Safe, seamless and secure:
evolving health and care to meet the needs of modern Australia.

Australia's National Digital Health Strategy

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FOREWORD

Digital information is the bedrock of high quality healthcare. The benefits for patients are significant and compelling: hospital admissions avoided, fewer adverse drug events, reduced duplication of tests, better coordination of care for people with chronic and complex conditions, and better informed treatment decisions. Digital health can help save and improve lives.

The Australian community has been clear about what it expects from healthcare services today and in the future. Australians want a health system which puts people first – giving more choice, control and transparency. They want better access to mobile digital health services for the whole community – not just those who are experienced users of new technology. They want their health information to be confidential and secure, protected from cyber criminals and from any unauthorised access.

Healthcare providers have been equally clear. They want secure digital services that will provide instant access to a patient's information - especially in an emergency, support earlier diagnosis and better management of disease, and the development of new medicines and treatments. They want technology to reduce their administrative burden so that they can spend more time with patients.

Participants across the health sector are making significant investments in programs to modernise health service delivery so that it is more effective and efficient. State-wide electronic medical record initiatives and local innovations that bring together data and transform decision support have led to a need for agreement on a national set of priorities to guide the diverse players in the health sector towards common goals for better connected digital services.

The Australian Digital Health Agency was established in 2016 by the governments of Australia to lead the development of the National Digital Health Strategy (the Strategy) and its implementation.

The Strategy is the product of detailed consultation and co-production with patients, consumers and carers – and the healthcare professionals, industry, organisations and innovators who serve them. It draws on evidence of clinical and economic benefit from many sources within Australia and overseas.

The Strategy builds on Australia's existing leadership in digital healthcare. The Australian Government recently announced that every Australian will automatically have a My Health Record which they control – unless they choose not to have one – because of evidence that such a service can improve clinical outcomes. The Australian Medical Association has described this initiative as the "future of medicine".

All states and territories have prioritised digital health as key to improving service delivery and health outcomes, as have many healthcare providers. Entrepreneurs and developers across the country are investing in new tools and ways to use data as well as innovative ways to provide health services. The Strategy will leverage existing assets and capabilities to fast-track the realisation of benefits for patients and the community.

Australians are right to be proud of their health services: they are among the best, most accessible and efficient in the world. We do, however, face the challenges of financial constraint and rapidly rising demand for services. It is imperative that we work together to harness the power of technology and foster innovation to support high-quality, sustainable health and care for all, today and into the future.

SUPPORTED BY

EXECUTIVE SUMMARY

Digital information can transform the quality and sustainability of health and care. Used effectively, it can help save lives, improve health and wellbeing and support a sustainable health system that delivers safe, high quality and effective health services for all Australians. The National Digital Health Strategy will benefit Australians by helping to:

- prevent adverse drug events, reduce medical errors, improve vaccination rates, better coordinate care and better inform treatment decisions;
- sustain a more efficient health system, through less time searching for patient data, reduction of avoidable hospitalisations, and reduced duplication of pathology tests and x-rays which inconveniences patients and increases the cost of healthcare;
- improve healthcare availability and patient experience by putting the patient at the centre of their healthcare, and keeping people out of hospital;
- provide greater access to healthcare for people living in rural and remote areas of Australia;
- protect the national digital health infrastructure and secure the personal health information of Australians.

The Australian Digital Health Agency has been established by the governments of Australia with a remit to evolve digital health capability through innovation, collaboration and leadership to facilitate digital health integration in the health system.[1] The Agency has developed the National Digital Health Strategy through extensive consultation with the Australian community and comprehensive analysis of the evidence. The Strategy proposes seven strategic priority outcomes to be achieved by 2022.

1. Health information that is available whenever and wherever it is needed.

By the end of 2018, every Australian will have a My Health Record, unless they choose not to. By 2022 all healthcare providers will be able to contribute to and use health information in My Health Record on behalf of their patients, providing potentially lifesaving access to reports of their medications, allergies, laboratory tests and chronic conditions, and supporting significant improvements in the safety, quality and efficiency of healthcare for the benefit of individuals, the healthcare system and the economy. Patients and consumers will be able to access their health information at any time online and through mobile apps.

My Health Record will be an unprecedented platform for innovation in the provision of digital apps and tools that will support Australians and their health providers to improve health and wellbeing.

2. Health information that can be exchanged securely.

Every healthcare provider will have the ability to communicate with other professionals and their patients via secure digital channels by 2022. Patients will also be able to communicate with their healthcare providers using these digital channels. This will end dependence on paper-based correspondence and the fax machine or post.

Digital communication will deliver significant benefits relating to the safety, quality and costs of Australian healthcare as well as improving the continuity and coordination of care, and supporting the development of new methods of diagnosis and specialist referral.

3. High-quality data with a commonly understood meaning that can be used with confidence.

The interoperability of clinical data is essential to high-quality, sustainable healthcare – this means that patient data is collected in standard ways and that it can be shared in real time with them and their providers.

By the end of 2018, a public consultation on draft interoperability standards will confirm an agreed vision and roadmap for implementation of interoperability between all public and private health and care services in Australia. Base-level requirements for using digital technology when providing care in Australia will be agreed, with improvements in data quality and interoperability delivered through adoption of clinical terminologies, unique identifiers and data standards. By 2022, the first regions in Australia will showcase comprehensive interoperability across health service provision.

4. Better availability and access to prescriptions and medicines information.

Patients and providers in Australia want safe and convenient digital management of medicines. By the end of 2018, all patients and their providers will have access to comprehensive views of their prescribed and dispensed medications through the My Health Record system. This will reduce the incidence of medication errors and adverse drug events – minimising harm to patients and creating significant cost savings.

By 2022, there will be digitally enabled paper-free options for all medication management in Australia. People will be able to request their medications online, and all prescribers and pharmacists will have access to electronic prescribing and dispensing, improving the safety of our systems.

5. Digitally-enabled models of care that drive improved accessibility, quality, safety and efficiency.

Digital technology can transform outcomes and experiences of different communities in different ways. The Strategy proposes a number of pioneering initiatives – co-produced between consumers, governments, researchers, providers and industry – to test evidence-based digital empowerment of key health priorities investigate and collectively solve any technical obstacles and then, where appropriate, to promote them nationally. These include:

- support for the Health Care Homes trial and more integrated management of chronic illness
- development of new digital services to support the health of babies and young children
- improvement of digital services for advance care planning
- improvement of information sharing in urgent and emergency care
- widening access to telehealth services, especially in rural and remote Australia.

6. A workforce confidently using digital health technologies to deliver health and care.

Healthcare professionals want more support in learning how to maximise the benefits of digital health tools and services. The Australian Digital Health Agency will collaborate with governments, care providers and partners in workforce education to develop comprehensive proposals so that by 2022 all healthcare professionals have access to resources that will support them in the confident and efficient use of digital services. In addition, the Strategy proposes rapid promotion of a network of clinician digital health leaders and champions across Australia.

7. A thriving digital health industry delivering world-class innovation.

Australians are already choosing to use digital apps, tools and services as the preferred way to manage their personal and professional lives. The consultation process has reinforced the increasing expectation that Australians want to use digital apps and services to support their health and care needs. Healthcare professionals also want to take advantage of innovative tools that are not only safe and secure, but integrate with their workflow and improve efficiency.

The Strategy proposes a new initiative to support an expanding set of accredited health apps as well as delivering an improved developer program to enable industry and entrepreneurs to expand existing services and create new services that meet the changing needs of both patients and providers. Government will be a platform for industry and innovators to foster an agile and self- improving health system that is sustainable.

Realisation of the benefits that digital health can deliver may require changes in policy as well as health system operation capability enhancements. The National Digital Health Strategy is a strategy for Australia and requires collaboration and cooperation between consumers, health services, governments and industry in order to succeed.

TO

1 in 10 people lose their child's health and development book

25%

Only **25% of youth** facing **mental health** problems seek care

3-6 days

Average wait of **3-6 days** to see a GP

15-20 visits

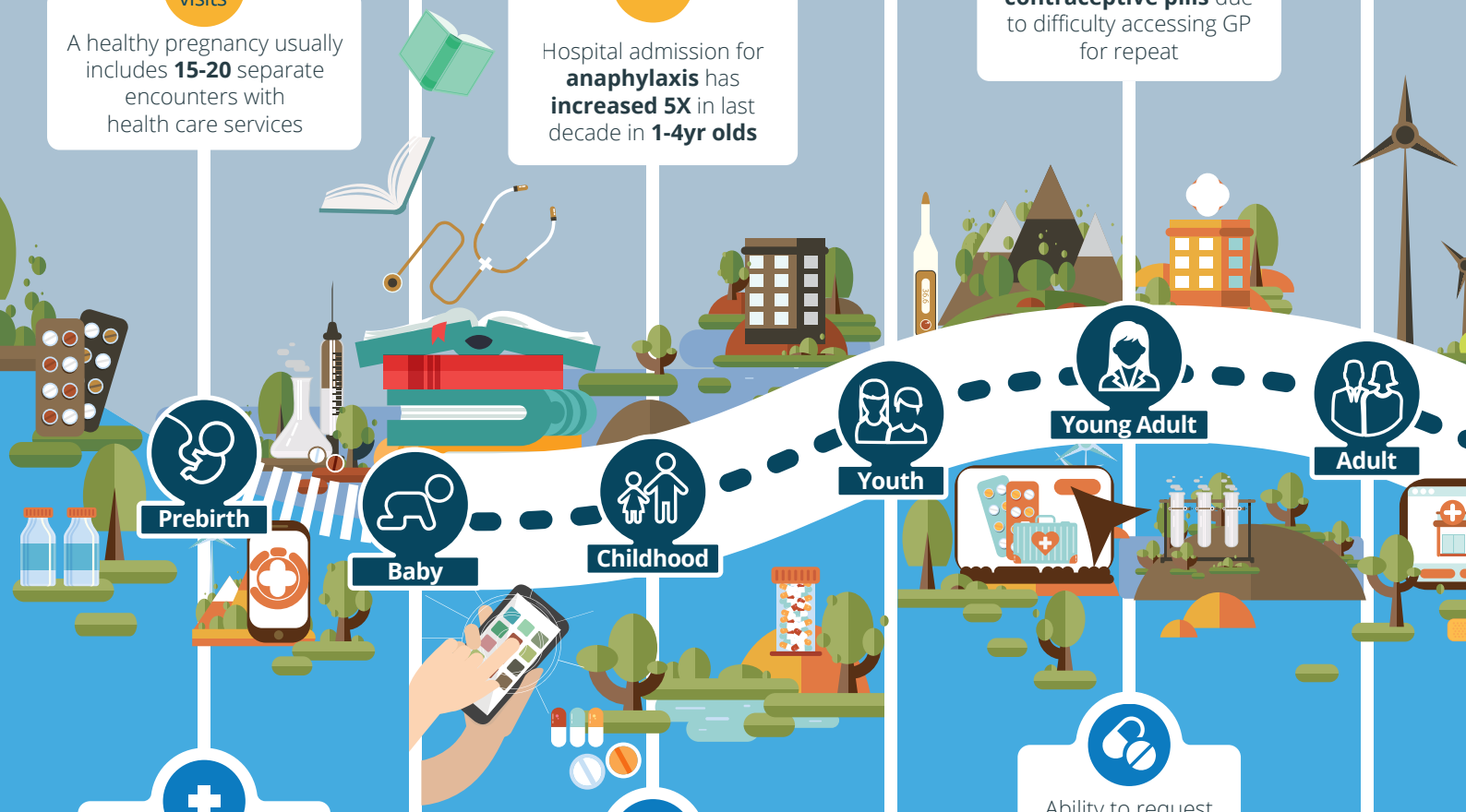
A healthy pregnancy usually includes **15-20** separate encounters with health care services

x5

Hospital admission for **anaphylaxis** has **increased 5X** in last decade in **1-4yr olds**

11%

11% of women missed contraceptive pills due to difficulty accessing GP for repeat



Content shared with My Health Record means reduced risk of lost information

Child Health mobile app replaces paper book

Allergy alerts integrated within My Health Record

Increased availability of online tools to support mental health

Ability to request scripts safely and securely online

Same day online consultation with chosen provider

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Systematic review and ethical considerations
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FU

ODAY

$1.2B

223,000 admitted to hospital due to **adverse drug event** costing **$1.2billion**

18%

18% of aged care residents experienced a missed or **significantly delayed dose of their medicine** within 24 hours of discharge from Hospital

40%

Death rates for remote Australians are **40% higher** for **coronary heart disease**

