Section D: Enablers / Ngā rawa e tika ai te pūnaha

10 System enablers overview / Tirohanga whānui ki ngā rawa e tika ai te pūnaha

Society and business models are changing

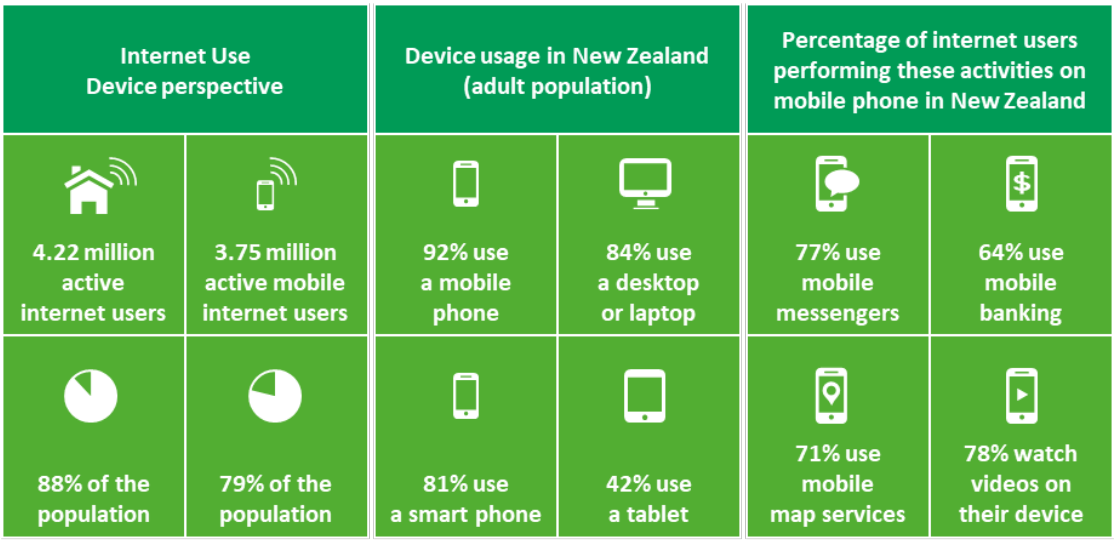
Over the past 15 years the way people interact, work, socialise, and go about their day-to-day business has been dramatically affected by changes in the digital landscape.

The internet has transformed the way people engage with services – instead of physical building-based services, such as banking and retail, the smartphone has become the medium of choice for connecting, finding information, doing business, and engaging with online content and entertainment. Customers now have high expectations of accessing what they want, when they want – with convenience, reliability, and security – and healthcare and disability support is no exception.

New Zealand consumers have generally been fast adopters of technology with relatively high internet use and uptake of mobile devices (Figure 10.1).

One of the constraints on uptake in New Zealand has been network coverage. The continued expansion of the rural broadband initiative in New Zealand is projecting that 99.8% of the population (including 271 marae) will have access to enhanced broadband by 2023 and mobile coverage across the country will be improved.

FIGURE 10.1: TECHNOLOGY ADOPTION AS AT 2019



SOURCE: DATA FROM KEPIOS, WE ARE SOCIAL AND HOOTSUITE 2019.

Consumers and business worldwide are increasing their use of digital technologies. While technology has supported the development of disruptive business models such as online hospitality service brokerage companies (such as Airbnb) and peer-to-peer ridesharing (such as Uber), it has also supported the growth and transformation of a wide variety of existing businesses. Technology is playing an increasingly important role in many service industries, allowing routine tasks to be automated and big datasets to be created and analysed. Such datasets are increasingly supported by artificial intelligence, providing insights into customer preferences, requirements, and trends that inform business performance and planning.

What technology changes mean for health

Numerous commentators have discussed the transformative role that digital technologies will play in the health sector. Some see these technologies as simply a natural business-as-usual progression for a sector that is clinically driven with a high use of diagnostic and clinical systems already. Others are concerned about the disruption and the ethical and governance challenges that may result. Many are optimistic:[384]

> *If any industry has more to gain and less to fear from robotics, cognitive augmentation, digital disruption, and artificial intelligence, it is healthcare. The powerful combination of data and analytics is fuelling precision and personalized medicine and pushing genomics to new scientific frontiers.*

An extensive review completed for the NHS in the United Kingdom projected that:[385]

> *genomics, digital medicine and artificial intelligence will have a major impact on patient care … … and … have the potential … to empower individuals to be more informed about their care, and to allow them to work together with healthcare staff to make treatment decisions.*

Technology will continue to transform the health and disability workplace as it has done in other sectors by disrupting traditional jobs through innovative business design, making obsolete old technologies and their workforces and creating jobs that did not exist 15 years ago (such as mobile app developer, social media manager, data scientist, and user experience designer).

As noted throughout this report, this transformation requires not only more information sharing but the efficient, timely, and effective use of data to improve service delivery and patient outcomes.

Research shows that the future of health will likely include (and, in some cases, is already starting to include):

- a growth in virtual healthcare to better enable clinical care, particularly for people in remote or rural locations and people with limited mobility or a lack of transport (for example, virtual fracture clinics that provide access to orthopaedic specialists)
- a greater reliance on artificial intelligence and machine learning in diagnostics (for example, breast cancer screening), disease prevention, drug discovery, and patient care – some predictions estimate artificial intelligence in the medical imaging space alone will be a $1 billion global market by 2022
- a significant investment and uptake in digital health technologies, including telehealth, personal and wearable devices, and mobile health technologies (for example, remote heart monitoring) that will massively increase the volume and types of data being captured as well as raising new privacy and ethical challenges
- greater use of augmented reality and robotics for surgery (for example, robotic arm-driven colonoscopies)
- a decrease in the cost of genomics and targeted treatments and an increase in their use (for example, the use of polygenic risk scores for long-term chronic diseases)
- an increase in digitisation of health records, requiring interoperable systems across multiple providers and organisations to build a single, longitudinal, whole-of-life view of the patient that can be accessed from a variety of locations
- the growth in value-based health, where outcomes are measured in terms of health and wellbeing as well as GDP

While the speed and potential impact of the variety of digital technology advances are uncertain, many of the technologies are starting to be used in New Zealand already. Planning for workforce, digital and data, and facilities and equipment needs to consider these advances.

Workforce

Many of the projected digital changes have the potential to free up staff to spend more time caring for patients and to more effectively utilise their skills and training. Most jobs will require digital skills, and people will need enhanced digital literacy at all levels in organisations. Digital healthcare will be critical to the delivery of the service changes discussed in chapters 5–9, supporting service providers and consumers and their whānau and carers to engage with the system in different ways than they do today.

While digital solutions are a key means by which time can be released for caring, it is equally clear that on their own they cannot address the workforce challenges New Zealand and global healthcare markets are facing.

New Zealand has a dedicated and highly capable workforce, but current workforce and training models are not sustainable. Workforce pressures are significant and need to be addressed urgently. Better planning for future supply, recognising the changing nature of work, is essential. This requires more deliberate thinking about how the current workforce is used and the new roles required, so all New Zealanders can receive excellent care and be engaged in decisions about their own health. A number of stakeholders also identified the need to review workforce training and development and to clarify the accountabilities of the many parties engaged in workforce planning and training.

As one of the largest employers in the country, the health and disability system could do more to improve the wellbeing of those working in the sector, to employ a workforce that reflects the country's diverse communities, and to ensure Māori, Pacific, and disabled people are employed in different roles and at different levels in the system. Discussions also highlighted that success was often because of the commitment and leadership of key individuals. Strengthened leadership and management are critical to enhancing the system's overall performance.

The people working in the system are committed and loyal to the organisation they work for and their profession or discipline. There have been suggestions though that there is a need for culture change and more collaborative working if the system is to deliver more equitable health outcomes and improved wellbeing for all New Zealanders.

Workforce issues are discussed further in chapter 11.

Digital and data

Underpinning many of the digital technology trends is the generation, transmission, and storage (often distributed) of machine-readable data. Real-time access to standardised datasets that can be linked virtually will give clinicians access to more complete patient information more quickly from any location, enabling them to, for example, work more efficiently and effectively, track and monitor performance, plan the future workforce more robustly, and build evidence of what works. Enhanced digital literacy, data stewardship, cyber-security, and ethical frameworks will also be needed to guide the use of these datasets, for example, in genomics and artificial intelligence.

Health systems worldwide are assessing their readiness for a digital future. New Zealand is lagging behind other countries with limited interoperability of systems and a lack of national data standards. Much of the data the system generates is treated as a by-product of clinical processes and is not used to its full potential.

The vendor landscape is fragmented, with too many customised legacy systems that do not meet global interoperability or cyber standards. Investment in information technologies has been low, and core foundation work will be required before the health and disability system can generate the potential gains from operating a more digitally enabled system.

In planning for a more digitally enabled health system, consideration will also need to be given to:

- how such a system will support more equitable health outcomes
- data privacy and stewardship including data sovereignty
- procurement and investment decision-making processes
- workforce and capability.

Digital and data issues are discussed further in chapter 12.

Facilities and equipment

The third key enabler for the health and disability system is facilities and equipment. Demographic pressures, technology advances and model of care changes mean that facilities design will need to change and additional capacity will also likely be required. It is also expected that the trend for access to enhanced clinical equipment to support service delivery will continue. Advances in technology are making some equipment more mobile and are supporting virtual service delivery and remote monitoring in a wider range of settings.

Significant capital investment will be required over the next ten years to support these changes and address issues associated with assets that have not been adequately maintained and/or are not fit for purpose. Capital investment decisions can shape how services are delivered for many years and should be aligned with a long-term health services plan. These plans should be considered more routinely alongside local government, education, and transport planning.

The scale and nature of capital programmes that have been signalled in capital intentions for the next 10 years plus, suggests that the system will need:

- a prioritised, robust pipeline that will deliver the medium and longer term service requirements.
- more robust processes than are currently in place to make investment decisions, manage capital projects and maintain assets.

Facilities and equipment issues are discussed further in chapter 13.

11 Workforce / Te tira kaimahi

The people who make up the health and disability workforce are the backbone of the health system. For the most part, they are a passionate, hard-working, kind, and caring group who go above and beyond to improve the health and wellbeing of New Zealanders. This was apparent in Phase One discussions and was reinforced through submissions. Many feel the 'system' does not support them to work to their potential, and stress levels are high.

This section looks at the make-up of the current workforce, recognising that the health and disability sector employs more people than any other. It considers the difficulties involved in workforce planning and the changes which will be necessary if skills shortages now and in the future are to be addressed. If the workforce of the future is to be more representative of the community it is serving, changes will be needed in training, regulation and recruitment. New ways of working will be necessary and working arrangements which combine increased flexibility with better work/life balance will be a challenge.

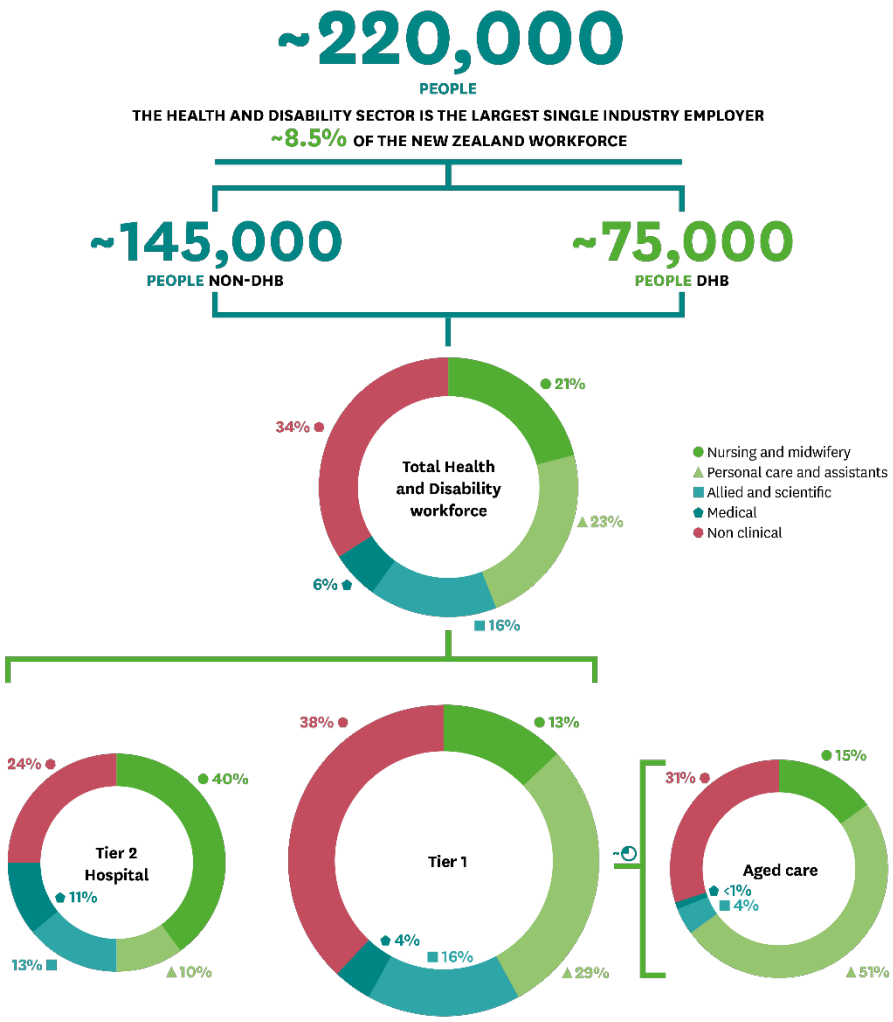
Overview of the workforce

The health and disability sector is a large employer

The health and disability sector employs about 220,000 people or about 8.5% of New Zealand's total workforce – it is the single largest sector employer in the country.[386] About 34% are employed by DHBs and 66% work in non-DHB roles, such as for private hospitals, residential homes for people with disabilities and rest homes (Figure 11.1). In many places, the DHB is among the largest employers in the region. In addition, volunteers and unpaid family and whānau carers play an important role in the health and disability system.

Clinical staff (staff engaged directly in the care of people) make up 66% of the health and disability workforce. Personal carers and assistants (23% of the workforce) and nurses and midwives (21%) are the largest groups and the medical group is the smallest (6%).

FIGURE 11.1: PEOPLE IN THE NEW ZEALAND HEALTH AND DISABILITY WORKFORCE



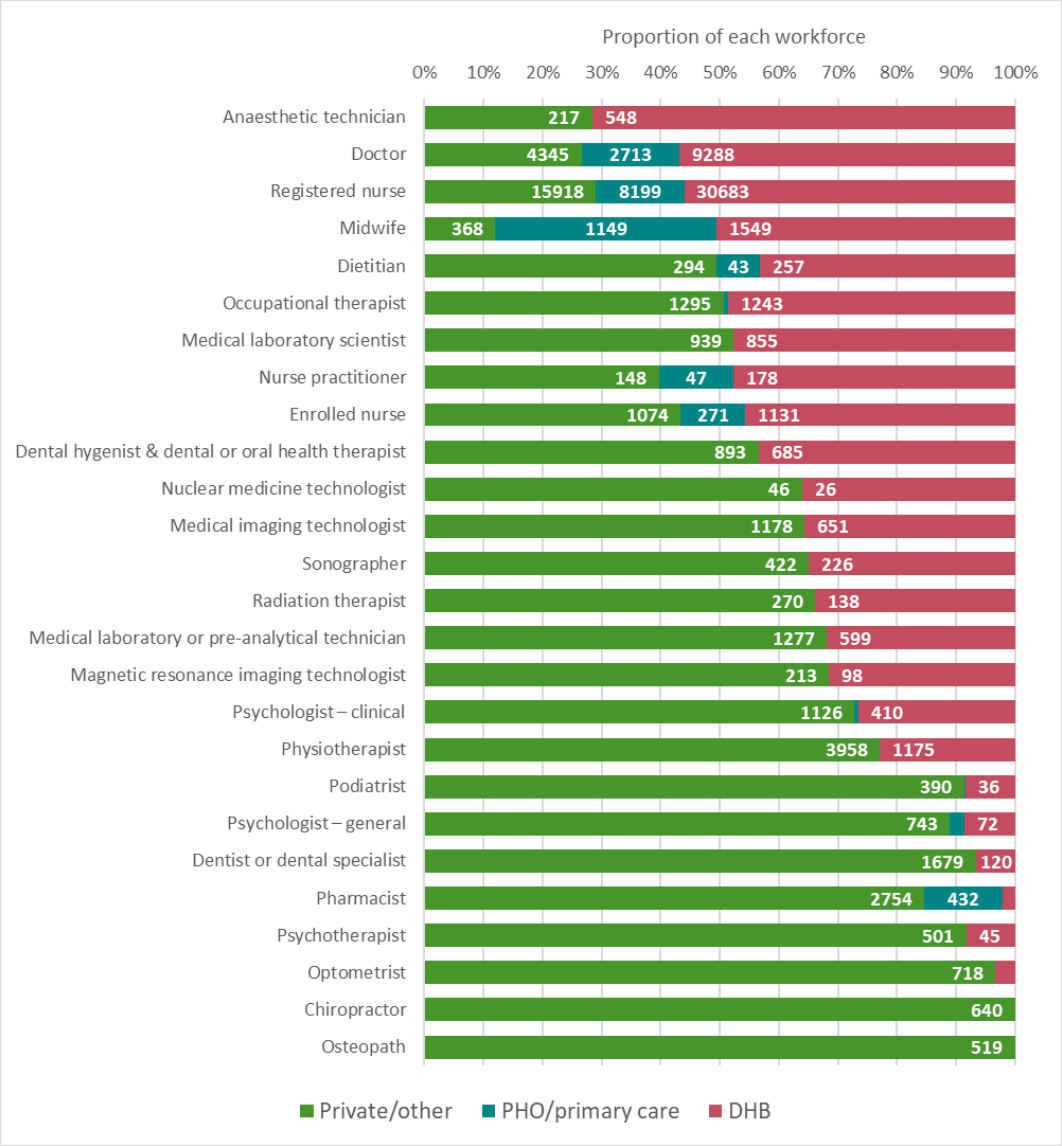
SOURCE: CENSUS 2013; STATS NZ QUARTERLY EMPLOYMENT SURVEY MARCH 2019; TAS DHB EMPLOYED WORKFORCE QUARTERLY REPORT TO MARCH 2019; 2019 ANNUAL REPORTS ON REGISTERED HEALTH PRACTITIONERS.

