Canterbury
District Health Board
Te Poari Hauora ō Waitaha

Canterbury District Health Board

LONG TERM INVESTMENT PLAN

July 2019-June 2029

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Explanation of Acronyms

Acronym	Explanation
AMP	Asset Management Plan
ARC	Aged Residential Care
ASH	Ambulatory Sensitive Hospitalisations – a group of conditions for which hospitalisation is potentially preventable through interventions delivered by primary care
AT&R	Adult Treatment and Rehabilitation
BWOF	Building Warrant of Fitness
CALD	Culturally and Linguistically Diverse
CCN	Canterbury Clinical Network
CDHB	Canterbury District Health Board
CDS	Community Dental Service
CHL	Canterbury Health Laboratories
DHB	District Health Board
ED	Emergency Department
EMT	Executive Management Team
EQ POW	Earthquake Programme of Work
IAAS	Infrastructure as a Service
ICT	Information and Communication Technology
NGO	Non-Government Organisation
NZALS	New Zealand Artificial Limb Service
NZPHD Act	New Zealand Public Health and Disability Act (2000)
OPF	Operational Policy Framework
OPH	Older Person's Health
PBFF	Population Based Funding Formula
PHO	Primary Health Organisation
RFP	Request for Proposal
SAAS	Software as a Service
SIAPO	South Island Alliance Programme Office
TPMH	The Princess Margaret Hospital

1 Executive Summary

1.1 Context

The objectives of District Health Boards (DHBs) are set out in Section 22 of the New Zealand Public Health and Disability (NZPHD) Act 2000, and include improving, promoting and protecting the health of people and communities. DHBs must promote the integration of health services, especially primary and secondary health services, as well as seek the optimum arrangement for the most effective and efficient delivery of health services in order to meet local, regional, and national needs. DHBs must also promote effective care or support for those in need of personal health or disability support services and reduce, with a view to eliminating health outcome disparities between various population groups within New Zealand.

DHBs achieve their objectives through the direct provision of some services and the purchasing of others' and through collaborative relationships and partnership with other health and social service providers, ministries, agencies, councils and local stakeholder and consumer groups.

Our vision is an integrated health system that keeps people healthy and well in their own homes and communities. A connected health system, centred on people, that aims not to waste their time. The vision is underpinned by three strategic objectives that drive everything we do:

- The development of services that support **people/whānau** to stay well and take increased responsibility for their own health and wellbeing.
- The development of **primary and community services** to support people/whanau in a community based setting and provide a point of ongoing continuity, which for most people will be general practice.
- The freeing up of **hospital based specialist resources** to be responsive to episodic events, the provision of timely complex care and support and specialist advice to primary care.

We take an alliancing approach to service design and delivery; partnering with other health service providers across our health system to understand the needs of our population and collectively managing our resources to deliver healthcare in the most efficient way. The development of this approach commenced prior to the Canterbury/Waitaha earthquakes in 2010/11 and enabled the Canterbury health system to respond to the exceptional circumstances and challenges the earthquakes created in a flexible and collaborative way.

As a result of the collaborative response, in the 2010/11 financial year, the DHB's elective surgery target was missed by just 4%. This was despite the immediate earthquake impacts including the loss of 106 acute hospital beds (17% of our acute capacity), 636 ARC beds, one general practice along with its staff, and an additional 600 acute surgeries being carried out on those injured by the earthquakes.

During the development of this Long Term Investment Plan (LTIP), a horrific terrorist attack against Christchurch/Ōtautahi mosques occurred (in March 2019) with the loss of 51 lives. We know from our earthquake experience that recovery from disasters is complex, requires a nuanced response and for some groups takes a very long time. This latest event caused deep harm to Cantabrians, occurring within a community where many are still feeling the consequences of the growing list of disasters and events that have occurred in our region since 2010.

- 4 September 2010, magnitude 7.1 earthquake, causing widespread damage (Darfield earthquake)
- 22 February 2011, magnitude 6.3 earthquake, 185 fatalities, widespread damage
- 13 June 2011, magnitude 6.4 earthquake, 1 fatality, further damage
- 23 December 2011, magnitude 6.0 earthquake
- 21 July and 16 August 2013, magnitude 6.5 and 6.6 earthquakes in Seddon (300km NNE of Christchurch)
- 2013 and March 2014, floods (partially resulting from earthquake-related land subsidence)
- November 2016, magnitude 7.8 earthquake, 2 fatalities, widespread damage (Kaikōura earthquake)
- February 2017, Port Hills fires, 1 fatality, 11 homes destroyed
- April 2017, widespread flooding across Christchurch and Kaiapoi from Cyclone Cook

- 15 March 2019, terrorist attack on mosques, 51 fatalities.