70%

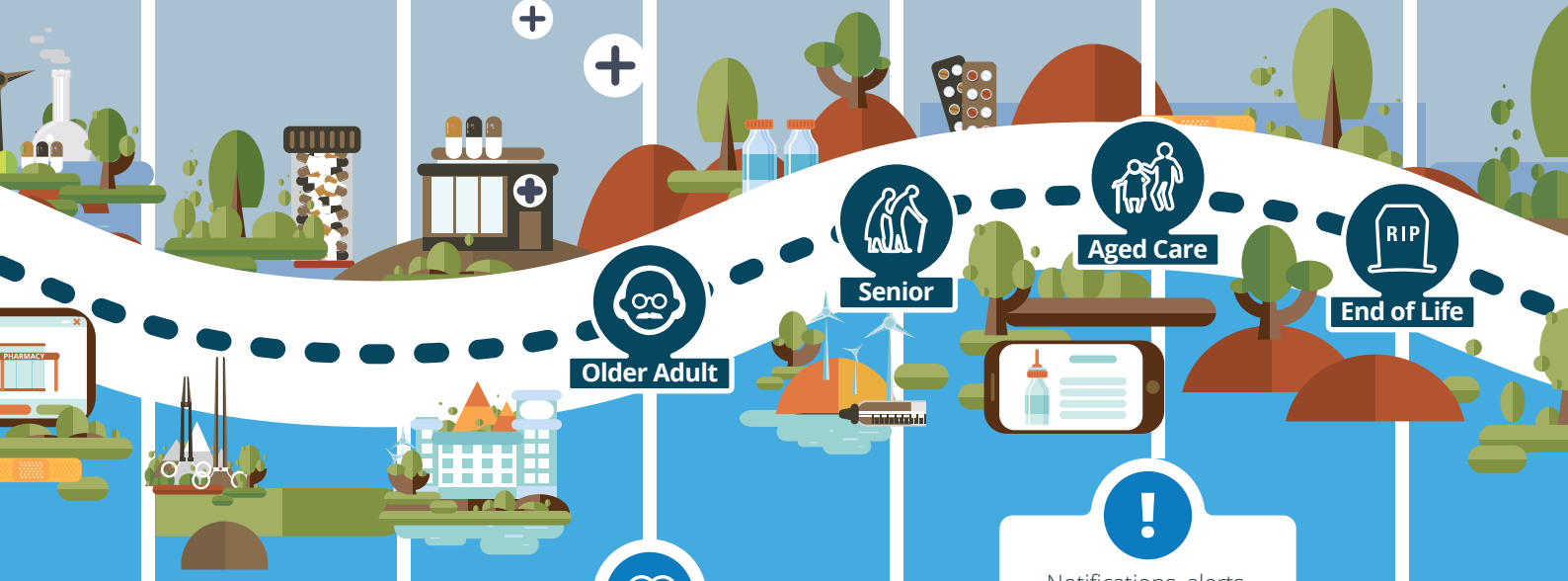
70% of people want to die at home, yet only about **14% do so**

14%

14% of pathology tests are ordered due to lack of access to patients history

8%

8% do not see specialist due to lack of **cost information**



Ability to compare costs and availability of specialists online

Digital tools make it easier to access services remotely

Medicines information available via My Health Record reduces safety risk

People and their clinicians will be able to see results of previous tests

Notifications, alerts, discharge and transfer summaries integrated into the system to ensure consistent information

Access to Advance Care Directive means less invasive unwanted procedures and average **$5,400 saving** per patient

UTURE

Australian Government
Australian Digital Health Agency

WHERE ARE WE NOW?

The majority of Australians are digitally connected, and make everyday use of digital services across a range of industries including travel, banking, education and government services. The amount of data being downloaded from the internet has doubled in the last two years.[2] Almost 80% of Australians have a smartphone, which (as of 2015) they collectively glance at 440 million times a day.[3]

Figure 1 – Key statistics about digital connectivity in Australia

In terms of digital technology and health, most (77%) Australians would like their doctor to suggest health information websites and 73% have already used the internet to research a health issue. However, only a small proportion of the population (6%) manage to find an online health source that they trust.[4] Of all Australian Google searches, one in 20 are health related.[5] Interestingly, the majority of older Australians (69% of those aged 65 and over) have used the internet to look up health information.[6] Taken together, this data demonstrates that most Australians are using digital technology as part of their daily life.

National achievements in digital health

Australia has made steady inroads in implementing digital health solutions. My Health Record has continued to grow in its capability, usability and integration with clinical information systems across the health sector. Almost five million Australians now have a record (20% of the population)[7] and, with opt-out participation arrangements due to be implemented from 2018, an estimated 98% of the population will then have a My Health Record. In 2018, Australia will have the highest participation rate in a national health record system in the world. For the first time, members of healthcare teams will have ready access to key health information for their patients.

Consumers are already accessing their health information from My Health Record through mobile apps.[8] A number of app developers are providing innovative mobile digital health solutions that address the challenges faced by health consumers and healthcare providers. The imminent rapid growth in the number of users of My Health Record will provide an opportunity

to transform healthcare, allowing better integration of health information, better quality healthcare and financial savings to the health system.

My Health Record is being leveraged to support trials of new models of care for people living with chronic conditions. For these people, our health system can seem disjointed and hard to navigate. Different health professionals and services work in isolation from each other, care is often uncoordinated, and patients can find it difficult to get to different services and appointments. The Australian Government's Health Care Homes trial will involve patients with chronic and complex conditions being supported by a care team which can be more innovative in the way it provides coordinated care.

Many other initiatives complementing the My Health Record have recently been launched or are under development. Another national digital service, My Aged Care, provides an online portal for consumers and carers to access information on aged care and to find information on aged care services. In addition, the Australian Government is finalising the development of a mental health portal which will provide support in accessing quality endorsed mental health apps and mental health services. The Australian Government is also building a National Cancer Screening Register that will create a single view for Australians participating in cervical and bowel cancer screening. It will integrate with GP clinical information systems and assist GPs to identify a patient's screening eligibility and history to support real-time clinical decision making. Health professionals, including pathology providers, will have improved access to their patients' information.

Over time, digital health can support policy changes and may be the key to commissioning good public health policy. Digital health can improve access to healthcare through telehealth and online consultations and can support health reforms such as Health Care Homes, mental health and integration of care.

Recognising that healthcare information is some of the most private information, and that digital health innovation is reliant on secure digital operations, the Australian Digital Health Agency has established the Digital Health Cyber Security Centre. Its primary purpose is to protect the national digital health systems and personal health information of Australians from the cyber threat, and to raise the security posture of the Australian health sector. The Centre partners with national and international cyber security organisations, across government and the private sector, to improve knowledge of the cyber threat and leverage shared expertise and material across organisations. It will support the security of Australian healthcare information by sharing best practice guides and mitigation strategies to improve information security and risk management right across the Australian health system.

State and territory achievements in digital health

State and territory health departments have begun to see significant improvements to health outcomes through their investments in digital health. In Queensland, all public hospitals and health services are now connected to the My Health Record system. Queensland is the first of the states and territories to do this.

The widespread implementation of electronic medical records throughout the public hospital system, secure messaging[9, 10], discharge summary capabilities[11] and eReferral and booking capabilities[10, 12] are all being implemented within states and territories. The Victorian eReferral Program, for example, has enabled secure messaging and exchange of clinical information, timelines and roles and responsibilities among health professionals.[10] This initiative has been implemented in four Victorian health services to develop a foundation eReferral technical architecture for sector-wide use.

State and territory health departments are also facilitating and capitalising on interoperability through programs of work to update clinical information systems[10, 11, 13-15] and data governance and management[16, 17], and through better utilisation of clinical data.[10, 15-17] For example, NSW has established a targeted activity and reporting system called "STARS" that makes health data more readily available to health services and professionals. NSW Health reports that STARS has been successfully used to identify clinical variation and emergency department utilisation, as well as to measure and compare quality and safety indicators and examine workforce utilisation.[18]

In addition, medicines management – including medicines safety, real-time prescription monitoring and a single enterprise-wide drug catalogue – has been identified as a key priority area for investment by the states and territories.[19] Western Australia and Tasmania have made significant progress in this area. Tasmania has real-time reporting and recording of controlled drugs[20] and the Fiona Stanley Hospital in Western Australia has instituted the Automated Pharmacy initiative which is promoting safe, quality and cost-effective evidence-based use of medicines.[21]

State and territory health departments are also leading the way in making better use of technology to address long-standing issues that have faced patients. The Northern Territory, for example, has focused on the needs of its remote population through the provision of telehealth services. This digital health solution has increased attendance at appointments and has seen a greater uptake of the technology by doctors. The "Did Not Attend" rate for appointments has lowered significantly and there have been concomitant savings in the dramatic lowering of accommodation and travelling expenses because patients are able to remain in their community for treatment.[22] In South Australia, all acute care facilities have been connected using telehealth, to foster collegiate decision making for patients with complex health problems and encourage knowledge sharing.[14]

Recognising the health and economic potential of personalised medicine, the ACT has established a genomic service for researching, developing and delivering new and innovative techniques to improve care for patients.[23]

The National Digital Health Strategy recognises the investment in these areas and considers how this digital system should interoperate, and how best to share from lessons learnt, to provide a more seamless service experience for healthcare providers and for consumers.

Non-government and local digital health achievements

The non-government sector has established a track record for local innovations in digital health, and is reaching into people's homes and communities to provide care for patients close to their homes. A mobile health pilot program in Canberra for type 2 diabetes helped motivate patients to record their health metrics using mobile devices, and found significant increases in patients' confidence in managing their chronic illness.[24] Similarly, a CSIRO trial screened more than 1200 people in their communities for diseases such as diabetic retinopathy. Images were digitised to be reviewed by ophthalmologists in Brisbane and Perth, providing specialist services to those who would not otherwise have access to them.

In the acute sector, St Vincent's Health Australia (private and public) now operates an electronic clinical information system that spans from pre-admission to post-discharge, including pathology and radiology, results viewing, multi-disciplinary progress notes and specialist referrals, and recording admission and discharge medications. Outpatient services have been a focus of innovation, with the CSIRO's Care Assessment Platform smartphone app alleviating the need for patients to travel to outpatient clinics for rehabilitation appointments by bringing the rehabilitation program to the patients' homes. Patients record their clinical

data such as blood pressure and physical activity, with cardiac patients using the smartphone app far more likely to participate in the rehabilitation program. The smartphone app program demonstrated the same, if not better, health outcomes compared to the traditional rehabilitation program.

Digital health can also be used to make back-end systems more efficient, providing significant financial savings. Ramsay Health Care has deployed a full suite of data standards for identifying, capturing and sharing information to support interactions with its suppliers, including GS1 Electronic Data Interchange (EDI) standards.[25] As a result, Ramsay has increased both the speed and efficiency of its purchasing processes, strengthened the efficient operation of its hospitals and helped ensure the continuous delivery of quality healthcare.[25]

The private health sector has made significant investments in digital foundations over the past decade to improve operating efficiency and service delivery. There is an opportunity to create a more seamless service experience for consumers and those providing care to them, as they move across public, private and community health settings. By agreeing national priorities for digital innovation in healthcare, we can signal to all participants – public and private health providers, industry, and professional groups – where future investment could align to create synergies and maximise return on investment.

The Strategy recognises that along with investment from the states and territories, private sector organisations will be key players in the delivery of innovative products, services and programs that improve health and care experiences and address Australia's greatest health challenges.

Why a National Digital Health Strategy now?

As outlined above, there has been impressive progress in implementing digital health at the regional, state and territory and national level. However, the complex funding and governance model of the health system remains a barrier to health information sharing across different health sectors. It is well understood that great gains can be made from providing integrated care for patients as they transition across the primary care, acute care, mental health and aged care sectors. Digital health has the potential to enable information sharing between the various parts of the Australian health system and thereby support programs and initiatives that integrate care, wrapping it around the needs of patients.

Governments continue to make significant investments in digital health systems. State and territory governments are embarking on major projects to implement state and territory-wide electronic medical records and to achieve integration across the range of clinical information systems in hospitals and health services managed by state or territory governments. While each state and territory is working within its own investment cycle and is at a different point in achieving this goal, there is a common pursuit to make health (and, for some jurisdictions, human services) information available in a more timely and usable way.

Similarly, private hospitals, aged care service providers and community health services are investing in information systems and technology to improve quality and service delivery. Innovation in data analytics and increased expectations from consumers and funders to improve the experience and reduce avoidable errors and re-admissions to hospitals are among the drivers of investment in the non-government sector.

Innovative start-up companies are crucial to developing the new digital health products and services focused on meeting the needs of patients, carers and healthcare providers. To accelerate the pace of innovation, innovators need spaces for collaboration and learning, and access to trusted information, tools, services and support to safely integrate with national digital health infrastructure.

Given the progress that is being made within locales, individual health services or within a health sector, there is a risk that uncoordinated investment in technology will exacerbate siloing in the health system, with each service or sector using a different “rail gauge”. The need for a truly inclusive national digital health strategy to underpin public and private digital health planning and investment is critical. A national strategy that sets out agreed priority areas and is underpinned by standards will send a signal to the market of areas of interest to governments and can encourage investment in both the public and private health systems in the same direction.

> *“Alignment and partnerships between jurisdictions, local health networks, clinicians and patients will be critical to deliver the national digital health agenda and work program. Many jurisdictions already have a significant program of digital health activities already underway, that could support development and implementation of a National Digital Health Strategy.”*
>
> ■ eHealth NSW submission

In this context, the Australian Digital Health Agency was established in July 2016 and tasked with leading the development of this National Digital Health Strategy and its implementation framework.[1]

The National Digital Health Strategy is, necessarily, a strategy for Australia, not just the Australian Digital Health Agency or the Commonwealth. The Strategy is built on the assumption that every participant in the health sector plays an important role in achieving the vision of digitally enabled healthcare: governments, industry, innovators, peak and advisory bodies, agencies, research institutions, healthcare providers, patients, carers and the broader community. The Strategy is not intended to govern everything digital in healthcare – rather, it is about laying a common digital health foundation, with which patients, carers and healthcare providers are engaged, and on which industry and researchers can innovate.

By investing in a national strategy for digital health, Australian governments recognise the need to expedite the development of Australia's digital health foundations, and that many of these national services can only and must only be built once, with sufficient quality and capability to cater for a range of needs, so they can be used by everyone who needs them.

The Agency will operate as a leader and facilitator, supporting and empowering health consumers, healthcare providers and industry. Given the Agency's ongoing commitment to co-production, the next step in implementation is to co-design a Framework for Action with the broader health and care sector to agree an implementation plan. This co-design is imperative to ensure that the national priorities of this Strategy complement existing investment in digital health initiatives by industry and state and territory health departments and the broader health sector.

