Health <Transformation> Lab

CARE + SYSTEMS + CYBERNETICS

Transforming Aged Care

Towards a future in which digitisation clasps hands with respect, and connection drives improvement

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Executive Summary

Towards a future in which digitisation clasps hands with respect, and connection drives improvement

> " *The neglect of our aged care residents has gone on for too long. The people who built Australia deserve more protection from their Government. I will act to ensure the sorts of shocking stories we heard during the Aged Care Royal Commission are no longer tolerated."*
>
> Then-Opposition Leader Anthony Albanese, 3 April 2022

Purpose

The Royal Commission into Aged Care Quality and Safety has perhaps shone history's brightest light on the systemic weaknesses and deficiencies of Australia's aged care sector.[1]

The stories it uncovered, of neglect, of disinterest and, above all, of disrespect, were shocking and — in many ways — surprising. Surprising not because isolated reports of deficiencies in care were unknown, but because the overall faltering of the system flew in the face of years of 'person-centric' reform interventions and efforts, and the sector's $20 billion annual Federal investment.[2]

Australia's aged care system provides support for 1.2 million people[3] — it is an essential service — but it is yet to realise our collective hopes for how we treat the people who rely upon it.

And politics has appreciated this, with aged care reform being a major battleground in the recent 2022 Federal election. Policy and system change is coming, there can be no doubt.

What is required is a large-scale system reorientation and transformation — at provider, service, policy and ethical levels. In meeting this challenge, we believe that technology and digitsation have a core — not superficial or ancillary — role to play. Amidst the sea of challenges, the potential for technology in aged care is far deeper and more transformative than might be imagined.

This paper offers some strategic provocations concerning how this can happen. It is written for anyone with an interest in the future of the aged care system, from policy-makers focused on how digital technologies can deliver on the goals of regulatory reform, to aged care providers concerned about the value to be found in digital transformation.

Most importantly, the purpose of this paper is to spur cross-system conversation. Eschewing the traditional siloed approach, we anticipate the report can contribute to the work of researchers, regulators, clinicians, advocates, and the many people engaged in the day-to-day delivery of aged care services in Australia.

> **❝** *The aged care system in Australia today has many flaws. There are, no doubt, some instances of wrongful or inappropriate behaviour, but the system as a whole is a product of different elements frequently acting as expected and intended, but not producing the best outcomes for those in need.*"
>
> Royal Commission into Aged Care Quality and Safety, Chair's Preface

A system under pressure

Few would disagree that our aged care system is under pressure — and there are many factors combining to stress the system.

Australia's population is ageing and, as we live longer, more people are requiring aged care, for longer periods. This pressure will only intensify over the next decade.

Simultaneously, the workforce required to serve this increasing population has stagnated. The entire sector is understaffed and by 2030 the staff shortfall is predicted to be 110,000 workers.[4]

In the wake of the Royal Commission, regulation across the sector is changing, further compounding the sector's uncertainty. The change in Federal government has been accompanied by significant new policy proposals: dramatically increasing the staffing requirements in residential aged care; and raising wages across the sector. Perhaps the most striking proposal is to make aged care providers criminally liable for low-quality care.

And finally, amongst all of these pressures, the pandemic — which has proven to be most deadly to those over 60 — has disrupted almost every facet of the aged care system. Simultaneously increasing the care burden and impeding staff recruitment, the pandemic has isolated older Australians from the rest of the community while requiring their carers to shoulder a heavier burden.

A system that demands, yet complicates, digital transformation

In addressing these challenges, technology — and especially digital technology — surely has a central part to play. However, the types of digital services that are commonplace across other industries and sectors have failed to gain traction in aged care.

In producing recommendations for a brighter digital future in aged care, we spoke to leaders and players from across the aged care system in order to gain insight into the lived experience of the system and its operation.

The perspectives gathered helped to uncover four characteristics of the aged care system that are complicating transformation in the system — both digital and otherwise.

1. **Dynamics of government spending to support an ageing population.**

2. **The fragmented landscape of aged care providers, operating with numerous economic pressures.**

3. **The challenges of the silent voice: difficulties for older Australians in advocating for themselves.**

4. **The digital mismatch: digital maturity of aged care providers is not on par with that of older Australians.**

> **❝ But it doesn't have to be this way. Alternative futures are possible...**

Enhancing respect and engendering trust should be the polestar of our reform

For centuries, age was synonymous with experience. Elders were treated with respect, their knowledge invaluable to community survival. Today, however, ageing can be an isolating experience. Frailty and reduced mobility can leave even those still living at home disconnected from the broader community.

Treating older Australians with the respect they deserve — and the respect demanded by the Royal Commission — hinges on their "de"-isolation. It requires a system that can, once again, incorporate them into the centre of daily life.

Accomplishing this will require much — at multiple levels of our system: from carer involvement to workforce dynamics, from care contexts and models to provider operations.

All of this tells us that strategies for digital transformation in aged care must:

1. Be deep rather than superficial;
2. Be systemic rather than piecemeal;
3. Favour the ethical over purely the technical;
4. Positively impact the provider and aged care recipient experience.

Respect requires connection — and digital technologies can 'upgrade' connections across aged care
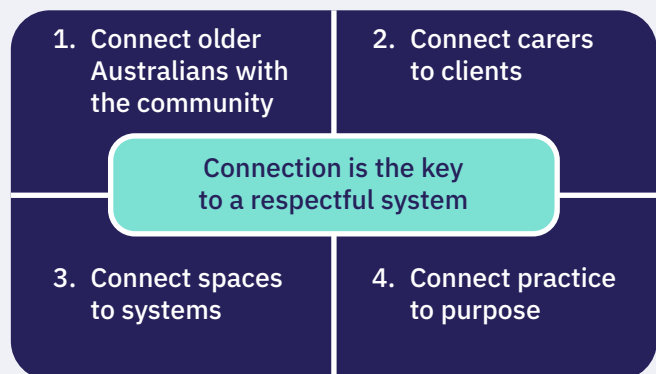
The foundation of a respectful system is one in which people are connected.

Whether it is the recipients of aged care being connected to their families and friends, or aged care workers having the time to genuinely connect with those they care for, respect requires that people be visible, that they be present.

The scaffolding for interpersonal connection is the creation of connected aged care spaces. Connected spaces automate data collection and safety monitoring, turning isolated sites into a cohesive, comprehensible, network.

But most important of all is the connection of practice to purpose; aligning each element of the system, the day-to-day practices of the thousands of people working within it, with the overall purpose of providing respectful aged care to everyone who needs it.

Connection is something digital technologies excel at delivering. And enhancing digital connection offers to 'open up' aged care, making it as simple as possible for all types of information — from video-calling to telehealth; food preferences to statutory reporting — to flow in and out of all the myriad aged care settings.

1. Connect older Australians with the community	2. Connect carers to clients
Connection is the key to a respectful system	
3. Connect spaces to systems	4. Connect practice to purpose

Rethinking aged care as the frontier of digital transformation is a bold objective, but it is foundational to the overall aim of optimising the care provided across the system.

Continuing along the current trajectory will lead to ad hoc digital additions that merely bounce off the surface of the problem.

Striking at the heart of the problem requires a depth of strategy and an awareness that good processes are necessary for good outcomes. To this end, our recommendations cover the types of digital technologies most immediately valuable to aged care, but also highlight the importance of setting in place the processes and resources required to achieve ongoing, meaningful change.

Summary of recommendations

Respect through connection; connection by 'design'

Digitisation can transform aged care, and can do so in a way that is person-centric and that embeds respect.

A framework for tech-entrenched respect is based on connection across four dimensions:

- Connecting older Australians to their community;

- Connecting carers to recipients;

- Connecting aged care spaces to those relying on them; and

- Connecting practice to purpose across the system.

Digital first approach to optimising care and operations

With every new investment, organisations need to consider if there is a digital alternative. Optimising the use and value of digital technologies comes from building their evaluation into every decision-making process.

Not all digital infrastructure is equal

Purposeful digital infrastructure provides secure and private customisation, with everything connected on a resilient network. While connection is the key to respect, security is a prerequisite for maintaining trust in digital systems.

New models and spaces for experimentation are critical

Technology-rich experimentation spaces provide opportunities for advanced prototyping and exploration. Bringing representatives from across the system into simulated experimental spaces can generate new ways of approaching old problems.

The Health Transformation Lab is a collaboration between Cisco and RMIT University — designed to be a place where leaders from across our care systems come to experiment with and solve their thorniest problems at the intersection of practice, policy and technology.

Health <Transform ation> Lab

Introduction: the digital opportunity amidst a sea of challenges

The Aged Care Royal Commission and what lies beyond it

The Royal Commission into Aged Care Quality and Safety has perhaps shone history's brightest light on the systemic weaknesses and deficiencies of Australia's aged care sector. Quiet fears concerning the limitations of the system, deficiencies in care, mistreatment of people, and challenges for the workforce have been realised, displayed and dissected for all to see. The report itself is a 2000-page, 148 recommendation litany on how our aged care system falls short in terms of respect, efficiency, quality and outcomes.[1]

Systemic roots of systemic problems

While the sector and policy-makers have braced themselves for some of these findings — at another level — they remain surprising. For decades, mantras of 'person centrism', 'lived experience' and 'human centred systems' have been the catch-cry of service designers and providers in the space. The sector, its workforces, its policy-makers and its technologists have not stood still — they have worked tirelessly to improve the system using every tool at their disposal.

Notwithstanding this, the Royal Commission, weekly media, political actors and system advocates raise critique after critique of Australian aged care.

So, if this is the case, what has gone wrong? Why have well-intentioned efforts, new initiatives, reform proposal after reform proposal, not aided the outcomes or reputation of the aged care sector?

A hint can be found in the Chair's Preface to the report of the Royal Commission:

> *The aged care system in Australia today has many flaws. There are, no doubt, some instances of wrongful or inappropriate behaviour, but the system as a whole is a product of different elements frequently acting as expected and intended, but not producing the best outcomes for those in need.*

In essence, there is something about the *structure and dynamics* of the system that — at times — inhibits the *outcomes* of the system. Positive intentions can, and do, co-exist with sub-optimal outcomes, deficient models of care and systemic inefficiencies. And the stakes are high: counted in years of life enjoyed, or not; lives lived, or not.