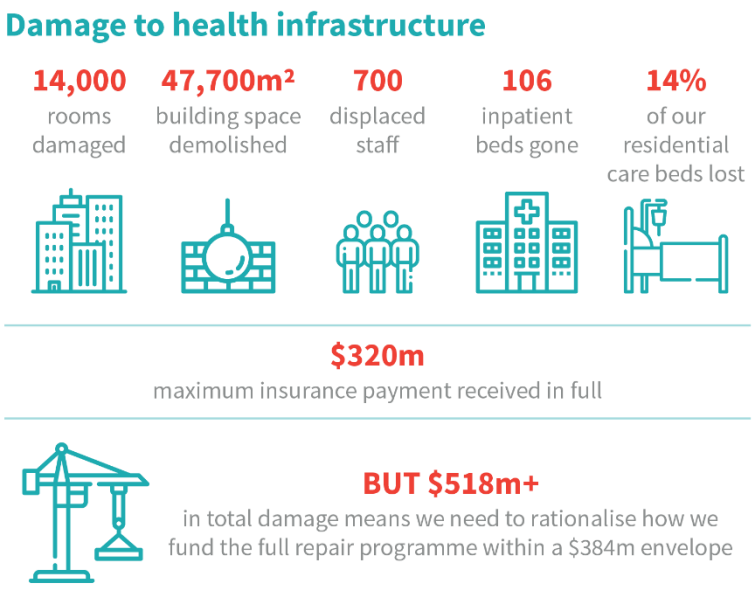
Prolonged levels of stress and anxiety, as well as poor living arrangements, largely as a result of the earthquakes, continue to exacerbate chronic illness and increase demand right across our health system. This is felt particularly across mental health, child and youth, and emergency services. International research and post-disaster experience would indicate that this is not surprising, and we can expect these patterns to continue for upwards of a decade.

These disasters have also placed incredible pressure on our workforce and our facilities. Recovering from these events, whilst coping with the constant turmoil of our ongoing facilities redevelopment, rebuild and seismic remediation programmes, requires a long term commitment from both the Canterbury health system and central government agencies.

The earthquake damage to our infrastructure was extensive and repair strategies are not simple. Ongoing delays with delivering the major redevelopment projects have exacerbated pressures on services, staff and budgets.

To date, 44 buildings that Canterbury DHB used prior to the earthquakes have been vacated and demolished or are scheduled to be demolished. Invasive repairs are having to be carried out by relocating and shifting patients and services as we go. Over 86% of the beds (and patients) in Christchurch Hospital have been moved at least once to allow for repairs and re-strengthening. Eight years on from the earthquakes, theatre and bed capacity is still reduced and we are hiring theatres and outsourcing an increasing number of surgeries to ensure we can meet demand and delivery expectations. This not only disrupts the continuity of care, but complicates our operating environment, increases the stress on our workforce and adds additional cost to service delivery.

Major decisions continue to be made with regards to the future use of almost every DHB building. This Long Term Investment Plan provides an opportunity to rearticulate our strategy and vision for the future and to understand and assess our asset planning in the context of this direction and our ongoing challenges.



The Cabinet Office Circular CO (15)5, Investment Management and Asset Performance in the State Services, notes that the 'primary purpose of LTIPs is to stimulate critical thinking and discussion on the factors that are driving the need for investments, the strategic responses to those factors and the rationale for the preferred way forward'. In this document, we demonstrate the particular pressures facing the Canterbury health system together with our proposed solutions for meeting those pressures and addressing the health needs of our population. Our LTIP development has occurred within the context of other planning processes, in particular the planning being undertaken for the redevelopment and repair of the Christchurch Hospital campus. As the planning processes have different and evolving timeframes, this document represents our current thinking based on our current environment, knowledge and expectations. Any further disasters, natural or man-made, will impact on these plans and as such, we must take a collaborative, flexible and adaptive approach to our investment planning.

1.2 Key Long Term Challenges

The Canterbury health system faces a number of key long term challenges. Populations are ageing, more people are living with long term conditions, and multiple conditions, service demand is increasing, treatment costs are rising, people's expectations are changing, workforce shortages are ever present and pressure on government funding means having to do more with less.

While Canterbury has made real inroads in achieving a truly integrated health system, meeting the health needs of a large population is complex. Progress is hampered by the unique operational challenges we continue to face following the earthquakes.

POPULATION PRESSURES

Following the earthquakes, our population growth has been rapid, with a 15.9% increase over the past eight years. While this population growth is a positive for our economic recovery and confidence in the region, it is a major challenge for our health system. Our population has also spread out across the region with Selwyn, Waimakariri and Ashburton being three of the fastest growing districts in the country. We are working hard to find a balance between the increasing needs of our growing population, and the workforce, infrastructure, and funding resources at our disposal.

DEMAND PRESSURES

Service demand patterns have changed. Prolonged levels of stress and anxiety are exacerbating chronic illness and negatively impacting on the health and wellbeing of our population. Increased demand is evident across our system, particularly in mental health services. We have implemented a number of intervention strategies to reduce this growing demand, but it remains a significant issue. Our health system is at full capacity and resources are stretched.

As a major tertiary provider, we are also dealing with an increasing level of demand for highly complex and resource intensive services from neighbouring DHBs, with a 9.5% increase in hospital admissions for people from other DHBs over the last five years. Our theatres, intensive care, radiology and oncology services are under particular pressure. These factors also place additional pressure on our workforce.

FACILITIES PRESSURES

The earthquake damage to our infrastructure was extensive and repair strategies are not simple. We lost 44 buildings and are having to cope with fewer hospital beds and a shortage of theatres. Ongoing delays with major redevelopment projects have added to the pressure and Christchurch Hospital's Hagley Building (acute services) is still not complete. We are hiring private theatres for our staff to work in and outsourcing more and more surgeries to meet service demand; the increased service costs are significant. Construction delays and disruptions place considerable pressure on staff and budgets.