The mix of workforce groups employed varies between the segments of the health and disability system, for example nurses and midwives make up 40% of hospital staff, but only 13% of Tier 1 staff. Personal carers and assistants make up just over half of aged care staff.

Analysis of data that is available for regulated health workforces show that approximately 40% are working in private settings, most of which are likely to be receiving some public funding from either Health or through ACC. Some staff work in dual practices (public and private). This has potential benefits for the system in terms of additional capacity, more choice for patients (particularly those with private health insurance), and increases the attractiveness of working in New Zealand. However, there are potential challenges around conflicts of interest, staff availability to train junior staff, pay equity, geographical coverage, and compounding skill shortages. Some professions such as dentistry and optometry are largely paid for directly by consumers and are a mixture of owner–operators and employees.

There are few restrictions on where people can work, and the terms and conditions of employment can differ markedly between employers.

FIGURE 11.2: PRIVATE–PUBLIC SPLIT OF THE REGULATED HEALTH WORKFORCE



SOURCE: MINISTRY OF HEALTH (RESPONSIBLE AUTHORITIES WORKFORCE SURVEYS) AND CENTRAL REGION TECHNICAL ADVISORY SERVICES (HEALTH WORKFORCE INFORMATION PROGRAMME).

Workforce shortages exist

Persistent workforce shortages exist in several areas (for example, in midwifery, sonography, and clinical psychology and in rural areas) and other areas have more recent workforce shortages (such as data science). In addition, a significant number of extra people will be required to address high turnover rates and potentially high retirement rates in some workforces (for example, general practice).

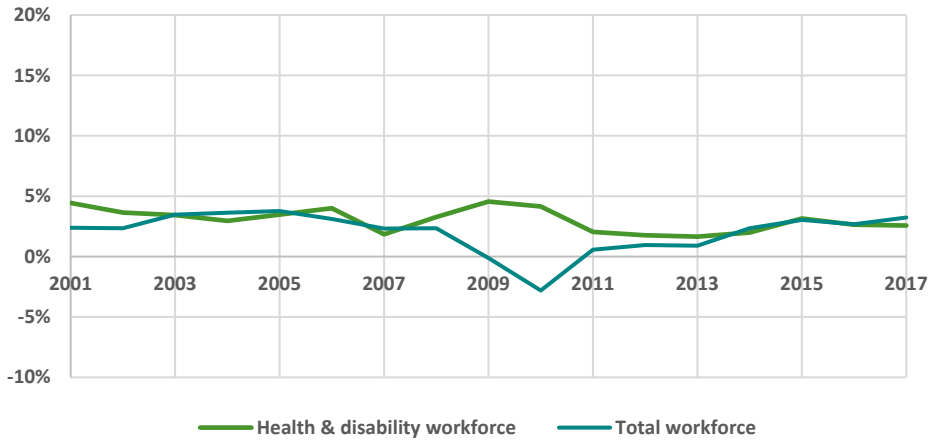
> *We cannot recruit enough clinical staff, putting all staff in the practice under pressure. (Individual submission)*
>
> *…the current estimated workforce shortage of approximately 1000 specialists is projected to continue and indications are that for most specialties the gap between the specialist workforce capacity and health service need will widen by 2028. This 'service gap' may include longer waiting times for specialist assessments, longer waits for treatment, higher thresholds for accessing services, continuing high levels of burnout among specialists, increased pressures to displace critical non-clinical work such as training and continuing education, and missed opportunities to apply specialists' experience and expertise to develop more innovative and efficient models of care. (Organisation submission)*

In some places, these shortages are already impacting on wait times and the quality of patient care. Also, some staff are shouldering additional workloads and may be working longer hours or rosters than are safe and may not be able to take the leave that they request.

Workforce projections suggest the current model is unsustainable

Projecting health workforce demand is challenging, particularly as current roles change and new roles emerge. New Zealand's ageing population with more complex needs is increasing the demand for health services. This will put pressure on the system as demand for service grows at a time when proportionally fewer people are expected to be in the workforce.

FIGURE 11.3: PERCENTAGE CHANGES IN THE TOTAL AND HEALTH AND DISABILITY WORKFORCES ANNUALLY, 2001–2017



SOURCE: STATS NZ (LINKED EMPLOYER-EMPLOYEE DATA).

The considerable debate over workforce forecasting methodologies will need to be addressed in Phase Two of the Review. However, for the purposes of this initial analysis, a simplistic approach has been used of projecting future workforce based on historical growth rates in the total health and disability workforce and the total New Zealand workforce.

For the past 20 years, the health and disability workforce has consistently grown, usually by 2% to 4% annually, and, in most years, has exceeded overall workforce growth. Projecting forward based on historical growth rates suggests an additional 76,000 health workers will be required between 2020 and 2030, around 6,500 to 8,600 additional workers annually. Based on these projections, the health and disability system would employ around 22% of the 'new' workforce and would account for 10% of the total workforce by 2030. This is in addition to hires to replace existing staff who retire or leave the system each year. An attrition rate of around 4% (which is a low estimate) would require a doubling of workforce hires.

Historically, New Zealand has been a net importer of workforce. OECD data shows that New Zealand's reliance on international or overseas-qualified doctors and nurses is high: 42% of doctors in New Zealand are overseas trained (the second highest in the OECD) and 26% of nurses (the highest in the OECD).[387] While this has been the case for many years, a global workforce shortage of around 15 million (18% of the total global health workforce) is forecast by 2030. This may make it challenging to maintain this workforce supply source and may make it more attractive for our New Zealand–trained workforce to work internationally.

While the analysis above is simplistic, it is likely that it understates, rather than overstates, the workforce supply challenge. A 2019 United Kingdom based analysis concluded that "Workforce challenges are currently the biggest threat facing the health service and are already having significant consequences for both patients and staff".[388] The issue is clearly also significant for New Zealand, indicating that current workforce and training models are not sustainable.

Current system arrangements

Legislation

Employees in the health and disability workforce are governed by the same legislation as other New Zealand employees; for example, by the Employment Relations Act 2000, the Holidays Act 2003, the Minimum Wage Act 1983, the Parental Leave and Employment Protection Act 1987, the Health and Safety at Work Act 2015, the Human Rights Act 1993, and the Privacy Act 1993.

In addition there are a number of acts and regulations specific to the health and disability workforce. For example:

- The Health Practitioners Competence Assurance Act 2003 sets out the mechanisms that require that health practitioners are competent and fit to practice.
- The Code of Health and Disability Services Consumers' Rights requires regulated and non-regulated workforces to provide services at an appropriate standard and establishes the role of the Health and Disability Commissioner in promoting and protecting those rights and resolving complaints.[389]
- The New Zealand Public Health and Disability Act 2000 sets out the roles of the main players, such as the Minister of Health.
- The Health Act 1956 sets out the roles and responsibilities of individuals to safeguard public health, including those of the Minister of Health, the Director of Public Health, and designated officers for public health.

- The Mental Health (Compulsory Assessment and Treatment) Act 1992 defines when the Director of Area Mental Health Services, medical practitioners, and nurses can require people to undergo compulsory psychiatric assessment and treatment and protects their rights.

Oversight

Oversight responsibilities are spread across multiple entities. Health Workforce New Zealand (HWNZ) is an independent committee established under Section 11 of the New Zealand Public Health and Disability Act 2000 reporting directly to the Minister. The Committee was established in 2009 to provide strategic leadership for a sector-wide response to New Zealand's workforce challenges. HWNZ also became the primary funder of post entry clinical training and was supported by the HWNZ business unit within the Ministry. In September 2018 there was agreement that the Ministry would establish a stronger workforce function and that the HWNZ would take on a more strategic role. An updated terms of reference is currently under consideration.

The Ministry of Health provides oversight nationally of the health and disability workforce and policies related to it:

- The Director-General of Health, Director of Public Health, Director of Mental Health, and Director of Addiction Services perform statutory functions (for example, the Director of Public Health has a broad clinical leadership role that includes professional oversight of and support to medical officers of health).
- A chief medical officer, chief nursing officer, and chief allied health professions officer provide clinical and technical leadership and advice.
- The Health Workforce Directorate is responsible for national coordination and leadership on workforce issues. It advises on workforce development and regulation; gathers workforce data and intelligence; and invests in health workforce training "to ensure the health system has the right people, in the right place with the right skills to provide the safest care and best outcomes for our population". [390] The directorate also runs the Voluntary Bonding Scheme.
- Profession specific taskforces for the allied health, kaiāwhina, midwifery, nursing and the medical workforce are organised by the Health Workforce Directorate for planning, to provide oversight and expert advice and facilitate links with local, regional and national networks.
- Other parts of the Ministry of Health, such as the Health System Improvement and Innovation Directorates, also play oversight roles.

Many other organisations also play key roles such as:

- The Health and Disability Commissioner is an independent watchdog which promotes and protects consumer rights, resolves complaints, and holds providers to account for improving their practices at individual and system-wide levels.
- Regional shared services organisations support DHBs in each region with the Ministry of Health providing funding for a regional director of workforce training.
- Central Region Technical Advisory Services (TAS) provides some national services such as DHB workforce information analysis and the Employment Relations Programme.
- District alliances are expected to encourage collaborative working.

- The Ministry of Business, Innovation and Employment (MBIE) and Statistics New Zealand provide labour market information. MBIE also develops the Tertiary Education Strategy with the Ministry of Education.
- The Tertiary Education Commission leads the Government's relationship with the tertiary education sector, funds tertiary education organisations, and monitors their performance. The commission has several focuses that relate to workforce, such as boosting achievement of Māori and Pacific students and delivering skills for industry.
- The New Zealand Qualifications Authority runs the qualifications framework and registers some health training providers.

The main organisations and the roles they play in training are discussed below.

Workforce training and supply

Oversight of the workforce pipeline, training, and accreditation

Universities, polytechnics, and other training providers provide initial training to large parts of the health and disability workforce, largely determining student numbers and curriculums, sometimes in conjunction with the Ministry of Health, the Health Workforce Directorate, DHBs, industry, the Tertiary Education Commission, and professional and regulatory bodies. DHBs offer undergraduate and post-entry training placements in hospital and community settings and ongoing professional development for the large workforce they employ.

The Health Workforce Directorate invests in training and development of the health and disability workforce to:

- support new graduate nurses, midwives, pharmacists, and doctors to transition into the workforce in their first year of practice
- subsidise the costs of vocational (specialist) training for doctors, including general practice trainees
- support the postgraduate training of nurses, midwives, and a variety of allied health and scientific workers such as anaesthetic technicians, sonographers, and medical physicists[391]
- support the non-regulated Māori workforce to develop formal competencies in their current roles and develop their potential to move into other health sector roles.[392]

Responsible authorities such as the Dietitians Board, Medical Council and the Medical Radiation Technologists Board define scopes of practice for their professions (these set the boundaries within which a practitioner can practise), prescribe necessary qualifications, register practitioners, and issue annual practising certificates under The Health Practitioners Competence Assurance Act 2003. They also set standards of competence. Responsible authorities, via professional conduct committees, can investigate individual practitioners' competence and conduct. Authorities are funded through professional levies.

Fifteen medical colleges are the professional and membership organisations for specialists. A focus of these colleges is training and ongoing professional development to support medical practitioners working in different specialties. Many of these colleges are Australasian. The relevant college must approve internationally trained specialists and senior medical officers before they can work in their profession in New Zealand. The Council of Medical Colleges acts as the collective voice for the medical colleges in New Zealand. It supports the colleges to discuss issues of common interest, share knowledge, and coordinate college objectives and policies, predominantly relating to a well-trained and safe medical workforce. The council is also the organisation that supports the work of Choosing Wisely in New Zealand.[393]

The large number of bodies leads to a lack of clarity about where responsibility sits and who is accountable for making sure the workforce pipeline is proactively managed over the short and long term. The boundaries between national, regional, and local planning are blurry, as are the responsibilities of the Ministry of Health, the Health Workforce New Zealand Committee, the Health Workforce Directorate, regional workforce development hubs, DHBs, universities, polytechnics, colleges, and employers.

More integrated workforce forecasting and planning that is informed by robust data and considers unmet need, new models of care and ways of working, and future roles and workforce mixes is desired. We also heard that the system wants more visibility of the pipeline and strong leadership to act on that planning and deliver people with the right skills at the right time to prevent future shortages.

> *A common observation about medical workforce planning internationally is the lack of it. So often it appears the challenges that are involved – not least the need to plan two decades ahead to account for the length of time needed to train specialists – leads to a policy stasis with workforce planning ending up in the 'too hard' basket. This in turn falls to depending essentially on introducing incremental changes in staffing on a year-to-year basis and making short-term adjustments to services and staffing in response to emerging health demand. (Organisation submission)*

Kaiāwhina workforce

A wide and varied group of non-regulated workers are referred to as kaiāwhina and fulfil an important function in the health and disability system. Kaiāwhina include people working:

- in health-related corporate and administrative positions
- in alcohol and other drug addiction support roles
- as support workers for older, disabled, or injured people living in residential facilities or in their own homes.

Kaiāwhina are monitored and regulated through industry standards, health and safety legislation, and employment agreements.

Careerforce is the industry training organisation for the health, mental health, aged care, disability, and social services workforce. Qualifications such as the New Zealand Certificate in Health and Wellbeing can be gained at relatively low cost, without university study. These qualifications can form the basis for certification in many healthcare, disability support, aged care, home and community support, and social services positions.

Undergraduate health-related courses

In 2018, around 21,000 people were studying for health-related bachelor degrees – nearly 17% of all students studying bachelor degree courses. The number of health students has been fairly consistent, at a time when the national number of domestic bachelor students has continued to decline.[394]

The universities largely determine which courses will be offered and the numbers of students who will be enrolled. The exception is medical training, where the government sets the number of places that will be funded each year and provides a commitment to placing all New Zealand residents in house officer roles on graduation. From 2007 to 2015, the number of new medical training places increased from 342 to 539.

The majority of health professional courses include clinical placements predominantly in DHBs. Access to suitable placements has been cited by some as a constraint that limits the number of places offered in undergraduate degrees.

Postgraduate training

Postgraduate training for clinical staff is principally delivered in the publicly funded health system. The Ministry of Health funds around $185 million of postgraduate training annually, which partially covers training costs for some workforces. In 2016/17, 63% of this funding was used for post-entry medical (including general practice) training, 12% for nursing, 12% for mental health and addictions, and the remainder spread across the Voluntary Bonding Scheme, midwifery, disability support, allied health, and Māori and Pacific support.[395]

A typical training path (of at least 11 years) for the medical workforce is shown in Table 11.1.