Alternative futures are possible

But this state of affairs need not persist. Alternative futures are possible. The scope for new value, new practices and better outcomes are thrillingly within reach.

The Royal Commission has detailed numerous recommendations that speak to the need to reorient the dynamics of the aged care system around respect and quality.

The pace and emphasis of digital change across our economy and society — including at times and in places spurred by our recent experience of the COVID-19 pandemic — have led to calls that technology can be, should be, must be, core to how we respond to the Royal Commission, and how we 'put people at the centre' of the system.

These calls are surely correct. The potential of digitisation and technology in aged care promises to improve all elements of the system — from the user's experience to provider efficiency, from workforce dynamics to system transparency. But the core lesson we must learn to avoid the structure and dynamics of the system overawing the outcomes of the system — the core issue highlighted by the Royal Commission and by the experience of carers, service providers policy-makers and advocates — is that our technology interventions must be systemic, they must be deep and they must be actually person-centred.

This paper

This paper is the result of consultations and discussions across the aged care sector — from providers to researchers, carers and support staff to recipients, management to technologists.

We contend that the real potential for technology in aged care is far deeper and more transformative than might be imagined. Properly understood, we argue that digital transformation — more than just smoothing specific inefficiencies or communication gaps — is critical to creating an aged care system that can be scaled to meet the future needs and provide the respect and quality that is the motivating force of carers, the aim of our providers, the demand of our ethics and the right of every user of the system.

Put another way, technology and digitisation can be core to system reorientation and transformation — at provider, service, policy and ethical levels. But only if we reorient the way we see technology, respect and person centrism in the aged care system.

This paper offers some strategic provocations concerning how this can happen — drawing from a range of perspectives from the aged care sector — and highlights some of the system-wide dynamics and pressures that need to be addressed when conceptualising technology solutions for aged care.

The purpose of the aged care system, in the words of the Royal Commission into Aged Care Quality and Safety:

> *[To] ensure that older people have an entitlement to high quality aged care and support and that they must receive it.*
>
> *Such care and support must be safe and timely and must assist older people to live an active, self-determined and meaningful life in a safe and caring environment that allows for dignified living in old age."*

The aged care system speaks

How the system both demands and inhibits technology transformation

> " *Quality of life should be the constant and predominant aim of the aged care system. The desire for a good quality of life may change in content but does not diminish with age."*
>
> Royal Commission into Aged Care Quality and Safety, Final Report

The problem of respect — and why technology matters

Until very recently in human history, older members of our society held positions of authority and power. Essential members of the community, their hard-won knowledge and experience was the object of respect — integral to the community's safety and development.

Today however, we have pushed the elderly to the edge of society, often leaving them lonely and socially isolated. Modern life has tended to stigmatise ageing, risks de-valuing older people and — often inadvertently or unmindfully — disappearing basic freedoms and simple pleasures from older members of our communities.[5]

These effects are often most acute in residential aged care facilities — by mere dint of context (and ignoring the obvious abuses uncovered by recent reports and Commissions). Residents are necessarily separated from the broader community, unable to leave the facility voluntarily and without any routine public contact. Food choices are often limited, staff are stretched for time and so the meeting of basic needs is often delayed. The ability to entertain one's grandchildren with a lovingly baked cake is often off the table, as is the ability to enjoy a conversation with well-known friends in local communities.[5]

But the issue is not just one found in residential settings. Millions of older Australians receive aged care support in their homes, with more than a quarter living alone.[6] And they tell a familiar story. With adult children busy with work and their own families, it can be hard for seniors to maintain contact with the people they love.

Of course, these are very much the kinds of issues that digital technologies have the ability to address. Facilitating choice, increasing organisational efficiency, reducing administration, increasing transparency — these are the heartland issues of digital transformation. And the COVID-19 experience has also shown that digital technologies — especially in domains such as health, education, service virtualisation and infrastructure dynamism — can have a marked and an immediate impact on safety, autonomy and quality.

That said, whether in the context of COVID-19 or beyond, the aged care system has not benefited as strongly as seems appropriate from digital transformation or technologies.

The types of digital services that are commonplace across other industries and sectors have failed to gain traction in aged care. The sector lags behind the hospital system in the adoption of electronic medical records and significantly trails broader industry in the implementation of digital human resource management. Many providers continue to rely on inefficient paper-based systems that absorb the time of nurses and carers, taking them away from face-to-face interactions with aged care residents.

How the aged care system context complicates and demands digital transformation

The reason for this failure to achieve traction is — as we have discussed and as has been pointed to by the Royal Commission — a function of dynamics and structure within the aged care system itself. There are systemic reasons why technology has failed to have the impact that it might in aged care. Other characteristics of the system, however, present new opportunities for technology to provide a much-needed reorientation.

A review of the system and engagement with players in different parts of it highlight four key characteristics of the aged care system that need to be well understood in this:

1. **Dynamics of government spending to support an ageing population.**

2. **The fragmented landscape of aged care providers, operating with numerous economic pressures.**

3. **The challenges of the silent voice: difficulties for older Australians in advocating for themselves.**

4. **The digital mismatch: digital maturity of aged care providers is not on par with that of older Australians.**

To illustrate the dynamics here, we will provide a summary of each of the above.

1. Dynamics of government spending to support an ageing population

The historic trends in government expenditure on aged care, as well as the new stimulus to support sector reforms are insightful in highlighting opportunities for technology solutions.

Australia's population is ageing, with 20% of the population expected to be aged over 65 by 2037, up from 1 in 6 (16.7%) at 30 June 2020.[7] The overall government expenditure on aged care was $19.6 billion in 2019–20 and is projected to rise to $27 billion by 2023–24.[8]

There are presently 1.2 million Australians receiving government funding for some form of aged care.[2]

- The great majority receive assistance through the Commonwealth Home Support Programme at an average of around $3,500 per person (Table 1).

- Relatively fewer people receive the higher care provided by the Home Care Packages Program but those that do collect almost $20,000 per year.

- Less than 20% are catered for by residential aged care, which is by far the most expensive aspect of aged care and makes up almost 70% of the government cost at an average of $54,000 per person.

Comparing consumer and government spending trends (Table 2) shows that the government spend on home care has increased significantly over time, with 2019–20 spending 226% of 2015–16 levels.[2] Furthermore, aged care sector reform is a significant priority area for government spending, with the 2021–2022 Australian budget including an additional $17.7 billion funding over five years.[9] This funding was announced by the Morrison Government in May 2021 as a direct response to the Royal Commission, as well as "the largest investment in aged care and the largest response to a Royal Commission in Australian history".[9]

Of this additional $17.7 billion, $7.5 billion corresponds to supporting home care and $7.8 billion to residential aged care services and sustainability. Themes of service suitability to meet individual care preferences, and assistance for both formal and informal care-giving workforce were highlighted. Also noted was $3.9 billion to increase the amount of front line care to meet the 200 minutes per day mandate, in residential aged care.

Implications for technology in aged care

- The funding trends indicate an increased opportunity for technologies and interventions that support in-home care, particularly ones that can demonstrate a betterment in meeting the needs and preferences of senior Australians, whereby both care giving and receiving are a transformed experience.

- Recent funding reforms for aged care create a significant flow of resource and finance into the system, and have been purposed in ways that increasingly call for people centred approaches that resist the trap of piecemeal or superficial solutions.

- The emphasis on meeting daily front line care mandates demonstrates a clear opportunity for technology that can redesign or reallocate workflows for care givers such that the bulk of their time is focused on direct care-giving. These solutions will be equally valuable in home-based and residential aged care settings, with great scope for creativity in both.

	Consumers	Providers	Government
Commonwealth Home Support Program Entry-level home support for older Australians needing assistance to live at home (low needs).	839,393 (67%)	1,452 (45%)	$2.8 billion (14%)
Home Care Packages Program Assists people living at home (moderate needs).	173,743 (14%)	920 (29%)	$3.4 billion (17%)
Residential aged care A range of services such as transition care (short-term care after a hospital stay) and short-term restorative care (expanded transition care).	244,363 (19%)	845 (26%)	$13.4 billion (68%)
Total	**1,257, 479**	**3,217**	**$19.6 billion**

Table 1 — Consumer numbers, provider numbers and government spending breakdown by Care Type (2019-20)[2]

		2015 – 16	2016 – 17	2017 – 18	2018 – 19	2019 – 20
Home support	Government	$2.6b	$2.4b	$2.4b	$2.5b	$2.6b
	Consumer	n/a	$204m	$219m	$252m	$251m
Home care	Government	$1.5b	$1.6b	$2.0b	$2.5b	$3.4b
	Consumer	$127m	$126m	$122m	$107m	$102m
Reddental care	Government	$11.4b	$11.9b	$12.2b	$13.0b	$13.4b
	Consumer	$4.5b	$4.5b	$4.5b	$4.8b	$4.9b

Table 2 — Government and consumer spending trends by Care Type (2019-20)[2]

2. The fragmented landscape of aged care providers, operating with numerous economic pressures

The aged care provider market is highly fragmented with the ten largest providers having just over a quarter of the market share. The remaining 74.3% of the market is comprised of 1766 providers.[10] (Figure 1)

This fragmentation alone creates significant competition, and limitation of profit margins in the space — which averages 2.3% across the sector.[10]

This 'economic squeeze' is exacerbated by:

- Steepling consumer expectations — with individuals expecting greater choice and control in their purchasing decisions, as evident in sectors such as hospitality, entertainment and transport;

- A range of changes to compliance processes and quality standards — spurred by the Royal Commission — placing increased pressure on an already limited and stretched workforce;

- The financial and operational strain of the COVID-19 pandemic that has further compounded and exacerbated many of the pre-existing issues in the sector.

The severity of the Royal Commission's findings, coupled with the largely supportive government response, has generated an urgency for change across aged care. Providers are being pushed to urgently respond to both administrative *and* care-related efficiencies and improvements.


