remote or very remote areas, 23.4% had had a telehealth consultation with a clinician in the past 12 months (ABS 2023e). This share was about 5 percentage points lower than for people surveyed in major cities (ABS 2023e); in 2021-22, the equivalent gap was around 10 percentage points (ABS 2022b).

Nonetheless, many regional and remote Australians face challenges in accessing telehealth, especially by video. The Commission heard about these challenges in discussions with participants involved in regional and remote health. The main barriers they emphasised were poor digital connectivity and challenges with digital literacy. The Commission has addressed the former in previous work: for example, the most recent productivity inquiry highlighted the fact that almost half of Australia's regions had broadband or mobile connectivity gaps in 2022 (PC 2023, p. 36).<sup>39</sup>

Another issue relevant to patients in regional and remote areas is the risk that expanding telehealth use affects the viability of regional practices. The Commission heard concerns from several participants about the impact of telehealth on regional medical practices. Though most participants involved in regional and remote health reported that telehealth has been positive overall, several also said that expanding its use carries risks. They argued that, when substituting telehealth for in-person care, patients may not always opt for telehealth providers in their local area. Thus, greater access to telehealth could lead to a loss of business for regional and remote providers, and threaten their overall viability; this could lead to a situation in which patients outside major cities have fewer options for in-person care, despite having more options for telehealth.

Overall, there is little concrete evidence on this. However, because of the 12-month rule, patients are still somewhat constrained geographically, as Medicare-funded appointments are generally only available with clinicians they have visited in person. This geographical constraint would not be in place were the 12-month rule relaxed. The impacts on regional practices are therefore an important factor for governments to consider in relation to the rule, and policy settings more broadly.

A separate concern is that expanded access to telehealth will lead governments to reduce the extent to which they invest in the regional and remote health workforce. Governments provide incentives for healthcare workers to practice outside of major cities. For example, the Australian Government's Workforce Incentive Program Doctor Stream aims to incentivise doctors to practice in regional and remote areas, by providing them with payments over and above what they would otherwise earn (DHAC 2024d). Many states have incentive programs for health workers as well. Some participants expressed concerns that these initiatives might become less of a priority as telehealth gains traction. If support for remote workers falls, some communities will be worse off, even with the benefits of telehealth. But so far, there is no evidence that governments' appetite for supporting regional and remote health has been affected by telehealth's expanded role.

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<sup>39</sup> This was based on information in Infrastructure Australia reports.

## 4. Remote care

### Key points

- \* **Remote care technologies could help lessen Australia's growing chronic disease burden.**
  - Remote patient monitoring (RPM) can ease pressures on our hospital system by preventing escalations in patients' conditions and reducing the need for acute care.
  - Digital therapeutics (DTx) enable patients to receive clinically tested medical interventions in the comfort of their own homes, enhancing access to care while delivering equivalent, or sometimes superior, treatment benefit.
- \* **Despite their promise, both RPM and DTx are yet to be widely integrated into patterns of care.**
  - Poor quality signals are diminishing the role remote care technologies can play in helping to abate healthcare costs and improve patient outcomes.
  - Gaps in funding mean that practitioners and patients alike may instead opt for subsidised in-person care or forego care, even if it is more costly for the system as a whole in the long run.
- \* **Governments could help users differentiate RPM and DTx from the broader array of healthcare apps that are not grounded in clinical evidence.**
  - A central library of approved DTx would help users to quickly identify proven therapeutics tailored to their needs.
- \* **Targeted funding arrangements could bolster the adoption of high-value remote care and maximise the impact of government funding.**
  - Funding approaches need to strike a fine balance. They need to overcome barriers for practitioners to recommend their use and encourage patients to stay the course; but also be finely crafted so that they only encourage use where they are well suited to patients' needs and are being applied in the right contexts.
  - A portfolio of funding approaches would best achieve this balance.
- \* **Both the Australian and state and territory governments have good reasons to invest in remote care. Coordination of efforts would help avoid gaps in coverage and duplication of effort as these new care models gain greater traction.**

Remote care technologies can improve the productivity of our healthcare system and lessen the burden of chronic conditions. These technologies, which enable patients to be monitored remotely and to undergo treatment from the comfort of their own homes, offer substantial benefits. Despite their promise, remote care technologies are yet to be widely integrated into patterns of care (section 4.1). We need to address barriers that impede the uptake of these technologies (sections 4.2 and 4.3) if we are to harness the benefits on offer.

## 4.1 Remote care can improve the management of chronic disease, but uptake appears to be slow

Remote care technologies hold significant potential for improving the productivity of Australia's healthcare system, particularly in managing chronic disease.

Chronic health conditions are a growing issue in Australia. These conditions are diverse: including diabetes, cardiovascular disease, cancer, arthritis, osteoporosis, back problems, chronic kidney disease, chronic obstructive pulmonary disease (COPD) and mental health and behavioural issues. Many Australians live with chronic conditions. Of those surveyed in the ABS's 2022 National Health Survey, nearly half (49.9%) reported having at least one chronic condition (ABS 2023d).

Chronic health conditions are also costly. People with chronic conditions experience physical pain or reduced wellbeing, which in turn can also affect their capacity to participate in the workforce (ABS 2023a). And expenditure on the treatment of chronic disease is relatively high. Governments and individuals spent a total of \$55 billion on chronic conditions in 2020-21, representing around 37% of treatment expenditure (AIHW 2023f, 2023e).

Remote care technologies can ease the burden of chronic conditions. Remote patient monitoring (RPM) technologies, which track patients' health data outside of traditional healthcare settings, act as a preventative measure to reduce the incidence of costly hospital admissions.<sup>40</sup> Digital therapeutics (DTx), which deliver a clinically tested medical intervention to a patient using software (box 4.1), can reduce the time and travel costs that patients incur when accessing care.

### Box 4.1 – What are digital therapeutics?

There is no universal definition for a digital therapeutic. A recent definition provided by the International Organization for Standardization and adopted by the Digital Therapeutics Alliance (DTA) states that DTx are:

... health software intended to treat or alleviate a disease, disorder, condition, or injury by generating and delivering a medical intervention that has a demonstrable positive therapeutic impact on a patient's health. (DTA 2023, p. 1).

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<sup>40</sup> These data include blood pressure, heart rate, glucose levels, or other biometric indicators relevant to the patient's condition. Data is typically collected through wearable devices, sensors, or mobile apps. Collected data can be transmitted in real-time, or instead can be manually entered by the patient into a portal for the practitioner to access later.

### Box 4.1 – What are digital therapeutics?

For the purposes of this research paper, a digital therapeutic is a patient-facing medical device that meets all three of the following criteria:

1. **Medium:** A digital therapeutic is available to patients through a **software-based** medium, such as an application or website. Some DTx may have associated hardware, but interacting with the software is the primary means of deriving a health benefit from use (Mantovani et al. 2023).
2. **Evidence:** A digital therapeutic is a **clinically tested** medical intervention. The health benefit of the therapeutic must have been validated with clinical evidence – such as through real-world, or randomised control trials (RCTs).
3. **Purpose:** A digital therapeutic prevents, manages, or treats a **specific medical condition**. It does not simply diagnose a condition or promote general wellness.

These three criteria delineate what is and is not a digital therapeutic. DTx are most commonly used for treating mental health conditions, but can also be used to treat chronic and neurological conditions. They are usually used outside of clinical settings.

What is a digital therapeutic	What isn't a digital therapeutic
<ul style="list-style-type: none"> <li>• A free website designed to treat insomnia with a patient-led cognitive behavioural therapy (CBT) course</li> <li>• A paid app with videogames designed to improve a stroke patient's motor function that has been clinically evaluated in multiple RCTs</li> <li>• A remote patient monitoring app that provides AI-generated advice to the patient without the practitioner's input</li> <li>• An AI chatbot that provides the user with targeted mental health exercises and advice for anxiety</li> </ul>	<ul style="list-style-type: none"> <li>• A calorie tracker</li> <li>• A sunlight tracker</li> <li>• A meditation app</li> <li>• A remote patient monitoring app that feeds data to the practitioner, who then provides medical directions to the patient</li> <li>• A hearing aid with an app for adjusting the settings</li> <li>• A pacemaker</li> </ul>

## RPM can prevent conditions from escalating and reduce acute care use

Chronic conditions escalate from time to time. The value of RPM is that it allows clinicians to detect escalations and complications earlier, and intervene to prevent adverse outcomes.

Most available RPM technologies target cardiovascular disease, diabetes and COPD – a subset of conditions that represents a significant share of Australia's chronic disease burden. In 2020-21, 5% of those surveyed reported having diabetes, 4% a cardiovascular condition and 2% COPD (ABS 2022a). Governments and individuals spent over \$14 billion on cardiovascular disease alone over the same period – more than any individual chronic condition other than cancer (AIHW 2023f).

Some RPM technologies can also improve outcomes for other conditions. AphasiaFit, for example, is an app that allows people with aphasia and their carers to monitor their communication therapy progress with speech recordings and patient-centric updates (Queensland Aphasia Research Centre, pers. comm., 19 April 2024).

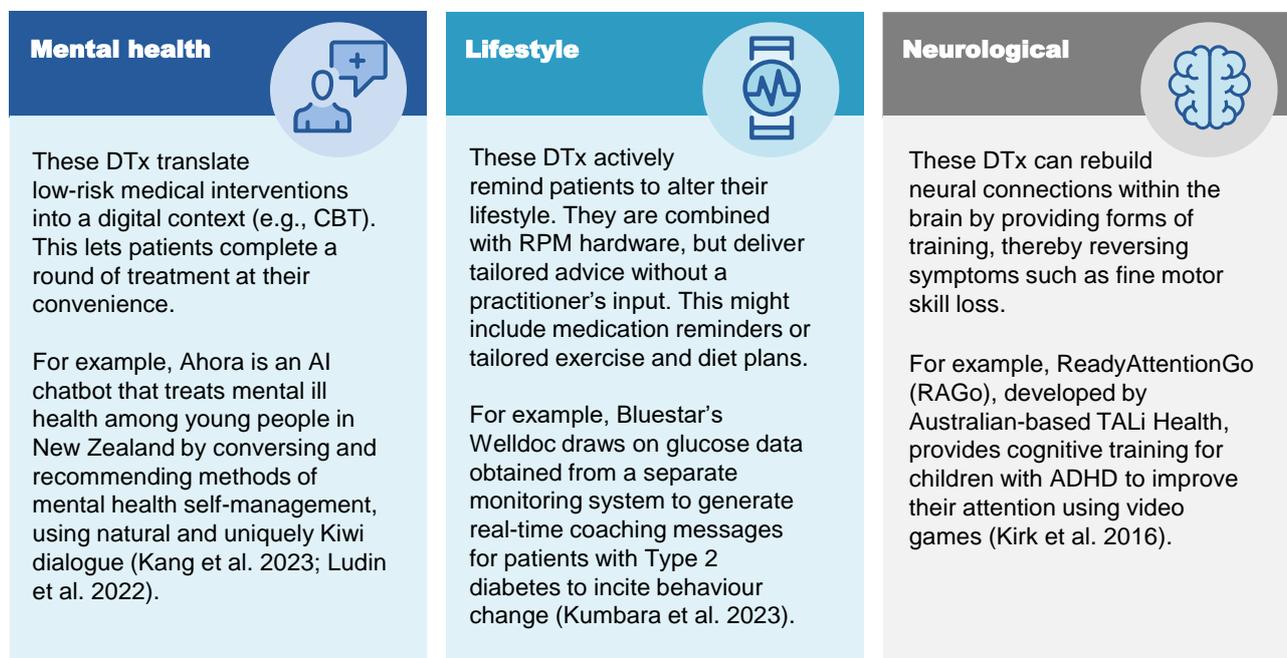
RPM has the potential to improve outcomes for patients and reduce the use of resource-intensive services. While the Commission heard from participants that the evidence base for RPM is still maturing, available research reinforces that it can be a highly valuable form of care in the right circumstances. A systematic review found that RPM can reduce patients' likelihood of being hospitalised, as well as the length of stay when they are. These benefits were pronounced for patients with cardiovascular conditions – with large RCTs finding two and three day reductions in the average length of hospital stays for non-invasive and invasive cardiovascular RPM, respectively (Taylor et al. 2021). Similarly, a review by De Guzman et al. (2022) found that many RPM programs deliver better health outcomes per dollar spent than typical alternatives, measured on a quality-adjusted life year (QALY) per dollar basis. While less invasive RPM technologies tend to be less costly, this can be at the expense of accuracy (Bhatia and Maddox 2020).

Overall, the evidence suggests that RPM can be an effective tool when well-targeted. RPM is likely to provide the most benefit where patients' conditions are unstable and risky, and where practitioners respond quickly to the needs of these patients (Thomas et al. 2021; Veenis et al. 2021).

## DTx can enhance access without compromising quality of care

DTx can improve access to treatments for a range of chronic conditions (figure 4.1), and allow patients to access treatment via their smartphones, tablets or laptops.

**Figure 4.1 – DTx mostly fall into three categories<sup>a</sup>**



a. CBT is cognitive behavioural therapy, a form of treatment for mental health conditions. It assumes that negative thought patterns, when identified, can be eliminated or reduced using coping strategies.

Source: Commission analysis drawing upon Kang et al. (2023); Kirk et al. (2016); Kumbara et al. (2023); Ludin et al. (2022).

DTx can be more, or equally as effective as traditional treatments. In mental health, DTx have successfully treated conditions such as anxiety, depression, insomnia, attention deficit hyperactivity disorder (ADHD), and

substance use disorders (section 4.3). DTx that incite lifestyle changes in patients with chronic conditions have also generated significant improvements in relevant biomarkers for hypertensive patients (Berman et al. 2018; Guthrie et al. 2019) and Type 2 diabetes patients (Davison et al. 2024; Krishnakumar et al. 2021). And a review of post-stroke rehabilitation apps (designed to treat the loss of motor function after a stroke) found that gaming apps could provide greater improvements in upper extremity function than usual forms of care or no training (Rintala et al. 2022).

By allowing patients to complete a round of treatment independently from the comfort of their own homes, DTx can not only reduce costs, but improve access to treatment.

DTx offer considerable labour-saving potential. As treatments are provided as part of a blended care model or self-administered, labour costs can be reduced and scarce practitioner time freed up. For example, in mental health, blended therapy models can save clinician time, compared with face-to-face therapy (Aardoom et al. 2016; Erbe et al. 2017), allowing them to dedicate more time to more severe cases.