Our growing population, changing service demands and increasing regional service expectations are compounding this pressure. The Hagley Building alone will not provide sufficient capacity to meet our population's needs and further investment will be required. A number of facilities are also damaged and need repair, but are reaching the end of their functional life. We are working hard to ensure the safety of our patients and staff, but the future of all of our facilities needs to be firmly determined.

WORKFORCE PRESSURES

Our Staff and Family Wellbeing Survey results show that people are engaged and believe they are making a difference, but they are weary and staff commitment is being tested. Sick leave rates have risen rapidly and are now among the highest in the country. This view is reiterated by providers from across our health system, equally concerned about the wellbeing and resilience of their workforce. The DHB is working hard to maintain a safe environment and ensure the wellbeing of our staff, particularly as we shift people, patients, and services to repair and redevelop facilities. We have implemented a number of initiatives to mitigate disruptions, however construction noise, service relocation and parking issues are causing increasing stress for staff and patients alike.

FISCAL PRESSURES

Our fiscal pressures are also compounded by the extraordinary impacts of the earthquakes. Increased earthquake related operational costs are evident in a number of areas including treatment costs related to increased health need, outsourcing costs to cover lost theatre and bed capacity and multi-year construction delays. The DHB is also meeting substantial depreciation and capital related charges associated with the repair of damaged buildings. While a careful programme of repair is underway, it is apparent that a considerable portion of our earthquake repair work will not be covered by our insurance proceeds. The DHB's normal capital expenditure and maintenance budgets will not be enough to cover repair costs and to address capacity constraints as our population continues to grow.

1.3 Investment Scope and Purpose

This Plan describes investments that have already been approved, those that are still the subject of negotiation with central government, and investments we are signalling that we believe will be necessary later in this planning period. At the same time, we are trying to deliver a substantial earthquake repair and seismic remediation programme. The future of almost all of our major facilities needs to be determined and aligned with the programme to avoid wasteful investment in short term solutions and ensure the safety of our staff and patients.

Our investment strategy supports our aim of achieving a fully integrated healthcare service with appropriate provision of tertiary care at a level that meets the needs of our growing population. A data informed approach is used to understand future service demands and support the design or redesign of services. We have analysed the expected demands on our services over the next ten to twenty years and identified areas expected to be subject to particular increases or changes in demand. The assets we have available to manage and meet this demand include capital assets such as our facilities, clinical equipment and information and communication technology; but building new facilities or purchasing more equipment cannot be the first response to increasing demand. Our assets also include our workforce and our alliance partnerships and relationships within the health system and beyond. Adaptation of our models of care will be critical in enabling us to meet increasing and changing demand in some areas, this approach has supported sustainable and effective change in our recent past and optimising the model of care is always an initial consideration.

1.4 Investment Scenarios Considered

Six alternative investment scenarios were modelled for this Long Term Investment Plan, all building upon scenarios for individual campuses and evaluated as part of their respective business cases. The scenarios presented in this LTIP explore the impact of varying levels of investment into our community based services and workforce, as well as the impact of changes to the timing of investment in facilities. The scenarios are evaluated for their expected impact on risk, financial sustainability, service levels and ability to deliver on our system goals.

The preferred scenario offers the best opportunity to meet service demand for our growing population in the most cost effective manner.

1.5 Investment and Financial Summary

1.5.1 INVESTMENT SUMMARY OF PREFERRED SCENARIO

The planned capital investment over the next 10 years is outlined below.

Table A - Planned Capital Investments

Asset Category	Building & Infrastructure Plant	Clinical & Other Equipment	Information & Communication Technology	Motor Vehicles	Total 10 Years (2019 - 2029)	
Major Investment Category	**$M**	**$M**	**$M**	**$M**	**$M**	**%**
Baseline	[redacted]					
Strategic Approved DBCs						
EQ Programme of Works (POW)						
Planned Strategic Investments						
Total 10-Year Capital Investment						

Note: "Strategic Approved DBCs" are detailed business cases that have been approved by the Crown.
"Planned Strategic Investments" are primarily key investments being planned and are subject to formal business case and approval process.

1.5.2 KEY ASSUMPTIONS OF PREFERRED SCENARIO

Integral to the financial assessment and affordability are a number of detailed assumptions with the key ones being:

- Ongoing successful management of people in community settings leading to reduced demand on hospital services
- Appropriate population based funding (PBF) is aligned to demand and demographic change
- Appropriate deficit funding from the Crown aligning to operating deficits, where being forecast
- New equity funding, where assumed for Planned Strategic Investments, will be made available
- Transformation and earthquake recovery strategies will not be delayed due to sector or legislative changes.

1.5.3 KEY FINANCIAL ASSUMPTION RISKS

The key financial risks are associated with the assumptions outlined above not holding true. This is particularly so around the assumption of full deficit funding. Whilst this assumption presents an elevated risk, it is moderated by a number of outstanding funding related matters still in discussion between the MOH and CDHB. In addition, the forecasts exclude funding for capital charge for new capital equity (per the recently announced change in capital charge regulations), which will reduce the deficits and the size of deficit funding required.