Implications for technology in aged care

- Financial constraint and economic pressure in the system has so far impeded its ability to invest in underlying technology infrastructure to propel operationally relevant digitisation. It is increasingly important for technology value propositions to demonstrate wholistic solutions that can address providers' economic pressures.

- Technology and digitisation offerings that can simultaneously serve person-level outcomes and organisational efficiency — such as automation of manual tasks that detract from caregiving functions, meeting of mandated quality standards and high quality telehealth — will be crucial in the next phase of system reform.

Figure 1: Market fragmentation of aged care sector with market share of largest ten providers (2021)[10]

Provider	Market share
DAC FINANCE PTY LIMITED	3.4%
REGIS HEALTHCARE LIMITED	2.9%
BUPA ANZ HEALTHCARE HOLDINGS	2.4%
AVEO	3%
BLUE CARE	3%
ESTIA HEALTH LIMITED	3%
ALLITY	2%
JAPARA HEALTHCARE LIMITED	2%
LENDLEASE GROUP	2%
STOCKLAND	2%
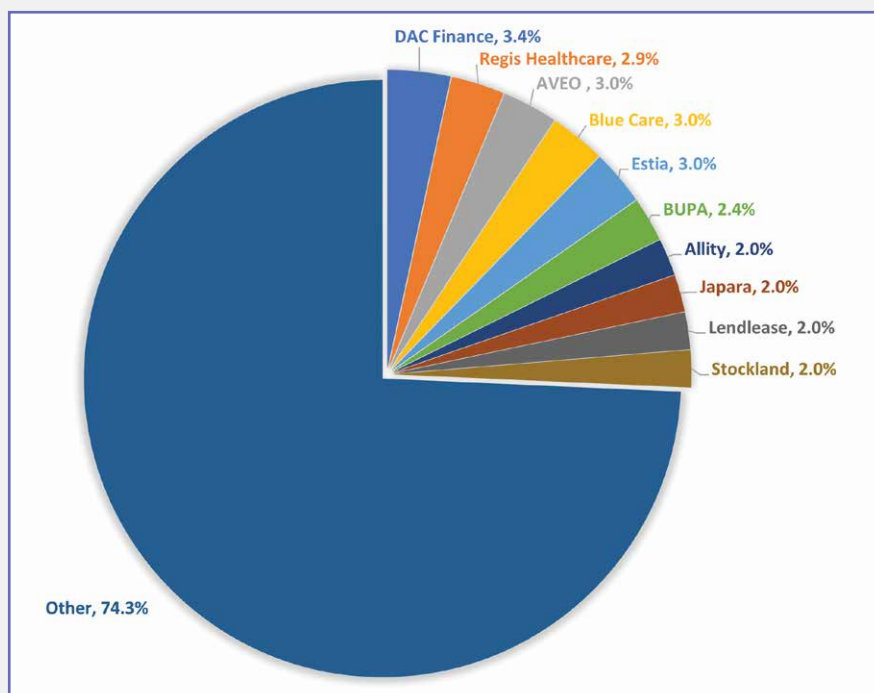
Consumer demand has been an important part of digital and system transformation in other sectors —patients advocating for change in health, students in education, users voting with their feet in standard service markets.

And while some of these dynamics are at play in particular ways in aged care, they are more complicated and specific.

Particularly in residential aged care, the opportunity to hear the consumer voice, or boost residents' self-advocacy potential, is significantly diminished.

68.1%
of aged care residents have moderate to severe cognitive impairment.

Royal Commission[11]

And while the issue is extreme in the context of residential aged care, the issue is complex even at the home care level. In 2021 over 60% of Australians living with dementia aged 65–84 were estimated to be living in the community rather than cared accommodation. The vast majority of people with dementia living in the community reside in private dwellings with other people.[7]

The issue of a silent voice shows itself in everything from advocating for one's self in the largest sense (for example in health management or circumstances of neglect or abuse) through to seemingly smaller — but no less meaningful issues — such as food choice, activity preferences, social interactions and personal care.

In the context of the Royal Commission's emphasis on 'dignity of risk' — the notion that treating the elderly with respect includes allowing them to make autonomous decisions about their lives — it becomes all the more complex. However, a number of providers voiced the concern that there was currently no guidance on where liability would fall in the event that an aged care resident, in making a risky decision like going for a walk outside or smoking a cigarette, became injured or ill.

With such a large proportion of the core beneficiary being unable to advocate for themselves it is all too easy for the consumer to be lost or overlooked. To do justice to a respectful system that does put people first, solutions for the aged care sector need to consider a range of other protective measures that can compensate for a less obvious or loud consumer voice.

Implications for technology in aged care

- Digitisation solutions that provide real-time, visible, customised transparency around an individual's quality of care and wellbeing status (for example via data capture and data flow solutions accessed by care givers, family members, medical professionals) can become a powerful proxy voice that can literally sound many alarms when needs are not being met.

- Technologies with deployment features that provide risk management solutions for providers (e.g. security devices that can prevent individuals from entering high risk physical areas but still enable a range of physical mobility) can make a meaningful difference in fostering consumer choice.

- Technologies that can balance monitoring and privacy — through anonymisation or encryption features— can benefit everyone. Individual privacy and security can be maintained and many physical risks can be mitigated without intrusive surveillance.

4. The digital mismatch: digital maturity of aged care providers is not on par with that of older Australians

The stereotypical older person is often caricatured as technologically illiterate, unable to turn on a computer, let alone use it (or other digital technologies) effectively.
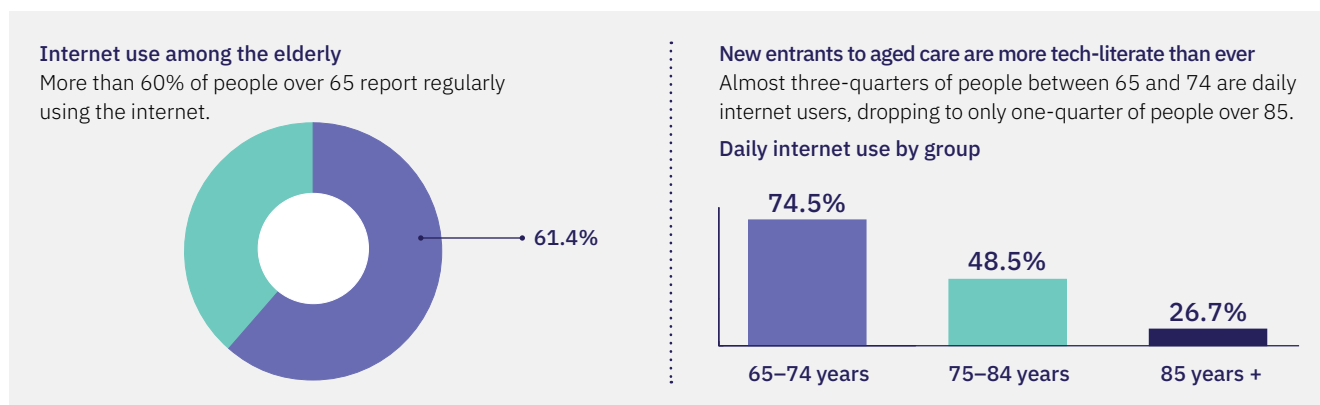
But today's entrants into aged care have experienced the computerisation of the workforce and digitisation of just about every aspect of daily life. They have markedly different lifestyle and consumer patterns compared to a person entering aged care twenty years ago.

Put another way — enter the technologically -empowered senior Australian.

The overall increase in Australia's average age is accompanied by an explosion in the number of older people who use — and expect to continue using — digital devices and services of all types. In 2020, sixteen per cent of the Australian population (4.2 million people) was over 65, up from twelve percent (2.1 million) in 1995 and 74.5% of people between 65 and 74 reported being daily internet users (Figure 2).[12]
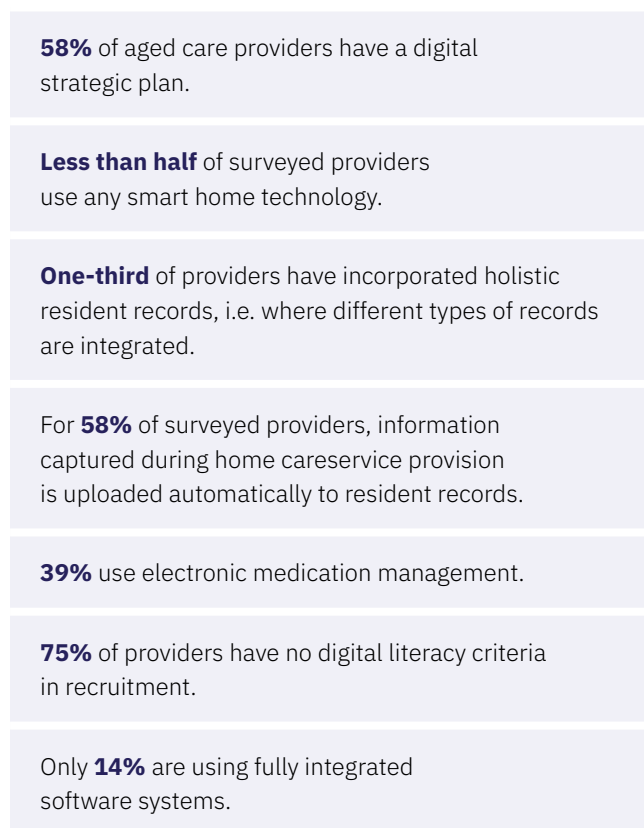
But while the users of aged care have changed markedly in recent years, the digital approaches of providers have not changed at the same rate.

Despite the fact that more than 61% of older people use the internet, only a handful of providers offer wireless internet access as standard for residents. And there is little progress being made: 42% of aged care providers have no digital strategic plan, less than half of the providers use any smart technology, and only 14% are using fully integrated software systems. (Figure 3)

Figure 3: Digital maturity of aged care providers[10]

58% of aged care providers have a digital strategic plan.

Less than half of surveyed providers use any smart home technology.

One-third of providers have incorporated holistic resident records, i.e. where different types of records are integrated.

For **58%** of surveyed providers, information captured during home careservice provision is uploaded automatically to resident records.

39% use electronic medication management.