DTx can also produce cost savings for patients. Accessing treatment digitally removes the travel and time costs incurred for patients who would have previously visited a clinic. And for some mental health conditions, DTx can reduce spending on medication. For example, Sampson et al. (2022) found the introduction of an NHS-recommended therapeutic for insomnia in the United Kingdom reduced primary costs by 70 GBP per user, largely through reduced spending on prescription drugs.

Reduced travel and time costs can also improve access to care for patients who would otherwise have to attend outpatient clinics. This can improve the continuity of care for some patients: one study of a digital therapeutic for Parkinson's disease found statistically and clinically meaningful improvements for the less physically active patient subgroup (Ellis et al. 2019).

The increase in convenience offered by DTx encourages patients to seek treatment where they previously would not have. For example, Cardihab's Digital Cardiac Rehabilitation programme greatly increased participation in cardiac rehabilitation in one study, as those who declined traditional models of care were more willing to use a digital treatment program (Cardihab 2020) (box 4.2). This in turn avoids higher costs associated with future care, in effect providing a productivity benefit for the healthcare system.

While the benefits of DTx are promising, as with other treatments, they are conditional on patients staying the course. Attrition rates found in trials may not reflect real-world behaviour, particularly when trial participants are given reminders or offered financial incentives (Nwosu et al. 2022; Torous et al. 2019). Real-world evidence suggests that high attrition rates can limit the potential public health benefit of DTx. One study of the use of DTx in treating depression, revealed that on average only 3.5 of the 6 modules were completed and that patients who completed less than four modules had no significant overall benefits (Christensen et al. 2016).

### **Box 4.2 – Case study: digital cardiac rehabilitation**

CardiHab is a digital-based cardiac rehabilitation service for patients recovering from a cardiac event or procedure, developed by CSIRO researchers at the Australian eHealth Research Centre, in partnership with Queensland Health.

The app guides patients through their personalised rehabilitation and includes components such as education, medication adherence, behaviour modification and psychological counselling. Clinicians can access patient data, review results and communicate with patients through a web portal.

#### **Impacts**

- The digital service is easily accessible and convenient for patients. Patients can access rehabilitation at home with the app, rather than attending in person at a clinic. This model of care reduces the barriers patients face in attending rehabilitation such as travel costs, time restrictions and scheduling issues, cultural factors and wait lists.
- The service enhances uptake, adherence and completion of rehabilitation, which could reduce hospital readmission after major cardiac events. A randomised control trial conducted by CSIRO and the Metro North Brisbane Health and Hospital Service demonstrated that the Digital Cardiac Rehabilitation model of care was as clinically effective as traditional care, and significantly improved patient uptake, adherence and completion of cardiac rehabilitation (Varnfield et al. 2014). Similarly, a clinical study by Queensland Cardiovascular Group found that providing patients with an option for digital rehabilitation increased participation from 21% to 63% (Rivers et al. 2022).<sup>a</sup>
- The model of care may also reduce the time health workers spend on gathering patient data (for example, blood pressure trends, medication adherence, or information on what exercises have been done), as this data is available in the app.

a. This study aimed to assess the real-world efficacy of the platform and did not include a control group. The study also found that for some, technological issues are a barrier to use.

Source: CardiHab, pers. comm., 17 April 2024.

## **Remote care uptake is slow but growing**

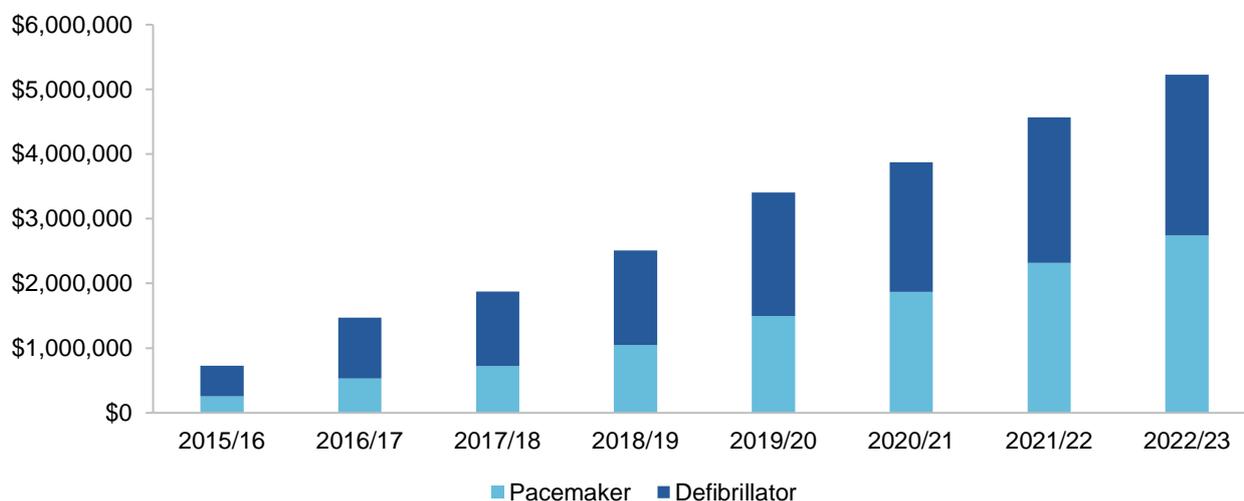
### **RPM is used in pockets across our healthcare system**

Healthcare providers are experimenting with RPM technologies and incorporating them into patterns of care.

GPs are integrating RPM into their care models. As of 2015, practitioners have been able to claim reimbursement for time spent monitoring patient data from implantable cardiac devices (specifically, pacemakers and defibrillators). Since then, there has been about \$11 million of MBS expenditure on pacemaker remote monitoring, and \$12.6 million on defibrillator remote monitoring (Services Australia 2024). The use of these services has grown steadily year on year (figure 4.2). And other GPs have expressed interest in adopting RPM. A recent survey found that while 19% of GPs surveyed had already introduced some form of RPM, a further 26% planned to introduce RPM in the next two years (CBA 2023).

## Figure 4.2 – Medicare-funded remote monitoring of implantable cardiac devices has grown steadily

### Total MBS spending on implantable pacemaker and defibrillator RPM, 2015-2023



Source: Commission analysis of data from Services Australia Medicare Item Reports (Services Australia 2024).

Hospitals too are experimenting with RPM. The Royal Prince Alfred (RPA) ‘virtual hospital’ in New South Wales, offers a range of remote monitoring services. Among these includes their multidisciplinary virtual care centre, which operates 24 hours a day, 7 days a week at the RPA Hospital campus (chapter 3).

Some Primary Health Networks (PHNs) have also invested in remote monitoring. The Gippsland PHN, for example, recently began funding RPM for patients with chronic conditions, delivered through local GP clinics. Its aim is to reduce unplanned hospital admissions and improve the quality of life of patients enrolled in the program (Gippsland PHN 2023).

State-wide programs are also gaining traction. South Australia, for example, has been delivering a remote monitoring program for patients with chronic conditions called Virtual Clinical Care (VCC) since 2018. And New South Wales commenced a pilot of a remote monitoring program in mid-2023 which aims to improve care for people with COPD, diabetes and heart disease in NSW Local Health Districts and Speciality Health Networks (eHealth NSW 2023c).

Some programs are still new, and evidence is still emerging as to their benefits. Others, however, are more mature and show evidence of significant benefits. VCC, for example, has improved care for patients with chronic conditions, including averting a significant number of hospitalisations (box 4.3).

### **Box 4.3 – Case study: South Australia’s Virtual Clinic Care program**

Virtual Clinical Care (VCC) is an RPM program funded by SA Health. It provides care for patients with chronic diseases and has been in place since 2018. The program aims to reduce preventable hospital admissions through monitoring and early intervention.

Under the program, patients are provided with monitoring equipment (such as a blood pressure monitor, or pulse oximeter) and a digital portal. Patients respond to a health interview through the preconfigured tablet in the kit, and the results are sent securely to a central database to be monitored by a registered nurse. A dashboard flags patients with results outside their individually determined monitoring parameters, and the nurses then triage patients whose condition is worsening.

#### **Impacts**

- According to an internal evaluation, between 2018 and 2022, the program led to the avoidance of over 1,000 potential emergency department presentations, and over 1,300 potential hospital admissions.
- Where hospital admission is still required, early intervention may reduce the length of hospital stays. Between May 2018 and June 2021, a total of 72 occupied bed days were saved by the program.
- The VCC program has also improved patients’ self-management of their conditions. As part of the program, VCC nurses provide regular health coaching based on a patient’s condition and individual circumstances. As a result, patients on the program have shown lasting improvements in ED presentations, medication compliance and body weight, with some choosing to purchase their own monitoring equipment after the program.

Source: SA Health, pers. comm., 23 April 2024.

### **DTx have yet to be widely integrated into patterns of care**

Available evidence suggests that DTx are not commonly used by patients or practitioners, though there may be appetite to do so.

The number of therapeutics approved for use provides some insights into whether DTx are gaining traction in Australia.<sup>41</sup> The Commission estimates that as at April 2024, a total of 31 devices that could be classified as DTx were listed on the Australian Register of Therapeutic Goods (ARTG). The Therapeutic Goods Administration (TGA) regulates DTx under the Software as a Medical Device (SaMD) framework. When a product qualifies as a medical device under the framework, it must be registered before it can be added to the ARTG and legally supplied in Australia (TGA 2021b) (chapter 5). As in other countries, the rate of DTx approval has fluctuated over time in Australia. During the COVID-19 pandemic, governments saw a spike in the approval of mental health DTx in response to the added mental health burden and the physical isolation imposed by lockdowns (Kadokia et al. 2020).

While approvals suggest DTx are yet to gain traction, survey evidence points to a growing appetite among practitioners. A 2018 survey conducted by the Royal Australian College of General Practitioners (RACGP)

<sup>41</sup> Although qualitative studies of mental health DTx use by patients (see Gan et al. 2023) or practitioners (see Byambasuren et al. 2020) highlight what inspires or limits uptake of DTx among these stakeholders, there are few macro-level data that shed light on overall usage patterns of DTx in Australian healthcare.

found that the proportion of Australian GPs who rarely or never recommended apps to patients (not limited to DTx) fell from 47% to 26% between 2017 and 2018 (RACGP 2019a).

We are yet to fully realise the benefits that remote care technologies offer. Participants have identified several barriers that dampen incentives to use these technologies. The remainder of this chapter considers how these barriers might be overcome.

## 4.2 Governments can improve quality signalling to facilitate uptake

### Quality signals for DTx are weak despite regulatory systems

Incomplete information on the quality of DTx is diminishing the role clinically proven technologies can play in helping to abate healthcare costs and improve patient outcomes.

Practitioners are interested in two types of information in deciding whether to recommend their use. First, they need information that helps them determine whether a treatment is clinically effective. Second, they need information that helps them determine whether the treatment is suitable for their patient – for example, to distinguish between an app that treats eating disorders effectively and an app that treats eating disorders in *young people* effectively.

Patients are also interested in two types of information in deciding whether to use DTx. They too need information that tells them whether a treatment is clinically effective (Svendsen et al. 2020). They also want reassurance that their sensitive health data is being stored and managed appropriately (Byambasuren et al. 2020).

But finding this information has high search costs.

Along with RPM, DTx falls within a much broader spectrum of health apps and websites. More than 300,000 consumer health apps are now available on app stores, with around 200 new apps being added daily (Jakob et al. 2022).

This proliferation of technology makes it challenging for practitioners and consumers alike to identify 'quality' applications, particularly those grounded in clinical evidence. A longitudinal study of mental health apps in major Australian app stores illustrates the magnitude of the challenge in respect of DTx. The study found that of the 982 apps observed, only nine claimed clinical effectiveness, with three of these citing a published study (Larsen et al. 2016). A similar study found that of the 293 apps for anxiety and/or depression sampled, 88 claimed to use CBT but only five had published evidence demonstrating efficacy (Marshall et al. 2020). Data protection can be similarly opaque – one study of diabetes apps found that 81% of the 211 apps sampled did not have privacy policies (Blenner et al. 2016).

Registers of clinically effective products approved under our regulatory systems are not readily accessible. The ARTG is not user-friendly and lacks a categorisation system to easily navigate approved DTx and RPM devices. In contrast, rating systems employed by major app stores are highly accessible, but provide little insight into clinical effectiveness and instead focus on user experience.

In the case of DTx, difficulties singling out apps that are clinically effective and tailored to the particular needs of their patients is impacting practitioners' willingness to recommend their use. While more practitioners are recommending apps to their patients than in the past, GP knowledge around effective apps and the lack of a trustworthy source to find effective apps are cited as key problems inhibiting uptake (RACGP 2019a). Similar challenges have emerged internationally, including in France (Della Vecchia et al. 2022; Sarradon-Eck et al. 2021) and the UK (Leigh et al. 2020).

Efficacy concerns, along with worries about whether their sensitive health data is being stored and managed appropriately, is similarly impacting patient uptake. Patients, particularly older patients, are unlikely to trust DTx as medically-evidenced interventions without the input of their practitioner (Byambasuren et al. 2020; Schroeder et al. 2023). And international studies show data concerns are impacting both DTx and RPM use (van Kessel et al. 2023), with one international study finding that patients were significantly more likely to download apps if given assurances that their data was protected by legislation (Folkvord et al. 2023).

## There are existing policy foundations for improving quality signalling

Practitioner groups (such as the national boards contained within the Australian Health Practitioner Regulation Agency (AHPRA)) play a critical role in providing guidance to clinicians about quality treatment options and signalling best practice. Clinician decisions about whether to recommend remote care technologies to their patients will be guided by best practice and information disseminated by peak bodies around their efficacy. The growth in remote monitoring of cardiovascular implantable electronic devices highlights the role peak bodies can play in increasing uptake. The use of implantable loop monitors more than doubled following their endorsement by the Asia Pacific Heart Rhythm Society (Wilsmore and Leitch 2017).

Government too can also play a role by reducing search costs and compiling information that can inform an assessment of quality. Curated app libraries, such as the one provided by the NHS in the UK, can be valuable tools with which clinicians and patients can assess the efficacy, applicability and data safeguards of particular health apps.