TABLE 11.1: TYPICAL TRAINING AND CAREER PATHWAY OF MEDICAL WORKFORCE IN NEW ZEALAND

YEARS 1–6:	YEARS 7–8:	YEARS 9–11, 12, OR 13	SUBSEQUENT YEARS:
Complete a one-year health sciences course and five-year Bachelor of Medicine degree and Bachelor of Surgery degree or complete an undergraduate degree then the five-year degree	*Work as a house officer (supervised junior doctor) in a hospital and in the community for two years.*	*Become a registrar (trainee) in a specialist training programme. Complete three to five years of specialist training and exams to become a specialist (such as a Fellow of the Royal New Zealand College of General Practitioners) or seek general registration and continue as a senior house officer or locum.*	*Work as a general practitioner, consultant, senior medical officer, specialist, or Fellow.*

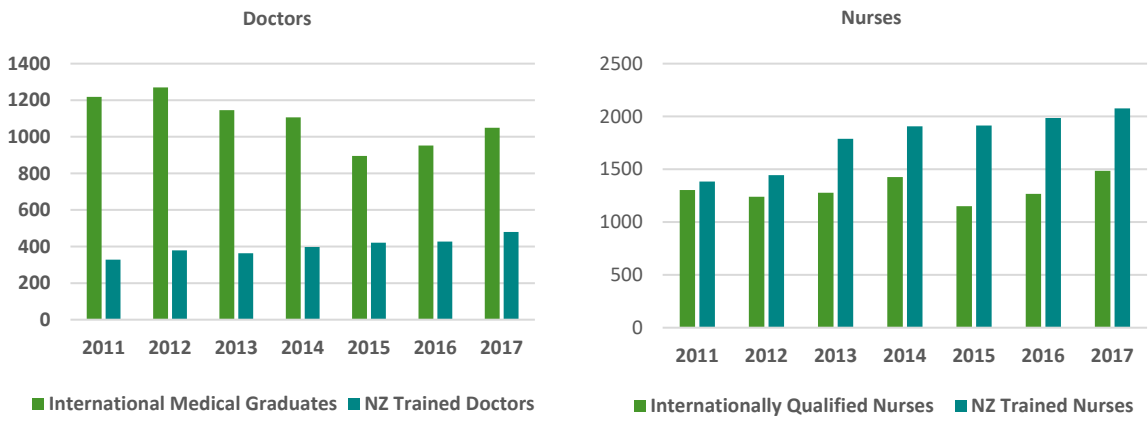
The Medical Council of New Zealand is the registering body and sets the curriculum for house officers in their early post graduate years (2 years). This includes generalist in-hospital experience and a minimum of 3 months in a community based setting.

Specialist medical training for registrars in New Zealand is managed by the New Zealand and Australasian medical colleges, most of which are Australia-based. The colleges set the curriculum for post graduate training (3-6 years), accredit training providers and have a high level of oversight for training positions. In some instances the colleges and the amount of funding available limit the trainee numbers which has the potential to contribute to health workforce shortages.

Specialist training is predominantly undertaken in an apprenticeship model with approximately 70% of experience gained working with senior staff, 20% from structured on-site training and 10% from activities away from the workplace. For hospital-based specialities the training is rotational by nature with trainees undertaking rotations nationally and across Australasia to gain the required experience. Placements for some specialty trainees mandated directly by the colleges. A number of trainees also complete a fellowship at an overseas hospital often in the UK or the United States.

Different training models are used in other countries. For example, in Canada the Royal College of Physicians and Surgeons of Canada and the College of Family Physicians of Canada do not provide specialist training, as occurs in New Zealand. Instead university medical schools provide this training and the Colleges provide standards and accredit training providers and certify that candidates have met the appropriate standards.

FIGURE 11.4: REGISTRATIONS FOR INTERNATIONAL MEDICAL GRADUATES (OVERSEAS-TRAINED DOCTORS) AND INTERNATIONALLY QUALIFIED NURSES COMPARED WITH NEW ZEALAND GRADUATES, 2011–2017



SOURCE: DATA ON DOCTOR REGISTRATIONS FROM 2011-2017 MEDICAL COUNCIL OF NEW ZEALAND ANNUAL REPORTS. DATA ON NURSE REGISTRATIONS FROM 2011-2017 NEW ZEALAND NURSING COUNCIL ANNUAL REPORTS.

Overseas-trained workforce

Doctors and nurses who come from overseas to work in New Zealand need to register here. Overseas-trained doctors must apply to the Medical Council of New Zealand to verify their qualifications and may have to sit an English language test and a registration exam. Australian-trained nurses can automatically register in New Zealand and others are assessed by the Nursing Council of New Zealand against the requirements of the Health Practitioners Competence Assurance Act 2003. The number of new registrations for these professions each year since 2011 is shown in Figure 11.4.

People trained overseas in other regulated health professions also need to register with their relevant responsible body, such as the Pharmacy Council or the Medical Sciences Council of New Zealand.

Training and developing the workforce of the future

The health and disability workforce of the future will need to work in new ways and use new digital technologies and better data. The system will need to develop new ways to train, retrain, develop, and support the health and disability workforce. For example, where this is not already happening, the system will need to support them to:

- adapt to new technology and build both digital skills and the skills to interact effectively with consumers, such as the ability to hone judgement, understand, interpret, and question results to improve patient safety and to communicate with consumers effectively and empathetically
- understand data sovereignty and medical ethics
- become work ready, for example, by making it simpler to update curricula based on professional and industry requirements
- learn and implement new ways of working, including team-based working, for example, through joint courses for health professionals from different disciplines
- learn new skills as old skills and roles become redundant
- build cultural competency and responsiveness
- apply generalist skills and call on specialist skills as needed
- work with patients and their family and whānau, carers, and the general public as partners in their own care and support and empower them to use new technologies.

Continuing professional development and new ways to retrain will also become increasingly important. For example, different approaches to stair-casing entry and qualification points, training models, and development programmes and academies. More flexible credentialing could allow staff to learn new skills and move into new roles as roles become redundant, in a way that provides assurance they have met the right standards.[396]

Currently, taking time away from paid work or having caring responsibilities is a barrier to many people taking up health education, particularly for people in low-income households. Opportunities exist for more ‘earn as you learn’ or apprenticeship-type models to be used. Greater investment will also be required in the kaiāwhina workforce to address inequities in the system.

Employment models and relations

Some aspects of employment are organised nationally, some regionally, and some locally. For example, nationally, the Nursing Advanced Choice of Employment system matches new nursing graduates with DHB jobs and near-national multi-employer collective agreements cover many DHB employees. Regionally, regional workforce development hubs are trying to join up workforce development within regions and avoid internal regional competition for staff. Locally, individual practices and DHBs directly employ staff.

In 2017, 13 national or near-national multi-employer collective agreements covered about 65% of all DHB employees, while seven regional multi-employer collective agreements covered a further 20%. Local collectives or individual employment agreements covered the balance of employees. In addition, there were three collective agreements with the New Zealand Blood Service. DHB chief executives have the authority to enter into collective or individual employment agreements covering DHB employees.

Union density (that is, membership as a proportion of the workforce) in 2017, was very high in DHBs at around 70%. The unions representing DHB employees are a mix of health sector–specific (typically occupational) unions and general unions. There is some overlapping coverage where two or more unions separately represent the same occupational group.

Under the New Zealand Public Health and Disability Act 2000, DHB chief executives must consult with the Director-General of Health before finalising the terms and conditions of a collective agreement. These obligations are explained further by specific Ministry of Health guidelines, the Operational Policy Framework,[397] and the Government Expectations for Pay and Employment Conditions in the State Sector.[398] The Ministry's key roles in health sector employment relations activity are to:

- monitor local, regional and national bargaining
- liaise with and provide information, advice and feedback to the Minister of Health and the Minister of State Services, other government agencies and DHBs
- advise and report to Cabinet, if required.

There are challenges for all with current union and employer relationships.

Unions are concerned that their members are remunerated fairly, well supported to complete training and professional development, and work in safe environments. Key issues raised in discussions included workplace stress, bullying, fatigue, safe rosters, and future workforce roles and numbers. A lack of trust in employers has resulted in additional clauses being built into the multi-employer collective agreements so employers can be held to account for delivering on commitments made during bargaining.

Employers, in particular DHBs, are concerned that so much specificity in agreements makes it challenging to meet their service delivery commitments, particularly in areas with workforce shortages. Discussions signalled that such specificity is also affecting decisions about hours of work, as the additional costs associated with weekend work, in particular, are high. This, coupled with the constraints that regulatory bodies place on scopes of practice and internationally accepted roles, is slowing the pace at which new roles are being adopted in New Zealand.

During Phase One engagement, concerns were also raised about:

- inconsistencies in interpretations of the multi-employer collective agreements between employers
- differing terms between agreements for workforces that are working together
- differing terms between public sector and non-government organisation (NGO) employers – particularly for nursing staff in Māori provider organisations.

> *The negotiation process was described as "an inefficient, drawn out process that concludes with a compromise deal that generally applies for only a short period before negotiations commence again". Recent processes have involved more strike action than has been the case over the preceding decade, which adds further tension to the process and has been challenging for the workforces involved.*

Unions and employers will need to work differently if the workforce challenges are to be addressed. A tripartite Health Sector Relationship Agreement between the Government, DHBs, and the New Zealand Council of Trade Unions and its major health affiliates (the New Zealand Nurses Organisation, the Association of Salaried Medical Specialists, Public Service Association, and the Service & Food Workers Union (now E tū)) was signed in 2008. This agreement reflects a commitment to constructive engagement and provides a framework and work programme that aims to assist in improving productivity, efficiency, and effectiveness in health and disability service delivery, while acknowledging resource constraints. Although this agreement has been in place for a decade, there is little evidence of constructive strategic approaches to workforce issues being the norm. Improving engagement through forums such as this will be essential for the future.

Health could do more for the wellbeing of its workforce

Workforce is stretched and stressed

The health and disability workforce is committed, but is stretched and stressed. Some members of the health workforce are burnt out. Discussions with DHB executives suggested that sick leave is notably higher than in the past and annual leave balances are increasing for some workforces – both signs of a stretched workforce. Recent negotiations with unions focused on roster changes and additional staff to support safer work practices.

Some professions reported high levels of burnout, which aligns with results in several recent workforce surveys as illustrated in Table 11.2.

TABLE 11.2: SUMMARY RESULTS FROM A SAMPLE OF WORKFORCE SURVEYS

Workforce	Sample size & year	Key issues
Senior doctors and dentists	1,487 in 2015	Half of senior doctors and dentists reported a high level of personal burnout, with the highest burnout amongst those working in emergency medicine and psychiatry. Contributing factors included intense and unrelenting workloads, under-staffing, onerous on-call duties, and frustrations with management.
Midwives	1,073 in 2013	Employed midwives had significantly higher levels of work and personal-related burnout and anxiety than self-employed midwives. "Aspects of the work environment found to be associated with burnout (particularly for employed midwives) were inadequacy of resources, lack of management support, and lack of professional recognition and development opportunities".
Nurses	739 in 2016	At an aggregate level nurses display high resilience and personal accomplishment in the face of moderate emotional exhaustion. Nurse morale has been steadily declining over time, for example 75% would recommend nursing as a career in 2017 compared with 83% in 2013. Issues include access to training, career progression, choice of hours, bullying, workload, and pay.
Addictions workforce	349 in 2017	A number of negative workplace experiences were reported to be "regular" occurrences. Approximately half the respondents reported regularly experiencing work overload (49%) and understaffing (57%), with smaller proportions reporting regular burnout (13%), bullying / intimidation (13%), and discrimination (9%). Regular harassment was reported by just 5% of respondents.

Sources: CNL Chambers, Frampton, CMA, Barclay, M, McKee, M. 2016. Burnout prevalence in New Zealand's public hospital senior medical workforce: a cross-sectional mixed methods study. BMJ Open 6:e013947. doi:10.1136/bmjopen-2016-013947. https://bmjopen.bmj.com/content/bmjopen/6/11/e013947.full.pdf
L Dixon, Guilliland, K, Pallant, J, Sidebotham, M, Fenwick, J, et al. 2017. The emotional wellbeing of New Zealand midwives: Comparing responses for midwives in caseloading and shift work settings. New *Zealand College of Midwives Journal* (53): 5–14. https://www.midwife.org.nz/wp-content/uploads/2018/09/Jnl-53-article-1.pdf
Walker, L. 2017. *NZNO Employment Survey 2017: Our nursing workforce – Resilience in adversity.* Wellington: New Zealand Nurses Organisation. https://www.nzno.org.nz/LinkClick.aspx?fileticket=C1q0M5fBavA%3d&portalid=0
A Roche, Kostadinov, V, Braye, K, Duraisingam, V, McEntee, A, et al. 2018. The New Zealand Addictions Workforce: Characteristics & *wellbeing.* Adelaide: National Centre for Education and Training on Addiction, Flinders University. https://www.tepou.co.nz/uploads/files/resource-assets/NZ%20addictions%20workforce%20wellbeing%20report_final.pdf

Concerns are not limited to the professional workforces.

> *Workers are increasingly rung and asked to fit more clients in while driving or working with clients, during their breaks and even holidays. Most have begun ignoring these calls. Often, they are asked to squeeze an extra client into an already over-filled roster. On such occasions a whole string of clients may be kept wondering when, or if, their support worker will arrive. The most compassionate workers tend to yield more often to these pressures out of concern for their clients, and frequently suffer burnout and excessive sickness breaks. Others, with more concern for self-care, resign and exacerbate the staff shortage. (Organisation submission)*

Table 11.3 summarises some of the key issues submissions tell us staff report at different stages of the life course.

TABLE 11.3: KEY ISSUES FACING WORKFORCE AT DIFFERENT STAGES OF THE LIFE COURSE

TRAINING							
▸ *Subjects not taken in school*	▸ *Student debt from training and living costs*	▸ *Few earn as you learn options available*	▸ *Pipeline not actively and consistently managed*	▸ *Lower numbers of Māori and Pacific students entering training*	▸ *Some exit training not work ready*	▸ *Siloed rather than team-based training*	▸ *Some traditional methods and roles*
NEWLY EMPLOYED							
▸ *No guarantee of placement in some roles after training*	▸ *Risk put into models of care with over-reliance on newly qualified staff*		▸ *Need for mentoring and coaching*	▸ *Need for team-based and innovative training to be reinforced in practice*		▸ *Health and safety risks*	▸ *Can be low pay*
WAYS OF WORKING							
▸ *Tension between generalist and specialist*	▸ *Need to be responsive to culture and reduce institutional racism*		▸ *Barriers to team-based working*	▸ *Need to work in new ways to improve outcomes for Māori, Pacific, rural and disabled populations*		▸ *Getting prepared and confident with digital future*	▸ *Lifting health productivity*
CARING FOR CHILDREN							
▸ *Lack of onsite childcare*	▸ *Paternity leave not encouraged*	▸ *Desire for e-rostering allowing last minute changes*	▸ *Shifts don't end on time*	▸ *Want return to work courses*	▸ *Rosters aren't provided in advance to arrange childcare*	▸ *Some meetings outside childcare hours*	▸ *Hard to work from home via tele-medicine*
RETRAINING							
▸ *Supporting staff to continue working in the health and disability sector as some roles disappear altogether and new roles appear eg genomics and robotics*			▸ *Many courses require multiple years rather than add on to generic training – makes switch to new area costly*				
CARING FOR PARENTS OR RECOVERING FROM ILLNESS							
▸ *May require break from work or flexible hours or to work offsite*							
MANAGING AND LEADING							
▸ *Growing change management skills needed*	▸ *Preparing for more digital future will require strong management & leadership*		▸ *Room to grow capacity of providers*	▸ *Balance between management & clinical skills*		▸ *Desire for more centralised leadership*	▸ *Role of alliances*
NEARING RETIREMENT							
▸ *Can sometimes be offered all or nothing roles and hours*		▸ *May want fewer shifts*	▸ *May want less physical job*	▸ *Time to pass on skills*			

Health profession attrition has serious impacts on the sustainability and productivity of the health workforce and can have a negative impact on continuity of care for patients. Submissions raised concerns about the ageing workforce with large numbers expected to retire in the next decade. In 2015, about 40% of doctors were aged 50 or over, up from 35% in 2009. Similarly, the average age of nurses in 2015 was 46.3 up from 45.9 in 2009. There are also risks to specialised professions.

Leveraging health's large employer status

As a large employer, the health system can influence the health and wellbeing of a large number of New Zealanders and their families and whānau, with flow on benefits to the rest of the economy. This is not just about pay and conditions, but also about building trust and confidence in the system, enhancing health literacy, and listening to the workforce about what really matters to them.

Research suggests that people with poor health literacy are less likely to use prevention services (such as screening); have less knowledge of their illness, treatment and medicines; are less likely to manage their long-term/chronic condition; are more likely to be hospitalised due to a chronic condition; are more likely to use emergency services; and are more vulnerable to workplace injury because they do not understand safety precaution messages.[399]

Improving the health literacy of non-clinical staff could also have spill over benefits for the consumers they serve and for their families and whānau. This could assist families and whānau to make informed decisions about their health and help them navigate the health and disability system.

TO THRIVE PROGRAMME, AUCKLAND DHB

This programme has been implemented to improve lower-income employees' prospects through access to job specific training, financial capability education, and career pathways within the DHB. It also focuses on wellbeing through access to free health checks and improved work conditions.

The DHB ran focus groups with cleaners, orderlies and waste orderlies (three workforce groups that make up 75% of the workforce paid less than $20 per hour before penal rates in the DHB). The focus groups identified key issues, work and life aspirations and priorities. Management then worked with the focus groups and external partners to develop a sustainable programme of initiatives that were trialled before being rolled out.

The initiatives include a mix of:

- Health and wellbeing initiatives such as free eye exams, annual health checks and a free gym membership
- Training in job related skills, computer skills workshops and access to computers, literacy and numeracy training, financial capability seminars, supporting Level 2 and Level 3 qualifications, and linked salary increases
- Benefits such as life insurance, shoe vouchers and laundry allowances.

Trainee positions have been established and To Thrive participants have been supported to gain an NZQA qualification with some transitioning to other roles in the DHB. Recent employment engagement survey results for this group were positive with 82% feeling supported to grow and develop and 81% feeling a sense of commitment to the DHB.