The other major risk is around the assumption of new equity funding available for significant facility projects. [redacted]. CDHB will address each of the major facility investments via a robust Better Business Case development process.

As an integral part of its annual and longer term planning process, CDHB monitors and manages the risks and will continue to review and reprioritise its planned investments, where appropriate, to align to any change in the health service needs (regional, national and local) and financial landscape.

We are also cognisant of the national capital funding envelope and will continue to engage with relevant Crown agencies (MOH, Treasury, HRPG, Capital Investment Committee) in a timely manner to ensure alignment with national funding and timeframes as part of our ongoing review and prioritisation process.

1.5.4 AFFORDABILITY OF THE 10-YEAR INVESTMENT PLAN

Subject to the assumptions holding true, the financial forecasts indicate that the 10-year investment plan is affordable as evidenced by:

- positive 10-year cumulative cashflow (without breaching the DHB Operational Policy Framework (OPF) overdraft limit for CDHB for the 10 respective years
- positive 10-year cumulative operating result before depreciation and capital charge

The position will be further improved when the impending capital charge regulations changes are formally introduced by the Crown as this will offset some of the capital charge expense included in the forecast.

1.5.5 FINANCIAL SUMMARIES

The financial summaries of the preferred scenario for the 10-year planning period ending 2029, are outlined below (further details are set out in chapter 8 and Appendix 10.8). The 'Planned Strategic Investments' information is segregated for clarity and is indicative only as these investments are subject to the formal business case and approval process.

Table B - Summary Cumulative Cashflow for 10-Year Period Ending 2029

Year Ending 30 June Summary Cashflow	Cumulative Total 10 Years $M
Indicative Closing Cash BEFORE Planned Strategic Investments	[redacted]
Add/(Less): Cumulative Planned Strategic Investments Cash Movement:	
Planned Strategic Investments	
New Equity - Assumed Crown Funded Planned Strategic Investments	
Indicative Cash Before Capital Charge on Assumed New Equity	
Indicative Capital Charge on Assumed New Equity	
Indicative Closing Cash After Planned Strategic Investments	

Note: To avoid potential circular references, deficit funding for deficit arising from IDCC impact of Crown funded Planned Strategic Investments has been excluded in the forecast i.e. the forecast closing cash position is conservative.

Capital charge on assumed new equity, for specific Planned Strategic Investments, is included for completeness as the mechanics of the imminent change to the capital charge regulations for Crown funding for new facilities has not been finalised. We understand the new regulations will result in funding for such capital charges, which will likely improve the indicative cash position.

Table C - Summary Cumulative Financial Performance for 10-Year Period Ending 2029

Year Ending 30 June	Cumulative Total 10 Years
Summary Financial Performance	**$M**
Indicative Cumulative Net Surplus/(Deficit) - Before Depreciation & Capital Charge	[redacted]
Depreciation and Capital Charge (Note 1)	
Indicative Cumulative Net Surplus/(Deficit) - Before IDCC on Crown Funded Planned Strategic Investments	
Add/(Less): Notional Depreciation & Capital Charge (IDCC) on Assumed Crown Funded 'Planned Strategic Investments'	
Depreciation on Assumed Crown Funded Planned Strategic Investments	
Capital Charge on Assumed New Equity	
Indicative Net Surplus/(Deficit) - After Notional IDCC for Planned Strategic Investments	

Note 1: Excludes notional depreciation and capital charge for assumed Crown funded 'Planned Strategic Investments' which is shown separately. For 'practicality' and to avoid distortion, other operating efficiencies and/or costs, if any, have not been assessed as the respective business cases have not progressed or finalised.

In addition to the imminent change to the capital charge regulations highlighted above, there are a number of outstanding historical funding matters currently under discussion with the Ministry of Health, which continue to have significant adverse impact on the DHB financial performance. No adjustments have been made for these matters, i.e. if the outcomes were favourable, the financial result will improve.

Table D - Summary Financial Position and Crown Equity as at 2029

As at 30 June	As At End of Yr 10
Summary Financial Position	**$M**
Estimated NET Assets (Before Planned Strategic Investments)	[redacted]
Add/(Less): Cumulative Planned Strategic Investments Movement	
Total Planned Strategic Investments	
Indicative Internal Cash for Planned Strategic Investments	
Indicative Accumulated Depreciation	
Indicative Capital Charge on Assumed New Equity	
Indicative Planned Strategic Investments Net Movement	
Indicative Net Assets After Planned Strategic Investments	[redacted]

As at 30 June	As At End of Yr 10
Summary Crown Equity	**$M**
Estimated Crown Equity - Before Planned Strategic Investments	[redacted]
Add/(Less): Cumulative Planned Strategic Investments Movement	
General funds - Assumed New Equity for Planned Strategic Investments	
Retained Earnings - Depreciation & Capital Charged on Assumed New Equity	
Indicative Crown Equity After Planned Strategic Investments	

The net assets and Crown equity are subject to a number of assumptions outlined earlier. In addition, over the course of the 10-year period, facility related assets are subject to revaluation process at three yearly intervals which will impact on the indicative values shown above.