There are two existing sources that collate information about DTx in Australia:<sup>42</sup>

- **Head to Health** is an online directory of digital mental health services funded by the Australian Government. The Commission's Mental Health inquiry (2020) recommended that Head to Health be developed to help inform a national digital mental health platform. The website received development funding in the 2021-22 Budget and was launched in June 2023 directing users to mental health services tailored to their needs (including DTx). However, it (understandably) does not list DTx related to other chronic conditions.
- **Beacon** is an online directory of digital health apps and websites managed by the Australian National University. A panel of health experts categorise, review and rate these apps and websites based on their effectiveness in treating a certain condition – including cardiovascular disease, diabetes, and a number of mental health conditions. However, it has not been updated since June 2018.

The Australian Digital Health Agency (ADHA) has proposed a possible model that could act as a central DTx register. Under the proposed Assessment Framework for mHealth Apps (2022a), a four-stage process assesses an app's acceptability, safety, trustworthiness, ease of use, privacy and security, and technical quality. Upon completing the assessment, the app is published in an mHealth apps library (figure 4.3). While in the library, the app's inclusion is reassessed on an ongoing basis.

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<sup>42</sup> At the state level, VicHealth's Healthy Living Apps Guide and Primary Health Tasmania's Digital Health Guide each fulfilled a similar role, though both now appear to be defunct.

**Figure 4.3 – The proposed mHealth Apps library could improve information flows**  
**Proposed description form for an app in the mHealth Apps Library**

*Proposed basic description*

*Proposed detailed description*

Source: ADHA (2022).

The proposed library could be a highly valuable tool for addressing information gaps and encouraging behaviour change. Its potential could be increased by providing incentives for developers to have their products assessed.

One way to do so would be allowing apps that have met the assessment requirement (be it TGA approval or a new form of rating attached to the DTx library) to advertise that they have met this requirement.

This is a significant departure from current practice. Under the Therapeutic Goods Advertising Code, advertisers cannot say a good is 'TGA approved' or 'registered' (TGA 2021c). They can instead include the product's ARTG number, but the meaning of this is less clear to consumers.

Finding a plain English means of communicating TGA approval would mean that a patient looking for DTx to lessen lower back pain, for example, could be able to distinguish between apps that have proven clinical outcomes and those that do not.

The framework could also broaden its focus from 'mHealth apps' to DTx more broadly, to ensure the library is comprehensive. Doing so, would capture web-based interventions proven to be clinically effective. Quality signalling is valuable irrespective of whether therapeutics are delivered through smart phones or web-based interventions.

## 4.3 Targeted funding arrangements could ensure high-value remote care

Given that remote care options can act as substitutes for in-person care, proponents have argued that they too should receive government support.

Both Australian and state and territory governments are already providing support for some specific initiatives, such as DTx that treat mental health (box 4.6) along with select RPM initiatives (section 4.2).

But remote care doesn't fit neatly within broader funding models. While there are instances of case-by-case funding, there are no dedicated reimbursement pathways for DTx, and pathways for RPM devices and

monitoring are limited to select cases (box 4.4). And in some cases, the rationale between what can and cannot be reimbursed is not always apparent. As a number of participants highlighted, Type 1 Diabetes patients for example, can access subsidised continuous glucose monitoring and flash glucose monitoring products through the National Diabetes Services Scheme (NDSS). However, those with Type 2 Diabetes cannot access subsidies even where continuous glucose monitoring may improve outcomes and prevent diabetes complications.

#### **Box 4.4 – How is remote care currently reimbursed?**

There are select options for reimbursing remote care where:

1. the remote care application or device is a companion to another device, prosthetic, therapeutic, or service. Depending on what it is a companion to, the application or device cost can be claimed under the Pharmaceutical Benefits Scheme, Medicare Benefits Schedule, NDSS, or National Disability Insurance Scheme
2. a private health insurer believes a remote care application or device reduces the cost of care, creates an efficiency gain for the insurer, or raises future engagement with the company, the technology's cost may be partially or fully covered by the insurer. It remains unclear as to how many privately insured patients in Australia use this pathway
3. patients have implantable cardiac devices (specifically, pacemakers and defibrillators), practitioners can claim reimbursement under MBS for time spent monitoring data. Reimbursements have totalled \$11 million for pacemaker remote monitoring, and \$12.6 million for defibrillator remote monitoring since funding became available in 2015 (figure 4.2).

Source: DTA (2022).

Gaps in reimbursement for remote care can affect uptake. While some remote care options are available at relatively low cost to patients, others can have high subscription or upfront costs and be prohibitively expensive. The first company to have a digital therapeutic approved by the FDA, sold a three-month course of its insomnia app for 900 USD (*The Economist* 2022). And in Germany, DTx supported by their national scheme (box 4.5) can range from 120 EUR for a one-time licence to 720 EUR for a 90-day prescription (Gensorowsky et al., 2022). The price of RPM devices, meanwhile, vary depending on device type (Peretz et al. 2018). A patient may pay \$70 once for a pulse oximeter, but could pay up to \$5000 annually for continuous glucose monitoring sensors and transmitters (Diabetes Australia 2022).

Where costs are prohibitive, patients may instead opt for subsidised in-person care even if it is less convenient and more costly for the system as a whole in the long run. This in turn, can add to system-wide pressures (chapter 1).

Reimbursement incentives can also affect practitioners' willingness to recommend remote care to their patients. In the case of DTx, remote care can act as either a complement to or substitute for in-person care. Where DTx acts as a substitute, there is little incentive for a practitioner to prescribe their use if they receive no compensation for doing so.

A lack of reimbursement can similarly affect practitioners' willingness to recommend RPM. Some RPM systems send automatic alerts when a patient's condition suddenly worsens. Additional labour is needed to

review and respond to these alerts, in part for liability reasons. A response might involve booking an appointment or suggesting a patient present at an ED – actions compensable under existing funding arrangements. But in cases where no response is needed, the clinician or nurse reviewing the data and alerts does not have their labour compensated.

Similar incentive challenges arise for RPM through hospitals. For example, post surgery rehabilitation monitoring requires investment of resources by the hospital that may not be reimbursed through traditional activity-based funding mechanisms.

## International policy experiments highlight the challenges of designing remote care funding

Some participants called for Australia to follow the lead of other countries, such as Germany and the United States, and provide dedicated funding pathways for remote care. In Germany, approved digital health applications (known as DiGA) can now be prescribed by doctors and reimbursed by the national health system. And in the United States, Medicare has become a major source of funding for RPM with codes, analogous to MBS items, covering clinician time for educating patients on how to use remote monitoring devices, developing a care plan, and reviewing the information that gets transmitted (box 4.5).

### Box 4.5 – A tale of two systems

#### Germany's model for DTx reimbursement: DiGA

DiGA are approved digital health applications (apps) that can be prescribed by doctors and reimbursed by the national health system. Since the policy's introduction in 2020, 55 DiGA can now be prescribed for a range of conditions related to the respiratory system, reproductive organs, heart and circulatory system, mental health and cancer.

As in Australia, DiGA have to undergo a regulatory approval process. Manufacturers must prove that apps meet the requirements for safety, functionality, quality, interoperability, data protection and data security. Manufacturers must also provide evidence that their app improves patient care. For an app to improve patient care, apps must either provide a proven medical benefit for patients, or procedural and structural improvements for healthcare (such as by improving the flow of patient information or better coordinating care processes). However, if the manufacturer meets all other requirements, their app may be included in the DiGA register for a preliminary period of 12 months through a 'fast track' process.

For the first year of listing, the price of an app is freely set by a manufacturer, but still reimbursable under Statutory Health Insurance. In 2022, freely-set manufacturer prices ranged from €120–745 per initial prescription cycle (which for all but one DiGA was a three-month therapy period). This is despite the rule that the price cannot be set higher than 25% over the average price of all DiGA in the directory. After this period, manufacturers negotiate the price of the app with the Central Federal Association of the Health Insurance Funds in a process similar to negotiations for new pharmaceuticals. The typical post-negotiation price of a DiGA is between €200–230.

#### US Medicare funding for RPM

In the US, Medicare is a major source of funding for RPM. Unlike Australia, however, US Medicare generally only covers patients aged 65 or over, and some patients with disabilities.

#### **Box 4.5 – A tale of two systems**

Under US Medicare, services are reimbursed through ‘codes’, which are analogous to MBS items. Multiple Medicare codes for RPM were introduced in 2019, including codes for:

- the cost of an initial appointment to educate the patient on how to set up and use the particular monitoring device
- the time the clinician spends reviewing the information that has been transmitted, and
- the time the clinician spends developing a care plan for the patient.

Since these codes were introduced, RPM usage has grown significantly (Tang et al. 2022, pp. 1250–1251).

The US Medicare funding changes were a key driver of this increase in uptake – though other factors also likely contributed. A number of commercial insurers also started reimbursing remote monitoring around the same time that the Medicare codes were introduced. And it is possible that the COVID-19 pandemic had an impact, as some clinicians may have started subscribing patients to RPM as a substitute for regular in-person visits.

Source: Gensorowsky et al. (2022); Gerke, Stern and Minssen (2020); Tang, Mehrotra and Stern (2022).

In both Germany and the US, dedicated funding pathways have been successful in improving uptake of remote care. In Germany, DTx prescriptions grew from around 3000 in 2021 to more than 50,000 in 2022 (Stiftung Gesundheit as cited in Dahlhausen et al. 2022; Klöckner as cited in Frey and Kerkemeyer 2022).<sup>43</sup> In the United States, meanwhile, RPM usage has grown significantly. A recent analysis of usage rates for patients insured by Medicare and several commercial providers found that in February 2020, there were about 4,400 general remote monitoring claims across 3,700 unique patients. In March 2021, this grew to about 19,700 claims across about 15,700 unique patients (Tang et al. 2022, pp. 1250–1251).<sup>44</sup>

While evidence is still emerging about the impacts of DTx in Germany, in the US, evaluations have found that changes to Medicare-funded RPM lowered hospitalisations and adverse outcomes for hypertensive patients, while increasing outpatient clinic visits (Acharya et al. 2023; Tang et al. 2023).

But models adopted internationally to support DTx and RPM have not been without their problems. Uptake is not the only relevant metric of success. Rather, the value of remote care depends on a range of factors, including targeting people who are at high risk of their health deteriorating and who are likely to adhere to the user guidelines. Emerging evidence suggests both have been issues. Given that many DTx are self-guided, adherence can be a challenge. Of the 50,100 DiGA prescribed by 2022, only 78% of these were used at least once by the patient (Stiftung Gesundheit as cited in Dahlhausen et al. 2022). And since RPM began being subsidised by US Medicare in 2019, usage rates have not been detectably higher among patients with more severe disease compared with those with less severe disease (Tang et al. 2022).<sup>45</sup>

<sup>43</sup> Under the Digital Healthcare Act, all people covered under statutory health insurance can receive a prescription for a DiGA. This represents around 88% of Germany’s population (Blümel et al. 2020).

<sup>44</sup> Codes for ‘general’ remote patient monitoring are separate from those for continuous glucose monitoring.

<sup>45</sup> In the case of DiGA, pricing has also proven contentious. The large discrepancy between manufacturer-set and negotiated prices is the product of the scheme’s ‘patient value-based pricing’ system. There are no clear guidelines or algorithms for deriving a reasonable, ‘value-based’ price (Gensorowsky et al. 2022). This allows for DiGA to be prescribed for at least 12 months at artificially inflated prices.

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## Tailored approaches would maximise the impact of any government funding

While international models show promise, there may be scope to better tailor funding so that it maximises the impact of any government funding and better manages fiscal risks. The latter is particularly important as DTx, and to a lesser extent RPM, are highly scalable. Doing so requires setting clear parameters for both what governments fund and how they fund it.

### Not all remote care warrants funding

Both RPM and DTx fall within a much broader spectrum of health monitoring apps and websites – what differentiates RPM and DTx is that they are grounded in clinical evidence. But this distinction in and of itself is not sufficient to warrant government support.

Ideally governments would limit any support for applications to those that are high value and cost-effective.

High value remote care applications are those that not only pass relevant clinical efficacy and safety thresholds but also generate a requisite amount of health benefit per dollar spent.

Cost-effective remote care applications are those that deliver the same health outcome at equivalent or less cost than a counterfactual, such as in-person care or pharmaceuticals.

The infrastructure for determining the value and cost-effectiveness of a remote care device already exists. Effective funding arrangements for remote care could rely on the Medical Services Advisory Committee (MSAC) or a similar body for evaluating which DTx and RPM devices might contribute to high-quality care.

### How remote care is funded matters for outcomes

Even if a remote care application is found to be both high value and cost-effective, the question remains as to how any funding arrangements can be designed to maximise this value, while minimising any unintended consequences and downside risks, including for governments.

Funding structures need to strike a fine balance.

On the one hand, funding structures need to incentivise uptake and adherence to overcome barriers for practitioners to recommend their use and encourage patients to stay the course – DTx are typically only effective so long as the patient completes the treatment cycle.

On the other hand, funding structures need to be finely crafted so that they only encourage use where they are well suited to patients' needs and are being applied in the right contexts. For example, in the case of RPM, that means targeting people who are at high risk of their health deteriorating. Carefully designing funding mechanisms is particularly important given the scalable nature of remote care technologies. An app-based therapeutic, for example, could be downloaded and used by a virtually unlimited number of patients. Similarly, practitioners can potentially monitor a large cohort of patients at once through an RPM dashboard.

### Bespoke funding arrangements would maximise benefits

Given the differences in the context in which remote care technologies are applied – the conditions they treat, the size and nature of the patient base they target, the extent to which they rely on a blended care model and their scalability – a portfolio of funding approaches is likely to work best.

In some cases, block funding might make sense. This type of funding has already been used to bolster uptake in the case of mental health DTx (box 4.6), and enables providers to cover their set-up costs.

Recognising that mental and behavioural conditions are quite common (ABS 2022a) and that the marginal cost of providing access to an additional user is close to zero, means that this type of funding can extend access to a potentially large cohort of target users, while managing any fiscal risks. Adherence could be encouraged through incentive payments or be a precondition for government support, for example, by mandating relevant applications demonstrate a requisite level of adherence.

In other cases, such as where there is a distinct and contained cohort of potential patients, leveraging existing funding structures (such as the MBS, PBS and/or program based funding pathways) with the addition of some safeguards might work best. For example, developing and disseminating best practice guidelines that advise clinicians on which types of patients are good candidates for specific remote care interventions, and on the procedures needed to ensure high-quality care, could ensure value for money. The Commission has previously recommended that governments produce more comprehensive guidelines outlining when particular interventions are clinically justified, and disseminate best practice to health professionals through bodies such as the Australian Commission on Safety and Quality in Healthcare and the various medical colleges (PC 2017c, p. 84).