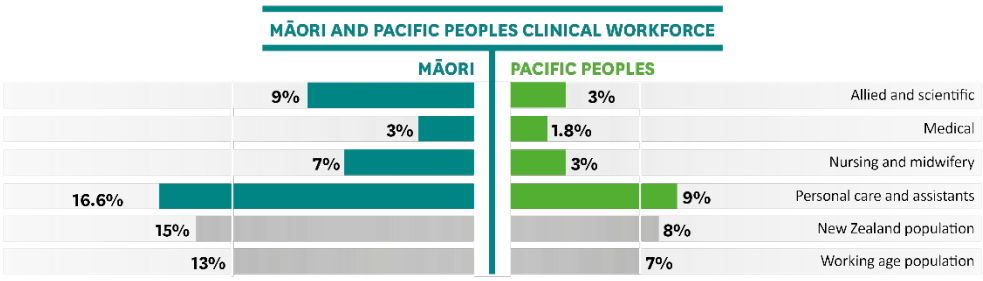
Growing a workforce that reflects New Zealand's many communities

Growing and developing the Māori and Pacific workforces

Too few Māori and Pacific peoples are in the health and disability workforce to reflect the size of their populations and their needs (as illustrated in Figure 11.5).

- Māori make up 15% of the New Zealand population and 13% of the working age population (15–65 years), but only 12% of the workforce and 8% of the DHB workforce.[400]
- Pacific peoples make up about 8% of the New Zealand population and 7% of the working age population, but only just over 4% of the DHB workforce.[401]

FIGURE 11.5: MĀORI AND PACIFIC WORKFORCE POPULATIONS



SOURCES: CENSUS 2013, STATS NZ POPULATION PROJECTIONS (2017), TAS: DHB EMPLOYED WORKFORCE QUARTERLY REPORT TO MARCH 2019.

The lower numbers of Māori and Pacific staff is a missed opportunity for staff to provide care that is responsive to the needs of and reflects the cultural views, language, history, values, challenges, and beliefs of consumers who share similar backgrounds and who are some of the least well served by the system.

Increasing the number of Māori and Pacific staff is an integral part of a strategy to improve equity of outcomes for these groups, along with improving the cultural intelligence and responsiveness of the entire workforce. For example, *'Ala Mo'ui: Pathways to Pacific Health and Wellbeing* states:

> *If we are to improve and gain equitable health outcomes for all Pacific peoples in New Zealand, it is essential to not only build the capacity and capability of the Pacific health and disability workforce but to also increase the responsiveness of the non-Pacific health workforce to Pacific health needs.*[402]

Ethnic and linguistic diversity is associated with improved access and quality of care, because:

> *[Pacific workers] bring connections with Pacific communities, personal understanding of Pacific issues, and Pacific cultural and language skills.*[403]

The Māori and Pacific populations are expected to continue to grow, but at slower rates than the Asian population in New Zealand.[404] As the Māori and Pacific populations are relatively younger cohorts (with median ages of 23.9 and 22.1, respectively, compared with 41 for New Zealand Europeans), the available workforce pool in future will include a larger proportion of these groups.[405] Table 11.4 shows the potential workforce over the next two decades.

TABLE 11.4: NEW ZEALANDERS AGED 15–65 BY ETHNICITY, 2013 AND 2038 PROJECTION

	Number		Percentage of total (%)	
	2013	2038	2013	2038
Total	2,907,340	3,481,500		
Māori	423,000	635,300	15	18
Pacific	206,500	361,600	7	10

SOURCE: STATISTICS NZ POPULATION PROJECTIONS.

There are a number of initiatives already underway to grow the Māori and Pacific workforces which are starting to pay off, and potential students and staff are being exposed to more Māori and Pacific health workers, who are also encouraging them to work in health. The first objective is to encourage students to achieve success in the right subjects at school, giving career advice, offering bridging programmes where necessary, influencing admission policies/quotas and institutional commitments to achieving equity, and pastoral interventions to support completion of study in a culturally safe environment.[406]

One initiative, in Taranaki, WhyOra, works with all secondary schools in the region to highlight health as a career, encourage students to take science, support students to apply for health study and help Māori into health cadetships and jobs, providing pastoral support from year 9 into employment. Most students return to work in Taranaki and are motivated to improve whānau wellbeing.[407]

Another initiative is DHB led. Auckland and Waitematā DHBs reviewed their recruitment and retention policies and processes from end to end to determine whether barriers had been inadvertently created for Māori.

Now the DHBs automatically short-list for interview all Māori applicants who meet the core criteria for any role and include Māori representatives in all nurse entry to practice interviews to engage Māori applicants, make them feel comfortable and culturally safe, and draw out cultural and community knowledge that they could bring to the role.

Other areas have been identified where there may be room to do more to:

- involve families and communities in initiatives, as recommended in *Taeao o Tautai: Pacific Public Health Workforce Development Implementation Plan*, to guide the workforce "who are the *tautai* or navigators of a new day dawning" to improve community wellbeing using the Pasifika way[408]
- increase Māori control and involve iwi and whānau, in line with the Whakapuāwaitia Ngāi Māori Thriving As Māori 2030 Māori Health Workforce Priorities and the National Māori Health Strategy He Korowai Oranga. [409]
- grow Māori leadership in the health and disability system, for example supporting initiatives such as Ngā Manukura o Āpōpō (or Tomorrow's Clinical Leaders – a clinical leadership and professional development programme for Māori nurses and midwives focussed on leadership in action and leadership as Māori)[410], and involving kaumātua (elders) in the system.

Building the cultural competence of the entire workforce and reducing institutional racism

Lack of cultural competency and institutional racism are barriers to meeting needs and improving outcomes for groups such as Māori, migrants, and refugees. The Health Services and Outcomes Kaupapa Inquiry (Wai 2575) raises institutional racism as a significant issue for Māori health – both for staff and for people accessing services.[411]

Submissions proposed compulsory training in cultural competence for the entire workforce:

> *Cultural competence and cultural safety training are core requirements for all health and disability workers. (Organisation submission)*

Diversity is not just cultural, but also includes among others, gender, sexual orientation, and age. Another submission stated:

> *The workforce must be fit for purpose; the training received must prepare staff for the realities of the diverse population that they will work with. (Organisation submission)*

Building cultural competency also requires leaders who support it.

> *There must be a strong emphasis on affirming culture and cultural responsiveness for health professionals. Cultural competency must be at the heart of every interaction between our health workforce and the diverse population it is working with. Strong, courageous leadership that has a true understanding of health disparity and health equity is therefore required to reflect and deliver this truth. In addition, this leadership must have a mandate to action the change required to implement this vision. (Organisation submission)*

Employing more disabled people in the health and disability system

Disabled people are three times less likely to be in paid work than non-disabled people and are an underutilised group who are more likely to earn a much lower income. Disabled people also generally experience worse health outcomes.

The New Zealand Disability Strategy for 2016 to 2026 aims to increase employment of disabled people and build the confidence of employers in employing people, with the public sector taking a lead, for example, by developing a toolkit for employing disabled people, paid internships, better data, and awards.[412] The health and disability system could use its role as a large employer to progress these goals.[413]

Research on the employment of disabled people in disability support services in New Zealand found that supply-side approaches to increase the employment of disabled people had not been successful, but that demand-side approaches, which focused on making employers "disability confident" were more effective in pulling disabled people into the workforce.[414]

A workforce with more disabled people may be able to work in a more understanding way with disabled consumers and influence the practice of their peers. This would also provide a way to increase the career and earning potential of the individuals and improve the wellbeing of their families and whānau.

Staffing rural and hard to fill areas

Geographic distribution of the workforce is a major challenge, particularly for primary care and rural and provincial hospitals, which can struggle to recruit and retain the workforce they need, despite a number of initiatives to meet this challenge. In general, job applicants and trainees tend to favour large cities, particularly Auckland, although the Voluntary Bonding Scheme is helping.[415] More areas will experience population decline over the next two decades, with Statistics New Zealand projecting 87% growth in urban areas by 2038.[416] At a recent sector workshop on priorities for health and disability workforce staffing, rural areas were generally viewed as a high priority.

Working differently

Ways of working are also changing. The health and disability system is starting to use the current workforce differently and to embrace new roles, which needs to be supported by strong leadership and management. Collaborative and team-based approaches are widely recognised as being critical to the delivery of new models of care. New Zealand is beginning to recognise the massive contribution that patients and their families and whānau can make to the health and disability system and to recognise the untapped potential of volunteers. There are growing consumer expectations that some services should be accessible online and accessible for extended hours outside standard 'business hours'. This will require significant changes in current work practices.

Adopting team-based approaches

Discussions highlighted that the workforce largely wants to work better as a team to make the best use of everyone's skills and to make it easier for patients and their families and whānau to access the services they need in a way that suits them. Many people in the workforce are also keen to learn from each other

and work in a more collaborative, supportive environment and culture that makes the best use of different team members' skills, improves patient safety, and reduces burnout. Local examples of team-based initiatives include:

- the South Island Alliance implementing the Calderdale Framework for delegation and professional skill-sharing with the allied health workforce[417]
- increasing use of multidisciplinary meetings that can result in better and more holistic treatment planning, improved communication, a wider range of therapeutic options, less duplication, more efficient use of time and resources, and improved equality of outcomes[418]
- 11 Youth One Stop Shops operate from Whangarei to Invercargill, providing a wide variety of services in one place and aiming to improve the mental health of rangatahi (young people).

The regulatory approach, to scopes of practice for instance, may be a barrier to team-based working, as is New Zealand's relatively siloed approach to training.

Using the current workforce differently

To meet growing demand, New Zealand will need to use the health and disability workforce differently. One area where this has already occurred is in the West Coast where a more generalist workforce model, supported by technology and specialist support, has been adopted to support a small and remote population.

> *West Coast District Health Board, the smallest in the country, may well be the way of the future in regards to striking the right balance between generalism and subspecialisation. Its 'one service, two sites' approach to specialist services, provided through a close partnership with Canterbury District Health Board, enables patients to receive safe, high-quality hospital care, as close to home as possible. Core acute 24/7 services at the small Grey Base Hospital are provided by West Coast Rural Hospital doctors with generalist skills across specialties, working with West Coast – and Christchurch-based specialists and subspecialists. This approach has evidently helped with recruitment of specialists to Grey Hospital. Being part of a larger group of colleagues with the ability to spend regular time at the tertiary hospital working in their field of special interest makes surgeons' roles at Grey Hospital more attractive. (Organisation submission)*

As technology changes the health and disability system will embrace new roles, such as genomics and robotics experts and data scientists, although the system may have to compete with other sectors for people.

Other new roles will emerge and change service delivery approaches. For example, physician associates, health coaches, and social prescribers are increasing, with further new roles such as culturally endorsed behaviour change specialists starting to emerge. There is also a view that much can be gained from rongoā Māori healers (traditional Māori health experts) working more closely with mainstream providers to complement medical approaches.

As the health and disability system is put under increasing pressure staff productivity will become more important.[419] The World Health Organization identified the following barriers to health worker performance and productivity:[420]

> *unclear roles and expectations, vague guidelines, poor processes of work, inappropriate skills mix within the work setting, competency gaps, lack of feedback, difficult work environments and unsuitable incentives mean that even where there are no critical workforce shortages, health workers may still fail to provide quality care.*

We heard that administrative burdens are weighing down staff. The scales have sometimes tipped in favour of more time spent on administration than with the patient (for example, 15 minutes with a patient or client and one hour writing up the engagement and connecting to social agencies, according to one submission).[421] Technology solutions that enable clinical staff to spend more time with patients and less on paperwork may assist.

Disruptive leadership and management

One common theme that emerged in discussions about why an initiative or an organisation stood out as a success was quality leadership and management. Frequently, this involved a small number of highly committed people who had a vision that resonated with others and around which new ways of working were identified and introduced in a staged manner.

Concerns were raised about whether, given the relatively small size of the New Zealand population, there was sufficient leadership and management capability and capacity for the number of existing roles and organisations.

It was also noted that change management had not been a focus or a skill that was widely applied.

> *Shifting the focus onto prevention, early intervention, and integrated care takes time and resources. Frontline staff and clinicians are busy with their day jobs and have little time to focus on leading changes. Moreover, they do not necessarily have the expertise needed to drive and manage a change process. People with project management and change management skills and experience are needed to help implement the changes required. Clinical champions are also needed to drive new models of care or initiatives. However, DHBs have to weigh up bringing in more staff to help drive changes with other more immediate priorities, such as addressing the growing demand on hospital services and managing clinical risks. (Group submission)*

In other jurisdictions, investment has been greater at a system level in training schemes focused on growing leadership and management skills. For example, the NHS has had a management training scheme for over 20 years and recently launched a digital academy. In the United States, the Institute for Healthcare Improvement is well recognised for its delivery of improvement science training and governance training.

Discussions suggested that if the system is to implement the sorts of change that have been discussed for decades, a more coordinated and deliberate approach to leadership development will be needed. This will need to occur at multiple levels and will require investment.

Empowering patients, their families and whānau, and volunteers

Family and whānau carers and volunteers are an important part of the unpaid workforce. They contribute hugely to the success of health interventions and disability support. Many submissions noted the benefits that could be gained by better supporting family and whānau carers, who are under pressure.

Opportunities exist to build the health literacy of patients, carers, and volunteers and offer them encouragement, training, and self-management and prevention tools. The New Zealand Health Strategy states:[422]

> *Beyond the formal workforce, it will be important to support families, whānau and individuals in communities in their roles as carers of people close to them. This support could involve providing health literacy education, as well as information and training specially tailored for volunteers.*

For example, the Nuka System of Care provides health services to and empowers Alaska Native and American Indian peoples. Nuka invests purposefully in engaging and building relationships with their customers to hear, listen, and learn about what they need to become well and build a multidisciplinary team and culture focused on meeting its customers' stated needs. This also flows through into who Nuka hires, looking for fit first, and technical skillset second, and supporting and developing young people as future staff and leaders. This hiring policy also helps with retention as it draws in people who want to deliver in a customer-centric system. [423]

Volunteers make up an important part of the health and disability workforce. For example St John Ambulance has over 9,000 volunteers who work in roles such as ambulance officers and event medics, teaching first aid, running health shuttles to get people to health appointments, and as hospital friends.[424] In the United Kingdom, over 11,000 volunteers are working as community first responders, attending life-threatening emergencies in their local areas before ambulance services arrive. They are a significant part of the workforce, adding to the approximately 20,000 paid staff. Training, good volunteer management, and governance for safety, as well as sharing learning between providers, were identified as key opportunities to support this type of initiative.[425]

Positioning health for the future

The system does not have adequate systems to gather information about and manage its workforce. In comparison to other large employers, its workforce systems are very basic. It is unlikely that other industries are managing the complexities of rosters or the large number of staff with such basic and standalone systems. Investment and change will be required.

It will be important also that those working in the system work more collaboratively and cooperatively towards a common purpose and have a shared set of values. It should not be assumed that those working in the system, or governing the system, will all join with this knowledge or sense of purpose. Induction processes should be strengthened, and organisations should consider on a regular basis how they are demonstrating these values and contributing to the overall system as well as to their own profession or organisation.

Directions for change: Workforce

Workforce pressures are significant and need to be urgently addressed by ensuring both better planning for future supply and more flexibility in training to prepare for different roles. Workforce practices will need to provide better work / life balance in the future.

CHANGING SKILL MIX

- *The types of work and the balance of demand for different skills is changing rapidly, yet our training methodology is very rigid. The Panel believes the sector needs to be both more open minded about how services might be provided and more flexible about the range of qualifications needed to perform various tasks.*
- *We need to improve communication between tertiary education providers, professional bodies, the Ministry and DHBs in order to undertake more effective workforce planning and supply management. This will need to be centrally driven.*
- *Growing the workforce is not just a tertiary education issue. We should be actively influencing secondary school students to attract them into the health workforce and support them to be successful. Taking a strategic approach to growing our kaiāwhina workforce over the next 5 years will be a key to achieving a step change in the ways in which we are able to deliver services.*
- *Our digital and data capability needs to be invested in significantly, both in terms of building the skills of our current workforce and also creating new roles to support changed ways of working.*

BEING A GOOD EMPLOYER

- *The system could have a significant impact on the health and wellbeing of our entire population both by being a good employer and by ensuring the system workforce properly reflects the population it is serving.*
- *Leveraging the system's ability to create employment opportunities for those who have traditionally found it hard to find employment (particularly those with mental health conditions and disabled people), and growing the Māori and Pacific workforce is a must.*

CHANGING CULTURE

- *Changing demographics along with increasing comorbidities, and technologies, will continue to increase the demand for all parts of the system to act in more multidisciplinary, collaborative ways. The need to be able to provide services where they are most needed by consumers and in ways which are most accessible, will also require flexibility on the part of the workforce. Ensuring such behaviours are the norm rather than the exception will be essential.*
- *There are currently many different employers within the system and employees working for multiple organisations. While the Panel believes that the system should continue to consist of a variety of different business models it will be important that there are explicit measures in place to ensure conflicts of interest are properly managed.*
- *The presence of multiple employers, managing multiple employment contracts, with significantly different conditions can create constraints to optimising the effectiveness of the workforce and the efficiency of training, from a whole of system perspective. These impacts will need to be managed more effectively.*
- *Existing workforce strategies promote a strategic relationship between our key unions and the employers but there is little evidence of this being an effective partnership. Building a more collaborative workforce will require unions and employers to buy into different ways of working.*

12 Digital and data / Te matihiko me ngā raraunga

Advances in digital technologies have huge potential to better support population and whānau-focused health and wellbeing. A prerequisite for the New Zealand system being able to take full advantage of these opportunities, however is to develop robust data standards, identity management protocols and interoperable systems to ensure quality data can be shared and managed appropriately.