75% of providers have no digital literacy criteria in recruitment.

Only **14%** are using fully integrated software systems.

Figure 2: Internet use among older Australians toal and disaggregated by age group[12]

Internet use among the elderly
More than 60% of people over 65 report regularly using the internet.

61.4%

New entrants to aged care are more tech-literate than ever
Almost three-quarters of people between 65 and 74 are daily internet users, dropping to only one-quarter of people over 85.

Daily internet use by group

74.5% — 65–74 years
48.5% — 75–84 years
26.7% — 85 years +

Implications for technology in aged care

- Strategies, solutions or approaches to increase the digital capabilities and digital maturity of aged care providers are critical. An aged care residence can not be viewed as akin to a hospital stay. It is the long term home of a senior Australian and should be able to provide for the types of digital interactions to which they are accustomed.

- Technology solutions that provide reliable, robust underlying infrastructure capable of integrating with a range of digital interfaces — such as procurement, health management, personalised entertainment — could make the path to digital enablement easier and faster.
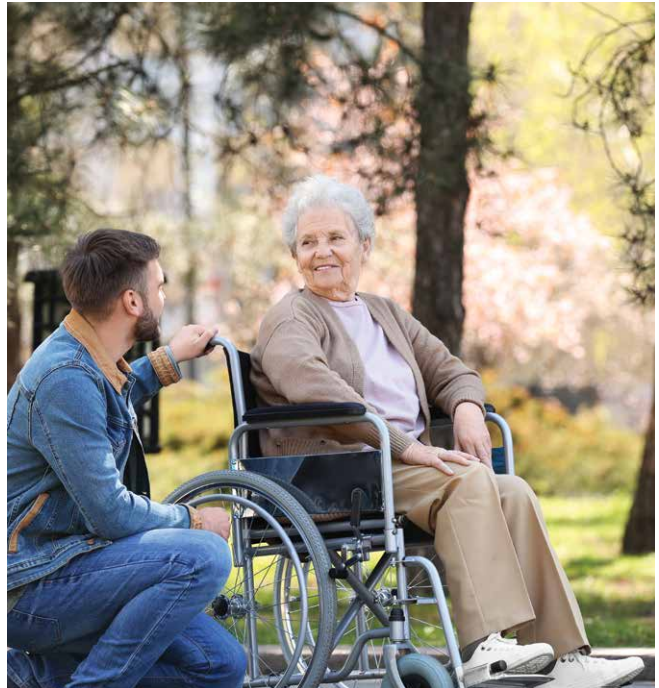
Summary: reimagining the role of technology in aged care

We need a significant reimagining of the way we as a society treat older members of our community and how, very specifically, the aged care system conceptualises its role in a rapidly aging society.

In this, technology has — we contend — a crucial and exciting role to play. The widespread incorporation of digital technologies can profoundly transform the aged care sector, relieving carers of administrative burdens and opening up communication possibilities between residents and the wider community.

While the Royal Commission countenances the notion that technology should be part of a reformed aged care sector, only a small number of its 148 recommendations explicitly reference new technologies and digitisation. Recommendation 34, for example, calls for government funding to support assistive technologies so that people can live safely at home for longer.

Similarly, recommendation 68 proposes a sector-wide move to digital care management systems; work is underway in response through the Department of Health and Aged Care's 'Digital transformation for the aged care sector' initiative.[13]

Better records management and more available assistive technologies are important. However, we envisage broader roles for digitisation and the adoption of new technologies in improving the quality of care provided to older Australians. Indeed, we consider that technology can and should be core to how we generate a respectful, quality-driven system — core to the system's purpose, not merely technical glossiness. Technology offers us all the tools and assets to do this at scale in creative, individualised and efficient ways. A profoundly different norm for the elderly, their carers, and their families is entirely possible. Simultaneously, providers can become more efficient, workforces more engaged and the system more effective.

But doing this demands constant attention to the needs and aspirations of aged care recipients. Selecting randomly from the sea of gadgets and assistive devices will at best provide a superficial hi-tech glow without meaningfully improving service-users lives. At worst, it risks making an already disrespectful system, more efficient in its disrespect.

Strategies for digital transformation in aged care must:

- Be deep rather than superficial;
- Be systemic rather than piecemeal;
- Favour the ethical over purely the technical;
- Positively impact the provider and aged care recipient experience.

Sustained innovation drives possibility

The new technologies that make new types of care possible

Even 10 years ago, it is quite likely that a report such as this one would find little reason — other than in the abstract — to be so optimistic about the potential for technology to improve the quality of aged care in Australia.

Just a decade ago, researchers were only just beginning to demonstrate the power of machine learning, few home devices offered remote connectivity, and consumer wearable tech didn't exist other than in niche, early-adoption environments.

In such a world, the idea of a technology enabled aged care system was a possibility — but a relatively suggestive or fictional one. It was a world in which technology could help, but the contexts in which it might be considered genuinely able to strike to the heart of aged care system purpose, and to improve standards of care, were limited.

Today, however, the landscape is entirely different. A digitally connected, smart aged care system — one in which physiological, behavioural and interpersonal observations can be constantly collected and any dangerous changes highlighted in real time — is no longer the realm of science fiction.

Example collectible data

Physiological: blood sugar, blood pressure, heart rate and rhythm.
Behavioural: anger, distress, movement, falls.
Interpersonal: contact with others, loneliness.

A dimension of this is surely the effect of the COVID-19 pandemic, which has spurred our social and economic thinking about digitisation to move from 'abstract possibility' to 'deployable reality'.

Be it telehealth, virtual working, smart-building technologies or track-and-trace platforms, the pandemic has shown us the art of the possible in respect of technology, driven by necessity. We have collectively realised, in some sense, that digitisation offers us new — practical — possibilities in crisis situations. And while this kind of demonstration effect is crucial, it has also helped us to highlight and bring to the mainstream a number of key technology dimensions and trends that can now be brought powerfully to bear on our aged care systems.

Under-pinning these new possibilities six key trends or technology directions can be usefully brought into focus:

1. **Machine Learning and AI:** the neural networks that power modern machine learning were first described in the 1950s but it was not until 2012 that deep learning was demonstrated on normal consumer-sized computers. Today, deep learning can take place on board smart devices from cameras to sensors, making possible advanced analytics without requiring sensitive information to be sent to a central server.

   For aged care, machine learning can ensure continuous improvement and adaptation of real-time smart monitoring of aged care spaces, generating alerts for spills, falls or other dangers.

2. **Advanced Networks:** Simple connectivity delivers little value of itself. The potential for applications to be supported, secured and scaled depends heavily on how 'smart' the underlying network platform is. Advanced networks give aged care providers the ability to pre-program (and re-program) policies for individual users or devices.

   For example, a wearable heart monitor can be programmed to only interact with other devices. Any attempt to contact the data centre would suggest the device has been breached. As aged care deploys more sensors the risks increase and the need for advanced networks becomes more acute.

3. **5G:** The fifth generation (5G) of mobile connection technology has been developed hand-in-hand with the Internet of Things (IoT). Indeed the high-speed, low latency remote communication required to power IoT was the initial impetus for research into 5G. As 5G coverage becomes more widely available it will become possible for people and devices to be connected — at broadband speeds — absolutely anywhere.

   In aged care this can mean that every aspect of care that requires connection, such as falls or heart rate monitors, are no longer restricted to operating only within a certain home or facility.

4. **Internet of Things (IoT):** IoT represents a shift from the centralised internet where data are stored on servers towards a distributed, always connected mesh of "edge" devices in constant communication. These devices, encompassing everything from smart fridges to wearable health sensors, combine to create whole new ways of protecting health and enhancing wellbeing by turning the quotidian into actionable data.

   As reporting requirements across aged care become more stringent, internet-enabled smart devices can be leveraged for automatic data collection. It has never been easier to deliver health and safety from afar.

5. **Collaboration Technologies:** Virtual collaboration tools, from video-conferencing to task delegation, allow people to work together without needing to be physically co-located. The pandemic has accelerated the adoption of remote working and collaboration, showing that with the right incentives, rapid organisational change is possible.

   Aged care has experienced an extreme version of this shift and with staff stretched thin, online collaboration is essential.

6. **Cybersecurity:** Last year there was a cyber attack on a piece of critical infrastructure every 32 minutes.[14] The modern reality of operating an aged care service is that it will, inevitably, be targeted. All of the efficiency gains promised by this era of always-connected smart devices evaporate if they become portals into unsecured networks. Health systems have proven to be a common target for hackers and it will be essential that aged care providers appropriately secure their networks and connected assets.

   But commensurate with the threat, has been rapid advancements in cyber and data security. These are key to making the digital future of aged care a tangible reality.

Strategic provocations: aged care x technology

Directions for purposeful digital transformation

In producing this paper, insights were gathered from across the aged care sector, from clinical staff (e.g. geriatricians and aged care nurses), to support staff (food preparation and pastoral care), to recipients of aged care (both the elderly and their family-carers). We also met with representatives from some of the sector's largest providers of aged care.

Perhaps unsurprisingly, each group had different perspectives on the problems facing aged care and potential solutions that would make a meaningful difference in the system:

- For recipients of aged care the two most common concerns were the difficulty of navigating the system and the lack of available funding.

- Clinical staff described the challenges of caring for people with dementia and expressed frustration at the challenges and institutional rigidities involved in improving standards of care.

- Support staff discussed the heavy workload of staff and the near-impossibility of spending time sitting with residents or of otherwise providing for their emotional wellbeing, within the structures and administrative dynamics of the existing system.

- Aged care providers also spoke of the difficulty of providing appropriate care to people with diminishing mental competence and described the challenge of consistently finding sufficient well-trained staff to meet existing and emerging needs.

Common across all groups was the view of a system in a state of flux, with high levels of uncertainty concerning what adaptations will occur in the wake of the Royal Commission and the as-yet unseen new aged care legislation.

Notwithstanding the uncertainty, however, there was also a clear and underlying 'common' sense that the challenges facing different components of the system must be faced collectively — must be solved together — if a brighter future for aged care is to be brought forth.

And this is where we contend that technology can play a — if not the — pivotal role.