A third option could be to include remote care in an overarching stream of funding for chronic disease management. This option might be preferred where patient characteristics or the context in which they receive care is critical to outcomes. This form of flexible funding approach has been advocated by the OECD (2019) and the Commission (2017d, 2021) for treating chronic conditions. More recently, Breadon et al. (2022, p. 49) argued that governments should provide GP clinics with 'flexible budgets for some types of care (such as chronic disease management)', in addition to the MBS subsidies they receive for individual episodes of care (though these reimbursements would be smaller). Two possible advantages of this model is that treating practitioners would only recommend remote care when they expect it to provide the most health benefit. Practitioners could also be incentivised to monitor a patient's adherence as a condition for accessing the fund.

Ultimately, it is a mix of these funding models that will allow the gains of remote care to be fully realised. Irrespective of which approach is adopted, any future funding models will require careful calibration to get the incentives right and manage the fiscal exposure of governments.

Maximising the impact of government funding will also require governments to coordinate to their efforts. Both the Australian and state and territory governments have good reasons to invest in remote care. Greater coordination of efforts would help avoid both gaps in coverage and duplication of effort as these new care models gain greater traction.

**Box 4.6 – Case study: mental health DTx**

Mental health DTx can either be used as standalone mental health treatments or combined with clinician support in 'blended care' services. There are three major providers of DTx for mental illness in Australia: Mental Health Online, MindSpot and THIS WAY UP.

Other services offer support to specific cohorts. For example, the AIMhi Stay Strong App is aimed at Aboriginal and Torres Strait Islander people and has embedded guidance from Elders. Meanwhile, The Essential Network (TEN) is a blended mental health service for health care workers, which provides a web-based therapeutic called Navigating Burnout.

All of these services receive some form of government funding.

**Impacts**

- Mental health DTx offer high quality care. An evaluation of Mental Health Online, MindSpot and THIS WAY UP found that online treatments with therapist support significantly improved outcomes for a range of conditions (among them obsessive compulsive disorder, post-traumatic stress disorder, panic disorder, and depression) (Bassilios et al. 2022, p. 6). The evaluation also found that self-directed treatment moderately reduced symptoms, with all service delivery generating a gain of 1,181 Quality-adjusted Life Years per year (p. 143). A smaller non-randomised study of AIMhi, meanwhile, found statistically significant improvements in the wellbeing of 30 young people of Aboriginal and Torres Islander background after four weeks of using the app (Dingwall et al. 2023).
- DTx can also support the mental health system to meet demand by using a comparatively small amount of clinician time. Mental Health Online, MindSpot and THIS WAY UP have been shown to be cost effective compared to usual care for individuals with depression or anxiety symptoms, with the delivery costs of self-guided treatment ranging from \$52 to \$99 per user (Bassilios et al. 2022, p. 7).
- DTx are an essential part of blended care, which is easily scalable to manage sudden spikes in demand following environmental, social and economic shocks. For example, TEN was funded by the Australian Government Department of Health as part of its response to COVID-19 pandemic. Almost 10,000 healthcare workers completed online assessments between May 2020 and December 2021 (Coleshill et al. 2023).
- DTx can offer greater anonymity, reducing the effect of stigma. For example, healthcare workers can forgo accessing mental health services due to fear of being reported to AHPRA or of facing discrimination from colleagues and employers. To address this, TEN services offer anonymous access to a combination of DTx and telehealth.

Source: Bassilios et al. (2022); Coleshill et al. (2023); Black Dog Institute, pers. comm., 22 April 2024.



## 5. Artificial intelligence

### Key points

- \* **Artificial intelligence (AI) technologies have the potential to enhance productivity in almost every aspect of the healthcare sector.**
  - AI is evolving rapidly in ways that have expanded the nature and scale of its potential applications in healthcare.
  - Embedding AI within mainstream health service delivery could free up the health workforce and prioritise resources to enhance the quality of care.
- \* **But AI also presents new risks when applied in healthcare, which creates a gap between what is technically possible and what health service providers and consumers are comfortable using.**
  - The level of trust and confidence in AI is relatively low amongst Australians. Uncertainty around the effectiveness of the regulatory regime in managing AI risks is a key driver.
- \* **AI is evolving more quickly than the regulatory regime can anticipate and there is more government can do to ensure the regulatory approvals process keeps pace.**
  - Government should revisit the exemption for clinical decision support software under the Therapeutic Goods Administration (TGA) approval regime to ensure that risks around automation bias and the opaque nature of AI are adequately addressed.
  - The evolving nature of AI technologies requires ongoing oversight by the TGA, with formalised post-approval monitoring and review.
  - Greater public transparency around the TGA approvals process and post-approval regulatory activities may assist in building trust and confidence in AI.
- \* **Government can play a role in facilitating access to quality healthcare data for use by AI.**
  - The accuracy of AI relies largely on quality data.
  - Risks around privacy need to be carefully managed to build a willingness amongst Australians to consent to sharing their health data.
  - Identifying government-held data that can be safely shared, subject to appropriate safeguards, could generate substantial public benefit.

Artificial intelligence (AI) has been described as the key to the sustainability of quality healthcare in Australia (AAAiH 2021). This chapter outlines the potential applications of AI in health and the associated productivity improvements that can be generated (section 5.1). It also outlines the risks AI creates, which are heightened in the context of healthcare (section 5.2), and explores vulnerabilities in the way those risks are managed through the regulatory framework (section 5.3).

## **5.1 AI can improve almost every aspect of healthcare**

### **AI use in healthcare is evolving**

The family of techniques and algorithms referred to as AI<sup>46</sup> have been applied in healthcare for decades. Since the 1970s, AI machine learning pattern recognition and processing techniques have been applied in areas such as pathology, radiology and diagnosis to process, analyse and compare large and complex amounts of health data (Davenport and Kalakota 2019).

Advances in computational power have enabled the development of larger and more complex AI models, with a wider range of potential uses. The increasing sophistication of generative AI, including large language models such as OpenAI's ChatGPT, has expanded the range of potential applications, such that they now encompass almost every facet of healthcare (Coiera et al. 2023). Specific clinical applications of AI (like robotic surgery, diagnosis support and clinical trials) are growing alongside more general applications of AI that can be applied across the entire health sector to automate administrative tasks and aspects of business management (such as note-taking, payments, consumer engagement) (Maslej et al. 2023).

But despite the range of potential applications and recent growth in global investment, AI is not yet embedded in everyday healthcare delivery in Australia. AI has not been fully incorporated into health professionals' workflows or medical record systems, and has been described as something that is used mostly in research labs and tech firms rather than clinical practice (CSIRO 2023; Davenport and Kalakota 2019). The health sector is currently one of the least mature industries in terms of AI implementation both in Australia and internationally (Fifth quadrant 2023; Maslej et al. 2023). Australia's uptake of AI in general has lagged many other developed countries. Australia was ranked 15<sup>th</sup> overall in a Global AI Index which measured the scale of AI output and relative intensity, and Australia's operating environment (defined as the regulatory environment and public opinion on AI) was ranked lowest of the 62 countries assessed (Tortoise 2023) (section 5.2).

### **The potential benefits are significant and wide-ranging**

Healthcare has been identified as a sector with the most potential to benefit from AI for two reasons (PwC 2017). First, the health system needs 'to do more with less' in the context of increasing demand (driven by an ageing population) and supply constraints (driven by workforce pressures) (chapter 1). Second, AI relies on data and the healthcare sector generates a significant volume of data.

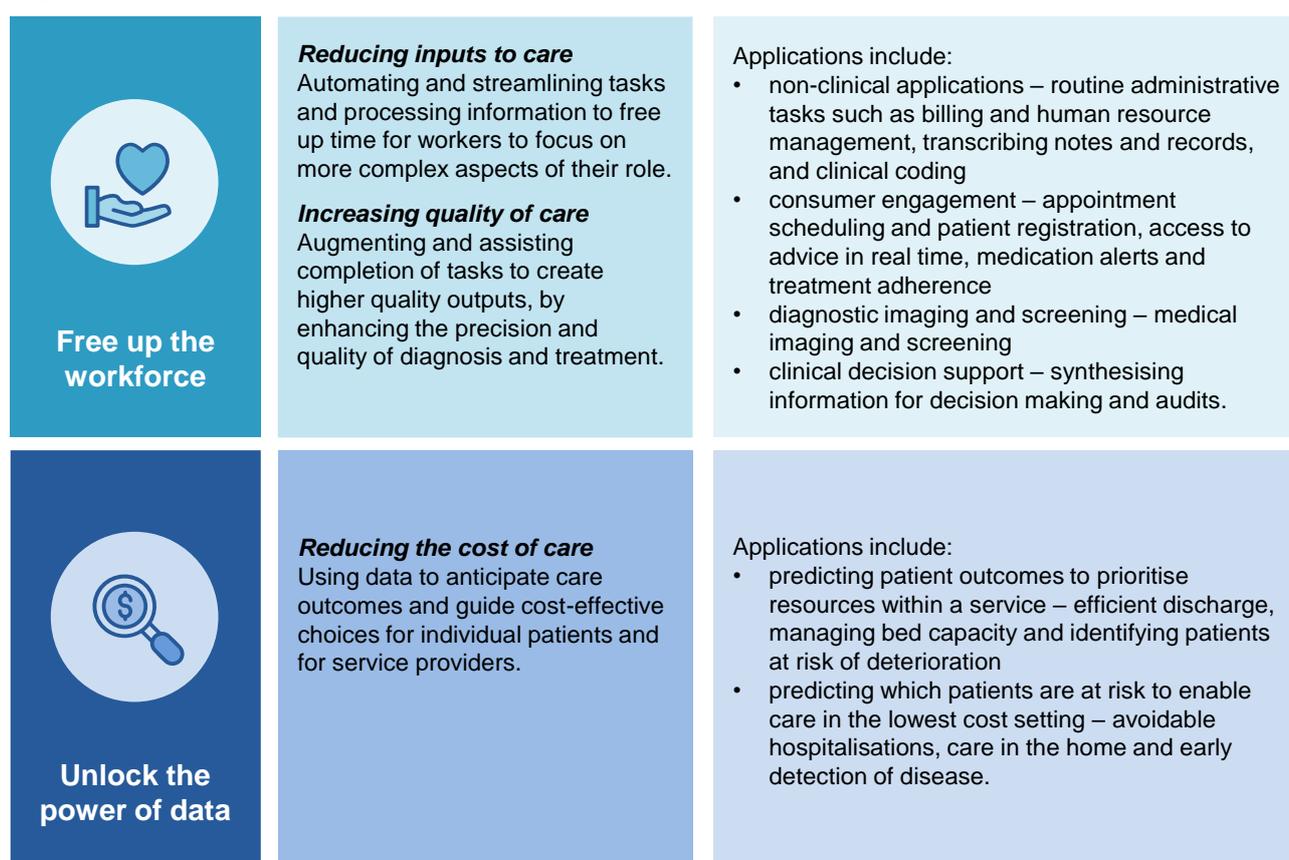
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<sup>46</sup> There is no single agreed definition of AI. However, it is generally used to describe a collection of interrelated technologies that can be used to solve problems autonomously and perform tasks to achieve defined objectives without explicit guidance from a human being (Hajkovicz et al. 2019). There are many different types of techniques and algorithms that make up the wider family of AI and the boundary between these techniques can be subjective, as different techniques are evolving and are being combined and applied (Davenport and Kalakota 2019; Suleimenov et al. 2020).

There are two main areas where the development or application of AI can generate improvements in productivity for the healthcare sector (figure 5.1).

- Automating administrative tasks and processing information for clinicians can bolster workforce capacity and enhance the precision and quality of diagnosis and treatment.
- Using data to anticipate care outcomes can guide cost-effective choices for individual patients, service providers and the healthcare system more broadly.

**Figure 5.1 – Key productivity benefits from AI in health**

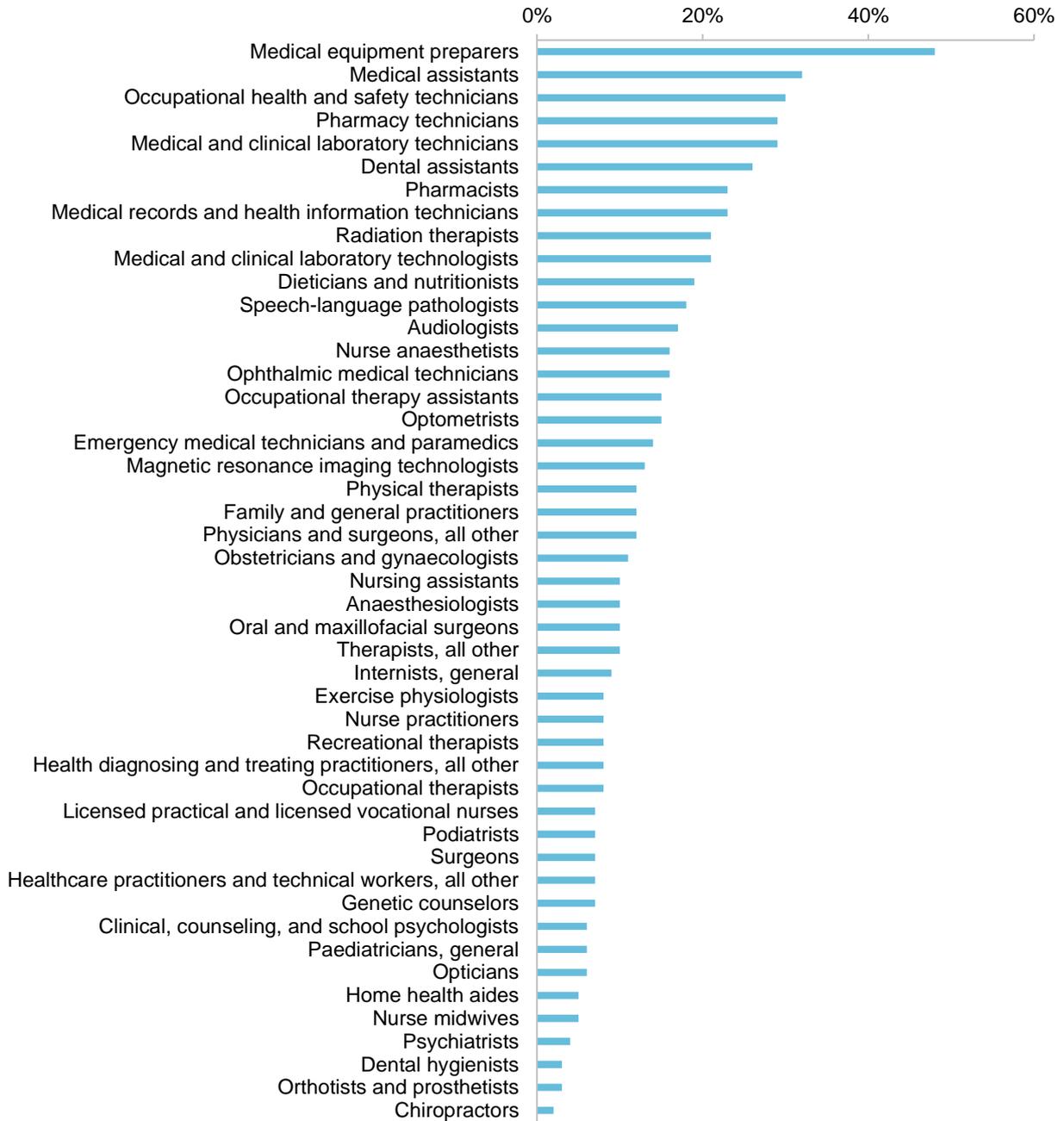


## AI can free up the workforce

Labour is a key input to the health sector. While the healthcare and social assistance industry is one of the fastest growing parts of the labour market, demand for workers is projected to grow faster than supply (NSC 2021).