This section examines some of the current difficulties with data in the system, from lack of ability to share effectively, through issues with national collections to data sovereignty. The section also considers the system landscape and how that should be developed to enable a more integrated, networked nationwide system which can not only measure and evaluate results, but which could facilitate services being delivered in ways which more effectively meet consumers' needs so that inequity is reduced.

Importance of data

Throughout our Phase One engagement, a theme raised in virtually every discussion and in many submissions was data. It was acknowledged that quality data is critical for:

- consumer empowerment, supporting consumers to actively manage their own health with access to their own health records to gain information and to contribute to them, and to support targeted wellbeing and education advice, research information, and choice
- better patient safety, care, and outcomes that enable clinicians to see complete, up-to-date patient data across the continuum of care
- new models of care that require multiple clinicians across different settings to have access to real-time patient data to support multidisciplinary care
- decision-making and research that require timely access and analytical capacity to extract meaning from large datasets.

Access to much improved, up-to-date, reliable data is fundamental in a system that aims to deliver more equitable outcomes, improved health and wellbeing, and a better consumer journey through the system. This requires system-level thinking in relation to architecture and design, data standards, systems interoperability, and efficient use of resources as NZHIT set out in its report:

> *Using digital technology to "put health and wellness in the customer's hands" is an area where New Zealand must develop a strategic and tactical approach to empower New Zealander's to have full equity and access to the healthcare services they need in a more proactive manner.*

Data journey for consumers, providers, and other organisations

We heard during Phase One that consumers generally assume their information is shared between providers (for example, between an emergency department and their GP). This is often not the case. Lack of integration between providers and consumers having to repeatedly give the same information is frustrating, burdensome, and, in some cases, increases risk and results in poorer health outcomes for consumers.

> *[we want] ease of sharing information so that people do not have to yet again share their story before they can get the help they need. (Individual submission)*

Consumers noted that they:

- want to know that the health system uses up-to-date data wisely to inform decisions
- want data to be used in a way that benefits them
- assume information is shared across providers and are frustrated when it is not
- want full access to their own information and the ability to update their own details
- are unclear about consent and are frustrated that consent is fragmented and ad hoc across the system
- were concerned about sharing sensitive information and security or privacy breaches
- were concerned with accountability and monitoring of their health records and those of whānau.

Providers noted that being able to access complete patient data and share this across multidisciplinary teams in a timely manner was critical to care, crisis responses and for changing the lives of consumers with high needs. Planners and decision makers require good information to deliver smarter policy, planning, and funding decisions.

However, four consistent challenges are:

- much patient information is not in machine-readable formats, so is difficult to access and share. For example, reports are stored as PDF documents that are difficult to access and use in clinical settings and are of limited utility for population-level reporting or research.

- privacy is cited, often incorrectly, for withholding patient information and other data that would help inform performance improvement, policy funding and investment decisions.
- many contracts do not clearly set out data requirements. Organisations generally understand their responsibilities in regard to clinical use of data, but do not see it as a requirement to routinely share data with other providers or the Ministry of Health.
- some compliance requirements are costly and burdensome. For example, minimum requirements for some datasets that DHBs must deliver to the Ministry can change annually, sometimes requiring system upgrades and lost productivity.

These issues are discussed further below.

Effective data collection and sharing

Improved access to and sharing of data will becoming increasingly important. A variety of barriers in the system will need to be addressed.

> *New Zealand collects rich and a growing range of healthcare and health-related data, a valuable national asset. These data are often distributed, disconnected and inconsistently captured, utilised and governed – leading to inequities and missed opportunities. No organisation is empowered to share so that the value of these data is maximised to the benefit of New Zealand and New Zealanders. (Group submission)*

One strength of New Zealand's health and disability system is the National Health Index that assigns patients a unique number on their first contact with the health system. This index allows data to be connected across multiple datasets, but the ways in which data is currently collected limits the system's ability to do this easily.

> *We have powerful national assets [like the National Health Index] but no funding or resourcing for them to be effectively managed, modernised or even used. (Paraphrased stakeholder conversation)*

Poor data standards and fragmented system architecture are barriers to integration

For data to be used most effectively, it must be easily shared within and across different systems. The ability to share data requires use of consistent data standards. In New Zealand, data standards are poorly implemented and interoperability is low. These limitations silo clinical information in multiple, disparate systems across different settings, increasing clinical workload and risk, undermining the consumer experience, and impeding valuable research and insight.

In general, systems and data are organised within organisations and around clinical specialties, subspecialties, or services, so no readily accessible, complete 'point in time' or longitudinal 'life journey' view of the consumer is available. There is also disagreement as to the respective roles and responsibilities of different organisations regarding data use and sharing within the system.

Several organisations have tried to establish standards but were hampered by a lack of resources, national buy-in, sector engagement, and independence. For example, the Health Information Standards Organisation was established in 2003 to lead the development and adoption of health information standards in New Zealand. To date, it has lacked the resources (having only two full-time equivalent staff), independence, and broad sector engagement to adequately fulfil its mission. However, we heard a strong appetite exists for national data standards and for New Zealand to be able to use data to its full capacity across the system.

Identity management is a critical enabler

In health, identity management for consumers and providers is complex, and the system lacks any kind of centralised identity management solution for either consumers or providers.

Good identity management includes being able to:

- irrefutably identify and authenticate who wants to access data (whether a consumer, whānau, caregiver, clinician, or organisation)
- check the identified person/organisation is permitted to access the data they are seeking to access
- maintain an audit trail of who has accessed what data and when.

The growing importance placed on digital identity is not limited to health care in New Zealand. The Department of Internal Affairs has overall cross-government accountability for consumer identity and is updating its RealMe identifier to assist across government services.

Challenges remain, however. The way systems connect is not standardised, and the way data is captured is inconsistent. For example, the types and coding of demographic data varies depending on the provider and the system they use. This means that even though a consumer may have a single, unique NHI number, most consumers have multiple identities across different provider systems. This makes joining up consumer data to get a single view of a consumer challenging. It also makes accessing information and keeping it up to date challenging and frustrating.

The benefit of centralising identity management also extends to clinicians who spend a significant amount of time accessing multiple systems, requiring separate credentials for each.

Contractual gaps prevent data sharing

System-wide contractual frameworks have gaps whereby some organisations are not contractually obligated to share data across providers, with DHBs, or with the Ministry of Health, despite receiving public funding streams. For example, discussions and submissions stated that some PHOs view patient data from GPs as PHO data and do not routinely share it with DHBs or the Ministry because they are not contractually obliged to do so.

A consequence is that it is not always easy to gather the required information to inform policy decisions or to evaluate implementation approaches. Lack of or delayed data sharing results in a long lag between a policy change and published research. On occasions, a further policy change may occur in the interim.

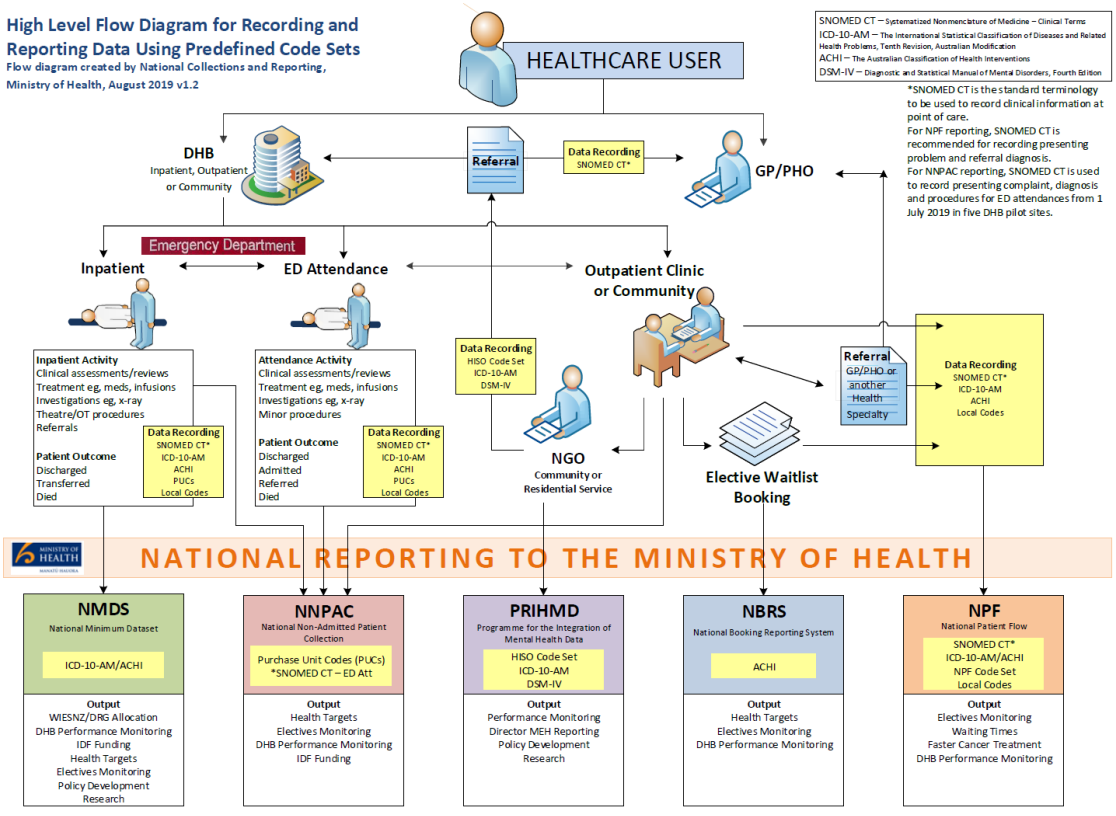
The onus is on the state to define contractual data requirements. These requirements should include data to inform clinical care, research, policy setting, and broader decision making. We will pursue this issue further in Phase Two.

National collections sometimes viewed as an overhead rather than as an enabler

The Ministry of Health uses national collections of clinical data to measure system performance and inform policy and funding decisions. More widely, DHBs and other stakeholders working in the system also use these collections to inform clinical service planning, business case development, and performance analysis. In some areas, collections are comparatively robust; in others, collections are less well specified or complied with.

In all instances, the system-wide collection of data for secondary use is time-consuming and resource intensive. Considerable manual intervention is required to codify, aggregate, and format clinical data to meet Ministry of Health requirements. The Ministry's national reporting framework is illustrated in Figure 12.1.

FIGURE 12.1: NATIONAL REPORTING FRAMEWORK



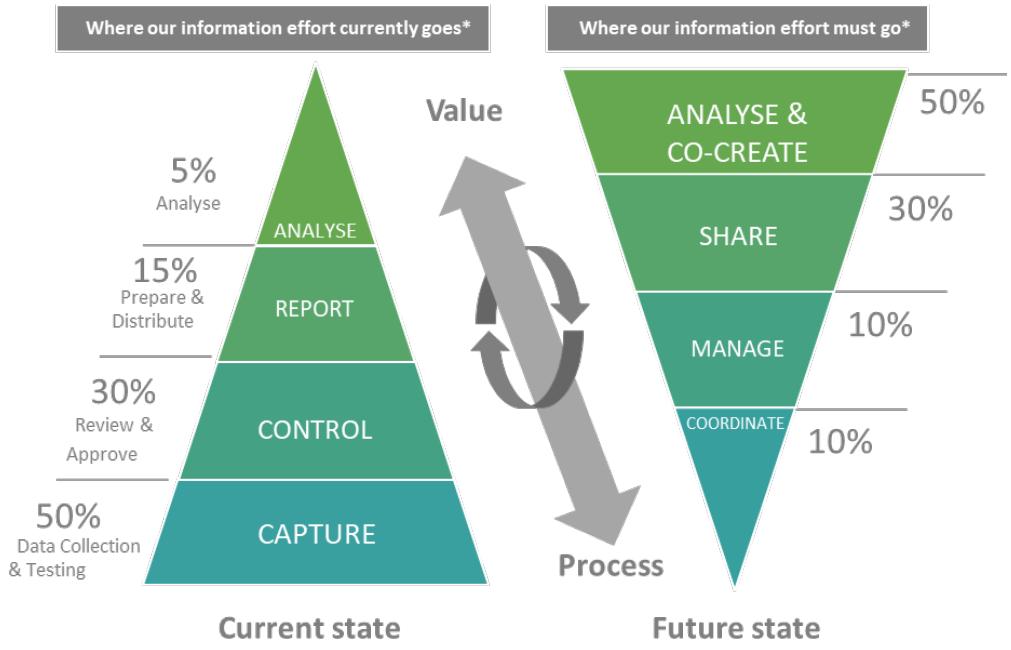
However, the reality is far more complex and resource intensive than Figure 12.1 conveys. For example, data-recording activities involve 180 full-time equivalent clinical coders across the system reviewing and interpreting clinical notes and manually coding them to the applicable standards. The flows of data from DHB, GP, and PHO clinical systems is represented by simple arrows, but in reality it involves complex, resource-intensive work. Providers have to manually extract and manipulate much of their data before they can export in the Ministry-prescribed format for import into national collections databases. This creates a significant overhead and, because the processes are manual, carries a high risk of human error.

The national collections are criticised in three main areas.

- Proactively defined and standardised health datasets are lacking. As noted, this means the required data and formats can change year by year, imposing significant demands on DHBs.
- Data flows in only one direction. To address this issue, the Ministry is working to expose its collections data and report back to the sector through its QlikView platform. However, this platform is of limited use to DHBs and other providers that are developing their own reporting, business intelligence, and analytics platforms. Implementing standards and exposing national collections data to the sector using an application programming interface (API) enabled data ecosystem is an approach that has been adopted internationally (for example, by the United Kingdom's NHS).
- Data collection is not timely. Manual processing is a significant factor in the delays. Some data goes through several updates and revisions due to variations in coding standards across different providers and systems. The current Ministry approach is to wait until the data is complete before publishing it, rather than publishing with an explicitly defined margin of error or 'unknown' subset of data. The consequence is a sometimes significant data lag that negatively impacts on the quality of decision making. For example, the most recent mortality data available is for 2013. A look across the Health Quality and Safety Commission's Atlas of Variation highlights how dated data is by the time it is published.

Looking to the future, the adoption of common data and interoperability standards should more readily enable the collation of key data elements without the need to manually code and consolidate data into national collections based on the outdated paradigm of aggregating data into large databases solely for the purpose of reporting. Access to distributed virtual datasets, supported by enhanced data science and artificial intelligence will remove the overhead of manually coding, processing, and staging data into a prescribed format for import into a collections database. At the same time, virtual datasets will open up the data for meaningful reporting and analytics across the entire system, which should support more 'information effort' going into analysis and use of data, rather than into data capture (as illustrated in Figure 12.2).

FIGURE 12.2: CHANGING THE BALANCE OF INFORMATION EFFORT



SOURCE: MINISTRY OF HEALTH PRESENTATION TO THE PANEL.

Privacy and data sovereignty

Privacy legislation is misunderstood

Sharing data is critical to enabling an integrated consumer journey, and this must be done in a way that appropriately uses and protects data. In workshops and interviews during Phase One, privacy was cited as the main reason for providers not sharing data with other providers. Many organisations said they refused to share data because they believed the privacy legislation prevents it.

The Health Information Privacy Code 1994 sets out 12 rules for how health data is to be collected, used, held, and disclosed.[426] During Phase One, two expert health lawyers noted that the code, in particular rule 11, sets out the rules for disclosure.[427] For example, a health agency may disclose information if it reasonably believes:

- that disclosure is one of the purposes for which the agency got the information
- it is necessary to uphold or enforce the law
- it is necessary for court proceedings
- the person concerned authorised the disclosure
- the information is going to be used in a form that does not identify the person concerned.

Disclosure is also permitted under a failsafe clause whereby data may be disclosed "to prevent or lessen a serious threat to … public health or public safety; or … the life or health of the individual concerned or another individual".[428]

The experts agreed that the privacy barrier is more perceived than real and generally due to a lack of understanding about how the applicable legislation works. Non-identifying data can clearly be shared and used openly. Identifying data can be shared either with consent or under appropriate circumstances (such as when the data is needed to inform healthcare decisions).

Significant sensitivities exist around sharing potentially prejudicial information on stigmatising subjects such as mental health, addiction, and sexual health, even across healthcare settings. The code does not go down to that level of detail, so, in the absence of a framework that codifies what information may appropriately be disclosed under what circumstances, lawyers are frequently engaged to broker data-sharing agreements between agencies.

The experts emphasised the importance of consent. They agreed a robust consent and data governance and sovereignty framework is needed, as is the ability for consumers to access and, where appropriate, maintain their own data – all of which are currently lacking. One expert went further and suggested legislative recalibration is needed as is a role for the Health Quality and Safety Commission, or a similar independent agency, to provide guidance and stewardship over health information sharing.