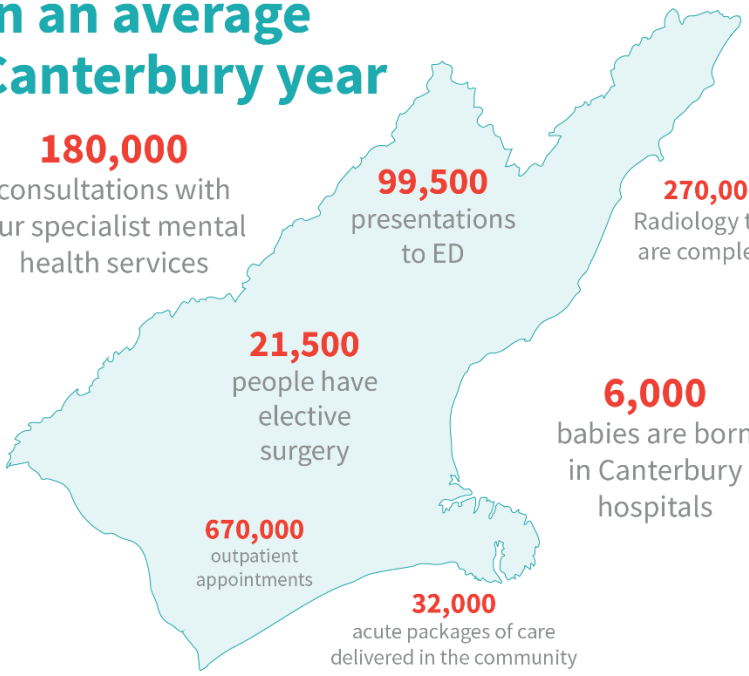
1.6 Improvement Plan

At a strategic level, we need to change the demand trajectory through earlier intervention, especially in relation to mental health and long term conditions, and by improving health literacy to enable people to take greater responsibility for their own health. The importance of social determinants of health such as employment opportunities, education and housing, emphasises the need to collaborate more across different sectors. This work will build on the success we have achieved in meeting health demands by providing services in the community to reduce demand for hospital services. We will continue to invest in maintaining this performance and seek opportunities for further improvement.

Achieving financial sustainability has been a major challenge since the Canterbury earthquakes. These have impacted on our asset portfolio, workforce and operational costs. Over the last nine years, we have been managing the impacts of New Zealand's largest natural disaster and a series of major traumatic events, that have impacted on the resilience of our system and of the population we serve.

Our key approach to creating financial sustainability has been the development of five taskforces to address continuous improvement, resource optimisation, workforce absenteeism, funder arm discretionary contracts and revenue optimisation. These initiatives create a four year pathway to financial stability, excluding interest, depreciation and capital charge.

In an average Canterbury year



180,000 consultations with our specialist mental health services

99,500 presentations to ED

270,000 Radiology tests are completed

123,000 people are discharged from hospital

6,000 children recieve a Before School Check (B4SC)

21,500 people have elective surgery

6,000 babies are born in Canterbury hospitals

670,000 outpatient appointments

32,000 acute packages of care delivered in the community

5,000 people are supported in aged resident care

The communities we serve

We are responsible for **578,340** people

Our community is growing

Our population growth rate over the past 8 years is 15.9% – higher than predicted before the earthquakes.

Our community is ageing

Our population is older than the NZ average. By 2026, one in five people in Canterbury will be aged over 65.

Gender

50.2% are male

49.8% are female

Age

59.5% are 20-64

16.1% are 65+

24.4% are 0-19

Our community is changing

Our population is becoming more diverse. We have the second fastest growing Māori population in NZ.