AI can help to relieve workforce pressure. Employees across all parts of the healthcare sector can have some of their tasks automated or made more efficient through augmenting technologies including AI. By reducing time spent on administrative or tedious tasks and by providing access to better quality information to support decisions, AI can free up time that can be reinvested in quality care for patients. Various studies have estimated the potential impact of automation. One international study estimated that around 35% of time spent in the health sector could be automated, but that the percentage varied by occupation (Spatharou et al. 2020) (figure 5.2) and the OECD has estimated the impact for Australian health professionals is 29% (OECD 2021). When both automation and augmentation of tasks is estimated, this impact rises to over 65% for workers in administrative roles (Faethm 2022).

**Figure 5.2 – Areas of potential impact for AI on the health workforce<sup>a</sup>**  
**Share of hours currently worked that could be freed up by automation by 2030**



a. McKinsey Global Institute data. Selected European countries: France, Germany, Hungary, Italy, Portugal, Sweden, UK. Source: Spatharou (2020).

**Non-clinical applications can provide some easy wins**

The use of AI in administrative or ‘back office’ tasks offers the most immediate potential impact (OECD 2020). The healthcare system comprises a wide range of providers, each with their own administrative processes in terms of scheduling, billing, payments, and human resources. AI has the potential to use unstructured purchasing and accounts payable data, or to use chatbots to address common hospital employee IT and human resources questions, all of which could improve employee experience and

reduce costs (Bhasker et al. 2023). The application of AI to these non-clinical functions does not directly impact the health or safety of patients, so carries a lower risk.

AI can also relieve the administrative burden on clinicians themselves. Surveys have shown that administrative tasks are consuming too much of healthcare workers time and are contributing to burnout (Azam et al. 2017; HIMSS and Nuance 2021). In Australia, nurses are estimated to spend around 9% of their working time on administration and GPs around 5% of their working time on routine administration (Cisco 2019; RACGP 2023). AI technology based on large language models has been developed that can transcribe notes during a consultation, draft referral letters and care plans and complete other forms of documentation. These time-saving technologies can be used in any healthcare setting to reduce the administrative burden on clinicians.

AI can also automate labour-intensive tasks such as clinical coding<sup>47</sup> of data, with a recent pilot finding that processing time for a full-time equivalent worker improved by 30% using AI (McDonald 2023).

### **Improving the interface with consumers**

AI-powered chatbots are becoming increasingly common in many aspects of daily life, and their potential in healthcare is significant.

Routine administrative tasks, such as appointment scheduling and patient registration, can be automated using AI to reduce reliance on customer-facing workers. AI applications have been developed that can provide a digital front door that enables consumers to complete check-in for appointments and gives access to translation services to assist in pre-filling forms.

AI can take pressure off the health workforce by giving consumers access to information about their symptoms and treatment directly and at the time when they need it. Large language models are creating conversation agents that can synthesise information and connect consumers to resources and experts faster and more effectively (Coiera et al. 2023). Chatbots have been used to give consumers access to discreet, convenient and timely advice, with this mode of engagement being viewed positively, and even preferred for consumers with sensitive health issues or for consumers in certain demographics (Dosovitsky and Bunge 2023; Miles et al. 2021). AI can also be used to overcome language barriers and digital literacy issues by translating information or providing information in a more accessible form.

AI tools can also be effective in providing prompts to consumers about adherence to treatment plans and medication alerts. Personalised and specific AI-based reminders can improve patient outcomes without the need for the clinician to take any action (Davenport and Kalakota 2019). Digitally enabled AI systems are also able to predict which patients may not attend a medical appointment and take proactive action to follow up. One study found that proactive alerts decreased 'no-shows' for colonoscopy procedures from 38% to 10% (Glatter 2019).

### **Diagnostic imaging and screening can be done at pace**

Medical imaging is used routinely in nearly every branch of medicine for diagnostic purposes (Committee on Diagnostic Error in Health Care et al. 2015). Demand for diagnostic imaging services is currently growing faster than the population, faster than total medical services and faster than the radiology workforce (Lu et al. 2024). The complexity of imaging analysis is also increasing – a standard CT examination of the brain in 1996 comprised 20 images, which has grown to up to 1200 slices under more recent technology (Partovi 2023).

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<sup>47</sup> Clinical coding converts health information into computer-readable language, so that it can be used by individual hospitals and practices (to support audit, decision support systems, clear communication between teams and medical billing) and at the national and international level (to support epidemiological analysis, strategic resource allocation, reporting, health inequality monitoring, and communication) (Blundell 2023).

The use of AI in diagnostic imaging has increased the capacity of the workforce. AI can augment radiologists' workflow by analysing medical images, such as x-rays, MRIs, and CT scans, to highlight anomalies and changes over time. In one Australian-based study, use of a comprehensive deep learning model reduced radiologists' average interpretation time by around 11%, while improving their detection performance (Buchlak et al. 2024).

When combined with the types of remote care models outlined in chapter 4, AI can support health practitioners to work at the top of their scope of practice and make the process of screening for risks more efficient and accessible, particularly for those in regional and remote areas. Use is not widespread, but there are some case studies where AI-assisted remote screening has occurred at the point of care, which can reduce travel costs for the patient and practitioner and make effective use of the local health workforce. For example, opportunistic AI-assisted screening for diabetic retinopathy has been undertaken in certain Aboriginal medical services clinics<sup>48</sup> (Scheetz et al. 2021) and a South Australian nurse-led pop-up clinic has analysed and triaged potential skin cancer based on images taken by nurses in regional and remote areas with the support of AI (box 5.1).

### **Box 5.1 – Case study: AI assisted skin cancer screening**

AI tools can be used to analyse digital images or photos to support diagnosis of skin cancer in a range of healthcare settings.

One example, Project Check Mate, is a pilot study focused on nurse led skin checks with educational support from AI to screen abnormal lesions. Launched in South Australia in 2023 as a research study led by the University of South Australia, with funding support from charities Skin Check Champions and the Hospital Research Foundation, the pilot utilises AI tools in nurse-led pop-up clinics to provide free skin checks at regional and remote community events.

#### **Impacts**

- The mobile pop-up clinics are improving access and reducing the travel burden for patients. By working with events such as field days, festivals and sporting fixtures in regional and remote areas, high risk populations can benefit.
- The screening process is as efficient as possible. All participants book, provide consent and answer skin cancer risk questions on a secure digital platform. The participant is then invited into a mobile clinic room for a full body skin check - where suspect lesions are identified, photographed and mapped to a 3D digital avatar with notes and next steps based on the nurse's expertise. Images can be instantly analysed by the AI algorithms during this process. The participant's profile (along with the AI diagnosis) can be easily shared with local GPs, nurse practitioners or dermatologists for timely management if required. The AI provides an additional layer of initial diagnosis which can help reduce over-diagnosis, improve accuracy and assist local practitioners with treatment pathways, especially if shared via teledermatology with skin cancer specialists or dermatologists who are often based in major metropolitan areas.

Source: Rosemary Bryant Foundation & Skin Check Champions (pers. comm., April 2024); Skin Check Champions (2023); Skin Check Champions (pers. comm., December 2023).

<sup>48</sup> Evaluation of the AI-assisted screening model found the diagnostic accuracy of the model to be high, but also identified a range of factors that may influence future uptake of AI by clinicians and patients, including ease of use, integration with existing systems, explainability of results, risks around legal liability and clinician and patient acceptance (Scheetz et al. 2021). Many of these issues are explored in section 5.2.

## Supporting clinical decision-making to manage information overload

Generative AI based on language processing has widened the scope of clinical decision-support that is possible. The benefits of electronic patient records (chapter 2) are magnified, as AI can synthesise information from a variety of systems and sources, and present conclusions in a form that is tailored to the clinician needs. AI can analyse and interpret images, electronic and paper records, and academic literature across multiple languages – scanning millions of pages in seconds – to supply information to the health provider about patient diagnosis that reflects the most up-to-date clinical research.

This can save time for clinicians, speeding up decision-making and reducing errors (Reddy et al. 2019). AI applications that generate consultation notes, summarise patient history and use patient records to identify personalised diagnosis or treatment options based on clinical guidelines can save clinicians' valuable time. One Australian study found that a psychiatric registrar spends more than double the amount of time handling patient records and administration than they do in consultation, and so using AI to prepare for consultations and update patient records could free up clinicians to have '3 extra contacts per clinician per day' (CareMappr pers. comm., 22 April 2024; Patrickson et al. 2022) (box 5.2).

### Box 5.2 – Case study: CareMappr

CareMappr software (previously Actionable Intime Insights or AI2) is an automated risk monitoring tool using AI to analyse patient data and manage the risk of readmission for particular cohorts of patients.

The CareMappr software analyses patients' Medicare Benefit Scheme (MBS) and Pharmaceutical Benefits Scheme (PBS) data from My Health Record as well as data from community based information systems to detect gaps in continuity of care such as medical appointment attendance or prescription refills. When a gap in care is detected, an alert sent to the monitoring clinician can support early interventions aimed at reducing rates of deterioration and relapse.

A pilot of a mental health software was conducted in 2019-20 in a Community Mental Health Service in South Australia to detect patients not adhering to treatment. The mental health application has since been rolled out across South Australia in partnership with public mental health services linked to Local Health Networks, as well as the State Government's Digital Health SA.

A trial of a hospital pharmacy application, AutoMedic, is currently underway in South Australia. The program is designed to detect potential issues with prescription medicine used by patients discharged from hospital.

#### Impacts

- Automated risk monitoring tools can improve patient care and manage readmission risks. Medications are routinely prescribed in the treatment of severe mental illnesses, but patients who stop medication or disengage with services have high risk of relapse (over 80% within three years) (Fusar-Poli et al. 2016; van Kasteren et al. 2022). AI-based alerts to a monitoring clinician can prompt an intervention aimed at reducing rates of deterioration and relapse, with the potential to reduce the number of people who require treatment in hospital. The hospital pharmacy application is forecast to avoid over 1,300 readmissions within 28 days of discharge in South Australia annually (pers. comm., CareMappr, 22 April 2024).
- The use of AI has reduced clinician time spent on administrative tasks. For the mental health application, the time saved allows 3 extra contacts per clinician per day and the hospital pharmacy application is forecast to save over 58,000 hours of hospital pharmacist time (pers. comm., CareMappr, 22 April 2024).

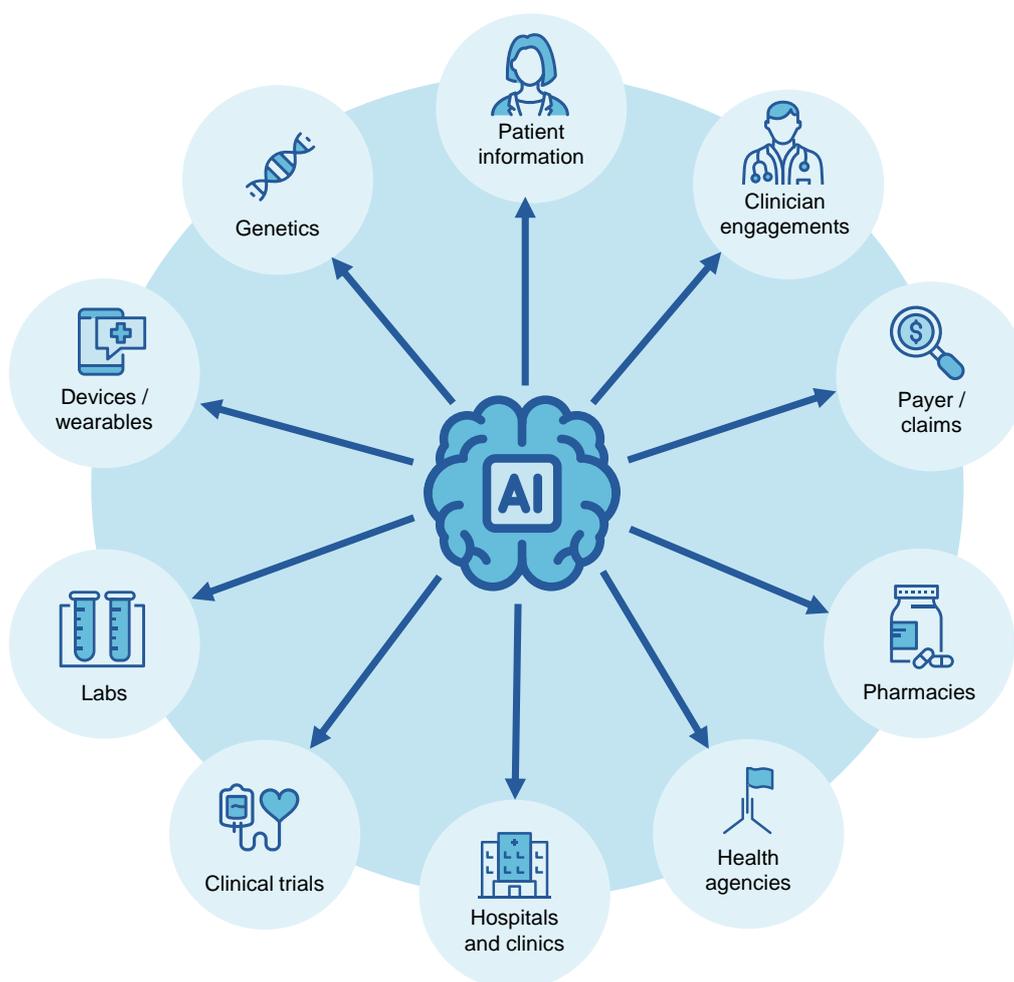
AI can also be used to improve the efficiency of the clinical audit process. The clinical audit is embedded within everyday clinical practice and involves the process of reviewing the records of patients with unexpected outcomes to identify recommendations for improvement. An AI algorithm was found to be significantly more accurate and logically consistent when compared to human performance in generating audits on a neurosurgical ward, and reduced the mean time to deliver a report from 10.2 days for humans to 5.8 seconds for AI (Brzezicki et al. 2020).