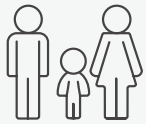
What does Australia want from digital health?

In developing this National Digital Health Strategy, the Australian Digital Health Agency led the extensive *"Your health. Your say"* consultation process to ensure that the Strategy was informed by Australian consumers, carers, healthcare providers, community groups, professional bodies and many other key health stakeholders.

More than 3000 people attended the 103 forums, workshops, webcasts and town hall meetings held across Australia. Over 1000 submissions and survey responses were analysed for key themes. Four key themes emerged, forming the foundation of the National Digital Health Strategy. These themes have been used as a key input and inform all elements of this Strategy.

A description of each of the key themes follows:

1. Support me in making the right healthcare choices, and provide me with options.



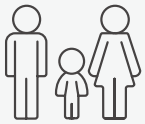
Health consumers and carers expressed a strong desire to be increasingly empowered – to take control of decisions regarding their own health and to be provided with access to their own personal health information that supports them in this.

After witnessing the impact of digital technologies on other industries, health consumers and carers have growing expectations of the ways in which digital technology will facilitate improved access to healthcare services, delivering services in ways that are convenient for them.

Health consumers and carers see healthcare services as including high-quality personal and health information, not just face-to-face appointments.

Clinicians, healthcare providers and peak bodies see the benefits of patient empowerment and access to information but recognise that reduced access to the internet among some socio-economic and demographic groups poses risks to healthcare access and equity that need to be addressed. They believe it is critical that patients are not left behind through the increased reliance upon digital health technologies and services.

2. Help all the people who care for me to understand me, and together, provide safe and personalised care.



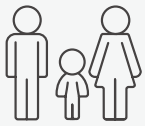
Health consumers and carers regularly experience the need to share their full medical history when they meet with a healthcare provider. The consultation process made it clear that Australians are tired of this, and believe that digital technology can and should facilitate this information being captured once and shared among all their healthcare providers.

In order to facilitate this, clinicians and healthcare providers need to have trust and confidence in the accuracy and completeness of their patients' information, allowing them to deliver the right health advice to patients, which will lead to better outcomes.

Clinicians and healthcare providers are willing to use digital technology, but require evidence showing the value of such technology before investing in change to their current working practices.

Clinicians and healthcare providers recognise the need to move from providing undifferentiated care to increasingly personalised care, and realise the reliance that this approach will have upon strong digital health foundations.

3. Create an environment where my healthcare providers and I can use and benefit from innovative technologies.



Health consumers and carers have an expectation that innovative digital technologies will continue to improve their experience with the health system, as they have in many other industries.

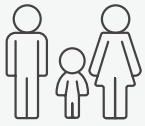
Over 80% of respondents to the online survey agreed that digital technology will transform and improve healthcare outcomes for Australia, with access to personal health information using digital technology considered highly important. More than four times as many people want to access their personal health information on a mobile app (48%), than do currently (11%) and 69% of people want to access their personal health information through their laptop or desktop computer, compared to 31% who do currently.

To support these expectations, clinicians and healthcare providers need ongoing training, as well as high-quality and reliable digital health technology, clinical information systems and internet connections, to ensure that they are able to use digital health technology and services effectively.

Researchers, scientists, the technology sector and the health informatics community all expressed a strong desire to work more closely with clinicians and healthcare providers in order to continuously improve digital health solutions. In addition, these stakeholders want to see clinicians and healthcare providers embrace the cultural change required to adopt and use digital technologies, and to promote staff education in order to maximise the potential benefits of sharing health information.

Researchers, scientists, the technology sector and the health informatics community also want clear rules and guidance around standards and specifications relating to the use of digital health services and technologies across the health sector, in order to develop digital health solutions that maximise interoperability and to reduce the cost of integrating siloed health information.

4. Preserve my trust in the healthcare system and protect my rights.



Health consumers and carers have a clear expectation that the privacy of their health information should be respected, and their rights protected. The consultation process made it clear that Australians expect strong safeguards to ensure their health information is safe and secure, and that their data is used only when necessary and when they choose.

Clinicians and healthcare providers need greater confidence in the security of the systems that enable them to share patient information with other clinicians. They need assurance that the digital systems they use support them to meet their obligations to keep their patients' health information secure and private, and that health data will be used safely and appropriately to improve patient outcomes.

Researchers, scientists, the technology sector and the health informatics community want de-identified data to be used for research to help deliver insights on health trends and deliver population health improvements.

To achieve this, simple, clear rules and guidance on privacy, security and data ownership are required.

Figure 2 – Key themes from the consultation process

Throughout the consultation process, a clear desire was expressed for Australians to have a greater level of digital access to health services. The following figure shows some key statistics that emerged from these consultations:

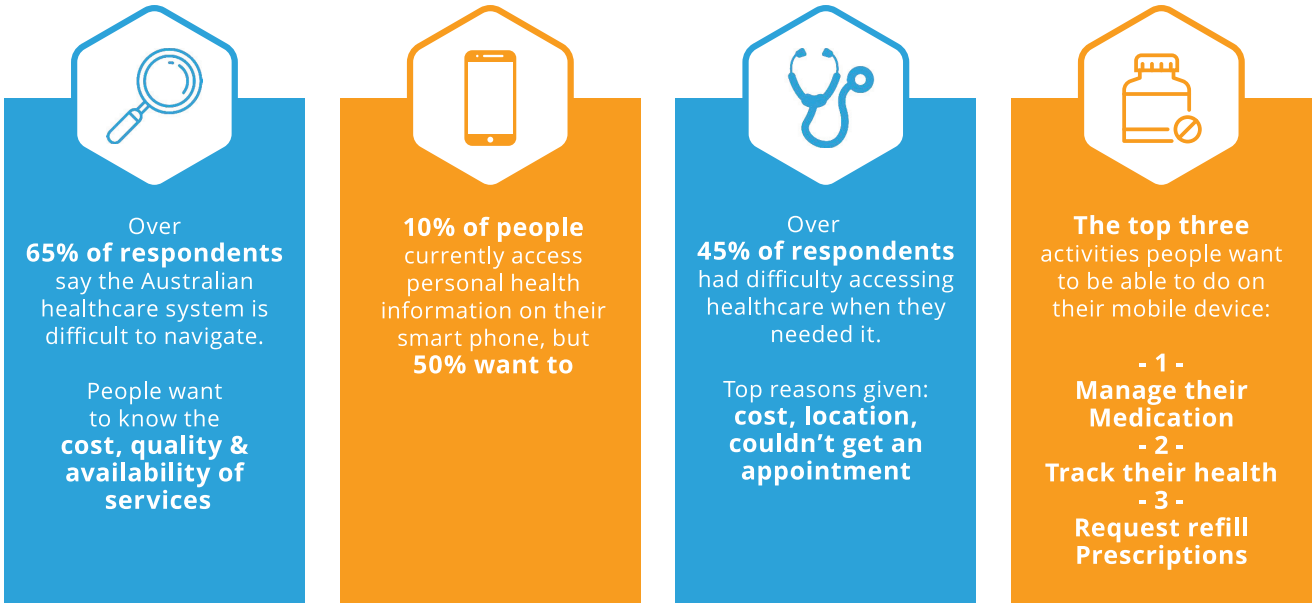


Figure 3 – Australians want digital access to health

The consultation process showed that it is not just health consumers who want to be able to access digital health services, but also that healthcare providers have a strong desire to make greater use of digital health tools and services in their work.

The following figure shows the health service activities that healthcare providers already perform, and want to perform using digital health solutions. It is clear that healthcare providers already make use of digital technology; for example, three-quarters of providers currently use digital means to access clinical reference tools.

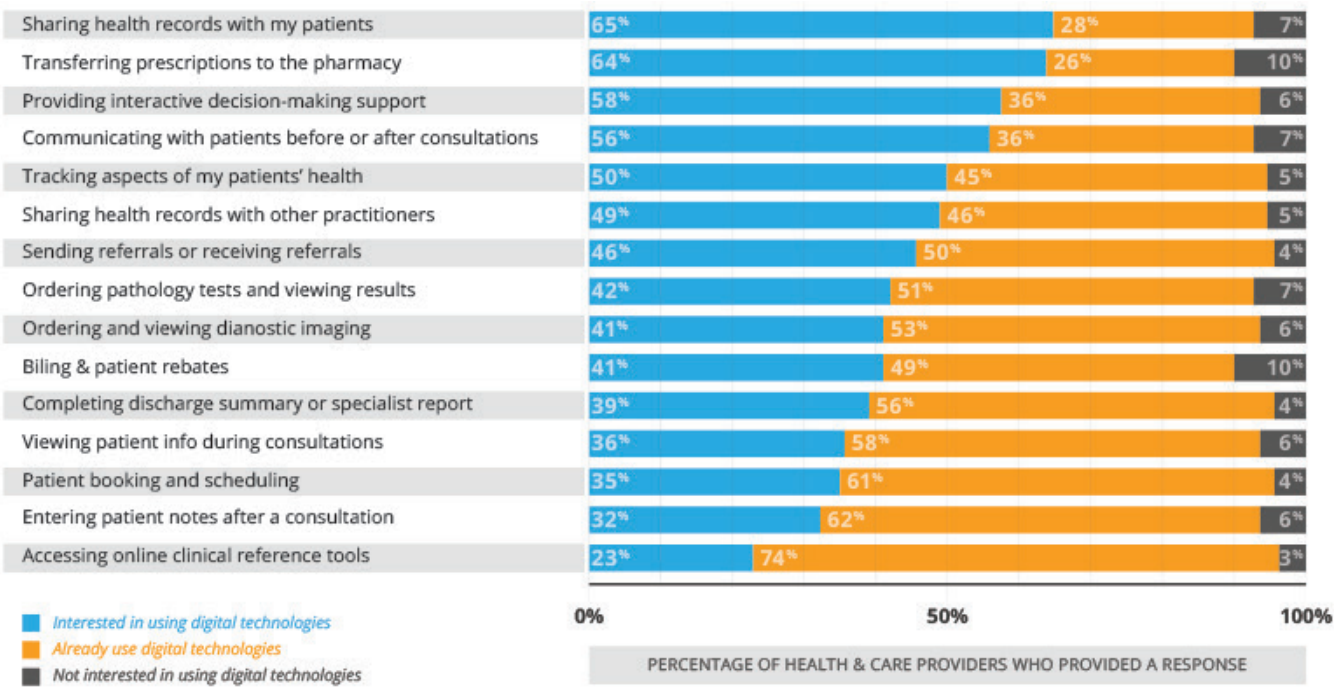


Figure 4 – Current use and interest in using digital solutions, by activity

A STRATEGIC DIRECTION FOR DIGITAL HEALTH IN AUSTRALIA

The vision for Australia's National Digital Health Strategy is:

Better health for all Australians enabled by seamless, safe, secure digital health services and technologies that provide a range of innovative, easy to use tools for both patients and providers.

Principles

The following guiding principles have underpinned the development of Australia's National Digital Health Strategy:

- **Putting users at the centre –** The Strategy has been developed to deliver on the needs of patients and health professionals as articulated in the national consultation process (and through ongoing user research). User needs and their context of use are placed at the centre of decision making, supporting improved prioritisation and user experience.
- **Ensuring privacy and security –** Australians expect strong safeguards to ensure their health information is safe and secure, respected, and their rights protected. They expect that their health data is only used when necessary and with their consent. The strategic priorities consider security, privacy and protection of sensitive personal information, balanced with safe information sharing and maintaining consumer and clinician trust.
- **Fostering agile collaboration –** The strategic priorities recognise that appropriate co-design and co-production methodologies are important for ensuring that digital health solutions developed for use in Australia meet the evolving needs of users and stakeholders.
- **Driving a culture of safety and quality –** The safety and quality of digital health solutions and services are of critical importance. The Strategy seeks to embed a systems approach to safety, quality and risk management throughout the design, development, implementation and use of digital health solutions and services.
- **Improving equity of access –** Digital health solutions and services have the potential to empower and to address longstanding barriers to equity of access in healthcare. The Strategy is developed based on the principle that all Australians deserve to benefit from the opportunities presented by digital health, and strategic priorities are aimed at improving health system accessibility across the socio-economic spectrum.
- **Leveraging existing assets and capabilities –** Australia is making significant advances in the delivery of digitally enabled health and care across Australia, through the development and operation of national digital health foundations. This Strategy was developed with respect to existing assets and capabilities and aims to avoid duplication.
- **Judicious use of taxpayer money –** Development of strategic activities is based on sound investment of funds to eliminate waste, deliver value for taxpayers, and ensure that investments are assessed on the basis of delivering the best health and care outcomes for all Australians.

Strategic priorities

The National Digital Health Strategy defines strategic priority outcomes to be achieved by 2022. The seven priority areas are derived from the consultation process and associated research. They articulate a set of shared outcomes for all stakeholders that complement existing investments in digital health initiatives and will enable health innovation and improved health and care experiences to be delivered. This will result in measurable benefits for patients, carers, healthcare providers and the broader health system. The following diagram shows the vision, key themes and strategic priorities.