9.2% are **Māori**

2.5% are **Pasifika**

10.8% are **Asian**

Based on the Stats NZ Dec 2018 Population Projections

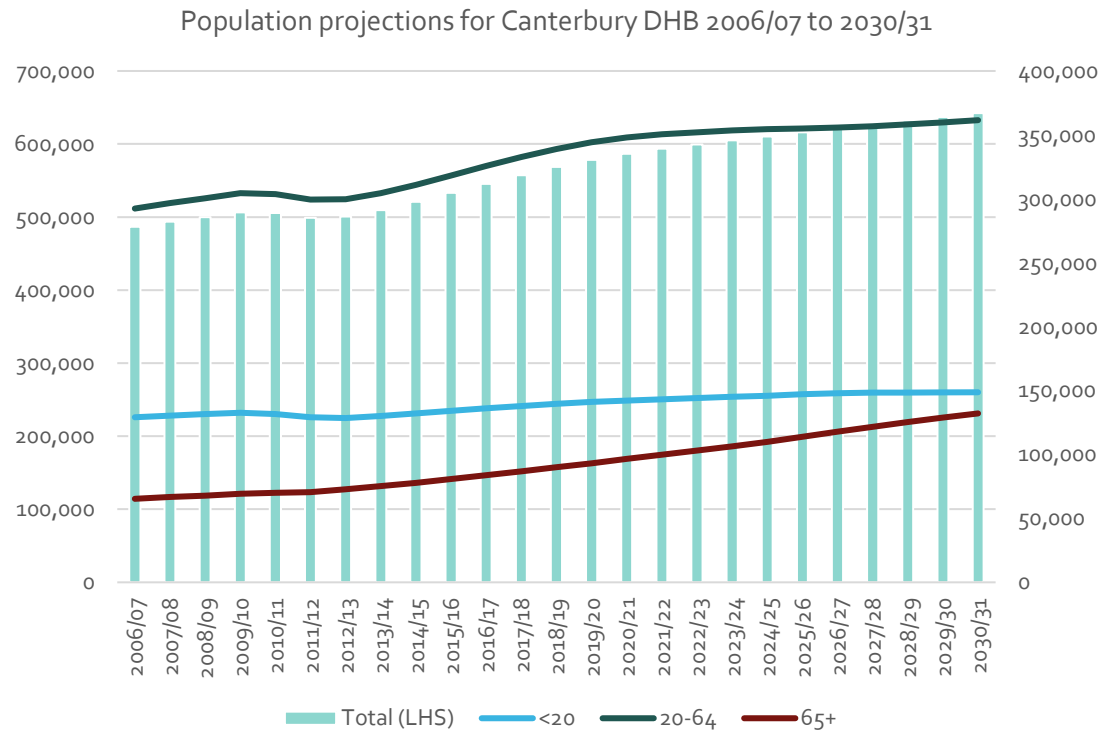
2 Strategic Context

This chapter describes the population we provide services for and how it is growing, ageing and becoming more diverse. We describe our strategic approach to designing and delivering health services, including through our alliance partnerships. We also describe the challenges we face in striving for equity in health outcomes and the challenges expected to arise from changing climate. Our decision-making takes place within the wider context of New Zealand wide health and non-health policies and is also impacted by constraints imposed by our key asset – our workforce. Finally we outline our investment logic model which underpins this long term investment plan.

2.1 Population

Stats NZ projections show the population of Canterbury/Waitaha for the 2019/20 financial year as having reached 578,340 people. Whilst the population figures showed a minor reduction after the Canterbury earthquakes in 2011, population growth resumed quickly and at a higher rate than expected. Our population is now 15.5% higher than in the 2012/13 financial year and is projected to keep growing (Figure 1).

Figure 1 - Canterbury population projected to 2030/31



Our population is older than New Zealand as a whole and Canterbury's health system cares for the largest number of people over 65 of any health system in the country. Our population is also ageing rapidly and is expected to meet 'super-aged status', where over one in five of the population 65 or older, by the end of the period covered by this Plan. The proportion of those aged over 65 is projected to increase from 16.1% currently, to almost 21% of our population by 2030/31 (Figure 2). Older people are among the highest users healthcare services and the projected increase in this demographic group will create significant additional pressure on the Canterbury health system.

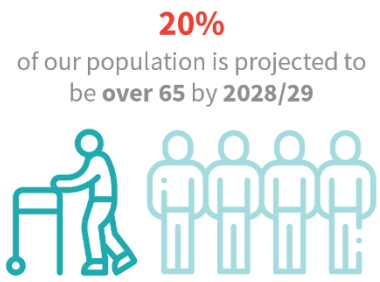
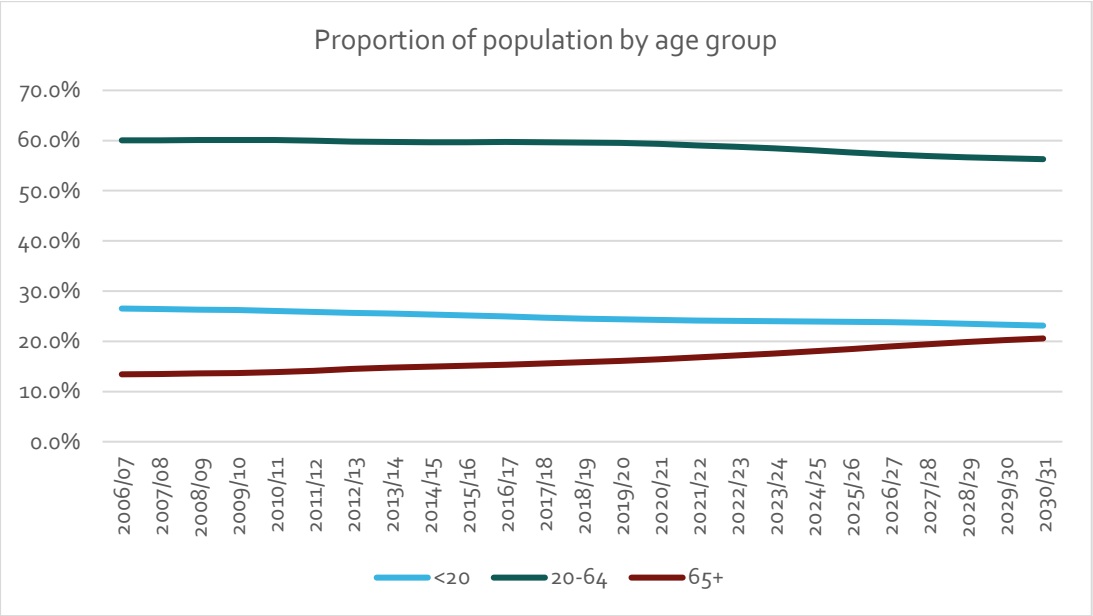