### AI can unlock the predictive power of data

Health information has been growing exponentially, and we are generating more knowledge than we can leverage (Hernandez-Medrano et al. 2018). IBM (2016) estimated that the average person is likely to generate more than 1 million gigabytes of health-related data in their lifetime, which is 200 times more medical information than a single individual could absorb in all their life.

AI has the capability to interpret health information in various formats. Health information comes from a range of sources and presents in a range of formats (figure 5.3). While the digitisation of data is increasing, Australia has not yet reached a point of interoperability that would enable the systematic collation and interpretation of data in different formats, from different care providers in different jurisdictions (chapter 2). But wherever AI has access information, it can be applied to improve efficiency of service delivery and patient outcomes within a particular care setting, or across care settings within the health system.

**Figure 5.3 – Types of health information**  
Sources of data that can be analysed and combined using AI



## Predicting patient outcomes can assist with prioritisation of resources at a local level

AI applications can be used to ensure that patients do not spend more time in hospital than is needed for their care. Hospital care can be inconvenient and stressful for both patients and their families (Federman et al. 2018). And hospitals are a high cost setting within which to receive care. Average hospital stays are 2.7 days and each day in hospital adds approximately \$1400 in costs (AIHW 2023a; Commission analysis using IHACPA 2023). AI tools can be applied to predict the length of stay and estimated date of discharge for an individual patient, to streamline the process of discharge planning using data contained in electronic patient records (Bacchi et al. 2022; Ou et al. 2011). One international study found that effective discharge processes can reduce the average length of stay by around 17% (Khalifa 2017).

AI applications are being trialled that can be used to anticipate demand for hospital services (looking across emergency department presentations, inpatient administration, separations and operating theatre arrivals) to manage bed capacity effectively (Koopman et al. 2020). AI tools are also being applied in Australia's virtual hospitals to identify patients suitable for virtual care and to create alerts to assist in remotely monitoring changes in a patients' condition.

AI is also being used to anticipate and manage risks, such as identifying patients at risk of deterioration during hospital stays. Most medical treatments are effective for the majority of patients, but being able to pre-emptively identify those patients who are at highest risk of an adverse event or ineffective treatment can lead to better health outcomes for patients and more effective use of resources (OECD 2020). For example, AI is being used to guide treatments, such as directing radiation therapy to reduce side effects and increase the efficacy of treatment (OECD 2020).

## Predicting which patients are at risk can save money across care silos

Supporting a patient in a lower cost setting (such as the home or primary health care) to avoid hospitalisation provides benefits for the patient and cost savings for the healthcare system. AI can be used to identify patients at risk of readmission and proactively manage those risks. The period after a person is discharged from hospital is a high risk period, where patients are the most likely to require readmission to hospital.

AI can also be applied to enable older Australians to live at home longer and reduce the need for care in more costly settings (such as aged care or hospital). AI is being applied through the use of sensors to monitor for declining functional independence and to prevent falls, which are a leading cause of hospitalised injuries and injury deaths among older Australians (AIHW 2023d; O'Connor et al. 2022).

AI can use genomic data to identify consumers at risk of developing serious and degenerative conditions, with potential system-wide benefits over a lifetime. In biomedical research, AI has been effective in identifying biological mechanisms that are associated with certain diseases and in guiding the development of important drugs such as novel antibiotics and antivirals (OECD 2020). The rewards from insights into the human genome have the potential to revolutionise human health (Koopman et al. 2020).

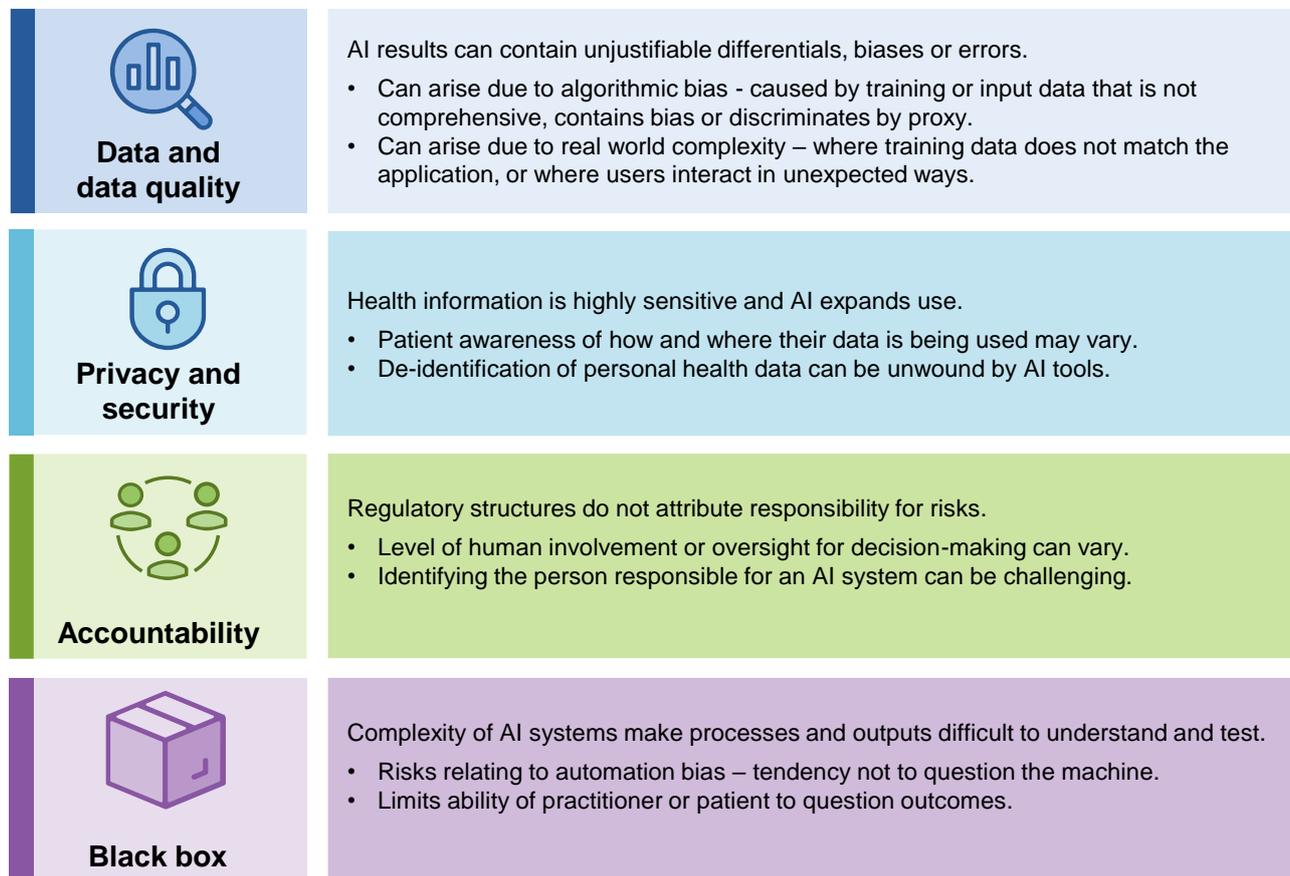
## 5.2 AI changes the risks in healthcare

### AI brings benefits, and risks

There is a general view that, while AI can provide substantial benefits in healthcare, its use comes with significant risks. Healthcare is generally classified as a high risk application for AI, as it relates to individuals' health and welfare (European Commission 2021; OECD 2024a). Each instance where AI is applied will have

its own unique risk profile, depending on the type of AI technology being used and the way in which it is being applied, but there are consistent challenges that are common across applications (figure 5.4).

**Figure 5.4 – Key risks around use of AI in healthcare**



## Risks contribute to uncertainty

One of the key challenges in AI adoption is effectively managing the risks associated with its use. Managing those risks will also build trust and develop a culture of acceptance amongst clinicians and patients.

Australia’s regulatory context and public opinion about AI (described as the operating environment) was ranked lowest of 62 countries in a global AI index (OECD 2023; Tortoise 2023) (section 5.1).

From a patient perspective, only one third of Australians say they trust AI systems and less than half believe the benefits of AI outweigh the risks (Solomon and Davis 2023). A survey of the Australian public found that 60% of Australians support the development of AI in general, but this reduces to between 27-43% when health care scenarios are posed (Isbanner et al. 2022).<sup>49</sup>

Similarly, clinicians have traditionally been slow adopters of new technology, relying on tried and trusted methods to deliver clinical care (Reddy et al. 2019). Understanding how AI solutions fit in and support the work of clinicians is critical to success (Koopman et al. 2020). Engaging clinicians in the design of digital

<sup>49</sup> The survey also found that 4 in 5 Australians valued continued human contact and discretion in healthcare and social services provision more than any speed, accuracy, or convenience that AI systems might provide (Isbanner et al. 2022).

solutions and integrating these solutions into existing workflows is a factor considered critical, but doing so for AI presents particular challenges given its complexity (MarketsAndMarkets Research 2023).

This creates a gap between what is technically possible and what users are seeking (Meskó 2022). Various participants, including the Australian Alliance for Artificial Intelligence in Healthcare (AAAIH), have suggested that improved regulatory frameworks are critical to closing this gap (AAAIH 2021).

### 5.3 The policy landscape needs to evolve

Regulation can play an important role in managing AI risks, to build trust and certainty and to facilitate productive innovation.

#### AI is placing existing regulatory guardrails under pressure

The health sector is one of the most highly regulated industries, with a range of regulatory levers that already apply to the specific risks around AI. The health sector operates in the context of economy-wide regulation which is technology-neutral and of general application – such as consumer law, civil liability for harm, privacy law and corporate governance requirements. The Australian, state and territory governments also impose health-specific regulation aimed at ensuring that health professionals are adequately qualified, medicines and devices are safe to use, and that health facilities meet certain standards (Solomon and Davis 2023).

However, the types of AI and the way it is being applied is rapidly changing and difficult to predict. The speed at which technology is advancing is creating challenges for the regulatory framework and the various regulators.

The international context within which software is developed is also evolving rapidly. The medical software industry is dominated by companies that operate across borders and differences in regulatory regimes can create disincentives for developers to supply to Australia.

New and unforeseen risks are emerging with each new application of AI that test the scope and coverage of the regulatory regime for the approval of software such as AI for use in healthcare.

#### The scope of TGA's regulatory coverage is not comprehensive

AI-enabled medical devices are assessed and approved using a risk-based regulatory framework, administered by the TGA. In general, any medical device used to provide treatment or replace the judgement of a clinician in diagnosis falls within the remit of the TGA.<sup>50</sup>

However, the coverage of AI used to support clinical decision-making is not comprehensive and the level of regulatory oversight largely depends on how active the clinician is in the decision-making process (figure 5.5). An AI tool that analyses information against clinical standards and makes a recommendation is typically exempt. AI that generates new output to inform decision-making, where that output cannot be easily verified, is typically regulated.

In practice, this means that a wide range of AI tools that may guide clinical decision-making fall outside of the regulatory net. Participants have questioned whether the regulatory coverage adequately accounts for the risks associated with the automation bias and the 'black box' nature of AI (AAAIH 2021). Participants have also

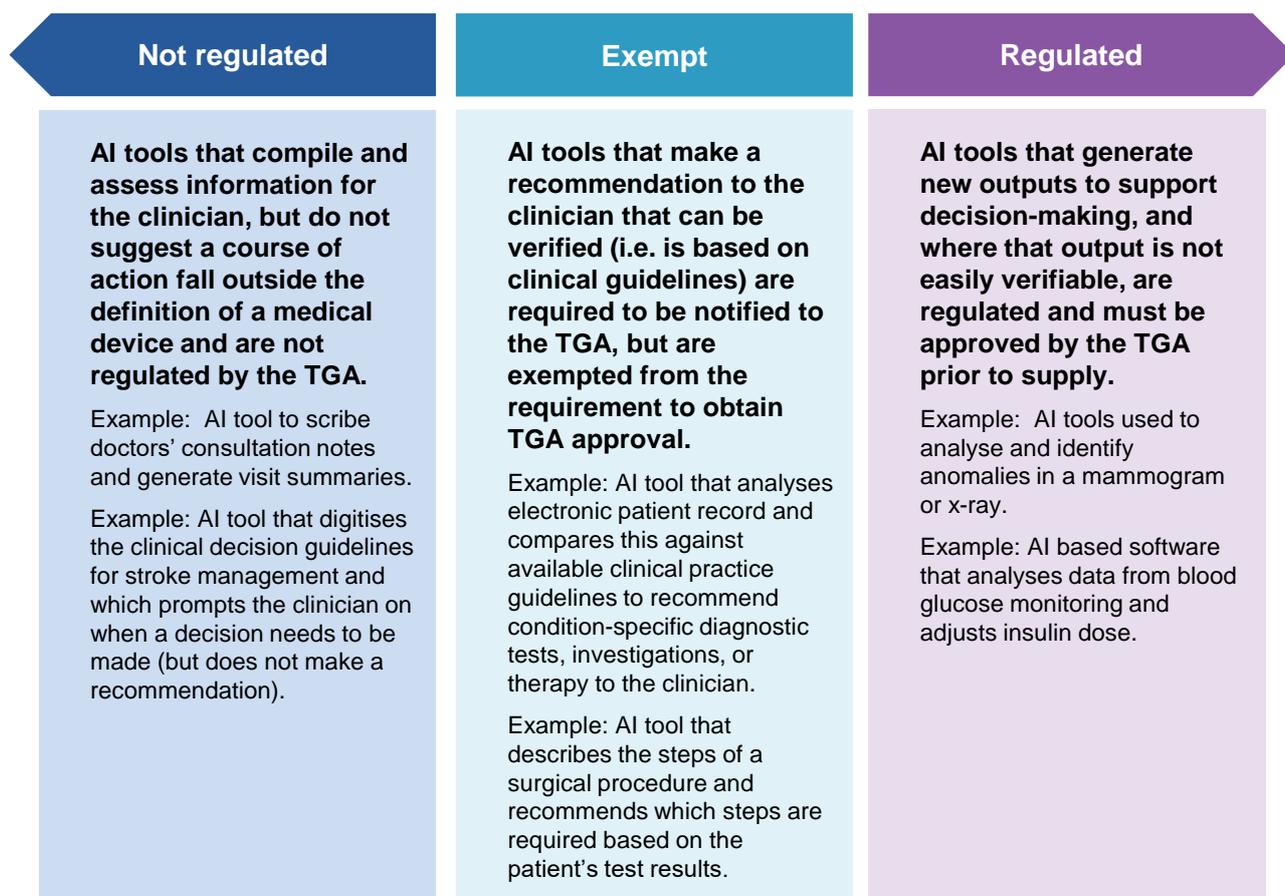
<sup>50</sup>The TGA's regulatory framework specifically excludes low risk medical devices, as defined under the Therapeutic Goods (Excluded Goods) Determination 2018 to include, amongst other things, consumer-only facing applications and general health and wellbeing software that is not specifically linked to a disease or condition.

noted that this outcome does not align with the expectations of Australian consumers, who expect that any AI used to inform decisions about their healthcare is regulated and carefully managed (Gillespie et al. 2023).