Connection, aged care and respect

Technology can play such a role because of its power to *connect*.

Combining perspectives from across the aged care sector with the findings of the Royal Commission and a wealth of research studies, *connection* — of people to people to system — emerged as the single most important priority.

In so many ways, the challenges — and failures — detailed by the Royal Commission are underscored by this constant failure of connection. People isolated from people, careers disconnected from those for whom they care, chasms between different contexts and parts of the system.

The Royal Commission's Final Report is subtitled *Care, Dignity and Respect*, and the importance of treating older Australians with respect is a cornerstone of its approach. But if we seek a more respectful system, again we are thrown back to the idea of connection.

Respect is, as a concept, necessarily relational: in this context, one has respect for another person or group.

Respecting someone involves first perceiving — *seeing* — them as a whole individual with needs, preferences, dignity, hopes and dreams, and then acting towards them in a way that recognises these qualities.

Following on from this conception of respect, the very antithesis of respect is to 'not see' a person, to make them — or treat them as if they are — invisible and isolated. That which is not connected cannot easily be perceived. That which cannot be perceived cannot be respected.

Building respect into the aged care system is, therefore, first and foremost a task of connecting — of making perceptible and linking together — elements and actors in and beyond the system. That which is connected cannot be isolated. That which is connected cannot be rendered invisible. That which is truly connected and made properly visible cannot be ignored.

Put another way — no connection, no respect.

> " *The aged care system that we envisage will need to operate in a technology-enabled environment for efficient clinical, business and operational systems. These need to be designed to identify older people's needs and preferences and to provide care tailored most effectively to their needs."*
>
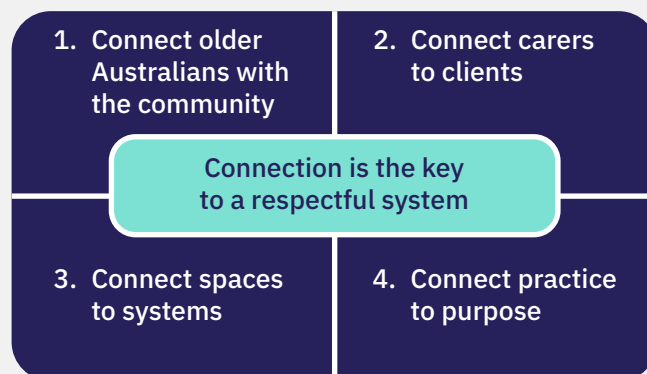> Royal Commission, Final Report Summary, 147

Connection and technology

One of the most revolutionary aspects of digital technologies is the collapsing of space, to bring people together no matter the physical distance, to deliver presence at the flick of a switch.

Connection — across barriers and boundaries — promises to 'open up' aged care, linking recipients to their community and carers to recipients. More advanced technologies create further enhanced connections and by interfacing between systems can turn our currently enclosed aged care spaces into expansive, transparent smart spaces.

A framework for technology and respect — based in connection

To illustrate the profound contribution that digital technology can have in generating connection and the basis of a respectful aged care, we propose four dimensions at which connection is required to enshrine respect across the aged care system.

1. Connect older Australians with the community	2. Connect carers to clients
Connection is the key to a respectful system	
3. Connect spaces to systems	4. Connect practice to purpose

The **first** dimension of connection is between people receiving aged care and the wider community. This connection is the bedrock of a transparent system, removing the communication barriers between those inside and outside aged care spaces thereby bringing older Australians back to the core of social and community life.

The **second** connection dimension is that of connection between aged care recipients and their carers. Throughout our research we heard many carers describe wanting to spend more time providing face-to-face care but being hamstrung in doing so by the weight of inefficient paper-based administrative work. Technologies that reduce the administrative burden can, therefore, directly boost quality and safety of care while improving operational and system-wide efficiency.

Cutting edge technologies make possible a **third** dimension of connection: between aged care spaces themselves and all the people who rely upon them. This is the rise of the 'smart' space in aged care — in ways that can simultaneously serve care and its quality through creation of near-autonomous quality optimisation, and the efficiency of operations through the use of sensors, machine learning and AI, creating futuristic spaces that independently collect, collate and report information.

Finally, the previous three levels work together to assist in augmenting a **fourth** dimension of connection — between practice and purpose. The Royal Commission highlighted that the aged care system's practice was out of step with its purpose; that good intentions were not delivering good outcomes. This disjuncture is, in part, a function of the disconnection between aged care practice and the expectations of the broader community.

By increasing the data flow in and out of aged care, we can make transparent practice, allowing for constant recalibration, addressing problematic practices as they arise and identifying successes wherever they appear. Thus, the Royal Commission's emphasis on new reporting and regulatory standards can be efficiently served by better flows and usage of data, and more actionably understood by policy makers and practitioners.

In the pages that follow, we unpack examples and possibilities of how technology can be part of this exciting — connected, respectful and optimised — recalibration of aged care.

Connect older Australians with the community
Inclusion through digital communication

Opening the digital doors to aged care spaces makes permeable the barrier between the inside and outside of aged care spaces.

A network platform to support hybrid working and communities

The old paradigm of communities built on physical proximity has given way to new models that combine face-to-face contact with online interactions. Digital connection enriches human interaction and operates to keep communities together when they cannot occupy the same physical space.

Aged care of all forms — home-based or facility-based — can incorporate and benefit from the same types of digital communication that power everyone from video game streamers to trans-national corporations.
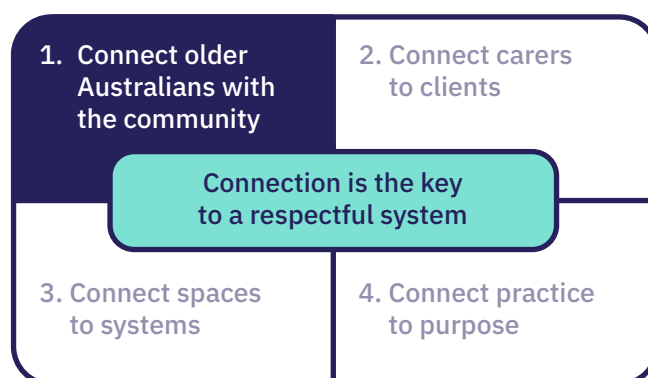
Wireless connectivity, coupled with video calling technology like Cisco's Webex, breaks down barriers to communication, and can be used to maintain relationships in between physical get-togethers.

For those receiving in-home care, where being at home can become a lonely experience, digital communication (including, soon enough, virtual reality interactions) keep families in ongoing contact. This has the benefit of keeping people in their homes for longer, knowing that in any circumstance, family members are easily contactable.

In residential care facilities the connection to the outside world can feel tenuous, limited by visiting hours and the need for staff assistance to venture outside. In these circumstances too, physical visits can be supplemented by online interactions, with the face of a loved one available wherever a resident is in the facility.

In creating and maintaining these hybrid communities, two conditions are paramount. The first is ease of use. Any friction in the process of starting a conversation fails to replicate the natural simplicity of face-to-face interactions.

The second is the facilitation of networked communication. Being able to quickly chat to two or more people is more rewarding than being limited to one-to-one conversations.

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Key lessons and provocations:

- **Scalable digital platforms built on an advanced network:** can help people maintain contact with loved ones and family. Relationships combining physical and digital communication are becoming the norm across society.

- **Infrastructure for networked communications:** can greatly assist the creation of hybrid digital /physical communities and alleviate some of the loneliness and isolation reported across the aged care system.

Virtualised medical care, designed for usability and data privacy

As Australians live longer, the number of people receiving aged care with comorbidities has steadily increased. Today, eighty percent of Australians over 65 report at least one chronic health condition (and 28% have three or more).[7]

In residential care, half of all residents have dementia, a quarter experience depression and fourteen per cent report arthritis.

For almost everyone receiving aged care, ongoing specialist medical attention is essential. Technology to enhance accessibility of specialist care can greatly improve quality of care.

For those in residential care settings, along with anyone living outside the major cities, accessibility is particularly limited.

The Royal Commission has recommended the urgent introduction of telehealth services into residential facilities along with community outreach clinics for people receiving in-home care.

Telehealth can take many forms, however, and it is important that the highest quality services are prioritized from the outset.

As with all digital connection, the success of telehealth is determined by ease of access and networking. Additional requirements arise with the inclusion of sensitive medical information — primarily issues of security.

As the State and Federal Governments install telehealth infrastructure across Australia, it is essential that they do so with cybersecurity and medical privacy front of mind.

Without appropriately secure infrastructure, it will take only one malicious attack to reduce confidence in the system and render the entire investment worthless.

Key lessons and provocations:

- **Comprehensive virtualized care services:** connecting senior Australians and specialists will be a game-changer in enabling access to specialist medical care, particularly in situations with limited options for physical service delivery.

- **User-friendly interfaces:** Maximal usability on both ends is a must. Inside aged care, dedicated telehealth devices provide ease of access. At the clinic, flexible services help specialists integrate telehealth into their workflow.

- **Data privacy & network security:** Medical information is private and sensitive, making network security a central priority.

Participation & integration into digital society

Modern technological innovations have reshaped the world, creating endless new possibilities. A respectful and connected aged care system should ensure that the benefits of these technologies are available to all. Put another way, we must connect aged care, and older Australians, with the digitally-enabled economy and society in which they have come to participate.

The stereotype of older people unable to understand technology has been replaced by a generation of tech-savvy over-65s — people who worked through computerization of workplaces and who are more likely to sit at the kitchen table with their smartphone than their knitting.

They are accustomed to using online services like Netflix and Uber Eats, and unlikely to be satisfied with standardized diets of 'suburban Australian cuisine and 1940s movies.' (Respondent interview)

Treating older Australians with respect means including them in the benefits of technological development.

The problem of access to online services is particularly acute in residential care settings. Though there are barriers to online access for those receiving in-home support, the rapid transformation in client expectations has taken residential providers by surprise. It remains routine for residents to provide their own devices — loaded with whatever media content a grandchild could fit onto them — and for internet access to be unavailable.

Perhaps most concerning were reports of residents handing cash to carers in exchange for ordering food from online delivery services.