Figure 2 - Canterbury DHB population proportions by age group

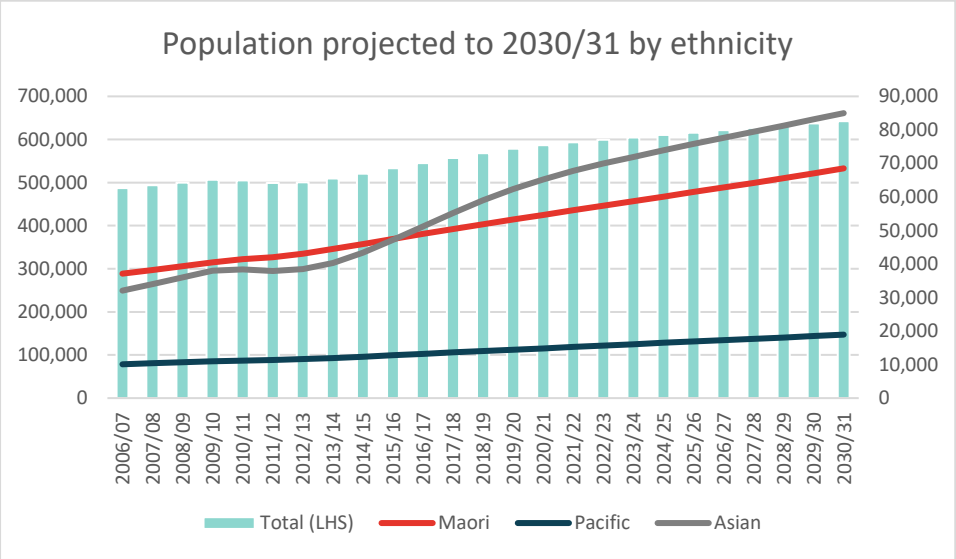


Sometimes overlooked next to the ageing of our population, Canterbury's child population is the fastest growing in New Zealand. There has been an increase of 8% in the total under-15 population over the last ten years and increases in the Māori, Pasifika and Asian under-15 populations of 23%, 35% and 88% respectively. There is a growing body of evidence that children's experiences during the first 1,000 days of life have far reaching impacts on their health, educational and social outcomes. In considering our long term response to demand and supporting our population to thrive, it will be important to focus on our younger population.

Canterbury was historically less diverse than much of New Zealand, characterised by a well off European population. The earthquakes, rebuild and changing opportunities in Canterbury have dramatically transformed our physical and socio-cultural environment. Our population is now significantly more diverse in terms of ethnicity, culture, deprivation and health need.

While our Asian population is our fastest growing population group, Canterbury has the second fastest growing Māori population in the country, with 53,300 Māori living in Canterbury, and a growing Pacific population of 14,460 (Figure 3).

Figure 3. Canterbury DHB population projections by ethnicity



We also know that some population groups have less opportunity and are more vulnerable to poor health outcomes than others. Ethnicity, like age and deprivation, is a strong predictor of need for health services and the change in demographics of our population are an important consideration in our future planning.

An estimated 93% of the Canterbury population is enrolled with a Primary Health Organisation (PHO), compared with an average of 92% across all large DHBs[1]. However the estimated percentage of Canterbury's Māori population enrolled with a PHO is 81% compared with an estimated 88% average across all large DHBs. Enrolment rates for socio-economically deprived people are also lower, estimated at around 84%.

As the second largest tertiary service provider and the largest trauma centre in the country, the Canterbury DHB provides an extensive range of highly specialised services to the populations of other DHBs where the specialised service or treatment is not available. This regional demand is complex in nature and growing steadily. In the five years to June 2017, there was a 9.5% increase in hospital admissions and a 15.5% increase in outpatient appointments for people referred by other DHBs. Regional demand is further discussed in section 3.4.

[1] Based on data sourced from the Ministry of Health and Stats NZ

The population forecasts above use the 'medium' growth scenario developed by Stats NZ and are estimates only, environmental, social and policy changes can have a strong impact on population shifts and are hard to predicate. As an example, in 2012 the Canterbury DHB's Facilities Plan (using Stats NZ projections) assumed that the Canterbury population in 2018/19 would be around 530,000 – over 37,000 people short of what we actually have. The 2011 earthquake and subsequent population underestimates created a double hit for the Canterbury DHB, with the population underestimated being linked to funding allocations, in a period where the demand for services significantly increased.

2.1.1 HEALTH PROFILE

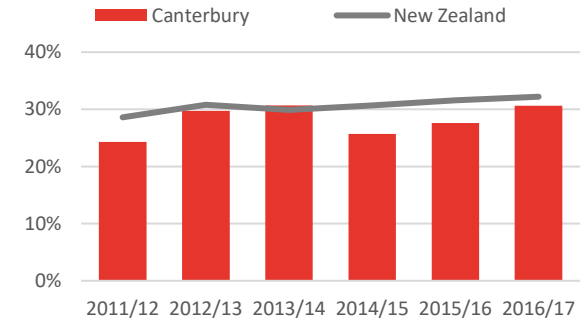
To make best use of our health spending, it is imperative that we understand the drivers of health loss and prioritise resources accordingly. New Zealand is experiencing a growing prevalence of long term conditions such as cancer, heart disease, respiratory disease, diabetes and depression. The Burden of Disease study estimates that 88% of health loss is caused by long term (physical and mental) conditions[2]. These conditions are major drivers of poor health and premature death and account for significant pressure on our health services.