Sharing a consumer's data with their whānau is a frequent issue. The system appropriately defaults to not disclosing an individual's data, but where an individual is happy to share data with their whānau or caregivers, there is no systematised process for enabling this.

Data sovereignty

While data collection and technology are providing new platforms for delivering health services, issues exist around how data information and technology should be used. Issues and concerns also exist about data quality, including inconsistent collection of ethnicity data across the health system,[429] and about data sovereignty and governance.[430]

The United Nations Permanent Forum on Indigenous Issues identified concerns about the collection, representation, and use of data about indigenous people – otherwise described as 'data sovereignty'. These concerns are wide ranging but relate to issues such as the social and political contexts in and for which data is collected, the variable quality of how ethnicity and indigeneity are described and captured, and the failure of data to describe the unique cultural, social, environmental, and economic characteristics of indigenous groups.

The United Nations Declaration on the Rights of Indigenous Peoples provides a framework for considering indigenous rights and is considered a broad expression of the right to self-determination, including indigenous rights to access and control of their own data.[431]

Te Mana Raraunga / the Māori Data Sovereignty Network contends that Māori data is data that describes Māori and the environments with which they have a relationship and is a taonga, so is subject to the rights defined in te Tiriti o Waitangi / the Treaty of Waitangi and in the Declaration on the Rights of Indigenous Peoples. Māori data held by the Crown is seen as part of a spectrum between Crown obligations and Māori rights and interests, so has been the subject of a wide range of claims to the Waitangi Tribunal.

There are concerns about the secondary use of Māori data and, in particular, the failure to appropriately recognise the original purpose for which the data collection was consented and the context in which its use was intended. Māori rights and interests in data about Māori that has been linked, shared, and aggregated include:

- Māori having access to and use of Māori data to improve and transform Māori lives
- data being collected and utilised that is relevant and responsive to Māori needs and aspirations
- building trust and value for Māori with data that recognises Māori contexts, realises potential benefits for Māori, builds trust in the system that governs that data, and manages risks associated with the inappropriate use of Māori data.[432]

Te Mana Raraunga has developed a set of principles for Māori data sovereignty in Aotearoa New Zealand. These principles advocate for the realisation of Māori rights and interests in data and for the ethical use of data to enhance the wellbeing of Māori people, language, and culture. These principles are:

- rangatiratanga / authority
- whakapapa / relationships
- whanaungatanga / obligations
- kotahitanga / collective benefit
- manaakitanga / reciprocity
- kaitiakitanga / guardianship.[433]

Concerns expressed by Māori are echoed by others.

However, it is also recognised that inclusion of Māori data is essential to delivering improved health outcomes for Māori. The health system needs to take accountability for improving the collection of ethnicity data and for ensuring that interpretation and use of data is consistent with data sovereignty principles. A whole-of-government approach will be required to address wider data sovereignty issues.

This will be particularly important as we encourage the use of more evidence-based clinical pathways etc. If Māori data is not fully incorporated into the evidence base the proposed processes or AI-enabled procedures will not properly account for Māori specific issues. It is most unlikely equity of outcomes will be improved without better Māori data being included in all analysis.

Vendors, systems, and interoperability

During Phase One, New Zealand Health IT Cluster Inc (NZHIT) was commissioned to overview the current state of information technology (IT) systems and vendors across the sector and comment on the sector's digital capability, including key issues and opportunities. This was in addition to direct engagement with IT and business stakeholders across the sector to gain further understanding of system-wide technology landscape and challenges. NZHIT noted in its report:[434]

> *Health has not yet moved through the maturity curve to recognise the benefits of the modern 'digital business models'. This requires a public–private partnership approach (not only in a monetary sense) and the environment is absolutely ready for this as the industry sector wants to partner with the public sector to deliver the solutions that both consumers, patients and the providers of healthcare services require, now and into the future.*

Vendor landscape

Research shows that the New Zealand vendor ecosystem is competitive, at times adversarial, and financially constrained. Vendor-led adoption of standards and vendor-led innovation are limited. This situation has created a market exposed to disruption by a local or – more likely – international newcomer.

> *Health economics don't support vendors to innovate. (Paraphrased stakeholder conversation)*

The vendor ecosystem is dispersed, with about 150 active vendors providing IT solutions and services across the sector. Some vendors are in marginally viable businesses. As an example, the New Zealand–wide market for patient management systems (patient software that the 1,000 general practices across New Zealand use) is estimated as only being about $15 million per year. Five main vendors service this market, with the market leader having an 80% share and some of the smaller vendors each relying on a single developer, which leaves them and the system exposed to risk.

Systems landscape

Multiple customised applications

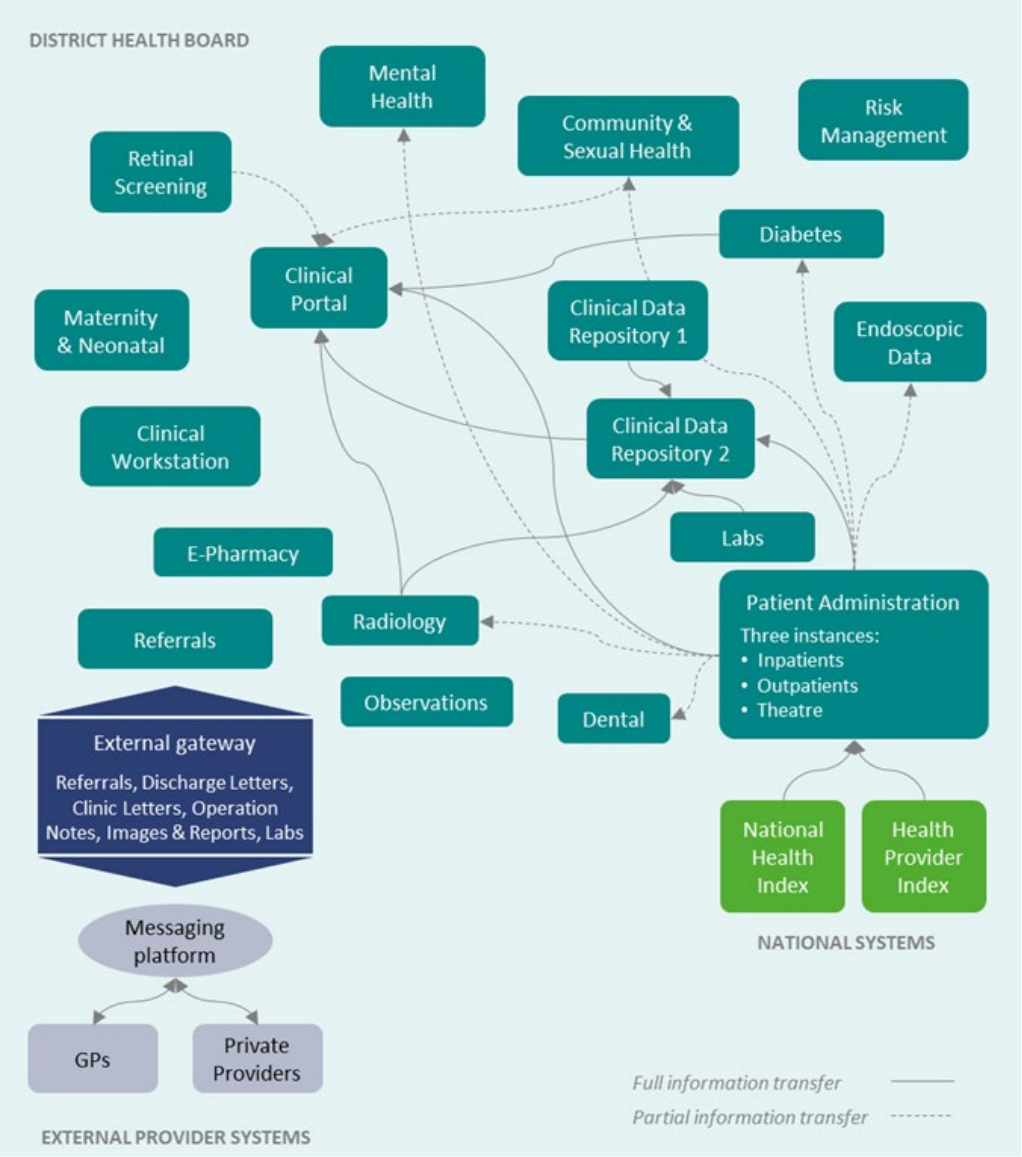
The 20 DHBs all deploy multiple applications.[435] In many cases, multiple instances of the same application support different clinical functions, often down to specialty or subspecialty.

Many aged or legacy versions of systems are in use across the sector. This limits the functionality available to users and places an expensive legacy support burden on both vendors and providers. Many systems are heavily customised, which makes system maintenance and upgrades challenging and expensive. The difficulty and cost of change slows or prevents the adoption of new models of care for example, the roll out of the HPV primary screening programme is dependent on a complete application change. [436]

The number of systems and level of complexity that exist within each individual DHB is illustrated in the simplified view of Auckland DHB's systems and data flows.

Figure 12.3 depicts only systems and data flows that are internal to the DHB. Flows, shown as dotted lines, denote integration of only basic patient details (typically name, data of birth and NHI). Some systems are not connected at all so data entry is manually replicated.

FIGURE 12.3: SYSTEMS AND DATA FLOWS IN AUCKLAND DHB



SOURCE: A WORKSHOP WITH A DATA TEAM FROM AUCKLAND DHB.

Even where applications are common across different DHBs, versions and implementations are typically different, which means datasets and functionality differ and cannot be readily shared. However, there are examples where some DHBs are working together to align, their systems. For example:

- Health Connect South is a collaboration of the five South Island DHBs. It has leveraged Concerto across all of the South Island, connecting 20,000 users in hospitals and the community to share data collected by primary, community, and secondary providers.[437] Data is collected from, and shared with, primary and community providers using the HealthOne system,[438] which is integrated with Concerto and was developed following the Christchurch earthquakes by an alliance of Canterbury DHB, Orion Health (a software company), and Pegasus Health (a PHO). Access is read-only but it does provide clinicians with a more complete view of their consumers.
- The Northern Region where the four DHBs have developed a regional information system strategic plan that maps out an applications system framework with core, common, and unique systems. Work is now progressing on foundation activity such as identity management and common interoperability and design standards. There is now a shared regional instance of Concerto which is currently used by Counties Manukau and Waitmata DHBs with Auckland and Northland DHBs joining over the next year. As with the shared South Island instance, data access through Concerto is read-only.

NZHIT also described use of IT for business operations and service delivery by many primary and community providers as "highly fragmented and unsophisticated" with extensive use of paper-based processes. Where data is captured in systems, it is "compartmentalised away from other health providers' systems (not integrated or interoperable)".[439]

Some Tier 1 areas have a very high level of digital uptake and a small number of vendors. However, many smaller NGOs use paper-based recording methods and care-planning processes that are transcribed into an electronic system 'back at the office'. The implications of this are that there are gaps in consumer information, and it is challenging to share information between providers.

Application hosting – on-premise, cloud and hybrid

Application hosting and data storage is a mix of on-premise, cloud (public and private), and hybrid approaches.

DHB IT leaders generally describe their on-premise infrastructure as "fragile", partially due to age and partially due to a lack of resilience because of a critical reliance on single pieces of hardware hosted in substandard facilities in hospitals.

The sector-wide (and global) trend is towards public cloud hosting of applications and infrastructure. However, migration to cloud hosting has been slow. The cost and difficulty of migrating legacy services and the limited availability of appropriately skilled resources are described as the major barriers. Meanwhile, the sector carries additional technical and consequential business and clinical risk due to fragile infrastructure sitting in substandard facilities.

Shadow IT

'Shadow IT' is common in DHBs where clinicians who perceive the organisation's IT to be too slow or creating a roadblock develop their own solutions using whatever tools they have at their disposal. This approach typically introduces additional business and clinical risk due to the technology used and lack of structured IT management and support.

One example of shadow IT is a system a clinician developed in 2001 to support admission and discharge of patients from a DHB's intensive care unit. By 2018, the system contained records of more than 26,000 admissions and had become a core part of the unit's operation. The system created an 'island' of information, separate from the DHB's other systems. Although it was useful for its intended purpose, it used technology not suited to supporting multiple concurrent users, was heavily reliant on key individual staff, and was open to backup failure.

IT leaders across the system are concerned that hundreds, if not thousands, of similar clinician-developed solutions exist across the health sector. Such solutions are well intentioned and may have been acceptable once. However, as the health and disability system becomes increasingly reliant on digital technologies, those technologies need to be reliable, secure, and fit for purpose, so a different approach is needed for safe and beneficial clinician-led innovation.

Historically, shadow IT used commonly available desktop applications like Microsoft Excel and Access but now mobile and cloud-based applications and platforms are most commonly used. This is positive because it mitigates some of the risks around solutions being technically reliable and scalable, plus it makes interoperability easier, but it is unclear whether data sovereignty and security are appropriately considered.

This challenge is not unique to health, and organisations in other sectors are responding by putting in place protocols and standards for the adoption and use of cloud-based applications. In some cases, they are providing pre-evaluated, pre-integrated apps, and data available in approved cloud platforms that provide a flexible environment for innovators to build in.

Systems integration and interoperability is poor

Even within large and (comparatively) well-resourced DHBs, the extent of systems integration and interoperability is generally low and restricted to replicating very basic patient details (such as name, date of birth, and NHI number) across a few core systems. New Zealand's health and disability system doesn't use mandated open, standards-based APIs and lacks mandated supporting data standards.

Current system integrations have evolved using old architecture and methods that are complex and expensive to maintain and change. The typical DHB response to this evolution has been to implement a clinical portal to mitigate clinical risk by providing hospital clinicians with a view of patient data across multiple systems. However, clinical portals are generally read-only, so clinicians typically have to log into multiple underlying systems separately to add or update source data. Several commentators referred to the burden of data entry across multiple disparate systems as a significant contributor to clinician burnout. One DHB Clinical Reference and Applications Group cited some of the DHB's nurses having to use 14 different applications in their day-to-day work with the same data being entered into multiple systems.

The issue is not limited to DHBs. NZHIT describes primary care as "highly connected" with the typical New Zealand GP communicating electronically with 84 "trading partners" each month. However, this connectivity is often achieved using outdated methods – sending data in non-machine-readable formats such as PDF files via expensive third-party messaging platforms or even by fax.

OUTDATED TECHNOLOGY STILL COMMONLY IN USE

- *For example, it is common for all the patient information that a DHB shares with GPs to be extracted out of the DHB's systems, and turned into PDF documents, then sent via a bespoke messaging gateway, and then over the HealthLink messaging platform. The information the GPs end up with in their systems is not machine-readable, – being sent as PDF documents files that are difficult to access and utilise use in clinical settings, – and the communications mechanism is expensive and outdated. The technology industry as a whole has moved away from messaging-based models towards open application programming interface (API) based integration and interoperability to share data and functionality across systems.*

To address the lack of integration and interoperability, the Ministry has proposed a national health information platform (nHIP) that will create a virtual electronic health record (virtual EHR) that is a complete view of a patient across existing systems and data. This approach is similar to that airlines and banks use to hide the complexity of legacy systems and expose their data and functionality through open, standards-based APIs.

The nHIP would provide a powerful platform for data integration and systems interoperability across the sector. However, large integration platforms can add complexity of their own, so, while they may provide massive benefit in the short to medium term, experience shows they can become bottlenecks and barriers to future change. There is no question that the sector needs nHIP now, but it will not be sufficient on its own. The nHIP will need to be complemented by data and interoperability standards so that, as legacy systems are replaced or new systems are added, the sector moves towards an open, API-based ecosystem supporting interoperability without total reliance on the nHIP. Standards are being developed and implemented in other jurisdictions that New Zealand could consider adopting – many vendors are operating internationally, so are used to complying with these standards.

Interoperability is critical to the delivery of an integrated digital platform

Some argue that the data sharing and interoperability challenge could be solved with a wholesale move to a 'monolithic' system – an all-in-one healthcare system – as this would force standardisation and require less integration. This does, however, come at the cost of flexibility and user experience.[440] Monolithic systems also tend to be expensive and risky to implement. The market leaders are large international players so changes and features wanted by New Zealand users would be unlikely to be prioritised over those of larger international customers. Some countries have experienced significant disruption with 'one size fits all' implementations,[441] downstream usability and productivity impacts on providers,[442] and, sometimes, worse outcomes for consumers.[443]

INTERNATIONAL EXPERIENCE

International data and interoperability standards are being designed and implemented to enable data sharing.