This example points to a reality that the entire aged care system must embrace technology because older Australians are going to force it to do so. Whatever the barriers, entry into aged care will not be allowed to mean never again eating a tofu banh mi or watching the latest season of *Emily in Paris*.

> **Key lessons and provocations:**
>
> - **Digital literacy:** Older Australians are technology literate and expect to be able to continue using online services across different home settings. Anticipating the need for these services should be built into workflow design, as a standard default.
>
> - **Digital infrastructure that guarantees high quality service, security and trust is a precursor to sustained uptake:** Providing familiar services enhances an individual's choice over how they spend their time. Making these services available can be accomplished easily by technology infrastructure designed for easy integration into the digital economy.

Connecting carers to clients
Eliminating the tyranny of administrivia

Carers are fundamental to the aged care system but are frequently overwhelmed by the non-care aspects of their work. Finding ways to allow more meaningful connection between carers and those they care for, is central to a respectful system, and technology can help.

Digital record keeping

Every aged care worker we spoke to talked either of the time consuming challenge of paper-based administrative work or how the change to digital systems had markedly improved their work.

One worker worked across two residential facilities — one paper-based and one digital. She tried to explain the difference:

> *...It is hard to describe how much quicker the computer-based [system] is. With paper-based every little thing is a little bit slower...collecting food orders, checking medical records, even just recording whether a patient is constipated or had a bowel motion.*
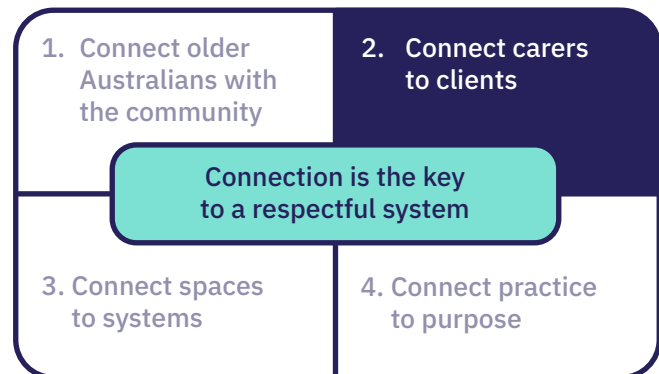
So much information is collected every day across aged care and the needs of older people are incredibly diverse. Dietary requirements vary from being diabetic to vegan to needing purees only.

Care requirements are equally diverse with a wide variety of different daily medications needed at different intervals.

The Royal Commission has highlighted that the continued reliance on paper makes it difficult to extract timely or accurate information about quality of care. They have recommended the entire sector (including providers of home-based care) move to computerised systems by June 2023. The Australian Government has committed $10 billion to supporting this transition.

Automating and streamlining non-care duties will also streamline achievement of new staff time requirements (200 minutes of staff time per resident per day).

Digital transformation of record keeping and information gathering provides a way to maximise quality of care while also improving staff happiness.

1. Connect older Australians with the community	2. **Connect carers to clients**
Connection is the key to a respectful system	
3. Connect spaces to systems	4. Connect practice to purpose

Key lessons and provocations:

- **Digital records management:** can vastly improve quality of care by freeing up carers' time, an enormous amount of which is spent on non-care tasks. The Royal Commission has recommended the entire aged care sector should be using digital records management by June 2023 and the move is backed by significant government funding.

- **Security:** Cyber security can no longer be treated as a check-box exercise. The network needs to be treated as the first and last line of defence against threats and needs to not only keep attackers out, but minimise any damage if they get in.

Machine learning, anonymised monitoring and the dignity of risk

Every person wants the freedom to control how they live their lives. As we age, it can become harder to maintain independence and all too easy to lose that control.

Just as some people love rock climbing and others find a cup of tea quite thrilling, older Australians vary widely in the types of risks they want in their lives. The concept 'dignity of risk' captures the notion that there is an important dignity in being able to decide the risks we take. One way to maximise a safe autonomy is to use technology to create safeguards around us.

For those who are 'ageing in place', monitoring of acute events is essential. Sensors for fall detection are the top priority but there are other risks too.

Cisco Meraki cameras use on-board machine learning to detect falls as well as spills and other hazards. With all identification occurring inside the home, an older person can be confident that no personal data will be transmitted externally.

This makes it possible for a family member to 'remote monitor' in such a way that they can see that their mother has returned home safely, but without being able to tell that she has a new lover with her.

In residential care, the need for accident monitoring is coupled with the need for access control. People with dementia can be a risk to themselves and may need to be kept away from dangerous spaces like stairwells or kitchens.

Systems of camera-based monitoring combined with sensors to restrict access can generate an advanced, real-time view of where residents are and whether anyone has moved into areas that are not safe. With the right analytics infrastructure, alerts can be automatically sent to carers when the system observes danger.

Across the aged care spectrum, protecting people from harm is essential. Equally important, however, is to not let safety get in the way of enjoying life.

Analytics-based, privacy-focused monitoring can help to provide the highest possible levels of autonomy with the minimal amount of risk.

Key lessons and provocations:

- **Sensors & access control:** can be configured and used in conjunction — in a delicate balance — to deliver scenarios maximising autonomy while minimising risk.

- **Analytics & Privacy:** Surveillance systems that track people anonymously can harmonise safety and privacy. Systems that passively monitor movement and control room access can provide additional safeguards without compromising freedoms.

Business intelligence and data analytics for workforce management and deployment

Aged care providers describe workforce management — the hiring, training and retention of staff — as the biggest challenge facing the sector in the future, with estimates suggesting a shortfall of 110,000 workers by 2030 unless significant change occurs.[4]

In the early days of the pandemic, in Victoria particularly, we saw that the lack of comprehensive digital workforce management resulted in staff working across multiple aged care sites and carrying COVID-19 from one group of vulnerable people to another.

Lacking the capacity to track or control staff movement across sites, the only option available to government was to prohibit workers visiting multiple sites, limiting their income and leaving providers under-staffed.

Providers of in-home care report having nurses arrive at a central point each morning to manually assign nurses to care recipients. Nurses then drive across the city, visiting patients, in an aged care version of the travelling salesperson problem: how to reach the maximum number of people in the most efficient way.

Other health care industries have long ago digitized workforce management, making it possible for doctors and nurses to be accredited and work across multiple sites and have each site be able to track their shifts as well as their training and development.

Staying on top of training will become increasingly important in the future as the Royal Commission's recommendations around mandatory training levels for all carers and the introduction of new training requirements for the sector's 68,000 volunteers.

Key lessons and provocations:

- **Capability solutions:** can optimize workforce training and reporting on mandatory training levels. A well-trained aged care workforce is the lynchpin of a successful system.

- **Digital workforce management:** is essential both to protect the health and safety of aged care residents and to maximize the productivity of the limited staff base.

- **Business intelligence solutions:** can assist with a range of operational areas, such as deployment tools to optimize staff allocations, and to ameliorate the effect of staff shortages.

Connect spaces to systems
New data flows to support new insight

Incorporating digital technology into aged care spaces should not be daunting. Smart sensors, connected devices and the entire internet of things combine seamlessly to create what we like to think of as 'articulate spaces'.

Creating an articulate space

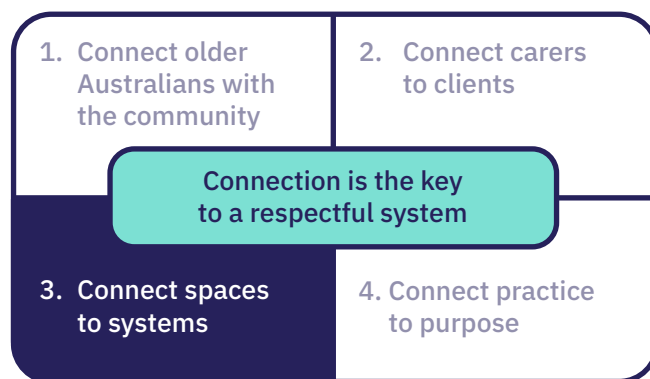At present, most aged care spaces are mute, unable to communicate at all.

Smart sensors and ubiquitous wireless connectivity, particularly when combined with location analytics, confer the power of speech, transforming silence into a steady stream of data. These articulate spaces take our understanding of how people and things behave in a space to the next level.

For people receiving in-home care, the power of an articulate home is the security of a constant connection to their care provider. Sensors to detect falls or unwanted visitors can allow people to maintain independence for longer, safe in the knowledge that someone will be notified if anything happens.

In residential care, new regulatory requirements make the automated collection and reporting of data almost essential.

Consider the difference between a carer, every month weighing each resident, recording their weight and then manually comparing it to previous values to determine if there has been unplanned weight loss (according to the not entirely intuitive official definition).

Or having each resident stand on the connected smart scale in their room each day, with their weight recorded automatically in a secure database and checked immediately against earlier readings. Rather than having a person check for weight loss, an algorithm can quickly perform the calculation and notify care staff of sustained weight reductions.

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National Aged Care Mandatory Quality Indicator Program

Five categories must be reported quarterly

- Pressure injuries.
- Physical restraint.
- Unplanned weight loss.
- Falls or major injury.
- Medication management.

This can be done every day with less impact on staff than manually collecting information once a month. And any problems can be identified and addressed much more quickly, improving care for patients.

Key lessons and provocations:

- **Articulate spaces:** integrating smart sensors, IoT and other connected devices will provide better optimisation of care outcomes and staff time.

- **Automated data collection:** Regulatory reporting requirements are onerous if performed manually but are trivial for well-constructed digital solutions.

Data flows and interoperable technology

An individual's health and aged care needs are dynamic; movement between supported home care, respite care, residential care, and hospital stays is a feature of the system. Additionally, intermittent contact with healthcare is typically a constant across all settings.

At present, record keeping systems are not designed with this type of movement in mind. Rather, systems are designed for an interaction akin to a hospital stay for a specific treatment or procedure.

Interviews with residential aged care providers highlighted significant opportunity to improve data capture and flows across a dynamic timeline and movement through a health management journey. Solutions that can provide a real-time and wholistic view of an individual's health journey will be sought after.