Recognising that AI tools introduce new risks when applied to clinical decision support, consideration could be given to revisiting the exemption criteria and expanding the regulatory coverage of the TGA to provide greater scrutiny and oversight of AI tools used to support clinical decision-making.

**Figure 5.5 – TGA coverage of AI software**

**Examples of clinical support software regulation under the SaMD**



Source: TGA (2021a, 2021b).

**AI needs a more dynamic approvals process**

Where AI does fall within the scope of TGA regulation, the evolving nature of AI makes the risks unique. Unlike some other medical devices, AI is by its nature capable of evolving and adapting, so both the AI process and its performance may change over time.

The TGA adopts a lifecycle approach to regulation, which incorporates mechanisms for review and for reporting of adverse events, to manage performance of the AI over time alongside the initial static approvals process. The TGA has utilised control plans to increase the frequency of review and undertakes audits based on risk on a case-by-case basis. The case-by-case approach prioritises safety, however there is a trade-off as it provides less certainty for providers, which can inhibit innovation and investment. There would be benefit in formalising the post-approval review process. This would provide greater certainty for providers

supplying the software about the regulatory process. It would also provide greater certainty to build trust and confidence for service providers and clinicians that the level of scrutiny is appropriate.

### **... and the approvals process is a 'black box' itself**

An essential element in building trust and confidence in the regulatory framework is in creating transparency around its operation.

The TGA's public reporting on its regulatory activity could be enhanced. While the Australian Register of Therapeutic Goods (ARTG) is a publicly available list of all TGA-approved devices, the register could do more to provide information about the type of technology (including specifically identifying AI technologies), the nature of each devices' approved use and the post-approval review mechanisms. The TGA could also enhance its public reporting to provide aggregated data on approvals, post-approval reviews and other regulatory activity to provide accountability to the public and to providers about the effectiveness of the regulatory regime.

### **'Black box' makes accountability more complex**

AI also raises new risks in the way the health workforce is held accountable for its use. Evidence suggests that humans have a tendency to over-rely on, and delegate responsibility to, decision support systems, rather than continuing to be vigilant – which is known as automation bias (Magrabi 2019). This creates risks for patient outcomes where the AI makes an error or is applied to a subtly unique problem.

The effects of automation bias are likely to be amplified when using AI as the black box nature of the techniques are not conducive to verification (Magrabi 2019). The complexity and sophistication of AI algorithms can make it difficult or impossible to understand how a model arrives at its outputs. While traditional machine learning AI techniques are based on specific rules and logic to produce targeted outputs, newer deep learning applications are evolving and adjusting their decision-making based on experience and observations, which can make them less intelligible over time (Knight 2017). This makes it difficult for a human to assess the reliability of the results or seek redress where errors occur (AAAiH 2021). This, in turn, makes it more challenging to apprise patients of risks where AI is being applied.

Where errors do occur, AI exacerbates the challenge of establishing legal liability for those errors and delineating responsibility (Reddy et al. 2019). Data on the prevalence of medical errors varies widely, with diagnostic error estimated to occur in 10-20% of cases (Graber et al. 2012) and adverse events are estimated to occur in 6.4% of public hospital admissions in Australia (SCRGSP 2024).

Medical negligence and product liability laws provide ex-post frameworks to establish liability for errors, but how these frameworks will apply in practice to AI has not yet been thoroughly tested in Australian courts. AI raises complex questions around who owes a duty of care, what constitutes causation of harm, how far consumer guarantees extend and what constitutes informed consent, that will need to be resolved.

Unlike other medical devices, there are additional characters in the AI production chain that can blur lines of responsibilities. The data provider that curates the data used to train the AI, the designer of the algorithm itself and the clinician making decisions all contribute in different ways to patient care. In a traditional medical context, responsibility is clearly delineated. For example, a medicine is approved subject to conditions, and if a physician prescribes the medicine for a patient in circumstances where those conditions are not met, the physician takes responsibility for harm. However, where an AI tool is used as part of scanning the patient and identifying treatment options, it is more difficult to assign responsibility when something goes wrong – it could be the fault of the algorithm designer, the AI operator that enters the data or the clinician that ultimately prescribes the treatment.

The ex-ante regulatory guardrails can resolve some of this ambiguity around responsibility. Where AI is regulated and approved by health sector regulators, such as the TGA, or endorsed in practice guidance by health professional bodies, it is easier to define what constitutes safe and reasonable use of AI. For example, the Royal Australian and New Zealand College of Radiologists has incorporated AI specific standards for clinical radiology within its standards of practice (RANZCR 2020). This gives the clinician and the service provider some guidance and comfort around what would be considered reasonable use of AI for the purposes of liability should something go wrong. Developing further guidance on the circumstances in which AI use is safe and accepted as appropriate clinical practice will assist in providing clarity for the purposes of liability.

## **AI needs access to quality data, and lots of it**

Data is one of the key inputs to the development and use AI technologies. The quality and accuracy of any AI tool is largely dependent on the data it uses for decision-making (Koopman et al. 2020).

Australia is data rich, having invested in data infrastructure such as electronic health records and health information systems to replace paper-based systems.

But access to health data involves delicate trade-offs between the rights of the various parties involved (the individual patient, the clinician providing advice and treatment, the service provider holding the data and the AI owner using the data) and the benefits to the broader public (though improved services and productivity improvements).

Health data is by its nature deeply personal and raises risks around privacy, so the incentives for an individual to share their data are low.

AI escalates those privacy risks by introducing new ways that data can be used inadvertently or deliberately to cause harm (ASD 2023). The health sector has the highest number of data breaches of any sector in Australia, and around 67% of those breaches reported between July and December 2023 were a result of malicious or criminal attack (OAIC 2024). Around 49% of healthcare organisations reported experiencing a data breach from an outside source in 2023 (SOTI 2023). AI tools can challenge the protection of sensitive information, with numerous studies highlighting how individuals can be re-identified in anonymised health data repositories managed by private or public institutions using AI (Murdoch 2021). AI tools have been applied for malicious purposes, for example, to generate material for phishing attacks (ASD 2023). AI also expands the range of characters in the supply chain who may have access to health information and may be at risk of inadvertent breaches.

Despite these risks, patients have demonstrated some willingness to consent to sharing their health information. One survey found that 74% of Australians are willing to share their personal information to advance medical research (Research Australia 2023). However, that willingness drops if the medical research generates profits for a private company (Aitken et al., 2016; Gillespie et al. 2023; Isbanner et al. 2022). That poses challenges as many AI innovators are for-profit companies. For example, an AI model may use patient data as an input for model refinement and training. Where that model is owned by a private company, the company can then generate profits by subsequently supplying that model to other healthcare providers (Bell et al. 2023).

To manage these risks, health data is subject to a myriad of legal and ethical obligations around its collection, storage and use. Consequently, data governance is one of the most critical and complex barriers to AI and in practice, it is particularly challenging to create AI datasets that draw from data held by more than one service provider or in more than one records system (Hajkovicz et al. 2019, p. 49).

Harnessing the potential of AI in health settings will require AI developers (including private companies) to access context-specific patient data to train AI models. The accuracy of AI models depends largely on the quality of data used to train it. Algorithmic bias can arise where datasets used train AI models are not

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comprehensive. Errors or misleading outcomes can arise where the data AI is trained on draws from a population that is different to the group it is then applied to (DISR 2023, Norori et al. 2021). The quality of the data can be as important as the size of the data sets (Aldoseri et al. 2023; Li et al. 2023; Reddy et al. 2019).

AI raises the stakes for data accessibility and data quality in health. The Commission has previously discussed the issues around data policy in *Making the most of the AI opportunity* (PC 2024c) and has made recommendations to facilitate the sharing of healthcare data as a priority in the *5-year Productivity inquiry: Australia's data and digital dividend* (PC 2023). There is a clear role for government in lifting data sharing to socially optimal levels. It was recommended that government identify relevant data that can be shared safely and linked to benefit individuals receiving government-funded services (recommendation 4.4), with protections around opting out of the system and de-identification of data.

There are many applications of AI in healthcare that require access to only a subset of patient information, but where there could be substantial public benefit from creating large datasets that could be safely used by AI. For example, after an appropriate de-identification process, past patient x-ray scans could be productively used to train AI without compromising a full patient record.

Even where patients may be willing to consent to sharing their data, access can be frustrated by lack of coordination and frameworks for data access. Health data is siloed, disconnected, and lacking shared data standards. This emphasises the importance of reforms to improve health information sharing, including enhancing My Health Record as an accessible source of data and progressing interoperability reform, which will be critical to the safe and productive use of AI in health (chapter 2).



## A. Consultation

During this research project, the Commission consulted with a range of individuals, organisations, service providers, industry bodies and government departments and agencies (table A.1).

The Commission also convened three roundtables on 4 December 2023, in collaboration with the Digital Health Cooperative Research Centre (table A.2), 18 January 2024 with Aboriginal and Torres Strait Islander organisations (table A.3) and 29 January 2024 (table A.4).

The Commission would like to thank everyone who participated in this study.

### Table A.1 – Consultation

#### Participants

Aboriginal Medical Services Alliance Northern Territory (AMSANT)

ACT Health

ANDHealth

Australasian College of Dermatologists

Australian Alliance for Artificial Intelligence in Healthcare (AAAIH)

Australian College of Rural and Remote Medicine (ACRRM)

Australian Commission on Safety and Quality in Health Care (ACSQHC)

Australian Digital Health Agency (ADHA)

Australian e-Health Research Centre

Australian Healthcare and Hospitals Association (AHHA)

Australian Medical Association (AMA)

Black Dog Institute

Brown, Prof Alex (CSIRO)

Cardihab

CareMappr Pty Ltd (CareMappr)

Centre for Digital Transformation of Health (University of Melbourne)

Centre for Online Health

Consumers Health Forum of Australia

Deadly Vision Centre

Department of Health and Aged Care (DHAC)

Digital Health Cooperative Research Centre (DHCRC)

Eucalyptus

Fitridge, Prof Robert (University of Adelaide)

## Participants

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Flynn, Dr Michael

Gippsland Primary Health Network

Goodman, Dr Andrew (CSIRO)

Healthdirect

Independent Health and Aged Care Pricing Authority (IHACPA)

InstantScripts

Integrated Living

Lewin, Prof Sharon (University of Melbourne)

Mahoney, Prof Ray (CSIRO)

Marathon Health

Medical Software Industry Association

Medical Technology Association of Australia (MTAA)

National Aboriginal Community Controlled Health Organisation (NACCHO)

National Association of Aboriginal and Torres Strait Islander Health Workers and Practitioners (NAATSIHWP)

National Health Leadership Forum (NHLF)

New South Wales Productivity Commission

Northern Health

NT Health

Queensland Health

Royal Australian College of General Practitioners (RACGP)

Royal Perth Bentley Group

rpavirtual

SA Health

SA Pathology

Sepulveda, Dr Patricio

Shephard, Prof Mark (Flinders University)

Skin Check Champions

Tasmanian Department of Health

The Royal Children's Hospital Melbourne

Therapeutic Goods Administration (TGA)

THIS WAY UP (St Vincent's Hospital Sydney)

Treasury

University of Queensland (LifeCHAT)

Victorian Department of Health

Victorian Department of Jobs, Skills, Industry and Regions

Western Australian Department of Health

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**Table A.2 – Roundtable participants on 4 December 2023 (in collaboration with the Digital Health Cooperative Research Centre)**

**Participants**

Alcidion

Annalise.ai

Digital Health Cooperative Research Centre (DHCRC)

Five Faces

Metluma

Peter MacCallum Cancer Centre

Propel Health AI

SiSU Health

Telstra Health

**Table A.3 – Roundtable participants on 18 January 2024**

**Participants**

Australian Indigenous Doctors' Association (AIDA)

Congress of Aboriginal and Torres Strait Islander Nurses and Midwives (CATSINaM)

Indigenous Allied Health Australia (IAHA)

National Aboriginal and Torres Strait Islander Ageing and Aged Care Council (NATSIAACC)

National Health Leadership Forum (NHLF)

**Table A.4 – Roundtable participants on 29 January 2024**

**Participants**

Australian Digital Health Agency (ADHA)

Department of Health and Aged Care (DHAC)