In the United States, Centers for Medicare and Medicaid Services (CMS) is driving its MyHealthEData initiative to improve patient access and advance electronic data exchange and care coordination throughout the healthcare system. The Interoperability and Patient Access Proposed Rule outlines opportunities to make patient data more useful and transferable through open, secure, standardised, and machine-readable formats while reducing restrictive burdens on healthcare providers.[444]

In the United Kingdom in late 2018, the NHS, in response to reviews and reports calling out fragmented and duplicated data, set out a draft framework for technology and data standards to which all future IT systems and digital services in the service must comply.[445] *This framework has been picked up by the newly formed NHSX, which has, among its responsibilities, been tasked with:*[446]

- *setting national policy and developing best practice for NHS technology, digital and data – including data-sharing and transparency*
- *setting standards – developing, agreeing and mandating clear standards for the use of technology in the NHS*
- *ensuring that NHS systems can talk to each other across the health and care system.*

NHSX announced in April that from July 2019 it will mandate the use of internationally-recognised technology and data standards across the NHS.[447]

Observations from the United Kingdom, Scandinavia, Canada, and the United States indicate that while most 'digital leaders' have successfully implemented monolithic systems within individual organisations, this approach has not been as successful when tried at a system level.

New Zealand's current state is very much 'best of breed'. Forcing a transition to monolithic systems, whether at DHB, regional, or national level, would involve large-scale change. Experience has shown that, for a variety of reasons, health, and the public sector in general, does not do large-scale IT projects well.

Another consideration is the impact on the local vendor ecosystem. Arguably, the systems could stand some rationalisation but a large-scale change to international vendor–supplied monolithic solutions could have a significant impact on New Zealand's current health vendor ecosystem, potentially leaving the country exposed to large-scale international vendors.

A lower risk alternative is mandating data and interoperability standards to ensure joined-up systems and data, then working with vendors to implement them. This could be done in smaller increments and used as a lever to modernise legacy and aged systems. Such an approach allows for decoupling of systems domains, separating (stable) systems of record from (agile) systems of engagement, which enables rapid changes and improvements to models of care and user experience.

Cybersecurity

National Computer Emergency Response Team (CERT NZ) quarterly reports show a trend of quarter-by-quarter increases in the number of cybersecurity issues and incidents affecting New Zealand organisations and individuals.[448] As the health sector becomes more reliant on digital technologies, it is becoming increasingly attractive for cybercriminals to target.

The threat now extends well beyond the theft of confidential consumer data. With the system becoming reliant on internet-attached devices for everything from managing consumer data and laboratory results, to radiology scanners, and even building services such as lifts, lights, and air-conditioning, a serious cybersecurity incident could paralyse the system and put consumer lives at risk.

The May 2017 WannaCry ransomware attack infected vulnerable Windows-based systems all over the world, encrypting data and holding computers to ransom. In the United Kingdom, the NHS was hit particularly hard and was forced to cancel 20,000 hospital appointments. WannaCry affected more than PCs as the prevalence of embedded Windows operating systems in radiology and laboratory equipment means they, too, are vulnerable. The NHS did not specify the equipment affected but did acknowledge that devices such as MRI scanners and blood test analysis devices were affected. A 2018 Health Advisory Committee report showed that similar vulnerabilities exist in New Zealand.[449]

Cybersecurity good practice is well defined– on top of the published government standards, up-to-date advice and guidance is available through CERT NZ and other agencies. Most cybersecurity issues can be mitigated through relatively simple 'IT hygiene' controls such as patching software and changing default usernames and passwords. The impacts of incidents can be minimised by implementing and testing back-ups and workarounds for critical systems and business processes. Unfortunately, IT industry experience shows that when IT organisations are under stress, due to a scarcity of funding, or, other resources and their focus is on 'keeping the lights on' day to day, basic hygiene practices can fall to the wayside. Further risk is added when IT architecture, applications and infrastructure are dated, as is the case in New Zealand. It is critical, therefore, that there is cross-sector leadership and sufficient resourcing to implement and maintain government standards and good practice on cybersecurity and business continuity.

Equity

During Phase One, equity and the role of digital delivery models and ways of working came up in several stakeholder meetings. Some programmes running across the sector are developing websites and mobile apps to better engage, serve, and inform Māori, young, and rural consumers.

Research shows clear opportunities exist for digital delivery models to improve equity and enhance democratisation of health care, but also barriers and risks, including that of the digital divide potentially exacerbating inequities.[450]

A local project that demonstrates the opportunities associated with taking a data-driven approach is The People's Project.[451] It works across government and in the community to rehouse people who are homeless using comprehensive team support and care.

Other local and international examples of opportunities and challenges are summarised in Table 12.1 and Table 12.2, respectively.

A University of Otago study documents how The People's Project took a cohort of clients and linked them across the Statistic New Zealand's Integrated Data Infrastructure (IDI).[1] The IDI contains administrative data on most services the Government provides to citizens. Linkage rates in all datasets were above 90%.

The study found that, in the preceding five years, the 390 people in the cohort had had 200,000 interactions with various government departments. The findings are significant, as they demonstrate how a cohort that is supposedly 'hard to reach' is highly traceable across a variety of government records and are more likely 'victims of inadequate systems'.

The project was highly successful in demonstrating data sets could be linked across agencies to inform decision-making that improved on the outcomes for people. Key lessons included the need for enhanced data stewardship, pro-active consent processes and ongoing consumer engagement.

TABLE 12.1: OPPORTUNITIES FOR DIGITAL DELIVERY MODELS TO IMPROVE EQUITY

Opportunity	Description
Telehealth	Consultations via video conference can provide more equitable access to services, for example: ▸ improved access to nurse practitioners, GPs, and other services in rural areas where attracting health professionals is challenging ▸ improved access for vulnerable or marginalised urban consumers who can't attend clinic-based appointments due to work or childcare commitments or transport costs ▸ mitigating the 'postcode lottery' by improving access to specialists in urban centres without the consumer or clinician needing to travel.
Remote monitoring	Remote monitoring of vulnerable consumers can reduce hospital admissions. An NHS study monitored vulnerable residential and nursing home patients for early signs of urinary tract infections over 2½ years and demonstrated a 6 : 1 return on investment by avoiding 57 admissions from a cohort of 100 patients.[1]
Technology-enabled care services evidence database[2]	For example, an NHS database that catalogues a wide variety of trials and implementations of various telemonitoring, telehealth, and telemedicine use cases.
Personalised and culturally adapted health and wellness information and services	Peer communities and chat groups via websites and mobile apps to better engage young people and other groups who prefer to self-serve and seek connectedness online. For example: ▸ Te Tihi o Ruahine Whānau Ora Alliance's Te Mauri Moemoeā rangatahi wellness web app[3] ▸ Whānau Tahi connected care platforms[4] ▸ an NHS programme to encourage medical professionals to prescribe apps for their patients with chronic conditions (for example, chronic obstructive pulmonary disease and gestational diabetes) reduced the number of patient visits by 25% over a two-year trial run by the Royal Berkshire Trust.
Shared care plans	Plans made collaboratively between health professionals, other support services, and whānau that are managed in real time using mobile apps.
Genomics and precision medicine	Treatments that are tailored and specific to the individual, not based on general population data, which is usually skewed against marginalised populations.

1 NHS England. No date. *TECS Case Study 003: Telehealth monitoring for early signs of urinary tract infection in vulnerable people.* https://www.england.nhs.uk/wp-content/uploads/2014/12/tecs-kernow.pdf

2 NHS England. No date. Strategic planning resources for commissioners (web page). https://www.england.nhs.uk/tecs/strategic-planning/

3 Te Tihi. No date. Gamification (webpage). https://tetihi.org.nz/what-s-on/item/1-gamification

4 Whānau Tahi. No date. Empowering whānau centric, self-directed change and care (web page). http://www.whanautahi.com

TABLE 12.2: CHALLENGES FOR DIGITAL DELIVERY MODELS TO IMPROVE EQUITY

Challenge	Description
Variability of broadband and mobile infrastructure and digital skill levels	Although broadband and mobile coverage is expanding, infrastructure availability, access to infrastructure, and digital skill levels continue to be variable across New Zealand.[1]
Affordability of mobile data for some populations	The Ministry is piloting with three mobile providers ways to zero-rate (to the consumer) data consumed by some health-related services.
Data collection gaps	Data collection gaps may exacerbate inequitable outcomes. Examples are seen across populations including Māori, Pacific peoples, disabled people, and rural populations. For example, if Māori data is not adequately represented in datasets used in the research and development of treatments, and artificial intelligence algorithms are used for diagnosis or to drive expert systems, worse health outcomes could result for Māori.
Lack of standardised data related to race, ethnicity, and disability	The lack of standardised data related to race, ethnicity, disability, and so on prevents high-quality disaggregation. For example, Māori and Pacific peoples are often aggregated into a single ethnic group, as are all Asian peoples.

1 Digital Divide NZ. www.digitaldivide.nz

Ways of working inhibit the potential of technology

Some current ways of working in New Zealand inhibit the full potential of technology across the health and disability system.

Lack of execution of information and digital strategies

Recommendations to improve data sharing, and implement data standards and electronic health records go back as far as the 2001 WAVE report.[452] The key outcome of which was the establishment of the Health Information Standards Organisation, which has developed standards but been relatively ineffective at implementing them. The WAVE report was superseded by the Health Information Strategy for NZ in 2005, [453] the National Health IT Plan in 2010, [454] and Digital Health 2020[455] (which, 18 years after electronic health records were first recommended, led to the current nHIP business case).

> *We have digital strategy with no evidence of execution. (Paraphrased stakeholder conversation)*

The causes underlying the lack of execution are many and complex, including:

- frequent leadership changes
- complex siloed and layered structure of the system
- lack of leadership, mandate, and accountability
- unclear roles and responsibilities between national, regional, and local organisations
- private sector–style competition between publicly funded organisations
- lack of system-wide thinking and collaboration
- national projects driven top-down and not well received (not considered fit for purpose, sometimes with minimal user representation)
- training and change management are typically poorly delivered, being either the first lines cut from projects when budgets come under pressure or poorly planned and not allowed for in the first place.

When the factors occur, poorly implemented change results and can drive workforce change fatigue and cynicism. Participation in – and adoption of – future change becomes even more challenging.

A further challenge to executing strategy is the burden of fragile legacy systems and infrastructure. Generally, most available funding is required to support business-as-usual activity, leaving minimal funding and resources for transformation. The response to this across other industries has been to move to 'bimodal' IT delivery models whereby business-as-usual and transformational resources and funding are separated and ring-fenced.

Lack of ability to scale innovation

During Phase One, we saw good localised pockets of digital innovation within DHBs, PHOs, NGOs, and other organisations. The main concern raised in these instances was that there seems to be little ability to accelerate and scale successful work to the regional or national level.

> *[The Ministry of Health] can enable scaling of local innovations. As the system steward, [the Ministry] can play a key role in promoting innovative practices across the system, especially by providing opportunities to scale local innovative practice to become nationally available. (Organisation submission)*
>
> *… the existing public health system may not be the best deliverer of disruptive technology that would bring positive benefit. (Organisation submission)*

A clear need exists for some kind of national, sector-wide coordination and sharing of ideas, skills, and how-to knowledge, for the evaluation of innovation work, and for funding to support useful innovation being scaled and utilised across the system.

Regulation lacks protections and avenues for innovation

New technology, disruptive business models, and smart use of technology can lead to significant change in traditional industries, but often regulation surrounding new technologies lacks certain protections and avenues for innovation. Oft-used examples are electric vehicles, Uber and AirBnB. Digital transformation of health care also carries risk –genomics and artificial intelligence are examples that provide significant opportunities but also potential for negative consumer outcomes if not well managed.

An early lesson from other countries is that regulatory approaches developed for pharmaceuticals and medical devices are unlikely to be sufficient for AI and genomics:

- In 2017, the Food and Drug Administration in the United States created a new unit dedicated to digital health. The unit includes engineers, software developers, artificial intelligence, and cloud computing experts to prepare the agency for regulating modern digital technologies.
- In the United Kingdom, an independent all-of-government data and ethics organisation, the Centre for Data Ethics and Innovation, has been established to facilitate safe, ethical, and equitable decisions about new and innovative technologies.

ARTIFICIAL INTELLIGENCE

Artificial intelligence (AI) will eventually impact on all aspects of medicine, but for now radiology is a very useful practical application with AI algorithms providing screening and diagnostic services for an increasing array of conditions.

The Royal Australian and New Zealand College of Radiologists is embracing the use of AI, but is also concerned by the lack of standards and regulation. The college's response to this lack has been to draft a code of ethics to inform standards and regulation for the development and use of AI. Funders, regulators, and other yet to be affected clinical specialties have had limited interest in the code.

The Royal Australasian College of Medical Administrators is also leading work in this area. It is developing an approach to enhance clinical leaders' competencies in digital health, including understanding and use of AI and machine learning.

> *The [Centre for Data Ethics and Innovation] will make sure our society can keep pace with these dramatic changes and maximise the benefits they bring. From helping us deal with the novel ethical issues raised by rapidly-developing technologies such as artificial intelligence, agreeing best practice around data use to identifying potential new regulations, the Centre will set out the measures needed to build trust and enable innovation in data-driven technologies.* [456]

New Zealand is a small economy with limited expertise to stay abreast of all relevant new technology. Leveraging work from other jurisdictions will be important if the system is to maximise the gains that can be made from new technology without exposing New Zealanders to unnecessary risk.

Shared services can be a barrier to digital transformation

The need to work more closely together on digital and data issues is not new to the sector. In each of the four regions, some form of shared service agency or function is in place for digital and data. Their size and scope varies. The largest, healthAlliance (owned by and serving the four Northern Region DHBs), is now one of the largest IT providers in the country. It provides software, IT infrastructure, payroll services, and project and programme services.

DHB chief information officers report that shared service agencies do a good job with their core business of running commodity IT infrastructure at a good price point. However, they are concerned that shared service agencies can be a barrier to digital transformation and, at times, exceed their mandate. The nub of that issue is that the mandate of shared service agencies – and, for that matter, the respective mandates of DHBs, PHOs, NGOs, and the Ministry – is unclear and has become increasingly unclear as the role and scope of digital technologies and IT in health care have grown.

The perception that shared services agencies may be a barrier to digital transformation shows that their respective roles and responsibilities are unclear or wrong, or, that the DHBs are not managing the agencies well.

Roles and responsibilities and ways of working across the sector will need to be redefined in the context of what work is required to digitise health care. Some digital foundations should be established once rather than in each of the 20 DHBs, 30 PHOs, and countless NGOs.

Investment, procurement, and decision making

Sector-wide spending on IT in New Zealand is low relative to spending in other sectors and in the health sector internationally. NZHIT estimated, based on DHB reporting, that 2.3% of the total health spend goes into IT. The accepted global health industry average is 4.6%[457] and Deloitte cites 3.5%.[458] The relatively low level of IT spending in New Zealand is not limited to DHBs. In general, the primary sector is also a very low spender.

A prevailing myth – not just in health – is that by moving services into the cloud IT can reduce costs. The reality is that transformation does not happen without investment.

Competition with other spending areas, from property to healthcare delivery, is also cited as an issue.

> *We need to separate funding for healthcare policy and funding for digital transformation. (Paraphrased stakeholder conversation)*

Achieving digitisation and transformation will require increased spend for a period of time as the shift is made to modern platforms and old, fragile systems and infrastructure are decommissioned. This will require a review of digital procurement approaches. Current procurement processes are slow and do not always support digital ways of working that are agile, iterative, and more co-design–led.

> *[The Ministry of Health and Ministry of Business, Innovation and Employment] need to be an enabler to share/spread good innovation but national procurement requirements are a barrier. (paraphrased stakeholder conversation)*

In planning for a digital future, it will be important that decision-making processes and decision rights are clear, that agility is supported, and that the environment supports the momentum needed to drive innovation and successfully deliver new services.

Workforce capability, capacity, and readiness must be developed

Although there are pockets of excellence, the health workforce on the whole – clinical, administrative, and IT – appears to lack the capability, capacity, and readiness for digital transformation. We observed the following.

- Across the breadth and depth of the sector, the level of understanding of what 'digital' means and its likely impacts is low.
- Digital leadership is often diffuse. Leaders lack either digital literacy or the authority or ability (that is, funding and other resources) to execute any digital strategy. This was a consistent theme across our Phase One engagement. A variety of clinical and business leaders across PHOs and DHBs commented on the limited number of digitally savvy executive leaders and business decision makers, which resulted in lower priorities and investment for digital and other IT projects and services.
- The workforce is generally cynical about change, partially due to change fatigue and partially because technology change has been poorly delivered with user training and organisational change management the first lines cut from projects when the budget comes under pressure.
- Increasing digital literacy among staff is sometimes resisted by those who have been in health for many years and rely on old skill sets.

Increasing digital literacy and skills across the existing health and disability workforce is essential and requires investment. For example the NHS has established a digital academy. The academy takes clinical and business leaders through a postgraduate diploma in digital health leadership with a view to developing "a new generation of excellent digital leaders who can drive the information and technology transformation of the NHS".[459]

Health will also need to compete with other sectors for new workforce roles, such as experience designers, Agile coaches, and data scientists, and will need to realign itself to become and remain attractive in a globally competitive environment for talent.

The impact of change tends to be underestimated. For digital transformation to be successful, workforce development and organisational change management will more routinely need to be included in all digital initiatives. As W Edwards Deming said:[460]

> *Nobody goes to work to do a bad job … Put a good person in a bad system and the bad system wins, no contest.*

The New Zealand health system is full of passionate and caring 'good people' who are doing the best work they can within the constraints and challenges the system presents to them daily. The right foundations must be put in place:

- data standards and interoperability so data can flow openly across the system and enable new models of care
- clear roles and responsibilities of the different entities in the system
- new ways of working to enable collaborative execution of a digital strategy and future innovation.