However, navigating the various data interfaces and systems of different health facilities also presents a significant challenge around data security and potential data privacy breaches. Secure networks, such as those offered by Cisco technology, are critical in this regard.

Data management and data flows need not be restricted to a health journey alone. The possibility of an individual's lifestyle and behavioural pattern prior to entering a residential care facility being captured and securely sent to a provider in advance could improve the efficiency of the resident onboarding process, whereby carers and provider staff can better anticipate how to provide the best quality care from the point of arrival. This style of solution could also be of assistance to carers providing home-based services.

Other aspects of interoperability involving lifestyle and behaviour related technology were raised by aged care centre managers.

For example, tablet-based applications that can allow users to access health data just as easily as they could access personal entertainment and communications functionality would be a huge plus. In this instance the ability to ensure software upgrades in one application not impacting the functionality of other applications or interfaces was also called out as a desirable feature.

Key lessons and provocations:

- **Automation:** providers are now realising they need to take complexity out of their operations, not just cost. Automation and AI are allowing millions of individual policies and sensors to be managed with the fear of being overwhelmed.

- **Usability:** Simple to use interfaces, such as those on Webex boards and connected tablets, can make it easier for individuals to access a range of functionality with few clicks and logons.

- **Digital records management:** Record keeping systems can be better designed and optimised for a dynamic series of health and lifestyle events that interface with an aged care management plan.

Connecting practice to purpose
Leading the way to a brighter tomorrow

The many parts of the aged care system have not come together to create the outcomes that older Australians expect and deserve. The central aim of incorporating digital technologies into each part is to create a seamless interoperation where all the elements align toward the one goal.

Make the system transparent

At the beginning of this report, we quoted from the Royal Commission, describing the aged care system as a combination of elements that work as intended but which do not produce the best outcomes.

It is inescapably the case that if the effects of each element in the system is not measured — both individually and in operation with the other parts of the system — then it is almost impossible to even know if the system is working.

And it is entirely impossible to iterate the system, to improve incrementally or perhaps at all.
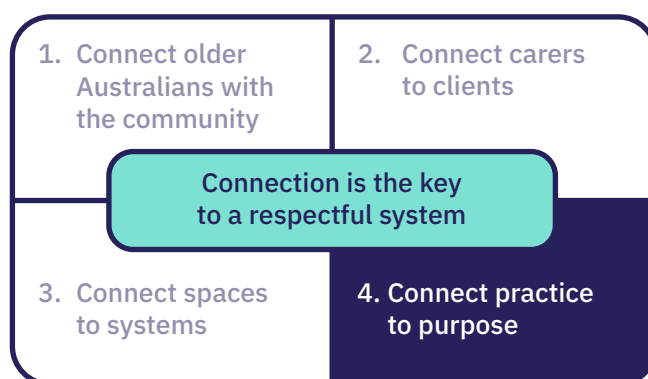
In connecting practice to purpose, the first step is to make the system transparent, in all of the ways outlined in this report.

Taking the data generated from smart aged care spaces, allowing torrents of data to flow to and from aged care recipients, giving older Australians the technological tools to retain their voice and place in the community, it will be possible to see the system as it operates dynamically. To see where it delivers the best possible outcomes and where it does not.

Align the elements of the system

The second step is to use this information to then bring the disparate elements of the system together.

This stage requires something more than just observing the system. This is the point at which policy and practice must be used to push at some parts of the system and to pull at others. Using the full range of policy levers available — but using them with knowledge — is what will ultimately deliver on the promise of the Royal Commission.

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Key lessons and provocations:

- **Cybernetic data analytics:** that can intelligently and securely collect, harness, combine and make information visible in real-time can significantly improve system transparency. A cybernetic approach by design is built with multiple data inputs and feedback loops that can provide a holistic view of interactions within a system.

- **Data standardisation:** in collection, capture and management practices across the sector would yield numerous operational efficiencies, while also enabling improved data and information aggregation. This would be beneficial to policymaking whereby the scale of issues or urgency of reforms might be better anticipated.

- **Ethical data usage and cybersecurity:** will only increase in significance, and will continue to be fundamental differentiating characteristics of robust digital infrastructure for the sector.

- **Privacy:** of data and other information will be critical. This is just as important for individualized transactions, such as medical information exchanged via telehealth, to the use of surveillance images captured via monitoring technology.

New models and spaces for experimentation

Harnessing the power of collaborative innovation

The ability to effect the types of digital and technology transformations described in this paper — and many others like them — relies on the extent to which innovation, collaboration and collaborative innovation can become strong characteristics of the aged care system.

Stronger collaboration, and new models for collaboration, has been highlighted in the Royal Commission's recommendations, and similar views echoed by stakeholders across various parts of the aged care sector. Recommendation 107 from the Royal Commission — 'Aged Care Research and Innovation Fund' stresses the importance of funding for research and innovation that is linked to practice via a networked approach across research institutions, academic, industry, technologists, community, among others.

In an increasingly interconnected world, ways of harnessing networks of intellectual and innovation capital are absolutely critical to shifting the dial on transformative digitisation within the sector.

However we would propose that there is a need to take this a step further. To truly achieve this level of change, it is equally critical to disrupt the ways that collaboration and innovation happen, and create new places and spaces that support networked models of collaborative innovation.

There is significant opportunity to establish purpose-built experimentation spaces that can attract, invite and inspire partnered prototyping, trialling and exploration. Spaces fitted out with robust digital infrastructure where technologists or designers can partner with a community of researchers and industry professionals to conduct system-level trials. Spaces where in-situ simulations can inspire real-time ideation and inter-connected product development.

> " *A profound shift is required in which the people receiving care are placed at the centre of a new aged care system... aged care does not 'need renovations, it needs a rebuild."*
>
> Royal Commission, Final Report, Chair's Preface

RMIT-Cisco Sandbox, digitally rich collaborative innovation experimentation space, at the Health Transformation Lab at RMIT

RMIT-Cisco Health Transformation Lab & Sandbox: gateway to a networked ecosystem

It is precisely this type of space — and collaboration enabler — that the Health Transformation Lab has partnered with Cisco to create, at the RMIT-Cisco Sandbox facility. It is a multiple health context-themed digital technology innovation environment; where connected experimentation can happen, where inspired conversation can occur, and where different configurations of the system can be brought together, both physically and virtually.

The collaboration potential of spaces like the one at the Health Transformation Lab, is much bigger than a relationship between a university and a corporate partner. Spaces like these are acknowledging the need to look beyond 1:1 partnerships and instead develop a networked ecosystem of collaboration. A networked ecosystem can leverage complementarities of collaborators and build collective intelligence; it can dynamically orchestrate aligned explorations and synergistic activities.

Cisco's health lab model is a ground-breaking gateway to a networked ecosystem. It is a partnership with universities to create digitally rich spaces for innovation that can connect policymakers, community, technologists, start-ups, healthcare professionals and academics in integrated solution design.
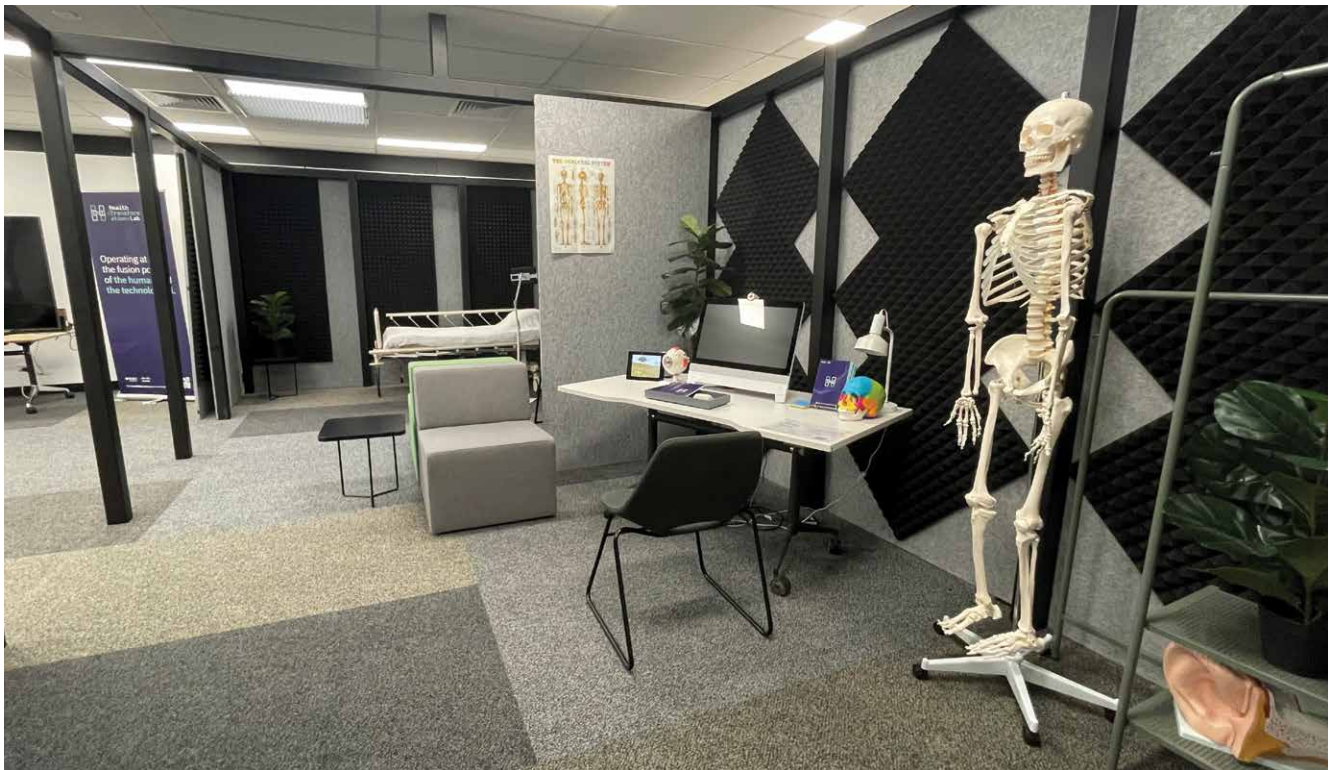
Entities like the Health Transformation Lab (RMIT) and the Digital Health Design Lab (Flinders University) are part of a broader ecosystem Cisco has activated, via its National Industry Innovation Network (NIIN) to amplify the scale and reach of industry-university collaboration systemic digital transformation.