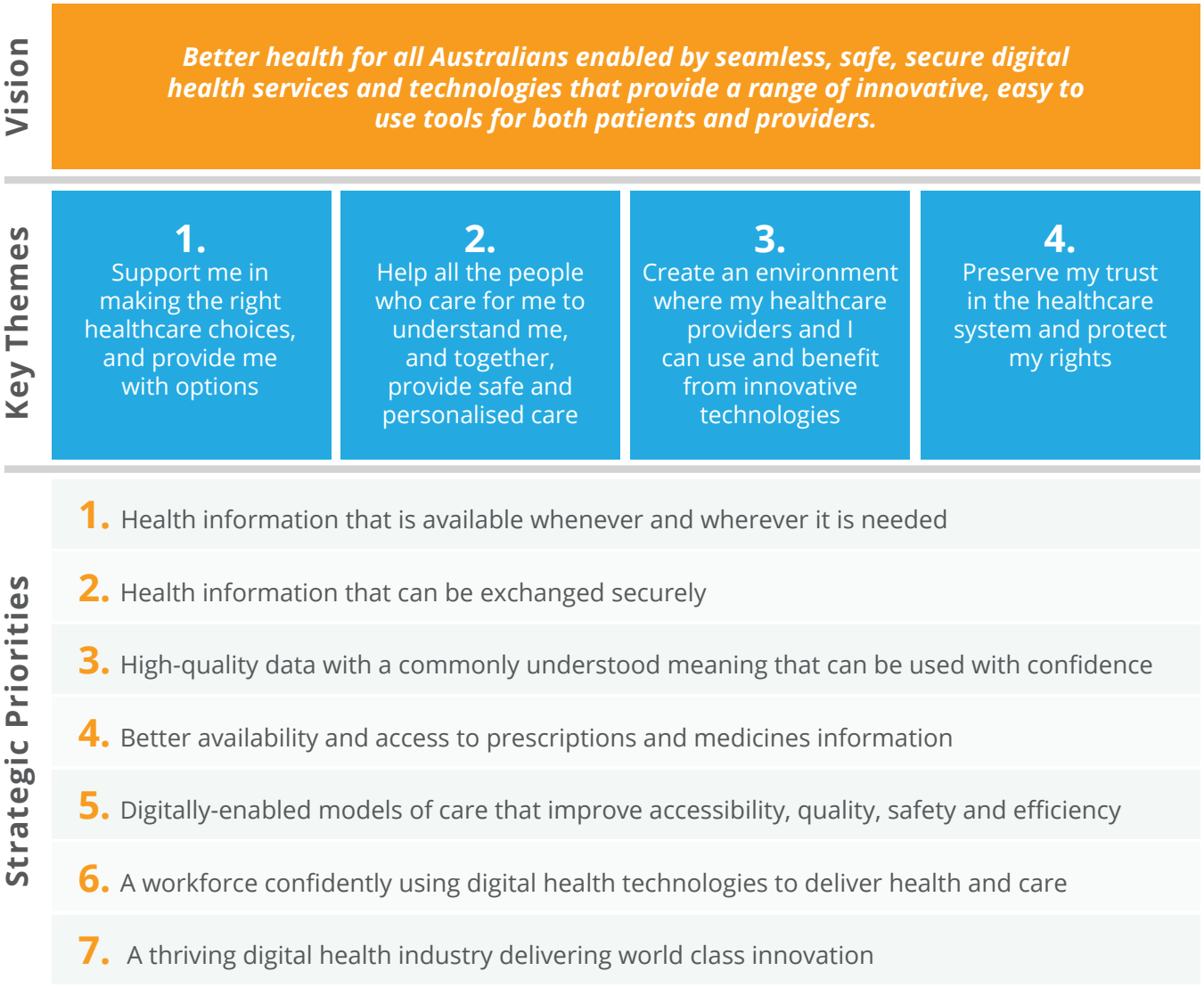


Figure 5 – Vision, key themes and strategic priorities

By 2022, the National Digital Health Strategy will deliver the essential, foundational elements of health information that can be safely accessed and easily utilised and shared. Innovators, entrepreneurs and developers will be able to use these foundational elements to develop tools that patients and health professionals can use every day to measurably improve healthcare and health outcomes.

The following sections outline each of the strategic priorities in detail.

1. Health information that is available whenever and wherever it is needed

By ensuring that health information is available whenever and wherever it is needed, the following will be delivered by 2022:

WHAT WILL BE DELIVERED BY 2022?

- Every Australian will have a My Health Record, unless they choose not to have one, by the end of 2018.
- All healthcare providers will be able to contribute to and use health information in the My Health Record on behalf of their patients, providing potentially lifesaving access to reports on their medications, allergies, laboratory tests and chronic conditions, and supporting significant improvements in the safety, quality and efficiency of healthcare for the benefit of individuals, the healthcare system and the economy.
- All Australians will be able to access their information at any time online and through mobile apps.

Since 2012, the national My Health Record system has provided a secure online summary of Australian patients' health information. Key parts of the health system are now connected, such as general practices, pharmacies, private and public hospitals. Over 4.7 million people and more than 9300 healthcare providers are participating.

In May 2017, the Australian Government announced that My Health Record would transition to an opt-out participation model. The decision means that by the end of 2018, every Australian will have a My Health Record unless they choose not to. This provides a transformative opportunity to support healthcare integration and deliver significant improvements in both the quality and efficiency of healthcare. Among other benefits, the My Health Record will:

- Reduce avoidable hospitalisations, adverse drugs events and duplication of tests
- Ensure that healthcare professionals have access to key patient information in the event of a medical emergency, or when a patient is away from home
- Improve the coordination of care and planning for people with chronic and complex conditions

The My Health Record is now set to be the core component of Australia's national digital health service, connecting key parts of the health system such as general practices, pharmacies, private and public hospitals, specialists and allied health professionals. With these foundations established and operational, the opportunity now exists to enhance healthcare provider participation and clinical utility to deliver key benefits for the healthcare system.

Case study: My Health Record "connects the dots" for mother of five

Paige is a mother of five children from Northern Queensland who was diagnosed with epilepsy at the age of 15 and hearing loss after the birth of her first child.

"I have several health conditions and was pregnant with my fifth child earlier this year," Paige explained.

"At one point during my pregnancy I had to keep track of more than 12 obstetric outpatient hospital visits, three neurology appointments, various pathology tests as well as GP visits. To add to this, my husband and I have five children. I'm often required to 'join the dots' between my healthcare providers to ensure I am provided with the best possible outcome for my family, but it became increasingly difficult to keep track of everything. My Health Record helps me keep a single record of my own health information, and the whole family has an individual My Health Record that is accessible by both me and my husband. Personally, it means my medical history is easily accessible to manage my health and this gives me the assurance that I'm receiving the best possible care. As a parent, it empowers me to take control and gain visibility of my family's healthcare and make the most informed decisions.

"Knowing that my family's medical history is easily accessible to treating clinicians and other healthcare providers is extremely reassuring."

There is strong support for My Health Record across all Australian states and territories [26], and professional and peak bodies, as a key enabler of modern healthcare, with the potential to deliver comprehensive, high-quality patient information.

> *"[The My Health Record] is the future."*
> - Australian Medical Association

> *"The My Health Record has many benefits including helping consumers become more proactive participants in the management of their own health."*
> - Cancer Council of Australia submission

> *"My Health Record provides a strong base with which to build on other shared care digital tools to enable integrated and personalised services, such as digital shared care plans, secure messaging and e-referrals. Data collected from My Health Record and other shared care platforms will contribute significantly to the evidence base for service improvements."*
> - eHealth NSW submission

> *"Prioritise making the My Health Record sharable and used by all health professionals and in all health settings. This fundamental step will have massive benefits to consumers who will be able to trust that their information is being adequately communicated."*
> - Consumers Health Forum of Australia submission

My Health Record already provides a data platform that can foster and support digital innovation, delivering economic growth and leading to the development of digital health solutions with greater clinical utility, such as mobile health applications.[27, 28] Early app developers are already taking advantage of new interfaces on top of the My Health Record system, which allow people to see the medications they have taken, or to view clinical documents on their mobile devices. It is anticipated that the development of digital health solutions and mobile health apps will attract significant investment.

My Health Record has the potential to provide a variety of benefits to individuals, healthcare providers, the health system, and the economy as a whole. However, the benefits of the system will only be achieved when there is wide-scale use by not only individuals, but also healthcare providers. Healthcare providers have repeatedly articulated that they would engage with the system when the majority of their patients are registered[29], which will occur on implementation of the opt-out model in 2018.

The frequency of use of My Health Record services will also likely increase as the platform and associated services better meet health clinician needs.[30] Improving clinical content within the My Health Record will support better health literacy for patients and enhance its use in healthcare. Already, people living in New South Wales and their healthcare providers can view pathology results through the My Health Record consumer portal and mobile applications.

Adopting a user-centric approach to usability, mobility and functionality enhancements, which give patients and providers contextually relevant services, will encourage ongoing use.[31-33] Greater utility will be realised through pushing information (e.g. notifications for patients) and pulling information (e.g. quickly accessing patient medical histories).[34]

The opportunity to better understand population-level health needs and support the planning of future health services will build on Australia's track record in the evaluation of new medicines and treatments.

The benefits of the My Health Record system will be realised through the delivery of three strategic objectives:

1. Increase consumer participation through the delivery of national opt-out arrangements coupled with coordinated awareness activities.
2. Increase core clinical content of the My Health Record system through improved system functionality and integration with existing clinical workflows.
3. Achieve extensive adoption by healthcare providers across the industry, through national education and support, national peak body engagement and local education and support primarily using primary health networks (PHNs) as delivery partners.

HEALTH CARE HOMES (Chronic Disease Management)

As part of the Australian Government's Healthier Medicare initiative, the Government announced its plan to introduce a Health Care Home model to improve care for patients with chronic and complex conditions. Under this model, patients voluntarily enrol with a medical practice known as their Health Care Home.[35] The Primary Health Care Advisory Group recommended the model, saying it "represents innovative, evidence-based best practice that harnesses the opportunity of digital health care."[36]

The My Health Record system will support Health Care Homes by enabling better integrated care through opportunities to manage care plans, assessing progress against goals, monitoring the activities of the rest of the team and sharing other documentation including event summaries, current medications, referrals, and discharge and diagnostic information.

Enabling the exchange of high-quality data between healthcare providers will enable healthcare teams and patients to better plan and coordinate care, and reduce barriers for healthcare providers to access and contribute to the My Health Record system.

How Will Australia Benefit?

- National opt-out will provide a transformative opportunity to support healthcare integration and deliver significant improvements in both the quality and efficiency of healthcare.
- Lives and money will be saved, with safer medicines management, better coordinated care and informed treatment decisions.
- There will be a more efficient health system (e.g. less time searching for patient data, reduced avoidable hospitalisations and tests).
- Patients will be put at the centre of their healthcare, so they can take greater responsibility for their own health.
- Data analytics will enable innovation and health service planning that will lead to more sustainable resourcing and new evidence-based clinical approaches.

2. Health information that can be exchanged securely

By enabling the secure exchange of health information, the following will be delivered by 2022:

WHAT WILL BE DELIVERED BY 2022?

- Every healthcare provider will have the ability to communicate with other professionals and their patients via secure digital channels if they so choose. This will end dependence on paper-based correspondence and the fax machine or post.
- From within their chosen system healthcare providers will be able to search for other healthcare providers in a single directory, and easily and securely share clinical correspondence.
- Patients will be able to communicate with their healthcare providers using these digital channels.
- Patients' health data will be safeguarded and able to be shared securely at their discretion. They will spend less time having to retell their story, and their healthcare providers will be able to work together more effectively to provide coordinated care.

Many patients' and carers' experience of modern day healthcare involves interacting with numerous different healthcare providers.[37, 38] The ability of healthcare providers to easily, reliably and securely exchange health information – both directly with one another and with their patients – is a key enabler of coordination of care and integration of care.[39-42] It is also a key driver of health service efficiency[41, 43-46], as well as patient engagement and satisfaction.[47-49] An economic analysis, undertaken as part of the development of this Strategy, has estimated that the gross economic benefit of secure messaging could be around $2 billion over 4 years and more than $9 billion over 10 years.

In Australia, there is established use of secure messaging using a range of different electronic communication methods; for example, diagnostic requesting and reporting, and sending discharge summaries from hospitals to general practice.[50] However, these different methods are generally not compatible – meaning that these proprietary secure messaging approaches do not work with each other.[50] Despite significant effort, there is no nationally consistent, standards-based approach to secure messaging, which limits the ability of healthcare providers to communicate effectively.

The inability of healthcare providers to share health information easily and safely can lead to communication breakdowns, which contribute to poor health outcomes, duplication and inefficiency.[39, 51-53] As a result, patients often have disjointed healthcare experiences, and feel that they need to repeat information all too often.[54]

Enabling secure messaging was identified as a high priority for action throughout the *"Your health. Your say"* consultation. Communication issues were frequently raised by healthcare providers, who reported being unable to effectively and securely communicate with each

other across organisational boundaries. Instead, they continue to use less secure methods such as fax, instant messaging apps and email to communicate and exchange information with their colleagues.

> *" Today, most providers that a rural generalist wants to communicate with do not have a secure messaging service. "*
>
> - Australian College of Rural & Remote Medicine submission

> *" [There is] no common standard for secure messaging between providers – we are like nineteenth 19th century colonies each with their own rail gauge. "*
>
> - Health service IT manager

There have been widespread calls from peak professional bodies and health services for immediate action to create a standardised, universally accepted, secure messaging capability.

> *" Secure messaging, supported by fully functional provider registries, should be readily available to all doctors. "*
>
> - Australian Medical Association submission

> *" One of the most pressing priorities is to improve interoperability, integration and secure messaging capability of the various systems (with appropriate privacy parameters) of public and private organisations to share data, which is critical for providing coordinated and connected patient care."*
>
> - Queensland Government, eHealth Queensland submission

> *" One of the key factors is enabling professionals to effectively connect, communicate and coordinate with the right people will be establishing interoperability of secure messaging. "*
>
> - Australian Association of Practice Management submission

A key challenge to achieving a national, standardised approach to secure messaging is the existence of multiple health service directories and the lack of confidence in completeness and currency of data in these directories and addressing services. Other challenges that need to be addressed are:

- Sectors with low levels of participation – particularly allied health and specialists.
- Establishing confidence in the reliability of secure messaging through appropriate use of notifications to confirm documents are sent and received at the correct destination.
- Lingering challenges in the use of existing national foundations highlighted throughout the consultation, including registration, renewal of PKI certificates, identifier match rates and poor usability.