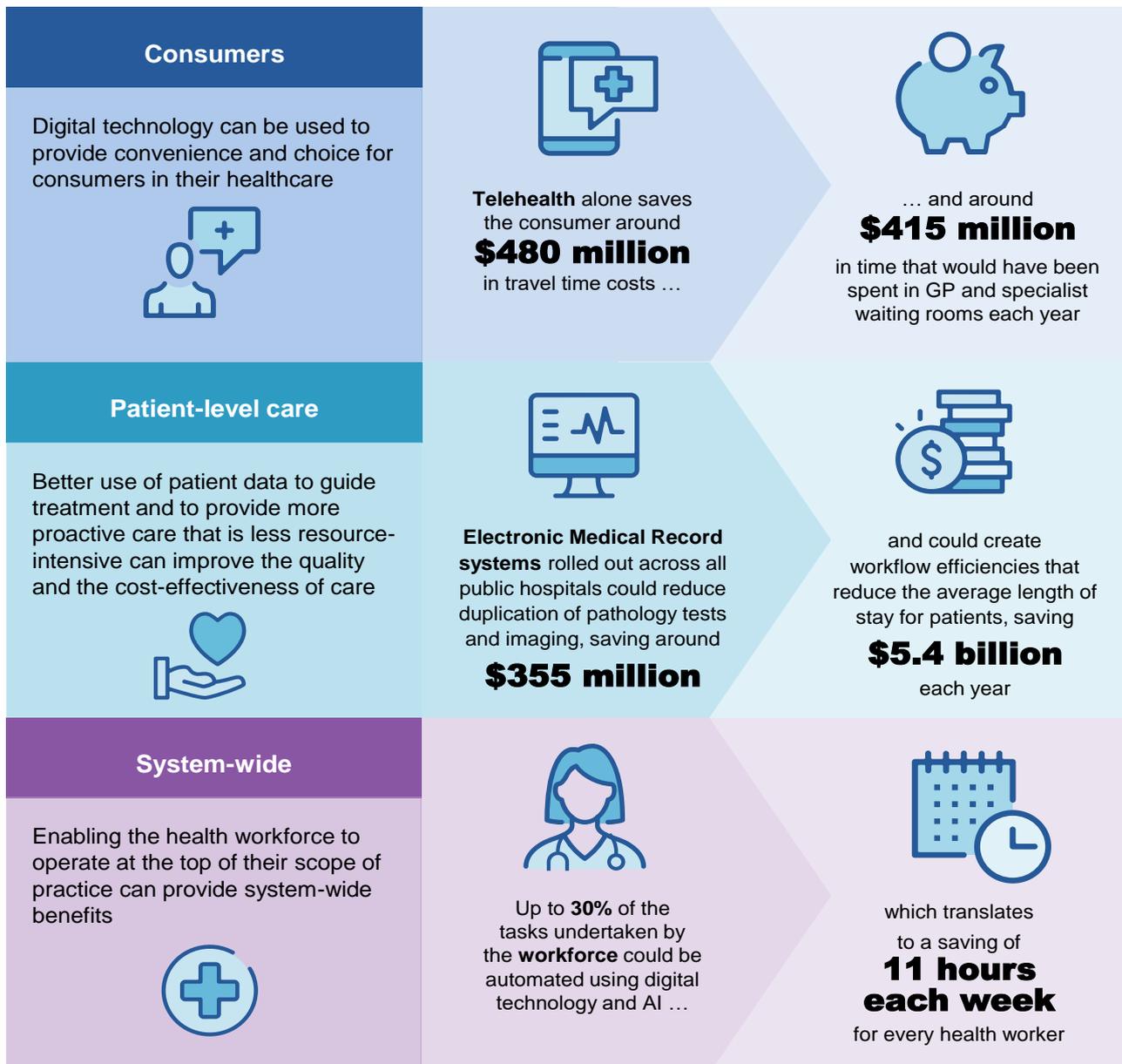
Therapeutic Goods Administration (TGA)



## B. Measuring the benefits of digital technology in health

This appendix explains the method behind the measurement of benefits featured in this paper (figure B.1). It outlines the assumptions made, data sources, and calculations used to arrive at the estimates.

**Figure B.1 – There are significant consumer, patient-level and system-wide benefits**



## B.1 Measuring the costs saved from telehealth use

We start with the assumption that, on average, consumers travel 35 minutes for a general practitioner (GP) or specialist appointment and spend 30 minutes in the waiting room, in line with the assumptions in the Commission's *Shifting the Dial* report (PC 2017d).

In that report, the Commission assumed travel time of 35 minutes based on an average travel time of 37 minutes in one study in the United States (US) (Ray et al. 2015). The lower figure of 35 minutes was assumed due to the higher population density in Australia compared to the US. We have not sought to measure the environmental impacts of this saving in travel time.

The Commission also assumed a waiting room time of 30 minutes. This was based on a survey conducted by Haas and de Abreu Lourenco (2016) reporting a wait time of approximately 26 minutes and a figure of 35 minutes reported by private firm Tonic Health Media (PC 2017d). Since then, Tonic Health Media (2020) has reported an average wait time of 30 minutes in waiting rooms. This is consistent with McIntyre and Chow (2020) who reviewed studies across North America, Europe and Asia and found mean wait times to be between 20 and 40 minutes.

While not perfect, these sources provide information to form a plausible assumption about travel and wait times.

Data on the number of GP and specialist telehealth appointments conducted was drawn from Services Australia (2024) for each month spanning January 2017 to December 2023. In 2023, nearly 28 million GP and 3.5 million specialist appointments were conducted via telehealth. This data is explored in greater detail in chapter 3.

It cannot be assumed that all of the telehealth appointments in 2023 were substitutes for what otherwise would have been in-person care. Some telehealth usage is additional, rather than a substitute, due to the convenience that telehealth offers. However, most telehealth appointments appear to have been substitutes, as evidenced by the smooth trend in total GP and specialist appointments between 2017 to 2023 (chapter 3). We estimate saved time costs under the alternative assumptions that 70%, 80% and 90% of telehealth appointments were substitutes for in-person care.

The main benefit afforded to patients from substituting in-person care for telehealth is the time saving from avoided commutes and avoided time spent in waiting rooms, allowing patients to devote more time to labour or leisure. It is through the lens of labour that we convert the value of time into dollars.

We assume the value of time (in dollars per hour), for any given month  $i$ , to be:<sup>51</sup>

$$\text{value of time}_i = \text{average hourly earnings}_i \times \text{participation rate}_i$$

To find the travel time costs (in hours) saved in each month  $i$  and for substitution percentage  $j$ , we calculate:

$$\text{total travel time saved}_{i,j} = \text{number of substitute telehealth appointments}_{i,j} \times \frac{35}{60}$$

The travel time cost savings are this figure multiplied by the value of the time saved:

$$\text{total travel time cost savings}_{i,j} = \text{total travel time saved}_{i,j} \times \text{value of time}_i$$

<sup>51</sup> Average hourly earnings are not reported by the ABS. Instead, we use ABS (2024a) figures on average ordinary time earnings for a full time employee and divide by 37.5 hours to obtain an average hourly rate. Monthly participation rates are drawn from ABS (2024b).

Similarly, for waiting room time costs saved in each month  $i$  and for substitution rate  $j$ , we calculate:

$$\text{total waiting room time saved}_{i,j} = \text{number of substitute telehealth appointments}_{i,j} \times \frac{30}{60}$$

$$\text{total waiting room time cost savings}_{i,j} = \text{total waiting room time saved}_{i,j} \times \text{value of time}_i$$

For each month, we have total cost savings from forgone travel and waiting room times, based on each month's number of telehealth appointments and corresponding labour market data. To find the annual cost savings in 2023, we aggregate the total cost savings for each month in 2023 (table B.1).

**Table B.1 – Travel and waiting room time costs saved from telehealth use, 2023<sup>a, b</sup>**

	Travel time saved (hours)	Travel time costs saved (\$)	Waiting room time saved (hours)	Waiting room time costs saved (\$)
<b>70% substitution</b>	12,870,448	421,816,409	11,031,812	361,556,922
<b>80% substitution</b>	14,709,083	482,075,896	12,607,786	413,207,911
<b>90% substitution</b>	16,547,719	542,335,383	14,183,759	464,858,900

a. Table estimates reported in 2023 dollars. b. The cost savings that assume a level of 80% substitution are reported in figure B.1. Sources: Commission estimates based on ABS (2024a, 2024b) and Services Australia (2024).

## B.2 Measuring the benefits of Electronic Medical Record systems rollout

### Reducing duplicate and unnecessary pathology and imaging tests

A key benefit to using an electronic medical record (EMR) system is that practitioners are able to view a patient's history and even be alerted if ordering a duplicate test, thereby reducing the overall volume of medical tests. The key assumption made is that the introduction of an EMR and alert system in a public hospital reduces overall pathology tests by 6.3% and imaging tests by 12.5%.

The reduction rates are based on the reported declines from the Royal Children's Hospital Melbourne following their implementation of an EMR system (Victorian DH 2020). We assume that the reduction rates are a result only of the EMR system implementation and that this reduction holds true across all types of public hospitals, not only paediatric hospitals.

In line with our assumed reduction rates, Zlabek et al. (2011) identified a reduction in pathology tests by 18% and a reduction in radiology exams by 6.3% following the implementation of an inpatient electronic record system at a US hospital.

Expenditure on imaging and pathology tests were measured using figures from 2020-21 reported by the Independent Health and Aged Care Pricing Authority (IHACPA 2023), which constitutes the latest publicly available release. The report details figures for the average cost of imaging per separation, the average cost of pathology per separation and the total number of separations. This allowed us to estimate total public hospital expenditure on both imaging and pathology, indexed by  $i$ , using the following approach:

$$\text{total expenditure}_i = \text{average cost per separation}_i \times \text{total number of separations}_i$$

The total expenditure figures are broken into their component fixed and variable costs using ratios from the appendix of IHACPA (2023). It is important to isolate these costs as any percentage reduction in tests would

provide savings in variable costs only. To measure the cost savings, we apply the corresponding reduction rates to total variable expenditure on pathology and total variable expenditure on imaging.

To overcome the absence of sector-wide data on EMR use in hospitals, we measure benefits assuming a current public hospital uptake of EMRs with functionality akin to that of the Royal Children's Hospital Melbourne (box 2.1, chapter 2) of 0%, 25%, 50% and 75% (table B.2).

**Table B.2 – Cost savings from reducing unnecessary pathology and imaging tests following EMR system implementation<sup>a,b,c,d</sup>**

	Pathology cost savings (\$)	Imaging cost savings (\$)
0% current uptake	128,202,358	226,986,421
25% current uptake	96,151,768	170,239,816
50% current uptake	64,101,179	113,493,211
75% current uptake	32,050,589	56,746,605

**a.** Benefits measured for the public hospital system. **b.** In 2023 dollars. **c.** Assumed reduction rate of 6.3% for pathology and 12.5% for imaging. **d.** The cost savings that assume a level of 0% current uptake are reported in figure B.1.

Source: Commission estimates based on IHACPA (2023).

## Reducing patient length of stay by improving workflow efficiencies

The implementation of an in-hospital EMR system shortens length of stay in both admitted and emergency care. This is a result of improved clinician workflow as delays in accessing patient information and test results from paper records are minimised, allowing for faster decision-making and patient flow. We assume that the magnitude of these effects are a 22% reduction emergency department (ED) length of stay and a 6% reduction in admitted care length of stay.

The reduction rate of 22% in ED length of stay is informed by two sources. A reduction in ED wait times by 21.5% was reported by the Royal Children's Hospital following their implementation of an EMR system and a US study that examined the effect of an electronic pathology ordering system against a paper-based system was associated with a 22.4% reduction in length of stay (Victorian DH 2020).

The reduction rate of 6% in admitted care length of stay mirrors the reduction reported by the Princess Alexandra Hospital following their implementation of an in-hospital EMR system (Victorian DH 2020).

Average public hospital cost data for ED presentations and admitted care episodes in 2020-21 was taken from IHACPA (2023). In combination with ED presentation and public hospital admission numbers from AIHW (2023a) and AIHW (2023b), we estimated total ED and admitted care expenditure in the public system for 2020-21.

To estimate total admitted care expenditure in the private system for 2020-21, we adjust the average cost per episode in public hospitals by the difference in average length of stay between private and public hospitals.<sup>52</sup> To estimate the average private hospital cost per episode, the average cost reported in IHACPA (2023) was multiplied by the ratio.<sup>53</sup>

$$\frac{\text{average length of stay private hospital}}{\text{average length of stay public hospital}} = \frac{2.1}{3.0} = 0.7$$

<sup>52</sup> ED expenditure does not require an adjustment as EDs predominantly exist in the public system.

<sup>53</sup> Implicit in this adjustment is the assumption that the average cost per day of admitted care is the same in both public and private hospitals.

The length of stay reduction rates for admitted care and EDs were multiplied by the expenditure figures to yield a total benefit of approximately \$5.4 billion. An assumption we make by applying the reduction rates directly to expenditure is that reductions of 6% and 22% in length of stay will lead to reductions of 6% and 22% in costs (table B.3).

**Table B.3 – Cost savings from reduced length of stay in ED and admitted care following EMR system implementation<sup>a,b,c</sup>**

	Total expenditure (\$)	Cost savings from reduced LOS (\$)
Admitted care (public)	42,455,615,944	2,547,336,957
Admitted care (private)	20,763,274,121	1,245,796,447
Emergency department	7,488,310,101	1,647,428,222

a. Expenditure and savings denoted in 2023 dollars. b. Reduction rate assumed to be 6% for admitted care and 22% for emergency department. c. Estimates assume 0% current uptake.

Source: Commission estimates based on AIHW (2023c, 2023b) and IHACPA (2023).

### B.3 Measuring the benefits of digital technology, including AI, on workforce tasks

The use of digital technology, including AI, across different healthcare settings has the potential to ease the workload of automatable tasks undertaken by the health workforce. This allows health professionals to devote valuable time to tasks that can improve patient quality of care.

We adopt a figure of 30% as the upper bound to the amount of healthcare workers' time that could be saved by automation. It is important to note that the value of 30% does not incorporate the possibility of additional automation in the future, instead it reflects what is currently possible.

Our figure of 30% is based on two sources. Investigating the future of the Australian workforce, the OECD (2021) reported that 29.2% of Australian health professionals faced an 'average' risk of automation. And a study of selected European countries by Spatharou, Hieronimus and Jenkins (2020) reported that 35% of time worked in healthcare is potentially automatable. We use the lower figure of 30% as medical equipment preparers and medical assistants were identified as having the greatest potential for automation by Spatharou, Hieronimus and Jenkins (2020) but are underrepresented in Australia.

To measure the potential time savings, we calculate the average weekly hours worked by a health professional and apply the 30% time saving. Data on health workforce hours was sourced from DHAC (2024) but was limited to medical practitioners, nurses, midwives and allied health professionals. We assume that average weekly hours worked in other health occupations is equivalent to the average computed from the data available.

Overall, it was found that the potential automation of tasks could save the average health worker up to 11 hours per week, on the basis that the average health worker worked 35.9 hours each week.



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