In this context the Health Transformation Lab and Cisco are delighted to be co-curating a series of efforts to inspire collaborative experimentation in digitisation for the aged care sector, to further trial and prototype the types of transformations described in this report.

This will include:

- Showcases and technology demonstrations in the RMIT-Cisco Sandbox environment.
- Partnered workshops, experimentation and prototyping around aligned ways to achieve aged care digitisation.
- Cross system dialogue, discussion and ideation related to the provocations within this paper.

The RMIT-Cisco Sandbox environment has been established to foster an open community of ideation, experimentation and innovation. We welcome the involvement of any interested individuals or groups who might want to participate in new, connected ways of working on health and wellbeing challenges.

RMIT-Cisco Sandbox, digitally rich collaborative innovation experimentation space, at the Health Transformation Lab at RMIT

Preliminary recommendations

Towards a future in which digitisation clasps hands with respect, and connection drives improvement

Respect through connection; connection by 'design'

Technology and digitisation can be core to system reorientation and transformation — at provider, service, policy and ethical levels. But only if we reorient the way we see technology, respect and person centrism in the aged care system. A framework for technology and respect will be based on the power of connection across four dimensions: connecting older Australians to their community, connecting carers to recipients of aged care services, connecting aged care spaces to those who rely upon them, connecting practice to purpose. Advances in technologies such as machine learning interfaces, Wi-fi/ 5G and IoT should be better leveraged to evolutionise connection — across barriers and boundaries — and deliver a profound difference in everyday life for older Australians and their carers.

1

Digital first approach to optimising care and operations

Organisations need to ask themselves a set of simple questions when considering new investments: is there a digital alternative?; is the value of a building, room or asset maximised by digitising it. Technology and digitisation offerings such as automation of manual tasks, meeting of mandated quality standards and high-quality telehealth — that can simultaneously serve care-based outcomes and organisational efficiency — should be prioritised in the next phase of system reform. Aged care providers are being pushed to urgently respond to both administrative and care-related efficiencies and improvements. Facilitating choice, increasing organisational efficiency, reducing administration and increasing transparency are the heartland issues of digital transformation. The solutions that matter will optimise care and operational outcomes.

2

Not all digital infrastructure is equal

Truly intelligent and purposeful digital infrastructure will provide secure, private customisation and interconnectedness. Everything mission critical needs to run on a connected network that is both robust and resilient. Security must be embedded deeply: while connection is key to respect, security and stability builds the trust needed in the system. Smart sensors, connected devices and the entire internet of things should combine seamlessly to create 'articulate spaces', but with robust security and privacy features. Surveillance systems that track people anonymously can balance safety and privacy. These are some of the hallmarks of sophisticated and purposeful digital infrastructure.

3

New models and spaces for experimentation are critical

The ability to effect the types of digital and technology transformations described in this paper — and many others like them — relies on the extent to which innovation, collaboration and collaborative innovation can become strong characteristics of the aged care system. Technology -rich experimentation spaces can catalyse next-level partnered prototyping, trialling and exploration; where technologists or designers can partner with a community of researchers and industry professionals, or where in-situ simulations can inspire real-time ideation and inter-connected product development. New models and spaces for experimentation can be a game-changer.

4

Endnotes

1. Royal Commission into Aged Care Quality and Safety. (2021) *Final Report: Care, Dignity and Respect*. Available at: https://agedcare.royalcommission.gov.au/publications/final-report

2. Aged Care Financing Authority. (2021) Annual Report on the Funding and Financing of the Aged Care Sector - 2021. Available at: https://www.health.gov.au/resources/publications/ninth-report-on-the-funding-and-financing-of-the-aged-care-industry-july-2021

3. Australian Institute of Health and Welfare. (2020) Aged care data snapshot - 2020. Available at: https://www.gen-agedcaredata.gov.au/resources/access-data/2020/october/aged-care-data-snapshot

4. Committee for Economic Development Australia (CEDA), *Duty of Care: Meeting the Aged Care Workforce Challenge*. 2021: Melbourne. Available at https://www.ceda.com.au/ResearchAndPolicies/Research/Health-Ageing/Duty-of-care-Meeting-the-aged-care-workforce-chall

5. Ogrin, Rajna, Claudia Meyer, Arti Appannah, Sally McMillan, and Colette Browning. (2020) "The inter-relationship of diversity principles for the enhanced participation of older people in their care: a qualitative study." *International Journal for Equity in Health,* 19:1–13.

6. Australian Institute of Family Studies. (2015) *Demographics of Living Alone*. Available at: https://aifs.gov.au/publications/demographics-living-alone

7. Australian Institute of Health and Welfare. (2018) *Older Australia at a glance*. Available at https://www.aihw.gov.au/reports/older-people/older-australia-at-a-glance

8. Australian Treasury. (2021) *Intergenerational Report.* Available at: https://treasury.gov.au/publication/2021-intergenerational-report

9. Commonwealth of Australia. (2021) *Australian Budget 2021–22*. Available at https://budget.gov.au/2021-22/content/download/glossy_ges.pdf

10. IBIS World. (2021) *Aged Care Residential Services in Australia*. Available at: https://my.ibisworld.com/au/en/industry/q8601/about

11. Royal Commission into Aged Care Quality and Safety. (2020) *Research Paper 8 - International and National Quality and Safety Indicators for Aged Care*. Available at: https://agedcare.royalcommission.gov.au/publications/research-paper-8-international-and-national-quality-and-safety-indicators-aged-care

12. Australian Bureau of Statistics. (2020) *Use of information technology by people with disability, older people and primary carers*. Available at: https://www.abs.gov.au/articles/use-information-technology-people-disability-older-people-and-primary-carers

13. Department of Health. (2022) Digital transformation for the aged care sector. Available at: https://www.health.gov.au/initiatives-and-programs/digital-transformation-for-the-aged-care-sector

14. Australian Cyber Security Centre. (2021) *Annual Cyber Threat Report*. Available at: https://www.cyber.gov.au/acsc/view-all-content/reports-and-statistics/acsc-annual-cyber-threat-report-2020-21

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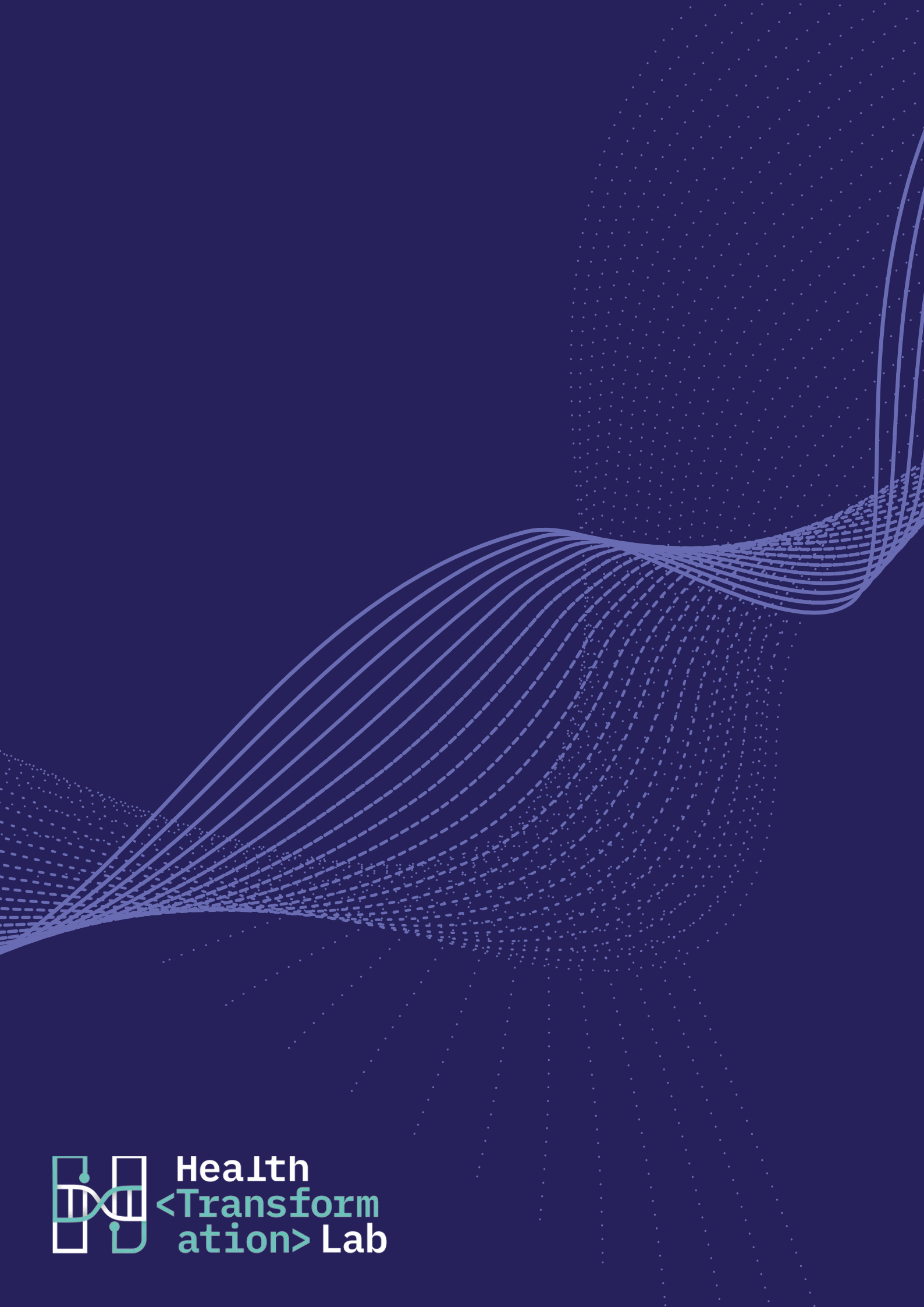
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