- Lack of a standardised approach to secure messaging hampering implementation of eReferral capability.
- Empowering healthcare providers to securely communicate directly with patients within an appropriate clinical policy framework.

International and local evidence supports a nationally led, standards-based approach to secure messaging. Countries including the UK[55], [56], USA[57], New Zealand[58], Canada[59], and Denmark[60] are investing in national foundations and standards to enable secure messaging and other usage patterns[50], and realising the benefits of improved coordination of care, efficiency gains, increased patient engagement, and better health outcomes.[61]

> *"National leadership is required to set out the parameters for secure communication (e.g. Secure Message Delivery). The current 'hands-off' approach is not working, as the software vendors are unwilling to invest in product development in absence of set criteria. While software vendors have attempted to develop their own proprietary 'interoperable' SMD with other providers, the development of such interoperable platforms is patchy as each vendor is rightly protective of intellectual property rights for their own products and systems. Health professionals and consumers will not be able to benefit from the national eHealth record system unless this fundamental issue is resolved as a matter of urgency."*
>
> The Australian Psychological Society submission

National foundations established to enable secure messaging will leverage collaborative work already underway by industry consortiums, and complement investments being made by states and territories in secure messaging[9, 10], discharge summary capabilities[11] and eReferral and booking capabilities.[10, 12] National foundations will also be able to be utilised for a range of potential future uses, including enabling new models of care, more easily sharing different types of information, and making it easier to introduce vendor solutions (such as secure instant messaging) into health services. Consumer needs for transparency, convenience and informed choice will also be addressed.

Case study – Western Victoria PHN secure messaging

Western Victoria Primary Health Network reports that in the Barwon region, clinicians sending secure messages via systems like ReferralNet and Argus are securely sending an average of 16 000 messages per month, saving time, money and effort. The number of messages sent each month continues to grow as clinicians incorporate this function into their daily work routine.

MENTAL HEALTH

> *" E-mental health offers one of the greatest invest-to-save opportunities for government and the community in mental health. E-mental health is clinically effective and huge cost savings can be gained by integrating it into a fully functional mental health system of stepped care."*
>
> ■ National Mental Health Commission submission

Online mental health services – either as an alternative, or as an adjunct, to face-to-face mental healthcare – have in recent years become popular and effective services for the treatment of disorders such as anxiety and depression.[62] The Australian Government's Fifth National Mental Health Plan, which is currently under development, recognises the maturation of data sharing and information and communications technology platforms such as My Health Record, and the potential that these digital services may have over the life of the plan to further support tailored individual care for people with severe and complex mental illness.[63]

The National Digital Health Strategy will contribute to maximising opportunities to prevent and reduce the impact of mental health issues and mental illness by prioritising secure messaging, which will support general practitioner and psychologist interactions. Increasing access to mobile health apps and online content will support healthcare consumers with tools to help manage their own health, and also give confidence to healthcare practitioners that they are recommending safe and evidence-based digital tools to their patients.

How will Australia benefit?

- There will be more appropriate servicing and better coordination of care.
- There will be improved healthcare availability and patient experience through online consultations.
- There will be reductions in administration and processing time.
- There will be savings from reduced costs.

3. High-quality data with a commonly understood meaning that can be used with confidence

By enabling the exchange of high-quality data between healthcare providers and the systems they use, the following will be delivered by 2022:

WHAT WILL BE DELIVERED BY 2022?

- A public consultation on draft interoperability standards, leading to an agreed vision and roadmap for implementation of interoperability between all public and private health and care services in Australia will be completed in 2018.
- Base-level requirements for using digital technology when providing care in Australia agreed with governments, peak clinical bodies and other key stakeholders.
- Health services will be able to assess their level of digital maturity (the extent to which they are supported by the effective use of digital technology) and be supported in improving their level of digital maturity.
- Improvements in data quality and interoperability through the adoption of clinical terminologies, unique identifiers and data standards.
- The first regions in Australia will showcase comprehensive interoperability across health service provision, community and hospital sectors, public and private.
- The safety and the quality of patient care will be improved by ensuring we have a connected health system that seamlessly shares high-quality data with the right people at the right time.

State and territory governments are embarking on major projects to implement state-wide electronic medical records and to achieve integration across the range of clinical information systems in hospitals and health services managed by a state or territory government. While each state and territory is working within its own investment cycle, with its own software and integration partners, and is at a different point in achieving this goal, there is a common pursuit to make health (and, for some jurisdictions, human services) information available in a more timely and usable way.

Similarly, private hospitals, aged care service providers and community health services are investing in information systems and technology to improve quality and service delivery. Innovation in data analytics and increased expectations from consumers and funders to improve the experience and reduce avoidable errors and re-admissions to hospitals are among the drivers of investment in the non-government sector.

Given the progress that is being made within geographic areas, individual health services or within a health sector, there is a risk that uncoordinated investment in technology that does not meet a common set of standards will exacerbate siloing in the health system, with each service or sector using a different system. A national strategy that articulates agreed priority areas and is underpinned by standards will send a signal to the market of areas of interest to governments and can encourage investment in both the public and private health systems in a common direction. Coupled with standards where stronger direction is required, this will lead to

an environment where healthcare providers will be able to access more complete information about a person under their care, irrespective of whether that person received health services in the public, private or community setting.

The ability of different healthcare providers to use shared information with commonly understood meaning is a pre-condition for team-based, coordinated care, continuity of care, efficiency, data analytics, and positive patient experiences.[64-67] Exchanging high-quality data between multiple health systems, trusting that the meaning will be interpreted in the same way, requires "interoperability".[64, 67, 68]

WHAT IS INTEROPERABILITY?

Interoperability is a complex concept. At its simplest, it is the ability to move information easily between people, organisations and systems.

"The importance of getting a co-ordinated approach between industry and government is critical. The government has a clear role in providing key infrastructure and allowing industry to meet the market. It is the role of the government to capitalise on existing projects as well as to foster new solutions."[176]

- Medical Software Industry Association (MSIA) submission

It is imperative that when information is shared between people and systems, its meaning is preserved from one context to another so that information is interpreted in the same way. That is, what was meant is the same as what is understood. This is the concept of "semantic" interoperability, which can be defined as: 'The capability of two or more systems to communicate and exchange information, and for each system to be able to interpret the meaning of received information and to use it seamlessly with other data held by that system".[69]

Australia was recently ranked number one in the world for its open data policies that create an environment for interoperability, and use of our data assets as a national resource.[70] In Australia, meaningful progress has been made in establishing foundations for interoperability, including clinical terminologies and standards. However, adoption has been limited,[71] and a lack of interoperability remains a significant issue.

> ***"Although there have been some vendor-based improvements in recent years, the lack of vendor interconnectivity and interoperability remains a major issue."***
>
> - Royal Australian College of General Practitioners submission

> ***"Standards exist in some areas, such as diagnostic imaging, however we are far from having genuinely interoperable informatics in health."***
>
> - Royal Australian and New Zealand College of Radiologists submission

The lack of interoperability between systems means healthcare providers often cannot exchange information effectively, which contributes to disjointed care, adverse events, inefficiencies and poor quality data.[72-74]

Both healthcare providers and health organisations called for interoperability – they want their systems to communicate more easily with other systems outside their organisation's boundaries.

> *"Interoperability of digital health systems is fundamental to sharing information."*
>
> - Royal College of Pathologists of Australasia submission

> *"There is a clear need to establish standards across the industry to guide developers and ensure everyone is working towards a common purpose of interoperability."*
>
> - Australian College of Nursing submission

There is strong demand for clear guidance and certainty regarding interoperability standards:

> *"The Strategy should clearly identify what standards are required to support digital health, including connectivity and interoperability, and by who and how such standards should be developed."*
>
> - Australian Medical Association submission

> *"BUPA believes the private sector will play a critical role, equally critical will be the role of government in supporting the development of necessary frameworks and standards to ensure the interoperability of any privately developed products."*
>
> - BUPA submission

Achieving interoperability is a complex and substantial undertaking.[75-78] Internationally, there have been concerted, nationally led efforts to achieve interoperability, from which Australia can learn and leverage. Key components of international programs have been:

- **Close collaboration**[75, 79] in developing interoperability strategies and roadmaps.[80-84]
- Adherence to **a principle of open systems** and transparency by default.[64]
- **Nationally endorsed standards.**[56, 85, 86] A number of countries have taken the additional step of mandating the adoption of standards in a specific timeframe.[87-89]
- Conformity **assessment schemes.**[90, 91]
- **Measures of digital maturity** and toolkits to support health services to improve their digital maturity[92, 93] and assist local organisations in procuring and implementing local interoperable solutions.[94] Digital maturity is the extent to which health services are supported by the effective use of digital technologies.

Interoperability is core to state and territory health department work programs. State and territory health departments are facilitating and capitalising on interoperability through programs of work to update clinical information systems[10, 11, 13-15], data governance and management[16, 17], and through better utilisation of clinical data.[10, 15-17] For example, Queensland Health is implementing

an Integrated Electronic Medical Record across its hospitals to allow clinicians and supporting staff to securely access a single view of a patient's medical record irrespective of the hospital in which treatment was provided, making it easier to share information about a patient's history. Six hospitals have already been upgraded, with progressive implementation of other hospitals across the state. Interoperable systems are also being leveraged in Queensland Health's Digital Hospitals program, where new digital bedside patient monitoring devices automatically upload vital signs and observations, such as blood pressure, temperature and heart rate, directly to the secure electronic medical record.

These types of programs form an important part of each jurisdiction's digital health strategy. Combined with the national program to make pathology results and discharge summaries available from hospitals to the My Health Record system, and to view this information through conformant software in general practice, key information about a person's experience in the public health system is being shared with authorised healthcare providers in other hospitals and in the community to support more co-ordinated and informed care for individuals.

The strategic aim is to enable the exchange of clinical information between healthcare providers, the systems they use, and the people they care for through interoperability. The standards and health informatics communities, technology industry, and health services expect collaboration and co-production, with national coordination where appropriate. Acceptance and adoption of standards that support interoperability by the health technology industry will be critical to our success in moving information easily between people, organisations and systems.

The Australian Digital Health Agency will take a national leadership role in achieving interoperability, through the development, monitoring and management of specifications and standards, and the development and implementation of compliance approaches in relation to the adoption of agreed digital health specifications and standards.[1]

The strategic approach we are proposing calls for a national interoperability strategy, and agreed interoperability standards, an implementation roadmap, a conformance scheme and digital maturity measures to be developed using a consultation and co-production process. In addition, there is a need to provide a more seamless experience across government services, enabled by common national foundations, to ensure that there is no duplication of digital infrastructure services across governments.

A co-production approach recognises that interoperability will be supported through a mix of pull and push adoption mechanisms that require careful design, including policy, procurement, compliance and accreditation frameworks, and quality measurement.[95]

There are also regional and commercial realities – the effort involved in upgrading systems to become conformant and priority and demand from the health sector, the need for backwards compatibility, the need for alignment with international standards (sometimes at the expense of local standards) to offer economies of scale, and the need to support regional approaches to interoperability where adoption of national standards is not optimal. Digital maturity support services will be required to support state and territory health departments and health services to increase their digital health maturity, leveraging national and international experience.

Delivery of this Strategy will not provide a fully integrated set of implemented systems across Australia by 2022 or completely seamless service delivery. Such an outcome will require adoption of all agreed standards by software systems, procurement of those systems across all health and hospital services, comprehensive service redesign and workforce capability, and confidence to deliver digitally enabled services.

However, this Strategy will deliver an agreed view of base level digital maturity, articulation of required standards, conformity assessment, and clear guidelines for jurisdictional and local health providers to inform procurement decisions.

It will provide a focal point for health service design to address one of the greatest challenges to our health system – delivering high-quality and timely health services to people living in rural and remote areas. Digital technology opens up new possibilities for people in our regions to access health services currently available in our cities – without the need to travel out of their communities.

Services will be designed for a regional area to capitalise on the excellent – but stretched – healthcare providers working in regional and remote areas to connect with a wider support team in both the community and public health sectors in other locations. Making better use of telehealth, integrating with services such as Hospital in the Home, and ensuring visiting specialists use a shared health record will help overcome the tyranny of distance when delivering health services across all parts of the country.

A focus on improving data quality is also required, reflecting the underlying need for efficient use of high-quality data, which will enable future developments including precision medicine and genomics[96] and the tracking of the efficacy of medical devices via linkages with the national product catalogue. Evidence suggests that high-quality data requires both strong data governance and agreement on standards for terminology.[74, 97]

ABORIGINAL AND TORRES STRAIT ISLANDER HEALTH

The Closing the Gap Prime Minister's Report 2017 highlighted that the health of Aboriginal and Torres Strait Islander people is slowly improving but the current rate of progress is not sufficient to close the life expectancy gap between Indigenous Australians and non-Indigenous Australians by 2031.[98]

The National Digital Health Strategy contributes to national objectives to ensure that Australians have a health system that promotes social inclusion and reduces disadvantage, especially for Indigenous Australians.[99] Enhancing the My Health Record system, and establishing national infrastructure and interoperability standards will enable better access to information and resources to improve data collection, availability, quality and analysis that will help ensure that policies and programs aimed at improving health outcomes for Indigenous Australians are evidence-based and informed by robust health research and data systems.