Getting those foundations in place will enable New Zealand to fully and effectively leverage digital technologies to unlock and unleash the capabilities of all those good people to improve the health and wellbeing of all New Zealanders.

Directions for change: Digital and data

Advances in digital technologies have huge potential to enable an information-rich, data-driven, people-powered approach to health care and to support the health sector in achieving better outcomes. New technologies such as genomics, artificial intelligence, and digital medicine are already transforming healthcare services, and other digital technologies, such as mobile, social media, cloud services, and analytics are changing the way healthcare services are delivered and consumed.

Good data needs to be one of the foundations of the health and wellbeing system. It enables consumers and providers to access and share information, plan, and make decisions about appropriate care. It can also help consumers to take control of their own health and wellbeing. For organisations and government, good data supports better decision making and planning, drives research and innovation, and enables monitoring and measurement of outcomes.

ROBUST AND ACCESSIBLE DATA

- *The system is becoming increasingly dependent on data and digital solutions. The Panel believes that the system needs to be better informed at every level by robust and timely data that is readily accessible to all who work in the system and all who use the system. Better data and more use of digital solutions is not only a necessity but it also provides an opportunity to free up clinician time to focus on more caring and to support those people who wish to use technology to help take greater control of managing their own health and wellbeing.*

STRONG LEADERSHIP TO DRIVE DATA STANDARDS AND OTHER MANDATES

- *The Panel believes that implementation of data standards, data stewardship, identity management, and interoperability must be accelerated. This will require strong national leadership, but will be essential for improving effectiveness and supporting collaborative and team-based working.*

DIGITAL LITERACY AND NEW WAYS OF WORKING

- *The Panel supports digital development at every level of the system. Training in new skills and ways of working will need to be embedded in an overall workforce strategy and development plan. New roles, such as for data analysts, will be required, and the system will need to make these roles attractive, as demand will be significant across the economy.*

13 Facilities and equipment / Ngā rauhanga me ngā taputapu

Facilities and equipment are essential to the provision of services and investment capital is needed to ensure facilities and equipment are fit for purpose. Unfortunately the current state of DHB assets is not good and there is little in the way of long term planning which can give any confidence that the problem is under control.

The process for justifying, designing, developing and commissioning major health facilities is complex and specialised. The section notes the scarcity of expertise in New Zealand, and questions whether these activities should continue to happen in multiple sites or whether some consolidation is preferable.

The section also looks at the way prioritisation and funding decisions are currently made and considers how better long term planning and more predictable funding might improve the performance of the system.

Overview

Recent high-profile examples of facilities failure show how functions like asset management can have a direct impact on patients and the services they need. Similar to other sectors, there are ongoing pressures on the availability of capital funding. It is inevitable that some form of prioritisation will need to continue.

Many public hospitals are running at very high levels of filled capacity, particularly during the winter. This makes it harder to deliver services, leads to delays, disrupts patient flow, and, ultimately, can harm patient outcomes. Modifications or repairs to existing facilities can also be disruptive to service delivery, particularly when spare capacity is low or non-existent. Pushing to make maximum use of capacity can reduce the effectiveness of service delivery.

Capital investment decisions shape how services are delivered long into the future. Investment decisions taken today can significantly affect, and arguably pre-determine the service models of tomorrow. New Zealand, like many other international jurisdictions must recognise that fact.

Large facility development is often a once in a generation investment, and substantial changes can be expensive. Well-designed facilities are flexible enough to support and enable new ways of providing services in the future. Poorly designed facilities can lock-in existing service models, preventing service delivery from evolving to better meet the needs of patients. Therefore, taking a long-term view is essential to inform good capital investment decisions.

Current state of DHB assets poor

DHBs collectively hold around $7 billion of non-current assets on their balance sheets, with around $6 billion of this being land and non-residential buildings. Other significant assets include clinical and other equipment ($480 million), IT and software ($160 million). The health portfolio is the fourth largest government asset portfolio after housing, school property, and state highways.

TABLE 13.1: NON-CURRENT ASSETS BY DHB REGION, AS AT 30 JUNE 2018

($ millions)	Northern	Midlands	Central	Southern	Total
Land	806	84	95	207	1,192
Buildings, improvements & plant	1,578	1,178	1,027	839	4,622
Clinical equipment	161	90	76	102	429
Other equipment	19	9	7	16	50
Information technology & software	5	48	58	52	163
Other	365	72	118	98	653
Total	**2,934**	**1,482**	**1,380**	**1,314**	**7,109**

Note: Land and buildings are measured at fair value less accumulated depreciation. All other assets are measured at cost, less accumulated depreciation and impairment losses.

SOURCE: MINISTRY OF HEALTH, DHB FINANCIAL ACCOUNTS.

DHBs project that $14 billion of new capital investment will be needed over the next 10 years. This is over a third of projected capital investment across government. This is double the $7 billion projected just three years earlier and compares with only $4.6 billion invested from 2009/10 to 2016/17.

DHBs have assessed that around 19% of their assets are in poor or very poor condition, and some facilities are many decades old. The Ministry of Health is developing a national asset management plan, which will give an updated view on the condition of DHB assets

A significant number of facilities are not fit for current models of care. For example, the Northern Region estimates that a fifth of clinical services are provided in facilities that are not fit for purpose, including Whangarei Hospital and some Middlemore Hospital facilities. Many facilities also have resilience issues, such as vulnerable power supply infrastructure, earthquake strengthening needs, and leaky building problems.

Capital investment often requires ministerial approval

A variety of rules govern how DHB investment decisions are made and funded.

For capital investments under $10 million, individual DHBs and their boards can fund and approve investments. A lower threshold of $3 million applies to information and communications technology (ICT) enabled investments.

For capital investments over $10 million (or any capital investment that seeks additional funding from the government), DHBs must seek approval from the Ministers of Health and Finance. This includes investments that are entirely self-funded by the DHB. If approved, government funding for these projects comes from the health capital envelope – a specific appropriation for health capital projects.

Capital investments outside the health capital envelope must be approved directly by Cabinet.

To support ministers in making their decisions, DHBs must develop business cases and submit them to the Capital Investment Committee (CIC). This is a ministerial committee established under the New Zealand Public Health and Disability Act 2000.[461] It reviews DHB business cases, prioritises capital investment, and provides independent advice to the Ministers of Health and Finance.

If approved by ministers, a capital project is then managed and governed by individual DHBs or through a partnership group. Under the latter approach, the Ministry of Health holds contracts and legal accountability for the delivery of the project. The ministers appoint a partnership group to oversee the project. Partnership groups are in place in Canterbury, West Coast, and Southern DHBs. Once the asset is completed, its ownership transfers to the DHB.

Managing to a system plan

Capital investment must be consistent with a long-term service plan

The system has long recognised that capital investment decisions should be based on a long-term service plan. This view was reflected in the report of the 2009 Ministerial Review Group, which noted that "[h]ealth service planning needs to drive investment planning or we risk locking ourselves into replicating the current locally-driven and hospital-centric capacity".[462] It was also reflected in the role and scope of the CIC, which would "develop a National Asset Management Plan (NAMP) for the health system based on agreed service plans".[463]

However, a long-term services plan has not been developed. The Ministry of Health is due to develop the National Asset Management Plan by the end of 2019. This is positive, but needs to be tied to a long-term services plan so new facilities are fit for future models of care and are distributed in a way that will best meet population requirements.

Prioritisation based on long-term planning

In the past, few business cases were approved due to fiscal constraints and the need to prioritise Canterbury DHB projects following the Canterbury earthquake. Business cases were assessed on an individual basis, rather than prioritised against other proposals. In 2018 the committee with the Ministry of Health, and Treasury developed an initial methodology for prioritising projects.

New government funding for health capital investments has been available on an annual basis through the health capital envelope. Approved funding for capital investments cannot exceed this limit in any particular year, and the full cost of the project is counted against the capital envelope in the year it is approved.

Most projects include multi-year expenditure so will not use the full amount of approved funding in that year. This means a project can 'use up' approved funding in the capital envelope even though it does not actually draw down that funding that year. The consequence of this has been a tendency to require large projects to be broken into smaller ones and/or priority being given to those projects where expenditure is planned to occur sooner.

This may not be consistent with long term service and capital needs.

In Budget 2019, the government introduced a multi-year funding approach to the health capital envelope, which allows funding to be shifted over two financial years (2019/20 and 2020/21). This improves the allocation process slightly but more consideration needs to be given to how government accounting rules and sector planning can work more effectively.

Effective prioritisation requires visibility of the pipeline of future investment needs across the system. The National Asset Management Plan should provide some of this information. However, the Ministerial Review Group recommended producing such a plan a decade ago, and it has been a role of the Capital Investment Committee since 2011. In addition, DHBs' 10-year capital intentions have doubled to $14 billion in just three years. It is clear the system has not done a good job of measuring and accurately reporting its infrastructure needs. During Phase Two, the Review will look further at options for making infrastructure planning more transparent and better integrated with inter system growth.

Links with local government, education, and transport planning need better coordination

Discussion with capital planners also suggested that the health and disability system could better coordinate its planning with other sectors, such as local government, education, and transport. Hospital facilities are important community amenities, need fast and convenient transport access, and are significant employers. As the system makes greater use of community-based facilities, it will be important to place these facilities near transport links, schools, and closer to high-need communities. Locating facilities near marae, churches, and other community centres can help make services more convenient and welcoming.

Delivery of major capital projects

Process for new projects is resource-intensive

The $10 million threshold for ministerial approval was set in 2000. An additional lower threshold of $3 million applies to ICT-enabled investments. These thresholds are lower than those applied to other social sector agencies and are the same for all DHBs –from West Coast DHB that has $31 million of non-current assets to Auckland DHB that has $1.1 billion of non-current assets. These thresholds are also in capital expenditure terms, not whole-of-life costs. This means the downstream costs of a proposal are not considered, which is not consistent with practice used across government.

Limited capability and capacity

Major facility investments are complex and require specific capability and expertise.

- Developing the business case involves developing the strategic clinical and operational case for change, evaluating options, completing design work to a sufficient level of detail to support the proposed case for change, and undertaking detailed financial, risk and benefits appraisals. This work is brought together using the Treasury's Better Business Case approach and needs to be managed by DHBs and the evaluation and prioritisation process of the Capital Investment Committee.
- Managing the procurement process involves completing all required documentation and running a process that is fully compliant with the government rules of sourcing, manages sector risk, and delivers a value-for-money development agreement. Major construction or capital works projects in other industries draw on legal, architectural, commercial, and procurement advisors that specialise in capital works. The pool of health sector expertise is limited.
- Managing the delivery of capital works requires specialist expertise. Health projects are often complex because the building, equipment, and digital requirements are comparatively highly specified. Supplies often have long lead times and can require specialist contractors to undertake specific elements of the project. The planning of projects must include minimising the impact on business-as-usual services, which is challenging when many facilities run 24/7 and there is limited capacity on site for project management activities and traffic flows.
- Commissioning the asset includes workforce recruitment and training to function in the new facility, ensuring that all operational requirements (including migration activities) have been met and are embedded into business continuity plans, and that 'old processes' are turned off where appropriate.

Discussions during Phase One signalled that, as major projects happen infrequently within a DHB, individual DHBs generally do not maintain the capability to manage and deliver such projects. As a result, most DHBs are highly dependent on consultants and external contractors at all stages in the major capital project life cycle. Managing these external contracts also requires specific expertise, which is variable across the sector.

Other concerns raised during Phase One include:

- The time and cost taken to develop and get approval for investments can be extensive. Specific issues raised included the extent of architectural design and costing work required as part of the business case process and the requirement on the DHB to cover these potentially substantive capital costs before approval of the case.
- Professional fees for construction, programme management, and architectural services can cost about 14% of the total project cost.[464] These costs may be necessary, but these services are usually outsourced, which limits the ability to retain and share learnings. In addition, the pool of available expertise in New Zealand is small, limiting competition between providers.
- The partnership group model has been a response to the lack of capacity at the delivery stage of major capital projects. In theory, these groups can make more effective use of capability available nationally. However, we have heard that this model is not scalable or sustainable. Partnership groups are formed and disbanded for individual major projects, preventing lessons from being incorporated into future projects. Funding for business case development is on a project-by-project basis, preventing the system from developing permanent in-house capability.

We have heard that the CIC process ensures there is a rigorous processes around major capital investment decisions, and gives greater visibility and control to the Ministry, CIC and Ministers. For large-scale capital investment, this rigour and oversight is valuable. However, that same process may not be fit for purpose for smaller investments and may merely delay small but necessary capital works.

There are potential benefits from more centralised design and delivery of capital projects. For example, standardised design of facilities could streamline construction, and the system could take a more strategic approach to purchasing scarce construction market resources. Some other countries take a more centralised approach to capital investment. Further consideration of this direction will be given in Phase Two.

More effective management of existing assets needed

In 2016, the Office of the Auditor-General reviewed the asset management practices of DHBs.[465] It found that "DHBs' asset management was not as mature as we expect from organisations of their size and with their level of reliance on their assets". Key issues included limited monitoring and reporting on the condition of assets, and weak reporting on asset performance. The Office of the Auditor-General has noted improvements in asset management since 2016, such as some DHBs preparing clinical services plans and the Northern Region long term investment plan.[466]

The Treasury has also raised concerns about DHB asset management practices. It found that, on average, actual expenditure on capital investment, repairs, and maintenance is significantly lower than planned expenditure. Based on this analysis, the Treasury concluded that "[s]ome DHBs look to be sweating their assets and underfunding repairs and maintenance to help balance their books".[467] Unfortunately, deferring maintenance or necessary investments can lead to higher costs in the future.

Clearly, asset management processes should be strengthened so current infrastructure is appropriately maintained. However, it is less clear how this can be best achieved. Current poor management may be a response to short-term financial constraints. For example, the Office of the Auditor General noted that the "sector strongly focused on delivering short-term results within a challenging operating environment and financial constraints".[468] We have also heard that these problems may reflect a lack of consequences for poor performance.

Capital charge

DHBs are required to pay an annual charge to the Crown based on their Crown equity (assets minus liabilities). Government departments and some Crown entities also pay this capital charge. The charge is intended to improve capital management by incentivising DHBs to reduce their use of capital and return any surplus capital to the Crown. It also signals that capital is not costless and should be managed effectively. DHBs paid a total of $325 million in capital charges in 2017/18.

Before July 2019, the capital charge was applied differently to DHBs than to government departments. When a department received equity funding for investment in assets, it also received an increase in revenue to match the higher capital charge it would have to pay. This was not the case for DHBs. This resulted in DHBs facing higher capital charges after investment in new facilities, which needed to be funded by reducing expenditure elsewhere.

The capital charge regime was changed in July 2019. Any DHBs that receive government funding for capital investments from 1 January 2019 will also receive an increase in funding to match the increased capital charge. When calculating the increase in funding, a DHB's financial deficit will be subtracted from the increase in equity. This will reduce the increase in funding for DHBs running deficits and provides a financial incentive to not run deficits.

While we have heard that the capital charge regime has an impact on some DHBs it is not the primary cause of the asset management problems in the system. Likewise, changing the capital charge will not solve these problems. The Panel believes other issues, such as the lack of a long-term plan for services or assets, need to be addressed first. The Panel's initial focus will be on these other issues.

Directions for change: Facilities and equipment

A significant volume of health capital investment will be required over the next 10 years to address issues associated with assets that have not been adequately maintained and/or are not fit for purpose. Investment will also be required to support new models of care and to accommodate demographic pressures including a reorientation toward Tier 1.

The Panel heard considerable frustration with current processes, including concerns about convoluted decision-making processes, the impact of the capital charge regime, and a lack of capacity and capability in the sector to manage and deliver major health capital investment projects.

MANAGING TO A SYSTEM PLAN

- *The Panel is of the view that future major capital investments decisions should demonstrate consistency with the long-term health service plan and follow a consistent decision-making process for facilities, major equipment, and digital technology.*
- *Capital planning should not be based on a one-year budget bid process. A longer-term rolling plan should be developed that is based on a prioritised, robust pipeline that will deliver the medium-term and longer-term service requirements.*
- *Links between system planning and local and district planning should be strengthened, and health infrastructure planning should be considered more routinely alongside local government, education, and transport planning.*

ASSET MANAGEMENT

- *The Panel believes that asset management planning processes must be strengthened to ensure that sufficient investment is made to maintain current infrastructure and replace major equipment, while also future proofing for new models of care and capacity growth.*

DELIVERY OF MAJOR CAPITAL PROJECTS

- *The Panel is of the view that processes for developing and approving business cases need to be streamlined so decisions are made in a way that minimises the time and expense incurred in progressing proposals that are unlikely to be accepted.*
- *The current distributed model for the design and delivery of capital projects is ad hoc, is expensive, and may not be sufficient or appropriate to meet the scale of investment required.*
- *Other jurisdictions have centralised these functions, and work is under way in New Zealand to explore such an option. The Panel believes there are potential gains to be made in this area and supports more work being done.*