Recognising that for many Aboriginal and Torres Strait Islander people, language or lack of transport may be an additional barrier to accessing health services[100], accelerated take up of My Health Record will achieve registration with vulnerable and hard to reach groups that may not otherwise have been engaged in the My Health Record system under opt-in arrangements. The telehealth test bed will focus on Aboriginal and Torres Strait Islander communities, with the aim of providing timely access to healthcare services to ensure early diagnosis and early interventions.

> ***" We wanted to establish programs and support infrastructure that strengthens Indigenous participation, practice and entrepreneurship in the digital economy."***
>
> ■ Kirstie Parker, CEO National Centre of Indigenous Excellence

Actions to address digital literacy, and collaboratively developing inclusive design principles and guidelines for digital health services and content will provide more Indigenous Australians greater opportunity to access technology and use it effectively.

Case study – Ramsay Health Care

Ramsay wanted to improve the efficiency of its supply chain processes, while leveraging Australian national eProcurement recommendations. To address this need, Ramsay has deployed a full suite of standards for identifying, capturing and sharing information to support interactions with its suppliers.
As a result, Ramsay has increased both the speed and efficiency of its purchasing processes, strengthened the efficient operation of its hospitals and helped ensure the continuous delivery of quality healthcare.
The cost of automated processing of purchase orders and invoices has reduced from $35 to approximately $2. Document volumes were estimated to have been in excess of a quarter of a million in 2016, and the associated savings were significant.[25]

How will Australia benefit?

- There will be improved coordination of care, leading to reduced medical errors and avoided hospitalisations.
- There will be reduced demand for services through improved self-care.
- Duplication and operating costs will be reduced through alignment of government health gateways and infrastructure.
- Patient and healthcare provider experiences will improve through a better connected health system.

4. Better availability and access to prescriptions and medicines information

By delivering better availability and sharing of prescriptions and medicines information, the following will be delivered:

WHAT WILL BE DELIVERED BY 2022?

- By the end of 2018, all consumers and their healthcare providers will have access to comprehensive views of their prescribed and dispensed medications through the My Health Record system, irrespective of who prescribed and dispensed the medicine.
- By 2022, there will be digitally enabled paper-free options for all medication management in Australia. People will be able to digitally request their medications online, and all prescribers and pharmacists will have access to electronic prescribing and dispensing, increasing convenience for people filling prescriptions and improving overall safety.

Medicines are part of most people's lives, and their use is growing. In any two-week period, around seven out of ten Australians and around nine out of ten older Australians will take at least one medicine.[101]

Significant funding is allocated for medicines provision and administration. In 2012–13, $19 billion was spent on medications in Australia, an increase of 5% since 2010–11.[102] Australians are among the highest consumers of antidepressants, cholesterol-lowering drugs and antibiotics in the OECD.[103]

In Australia, health consumers' medication histories are currently stored across a variety of paper-based and electronic systems that are often inconsistent, making consolidation into a single view highly problematic.[104]

The impact of incomplete and inaccurate medicines information can be devastating for patients and their families. There is evidence that approximately two million adverse drug events (ADEs) occur every year in Australia.[105] An estimated 230 000 ADEs lead to hospitalisation,[104] with an estimated cost to taxpayers of more than $1 billion annually.[104] Over 2000 deaths in Australia each year are related to medication errors.[106]

Medication errors have a disproportionate impact on older Australians, accounting for an estimated 20–30% of all hospital admissions in the population aged 65 years and over.[104] One study found that 40–50% of residents in aged care facilities were prescribed potentially inappropriate medications.[107]

The ability to capture a patient's current medicines and allergy information in a structured, coded, standardised and shareable form will support improved sharing of accurate and complete information across care boundaries. It will support quality use of medicines, prevent avoidable injuries and deaths, reduce hospital admissions and give consumers the opportunity to take more control of their own health and care.[101, 108-112] It is estimated that adverse drug events could be reduced by up to 50% with an effective digitally enabled medicines management program.[113] Substantial cost savings could be attained through the

reduction of medication errors, more efficient processes, improved patient outcomes and fewer patient visits.[114, 115]

At present, patients and their healthcare providers have limited access to current medications lists or medication histories. Further, information about the millions of medicines administered each year is not consistently recorded in a structured or coded form, making it very difficult to apply clinical decision support tools, or to use medicines data to support research into improving the use of and access to medicines to improve health outcomes.

Better management of medicines information was identified as a high priority among both health consumers and healthcare providers during the "*Your health. Your say*" consultation. Out of a range of health and care activities, Australians were most interested in using digital technologies to manage their medications, including online filling of prescriptions.[116] Nearly two-thirds of clinicians are interested in transferring prescriptions to pharmacies electronically using digital technologies.[116] A key challenge in achieving this goal is aligning relevant state and territory regulatory frameworks, and ensuring that electronic systems are easy for healthcare providers to use, co-designed in collaboration with medical professionals. This is especially critical for clinicians administering medicines in residential aged care facilities, given the common use of multiple medicines and the complex needs of aged care residents.[117]

Peak professional bodies and other key health stakeholders support the need for improved medicines management, as identified by health consumers and healthcare providers. The Royal Australian College of General Practitioners described electronic prescribing as "an urgent national priority" in their submission.

> ***"When patients move between care settings, the absence of complete and up-to-date medication data can contribute to instances of care becoming high risk, resulting in medication misadventures and unnecessary hospital re-admissions."***
>
> - Pharmacy Guild of Australia submission

Prescription medication abuse and overdose is also a growing public health issue, with coroners calling for real-time electronic monitoring of controlled drugs.[118] The Australian Medical Association has described prescription drug abuse as a "national emergency"[119], and states and territories are supporting national activity to increase the electronic monitoring capability for drugs of dependence, to reduce prescription drug misuse and abuse in the community.

Countries including New Zealand, Estonia, Denmark, Finland, the Netherlands and the UK are investing in electronic prescribing and shared medication records to improve medicines management.

Case Study: Estonia – successful implementation of electronic prescribing

The Estonian ePrescription service was activated on 1 January 2010. Implementation was initially led by the Estonian eHealth foundation (established by the state, the Estonian Health Insurance Fund, a number of large hospitals, and associations of family physicians). Take-up was rapid, contributing to initial implementation issues which required doctors to continue writing paper prescriptions.[120] However, physicians started to increasingly use the ePrescription service as problems were solved. Now 99% of total prescriptions are processed electronically and 92% of individuals who had used ePrescriptions were either very satisfied or satisfied with the service about one year after their launch, and in a 2015 survey, ePrescriptions were among the most popular eServices in Estonia.[121]

Medicines management, including medicines safety, real-time prescription monitoring, and a single enterprise-wide drug catalogue have been identified as key priority areas for investment by the states and territories.[19] The National Medicines Policy[122] and National Strategy for Quality Use of Medicines (QUM)[123] provide direction regarding quality processes and continuous improvements in the use of medicines, with the high-level goal of improving health outcomes for Australians.

The strategic approach to increasing availability and sharing of prescriptions and medicines information is to complement the work already underway, and support the Commonwealth Department of Health and the states and territories in establishing a national medicines program to implement digital services and solutions to increase the safety, quality and efficiency of medicines use across health and care. This program will also support governments in managing the use of controlled drugs in real time and reduce harm from misuse of these substances.

The Agency will work in collaboration with Australian governments and industry to improve medications management for both healthcare consumers and providers by co-producing and publishing a national digital medicines management blueprint which will include development of the infrastructure, specifications, policies, legislation and change, adoption and training activities for clinicians. The Agency will assist the development of proposals by scoping the implementation trials required to enable the services needed to support end-to-end digital medicines management, recognising the need to provide education and training to support adoption by the pharmacist workforce.

Initiatives will include enabling services such as electronic prescriptions, and a shared and usable view of medicines information, ensuring providers and patients can access the best possible consolidated medicines list via the My Health Record system.

AGED CARE REFORM

All Australian governments are committed to ensuring that older Australians receive appropriate high-quality and affordable health and aged care services.[99] The National Digital Health Strategy will support that objective by prioritising a digitally enabled medicines management program, making prescribing safer in aged care facilities and reducing adverse drug events, which disproportionally affect older Australians. [104] Enabling secure messaging, and the exchange of high-quality data between healthcare providers will also enable practitioners in aged care facilities to better plan and coordinate care.

The aged care system in Australia is being reformed to ensure it is the best possible system, and to offer greater choice and flexibility for consumers.[124] My Aged Care is the main entry point to the aged care system in Australia. The Australian Medical Association suggested in their submission to the consultation process that the My Aged Care gateway should be combined with the My Health Record system to help give "a full and holistic view of all health and care providers involved in the patient's care and what they are providing".[116] The Australian Digital Health Agency will work with My Aged Care to determine how information in the My Health Record can help deliver on its vision to make it easier for older people, their families and carers to access information on ageing and aged care, have their needs assessed and be supported to locate and access services available to them.

How will Australia benefit?

- Risk and harm to health consumers will be minimised through reduced adverse drug events.
- Prescription misuse will be reduced through real-time monitoring.
- The cost of hospital admissions for adverse drug events will be reduced (reduced drug–drug interactions, allergic reactions and inadequate dosing, either due to inadequate prescription or dispensing errors).
- Health system capacity will be increased due to more efficient and accountable administration of medication, improved consumer self-management and reduced hospital admissions.
- Complications and disease progression will be reduced for patients due to higher medication adherence.

5. Digitally-enabled models of care that improve accessibility, quality, safety and efficiency

By rapidly testing the digital health support of new models of healthcare and supporting the process of national roll-out, the following will be achieved:

WHAT WILL BE DELIVERED BY 2022?

- A number of pioneering initiatives – co-produced between consumers, governments, providers and entrepreneurs – to test evidence-based digital empowerment of key health priorities and then, where appropriate, to promote them nationally.
- Priority health reform areas such as Health Care Homes chronic disease management, telehealth, babies' and children's health, residential aged care, end of life care, and emergency care will be a focus. The test beds will run for two years to inform the national roll-out of innovations across Australia, ensuring that all Australians can benefit.
- By 2022, six test bed projects will have been launched, each of two years' duration. Four of these test bed projects will have been evaluated and the learning from two test bed projects will have been rolled out across Australia.

It is vital that digital technologies are rigorously tested and their benefits proven in real-world environments (i.e. "test beds"), prior to being scaled up to the whole of the Australian health system. Establishing test beds based on clinical priorities will allow evaluation and refinement of new and improved models of care based on digital health foundations and investigations into how to deliver such innovations nationally.

Developing a test bed framework will ensure that, where digital health is shown to be beneficial in Australia's health context, learning will support scaling up and rolling out to other communities and regions.[125] This will also ensure that only proven interventions with measured benefits are translated into usage in the Australian health system.

The test bed framework will guide how governments, industry, universities and healthcare providers can work together to trial and evaluate the use of digital health technology in regions, with the aim of expanding proven digital health solutions for scaling up to benefit all Australians.

The test bed framework will create the supportive policy, regulatory and governance framework to enable these models of care to be scalable and sustainable. Test beds will generally be cross-jurisdictional (spanning two or more state or territory health departments) and their development will involve primary health networks as coordinators of care. State and territory health departments to be included will be chosen through a commissioning process led by the Australian Digital Health Agency.

> *"Health does not lack innovation, the issue always is in scalability, and execution in a fragmented system."*
>
> HCF submission

The choice of test bed projects will not simply be about utilising the latest digital technologies and care models, it will also support the harmonising and scaling of existing best-practice-based evidence about what works, and what can be integrated into existing clinical workflows.[126]

Australia has the potential to be recognised as a unique location to test and trial digital health solutions for subsequent implementation not only nationally, but also internationally. A mature test bed model will attract international interest, with economic benefits to the Australian community.

There is a significant amount of work being undertaken across Australia by state and territory health departments on enhanced models of care, such as renal services information management in the Northern Territory[13] and a genomic service in the ACT[23]. Queensland is also investing in new models of care.[12, 15] Telehealth also features strongly in the future planning of all state and territory health departments; for example, the Burns Telehealth Service at Princess Margaret Hospital in Western Australia[11] and the delivery of a telehealth network of 180 video-conferencing units across all acute care facilities in South Australia.[14]

It is envisaged that approximately six test beds will be developed over the period of the National Digital Health Strategy, with each having a formal evaluation, examining the degree to which target benefits have been achieved and lessons learnt from implementation and roll-out.

The clinical priority areas for the test beds will likely be centred on the following health priority reform areas:

- **Better management of chronic disease (including Health Care Homes) –** Consultation feedback showed that health consumers with chronic conditions often experience a lack of coordination of their care. Almost four million Australians (16% of the population) see more than three different health professionals for the same condition. Of those, one in eight (13%) reported that there were issues caused by a lack of communication between their health professionals.[51]

  Hospitalisations from chronic diseases are a substantial burden on our healthcare system[127, 128], but digital health solutions now exist which could support better management of chronic conditions through new models of care.[129] This test bed will support investigation of how chronic disease management and care coordination can be digitally enabled and scaled up across Australia in ways that maximise improvements to health outcomes, preventing complications from chronic disease and reducing admissions to hospital.

Case Study: Gold Coast PHN – Integrated Care Model

Commencing in March 2015, 14 general practices across the Gold Coast established a Coordination Centre that offers proactive shared care of high-risk patients with chronic illness. The initiative covers a population of approximately 140 000 active patients as part of the Gold Coast integrated care model. This care model is designed to improve services for local patients with chronic and complex conditions in collaboration with general practitioners, and aims to reduce presentations to the local health service's emergency department and decrease planned and unplanned hospital admission rates.

Development of a holistic assessment process and systematic register has commenced, focusing initially on diabetes, respiratory, cardiac and renal conditions as well as frailty, end of life and residential aged care residents. Evaluation data are being collected on all interactions, to capture staff and patient experiences and perspectives on the new model of care, including satisfaction indicators.[130]

> ***"Digital health initiatives, such as the My Health Record, which enable patients to access their own health information, have the potential to help them monitor and manage chronic and complex health problems."***
>
> Cancer Council Australia submission

- **Embedding telehealth into clinical consultations –** Timely access to healthcare services is important to ensure early diagnosis and early interventions, which are associated with better health outcomes for the recipients of these services.[131, 132] There are many reasons why barriers to timely access exist, such as demand exceeding the number of services provided or the lack of access to a healthcare service in a rural or remote area.[131]

  The Northern Territory Government and the Australian Digital Health Agency are already working together to improve telehealth service delivery in remote Australia. The National Telehealth Connection Service will help improve access to health services to those patients needing it most. The aims of the National Telehealth Connection Service are to improve access to health services, better manage costs and optimise resources, and establish a telehealth scheduling system.

  The telehealth test bed will focus on ensuring telehealth models are harmonised across Australia by undertaking a review of existing telehealth use, and addressing regulatory, policy and other barriers that have arisen, to inform a business case for the embedding of telehealth into clinical consultations. The use of telehealth solutions in rural and remote and Aboriginal and Torres Strait Islander communities will be a focus.[127, 133]

Case Study: CSIRO – Telehealth home monitoring of chronic diseases for aged care

A trial of home monitoring via telehealth for patients with chronic diseases in an aged care setting was conducted by the CSIRO over a 20-month period. Concluding in December 2014, the results provided a series of insights showing numerous benefits, including a 46% reduction in Medicare Benefits Schedule (MBS) expenditure and a 25% reduction in Pharmaceutical Benefits Scheme (PBS) expenditure.

The trial also showed a 53% reduction in the rate of admissions to hospital. Among those patients who were admitted, there was also a 75% reduction in the rate of length of stay, with a greater than 40% reduction in mortality.

Users and clinicians alike were strongly supported the system, with over 83% user acceptance and use of telemonitoring technology, and over 89% of clinicians saying that they would recommend telemonitoring services to other patients.[134]

Case Study – Northern Territory telehealth project

The provision of telehealth services to deliver outpatient appointments was assessed at three Northern Territory sites between 2014 and 2015: Alice Springs, Katherine and Tennant Creek.

The evaluation demonstrated that increasing telehealth use in these locations (more than seven-fold in Tennant Creek, four-fold in Alice Springs and a doubling in Katherine) led to reductions in travel, with patients in Tennant Creek more likely to use telehealth than to travel. The "Did Not Attend" (DNA) rate for appointments lowered significantly. The estimated cost savings for the project for participants was in the order of $1.189 million.

Surveys indicated high levels of support for telehealth from participating patients and a strong desire to use telehealth in the future. Clinicians had similar attitudes in their endorsement of telehealth, reporting an improvement in continuity of care for their patients, and that they would be likely to use telehealth in the future and recommend it to their colleagues.[22]

> *"There is a long history of (rural and remote people) embracing alternative models and using available technologies to provide those services lacking in their communities."*
>
> Rural Doctors Association of Australia submission

> *"Several years ago my Melbourne-based endocrinologist offered me the option of Skype appointments. He now mails me his pathology test request form beforehand (a copy goes to my GP) and I upload my insulin pump data prior to the appointment. The appointment progresses exactly as if I attended his rooms. The Skype appointment means I don't have to spend at least 7 hours travelling, starting at 6.30am and not arriving home till 11pm. Travelling to face-to-face appointments leaves me stressed and tired, adversely affecting my blood glucose levels for the day. The Skype appointment makes me feel much better, with normal blood glucose levels, because there is no stressful travel."*
>
> Consumer, Regional NSW

- **Improving quality of health services in residential aged care –** When aged care residents are treated by aged care and healthcare professionals, there is often an "information gap", with a lack of sharing of the older person's information about health conditions and medicines[135] between the two sectors. It has been demonstrated that digital health interventions for aged care residents can dramatically reduce the number of transfers into hospital.[135]

  The aged care test bed will explore how digital health technologies can improve outcomes for Australians in residential aged care facilities.

- **Respecting patients' end of life care preferences –** Very few Australians currently have their end of life care wishes documented.[136, 137] When coupled with the lack of capability to share patient information, treating clinicians in hospitals are often unaware of the wishes of patients during end of life care, regardless of whether advance care directives are in place.[136, 137]

  The end of life care test bed will explore how improved care coordination during end of life care can be embedded into existing clinical workflows, and rolled out across Australia in ways which offer greater opportunities for individuals to have their wishes respected at the end of their lives.

Case Study – End of life care

A South Australian survey by Foreman et al.[138] found that the majority of people with a terminal illness over the age of 15 would prefer to die at home. While there is limited published evidence evaluating eHealth interventions in palliative care in the Australian setting, there are international models of digitally enabled end of life care which appear to show remarkable success in enabling patients to die at home, and feel supported through their end of life care pathway.

- **Improving child health –** Accessing and sharing information about their children's health is important for all parents. In 2017, the Australian Digital Health Agency partnered with eHealth NSW and the Sydney Children's Hospitals Network to establish the National Collaborative Network for Child Health Informatics (the Network). The Network is bringing together Australia's leading experts in children's health to identify national digital health projects that will have a positive impact on the health and social outcomes and experiences of children and their families.

  This test bed will utilise the expertise of the Network to support child health in the most effective ways. One of the likely areas of effort is to address the fact that parents are often required to remember and repeat information about their child's health, including vaccinations. It has been demonstrated that access to an electronic health record for children improves vaccination rates, and that consumers would like better access to their children's health records even when they move across state borders.[139, 140] Such access will also offer better support for children undergoing regular health treatments.

  The children's health test bed will examine how every child in Australia can have access to a comprehensive digital health record, readily accessible by parents and healthcare providers, to track key childhood healthcare interventions (e.g. immunisations) and ensure that healthcare providers are able to offer safe, high-quality care. A number of sectors will need to collaborate to investigate how to harmonise state and territory systems into a national child health record that can be easily adopted.

- **Improving emergency care –** The My Health Record system can potentially support healthcare providers in emergency department settings by providing efficient access to a patient's medical history.[141, 142]

  This test bed will examine how healthcare information can be shared across healthcare practitioners in real time, to better support management of healthcare emergencies, and will be undertaken in partnership with the Australian Commission for Safety and Quality in Health Care.

Case Study – Collection of genomics data in the UK

The UK has established a national architecture to enable consistent collection of genomics data, and matching of this information with longitudinal healthcare and mortality data within cancer registries, hospitals and primary care clinics. This is enabling a myriad of clinical and industry research projects and collaborations, with over 39 research themes being worked on, from lung cancer to population genomics.[145]

"Enabling Australia-wide access to high-quality genome sequencing is a foundational requirement for enabling precision medicine... Development and co-development (with our partners) of new capabilities that allow health consumers and payers to experience the benefits of precision medicine, including (but not limited to) more accurate (safe) and cost effective diagnosis and treatment (right therapeutic, right time, right place)."

- Garvan Institute of Medical Research submission

ADVANCE CARE PLANNING

The Australian Government and the states and territories recognise that promoting the autonomy and dignity of an individual is an important part of providing high-quality, patient-centred care. Advance care planning enables individuals to make plans for their future care, and encourages them to reflect on how they want to be cared for if they reach a point where they cannot communicate decisions about medical care for themselves.[146]

The national objectives for advance care directives (ACDs) include ensuring that clinical care and treatment plans written by healthcare providers are consistent with a patient's expressed values and preferred outcomes of care as recorded in their ACD, and that they be readily recognised and acted upon with confidence by health and aged care providers.[147]

The National Digital Health Strategy contributes to these objectives by prioritising the end of life care test bed. The test bed will explore how the My Health Record system can improve consumers' ability to seamlessly upload advance care planning documents, and help facilitate national harmonisation of formats and terminology. The Agency will collaborate with experts on how ACDs can be better incorporated into the My Health Record, to ensure that they become more accessible to treating health professionals, and encourage greater numbers of Australians to take control of their future life and care choices.

How will Australia benefit?

- Chronic disease management (Health Care Homes) will deliver reduced MBS, PBS and hospital expenditure due to reduced complications and hospital admissions.
- Telehealth will lead to a reduction in hospitalisations, reduced patient transport costs, and shorter waiting lists.
- Residential aged care will have fewer adverse drug events.
- End of life care will lead to reduced avoidable hospitalisations and shorter stays in hospitals.
- Child health records will lead to improved vaccination rates.
- Emergency care will provide improved quality and handover.

6. A workforce confidently using digital health technologies to deliver health and care

By developing a workforce that is able to confidently use digital health technologies and services, the following will be delivered by 2022:

WHAT WILL BE DELIVERED BY 2022?

- The Agency will collaborate with governments, care providers and partners in workforce education to develop comprehensive proposals so that by 2022, all healthcare professionals will have access to resources that will support them in confident and efficient use of digital services.
- Resources and curricula will be developed to ensure all healthcare practitioners are exposed to and trained in digital technologies and their use during training and upskilling.
- A comprehensive set of clinical resources which clearly outline the evidence for how, when and where digital health should be used in everyday clinical practice.
- Promotion of a network of chief clinical information champions to drive cultural change and awareness of digital health within the health sector.

The National Digital Health Strategy can only be achieved through supporting a change management approach within the health and care workforce.[148] Without this focus, there is a significant risk that healthcare providers will not develop the trust and confidence in digital technologies that will deliver significant advances in accessibility, quality, safety and efficiency.[149,150] The Strategy must incorporate the demographics of the health and care workforce and respect the reticence or ambivalence of some members of the health and care workforce.

> *"Technology on its own, … no matter how effective the platform, will not bring about changes in the behaviours of clinicians. An implementation strategy which addresses the barriers to effective adoption of these technologies will be critical to their success."*
>
> - Pharmaceutical Society of Australia submission

Engaging the sizable health workforce across diverse healthcare sectors, including primary care, acute care, aged care and mental health, and across the large number of health professions and geographies is challenging. However, given that patient care spans all these sectors, it is imperative that the whole health and care workforce is appropriately engaged with emerging digital health technologies and services.[151, 152] For example, Victoria has named digital workforce capability as one of the critical success factors that underpin its digital health goals.[10]

A trained, digitally aware workforce – appropriately equipped with hardware, software and digital literacy – is required.[148, 150, 151] To achieve this strategic goal, the following strategies must be put in place:

- **Help made available –** With the right support, healthcare providers will adopt digital health technologies and services if they can be shown how to use them[153] within their healthcare context, and the evidence for doing so. A range of organisations such as the primary health networks and the regional hospital and health networks will be important partners in supporting the health and care workforce at the local level, complemented by national mechanisms, such as the on-demand training functionality run by the Australian Digital Health Agency.
- **Digital health training provided throughout training pathways –** Australia must ensure that the health and care workforce is sufficiently supported and informed, with digital health embedded through all training pathways.[151] Innovation in healthcare education is already occurring within the tertiary education sector, with pilot courses on digital health in the planning stages at many Australian universities. Increasing the capability of the university sector to evolve curricula and incorporate digital health into undergraduate and postgraduate courses will ensure students are empowered to confidently and effectively use digital technologies upon graduation.[154]

> *"If nurses, doctors, administrators and senior managers are familiar with a technology, trained in its use and understand the benefits of its application, there is more chance it will be adopted."*
>
> Australian College of Nursing submission

- **Digital health integrated into national standards –** Health and care workers increasingly need a core set of digital competencies to enable them to work safely, efficiently and effectively.[154] More evidence is being gathered which demonstrates that failing to integrate digital health into normal workflows leads to poorer health outcomes for the Australian community.[155, 156] Given this evidence, integration of digital health into national workforce accreditation needs to be led by the professional associations and workforce accreditation bodies, sensitive to the needs of both technophile and technophobe health professionals.

  Healthcare providers should have easy access to best practice guidelines, and other supporting resources, which increase their understanding of how, when and why to use digital health solutions to improve outcomes in their routine clinical practice relating to a variety of illnesses.[157, 158] Clinical leadership networks, professional societies and peak bodies have responsibility for guiding their members on how to embed digital health into routine clinical practice and will be supported by the Australian Digital Health Agency to gather the evidence.
- **A network of clinical digital health champions –** A network of clinical digital health champions, who understand the benefits of digital health and encourage the upskilling of the workforce across the health system into the future, is important to build momentum and a critical mass of digital health proponents.[152]

  The capture and use of high-quality data and the resulting analytics can drive changes that will lead to a safer, higher quality, more effective health system. However, to achieve this, Australia's clinicians need to have the relevant skills. Investment in clinical informatics and data analytics as core skills for the modern health workforce is a key strategy.[159]

> *"Include education, ongoing support and have clinical champions to advocate the use of eHealth technologies."*
>
> Royal Australian College of General Practitioners submission

RURAL AND REGIONAL HEALTH

Australian governments recognise the unique challenges of providing healthcare in rural and remote Australia, and the importance to all Australians of providing timely access to safe, high-quality healthcare services, regardless of where they live.[160] The National Digital Health Strategy contributes to the national objective that "people in rural and remote Australia are as healthy as other Australians" by using technology and information to address systemic issues that require the most attention, including access, appropriate models of care, a sustainable workforce, and the development of collaborative partnerships. Leveraging existing infrastructure to enhance adoption of digital health technologies and services will help overcome issues of distance, as well as rural and regional workforce shortages, and allow for better sharing of information between rural practitioners and other healthcare providers.

> ***" The Australian College of Rural and Remote Medicine strongly recommends that the National Strategy for Digital Health be structured to support rural communities, and include clear objectives and actions which are designed in consultation with rural and remote practitioners and stakeholders to address their unique needs and circumstances."***
>
> ■ Australian College of Rural and Remote Medicine submission

Establishing the telehealth test bed will involve co-design of the framework with rural health consumer and healthcare provider organisations, while future uses for national digital health foundations, including enabling new models of care in rural and remote settings, will be co-designed with patients, carers, healthcare providers and other key stakeholders.

How will Australia benefit?

- All healthcare practitioners will be able to confidently and efficiently use digital technologies and services to interact with patients, use and contribute to their health record and exchange with the rest of the health system.
- The next generation of health and care workforce will be exposed to and trained in new clinical pathways, digital technologies and the importance of high-quality data.
- The workforce will be positively engaged on the effect of digital technologies and services on their working lives.

7. A thriving digital health industry delivering world-class innovation

By supporting a thriving digital health industry delivering world-class innovation, the following will be delivered by 2022:

WHAT WILL BE DELIVERED BY 2022?

- Australians will have better and more informed access to safe, quality health applications, tools and content, through a digital services endorsement framework that will be co-produced with clinical, design and innovation leaders.
- A new health innovation exchange will be established, where clinicians, researchers and entrepreneurs use data to identify opportunities to work collaboratively on designing digital health solutions.
- The Agency will work with industry to evolve the developer support program to reduce barriers to innovation and enable opportunities for better integration with the My Health Record system and other digital services.
- The Agency will consult with the community on development of a comprehensive approach to digital inclusion, to ensure new innovations do not leave anyone behind.
- Adoption will be accelerated by providing best practice design principles and guidelines to improve usability and user experience.

> *" To rapidly accelerate the impact of digital health, the Strategy should specifically recognise that the role of government is to facilitate private sector development of innovative digital products and services – through establishing the right infrastructure and environment for innovation, rather than attempting to develop new products or services itself. "*
>
> - BUPA submission

Australia has a track record of innovation and scientific achievement in healthcare. From the invention of the diagnostic ultrasound and the multichannel cochlear implant, to the foundations of Wi-Fi technology[161], Australian researchers and entrepreneurs have a global reputation for innovation that meets clinical needs and increases quality of life.

New innovative ideas are now under development through collaboration between Australia's best and brightest entrepreneurs and researchers, turning good ideas into reality, and making new digital health innovations available to healthcare providers and consumers.

In Perth, one hospital's pharmaceutical ordering system is being operated by robotic systems, allowing the workforce to be reassigned to patient-focused tasks.[21] A mobile app is being trialled that could help diagnose a child with asthma or pneumonia by simply having them cough into a smartphone.[162] A recent pilot program used telecommunications technology to allow patients with serious chronic conditions to be cared for from the comfort of their own homes, monitored

remotely by a care team which could respond with appropriate treatment or stage early intervention, helping to keep people well and out of hospital.[163]

In addition to these areas of innovation, there is an opportunity to further drive innovation to contribute to a strong and entrepreneurial economy, and improve our ability to meet the needs of Australians through safer, more efficient and effective healthcare delivery.[164, 165]

Case Study: Western Sydney Diabetes Gateway

The Western Sydney Diabetes Gateway is a mobile application that empowers patients with diabetes to track, manage and improve their health. Developed by Western Sydney Local Health District (WSLHD), Western Sydney Primary Health Network (WSPHN), NSW Diabetes, Telstra, Sanofi and other industry partners, the Gateway app complements clinical care by providing education and support for patients on a daily basis to encourage self-management of their condition. This innovative consumer portal is unique in that it links patients with the core healthcare system and incorporates their data into their care plans, thus improving both self- and clinical management. This is coupled with ongoing two-way communication between patients and their GPs, allowing patients to share data updates and goals, and to receive results and feedback – all from their smartphone or tablet.[166]

There is optimism and enthusiasm among both health consumers and healthcare providers that digital technology will transform healthcare and improve health outcomes.[116] This enthusiasm needs to be harnessed by offering well-designed, evidenced-based digital health technologies and services that are co-designed with users and respect health consumers' rights to privacy.

Although there is much that is encouraging about Australian innovation in healthcare, there are structural and cultural barriers which prevent Australia from leading the world in digital health innovation. There are lower rates of innovative digital health start-ups in Australia compared to other countries[167], and a perception of a lack of confidence within the private sector to invest in digital health product development and commercialisation.[29] Potential innovators can be discouraged by a highly regulated and complex healthcare system with strict accountability obligations.[165] More work needs to be done to support the scaling up of successful innovations, based on evaluations of past and current trials.[167]

> ***"The Australian health system needs to be agile and responsive as use of technology becomes more widespread and new tools emerge and change how we manage our health and deliver healthcare."***
>
> eHealth NSW submission

Healthcare researchers and experts are concerned that despite there being over 250 000 mobile health apps available to consumers, few have been evaluated in clinical trials, some have caused privacy concerns, there are no provisions for health system reimbursement, and there are examples of apps making health claims that are unproven or invalid.[168-170]

Many smartphone-based apps, however, have been proven to improve health outcomes[171] [172], and there is an opportunity to promote digital tools that legitimately improve and manage consumers' health, and respect their privacy.[168] Health consumers are looking to government to provide guidance on reliable information and tools to give them confidence in making health decisions for themselves and the people they care for.[116, 173]

The Agency will work collaboratively with partners, including the Australian Commission on Safety and Quality in Health Care, the Therapeutic Goods Administration and research, clinical and consumer organisations, to design a sustainable digital health services endorsement framework to complement existing initiatives by both the public, private and non-government sectors to compile a list of safe, evidence-based digital health services and content that have beneficial health outcomes and respect peoples' right to privacy.

While digital innovation is transforming many aspects of our lives, there is not yet equal opportunity for all to participate, particularly those people who make the greatest use of health services.[174] There are three million Australians without internet access, and only 63% of Aboriginal and Torres Strait Islander households have internet access at home.[175]

Good Things Foundation – digital literacy programs improve access to health services and improve health outcomes[174]

"Widening Digital Participation" was a program established in the UK to support those most likely to experience digital and health inequalities. Between 2013 and 2016 it was found to have achieved:

- *a reach of over 387 000 people, raising awareness of digital health resources*
- *the provision of training to almost 222 000 people in the use of online health resources*
- *the provision of training to over 8100 volunteers to help deliver the program*
- *a range of positive impacts on participants, including:*
  - *41% learnt to access health information online for the first time*
  - *65% reported feeling more informed about their health*
  - *52% reported feeling less lonely or isolated*
  - *a total of £6 million was saved in avoided doctor and hospital visits in a 12-month period.*

Australia's digital divide was a key theme highlighted by respondents to the "*Your health. Your say*" survey, who noted that it must be addressed to ensure that the health benefits achieved in the coming years are shared equally.[116] This view was supported by many submissions, including from Carers Australia, the Good Things Foundation, the Tasmanian Aboriginal Centre, the Consumers Health Forum of Australia, Alzheimer's Australia, and the Australian College of Rural and Remote Medicine.

> *"Feedback from older consumers has focused primarily on access and navigation barriers: they either had no access to the internet, did not have the skills necessary to navigate the website effectively, or found it too difficult to find the information that they needed."*
>
> Alzheimer's Australia submission

> *"Digital literacy and access is also a significant barrier that needs to be addressed; both in terms of technical ability to access the internet and other digital platforms, but also having the financial means to do so."*
>
> Carers Australia submission

The Agency will convene stakeholders across the community to develop comprehensive approaches to digital inclusion, ensuring that actions to address digital literacy are based on high-quality evidence for how best to support people who are currently experiencing digital disadvantage.

Innovation is about doing things in different ways, whether by using new technology or through collaboration, to create new offerings that meet the needs of health consumers, healthcare providers, industry and the broader community. Accelerating innovation in the health system means:

- facilitating meaningful partnerships between industry, healthcare consumers and the research sector, focusing on addressing the health system's highest priority challenges
- removing the barriers which prevent the development of new products and processes in the health system
- creating conditions for entrepreneurs to try new things, to engage in rapid prototyping, to learn from patients, carers and healthcare providers, to safely develop products with a "permission to fail", and applying lessons learnt to make continuous improvements to new innovative solutions
- making investments that drive change
- learning from global best practice
- highlighting and scaling up the innovations that work.

The Agency will work with its partners to evolve the Developer Support Program, focusing on providing a simple gateway to access information, tools, services and support to safely integrate with the My Health Record system and other digital services, as well as providing a space for collaboration and learning. This means providing more transparency on product roadmaps and planned new system improvements, and inviting members of the developer program to partner on co-delivery of new functionality.

The Agency will simplify, guide and support developers on how to bring new ideas to market, facilitate test environments, provide an open source hub of code sets, and provide support on how digital health national infrastructure services can support developers to deliver valued services for patients, carers, clinicians, researchers, administrators and technologists.

PREVENTIVE HEALTH

All Australian governments have affirmed that Australia's health system "should focus on the prevention of disease and injury and the maintenance of health, not simply the treatment of illness" and "support an integrated approach to the promotion of healthy lifestyles, prevention of illness and injury, and diagnosis and treatment of illness across the continuum of care".[99]

The National Digital Health Strategy supports this national commitment through a number of initiatives. Providing a My Health Record to every Australian who wishes to have one will assist patients to understand and communicate with their preferred clinician and other healthcare providers about their health problems, and discuss treatment goals and progress with clinicians. A digital services endorsement framework will give people access to high-quality information about mobile health apps and reliable content that supports and encourages them in taking care of their own health.

> ***" A clear focus (is) needed on meaningful data to be targeted to improve specific health outcomes. Technology should be aligned to areas (e.g. chronic illness such as diabetes or epilepsy) where it can help shift from a reactionary care model to predictive and preventive care."***
>
> ■ Darling Downs and West Moreton Primary Health Network submission

How will Australia benefit?

- There will be greater availability of well-designed and developed digital health solutions, leading to improved patient and clinician choice and experience.
- There will be increased rates of industry developing and scaling innovative digital health and care services.
- More people will have the opportunity to improve their digital skills and participate in the digital economy.
- Digital health solutions will contribute to building a strong and entrepreneurial economy.
- Australia will be acknowledged globally as a leader in digital health and have an open system that supports industry to develop innovative digital health solutions that deliver improved health outcomes.

CRITICAL SUCCESS FACTORS FOR THE NATIONAL DIGITAL HEALTH STRATEGY

In order to realise the benefits of digital health, the National Digital Health Strategy will need to address the following to ensure successful implementation of priority strategies.

Trust and security assurance

Consumer and healthcare provider trust in digital health is critical to the successful delivery of the National Digital Health Strategy. Strong privacy, security and risk management frameworks to protect sensitive information while also enabling the safe and efficient sharing of information are vital.

Healthcare professionals need to understand how to use digital tools in a way that safely handles personal information, and consumers need to be educated about their privacy rights in order to make informed choices regarding how their health information is used.

The Australian Digital Health Agency has established the Cyber Security Centre to protect the national digital health systems and personal health information of Australians that is stored and transacted through them from the cyber threat, and to raise the security posture of the Australian digital healthcare system. The Agency will continuously adapt and improve the security of Agency systems and services to ensure emerging threats, risks and vulnerabilities are managed effectively.

Commitment, cooperation and collaboration across all governments

Given the significant investment in digital health being made across health services and governments, a national approach must acknowledge, complement and build on these developments and not duplicate existing activity. Achieving the outcomes and benefits anticipated in this Strategy will require all governments to support the priorities and commit to ensure national capabilities are delivered for all Australians, no matter where they live or are travelling. Working together and leveraging existing assets and capabilities will avoid duplication and fast-track the realisation of benefits.

Establishment of legislative, regulatory and policy frameworks

The management of personal healthcare information and clinical processes such as medicines management is governed by a complex network of federal, state and territory legislation.

This Strategy has an outward focus that will require shifts in policy – including legislation, regulation and funding models – to deliver the priorities. Enhancing models of care, changing prescription processes and medicines information, and improving interoperability are some priority areas that will require changes in policy and funding structures, and will require capabilities that do not yet exist in the healthcare system. Australia's policy and legislative framework must be able to accommodate changes that will occur from time to time, and for the maturation of implemented solutions. Stakeholders will need to be supported to navigate their way through this process.

Legislation is in place to govern the operations of the My Health Record system and the Healthcare Identifiers Service, as well as the oversight and mandate for the digital health agenda under the Australian Digital Health Agency. By law, a review of the enabling legislation for the My Health Record system and the Healthcare Identifiers Service needs to be undertaken every three years. The next review for both of these Acts will be required during the timeline of this Strategy.

Strong consumer and clinician engagement and governance

The ongoing use of collaborative, co-design and co-production principles will be integral to ensuring digital health is usable within the health system. Engaging the tremendous diversity of health professionals involved in health and care is challenging. Any initiative requiring a change of practice in the digital health domain will require this scope of clinical engagement to be successful.

The Australian Digital Health Agency will need to work with individuals, healthcare providers and software and technology vendors to ensure that consumer-focused digital health solutions are easy to use and able to be understood by individuals, while still providing the level of detail and the information required for an individual to be active in the management of their healthcare.

Effective governance and leadership

Strong national leadership will be critical to the success of this Strategy. No single organisation can achieve the desired outcomes from digital health alone. A coordinated approach will support governments and industry to deliver on the objectives.

Learning from others

Australia is innovating strongly in a few select areas in the digital health space; through this Strategy we seek to become a world leader in digital health. By developing meaningful partnerships between industry, healthcare consumers, and the research sector, and working with our international partners to share our lessons and insights, there is an opportunity to accelerate our progress in digital health.

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