There is good evidence from national and international studies that risk factors such as poor diet and tobacco use, together with diseases such as diabetes and depressive disorders, collectively account for around one third of the total health loss sustained at a national level[2]. A key strategic objective for the Canterbury DHB is that 'people are healthier and enabled to take greater responsibility for their own health'. Modifiable risk factors are estimated to account for around 70% of the health loss burden of major cardiovascular disorders and diabetes, and around 30% of the cancer burden. Tobacco smoking alone is estimated to cause 70-80% of the burden of chronic obstructive pulmonary disorder (COPD)[3], a major contributor to adult preventable hospital admissions. Whilst it is hard to accurately estimate the contribution of modifiable lifestyle risk factors, this does emphasise the importance of supporting our community to keep well and make healthy lifestyle choices where possible.

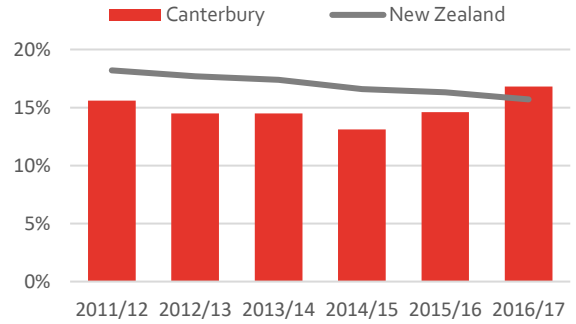
In Canterbury, the estimated proportion of the population (15+) who smoke or who are obese increased during the period 2014/15 to 2016/17 (Figure 3). According to the 2016/17 New Zealand Health Survey, 17% of the Canterbury DHB population smokes and 31% are obese[4]. The increase in smoking came after a period of declining smoking rates and may be related to the Canterbury earthquakes through increased stress and the changing demographics associated with the rebuild workers. A 2013 study found that nearly one fifth of people surveyed reported drinking more than before the earthquake and more than one tenth were smoking more[5].

Figure 3

a. Proportion of the Canterbury DHB population (15+) who are obese



b. Proportion of the Canterbury DHB population (15+) who smoke

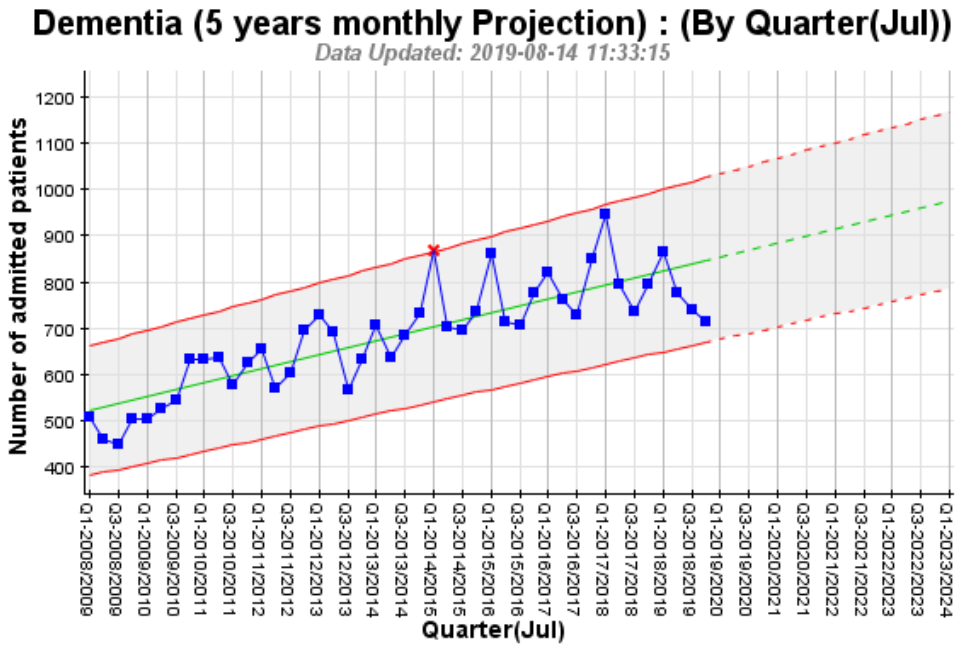


[2] Health Loss in New Zealand 1990-2013: A report from the New Zealand Burden of Diseases, Injuries and Risk Factors Study. Ministry of Health. 2016.
[3] Strategic Overview- Respiratory Disease in New Zealand. National Health Committee. 2013
[4] From New Zealand health survey – note that sample sizes are small
[5] All Right? A summary of research behind the wellbeing campaign for Canterbury. 2013

As people live longer, the length of time they spend living with long term conditions also lengthens. A super-aged population is expected to have increased rates of admissions for a range of non-communicable diseases such as cancer and heart disease. At a national level, the Burden of Disease study indicates that around 20-35% of gains in life expectancy are spent in poor health.

In Canterbury, the number of people with dementia has been increasing and is expected to continue to increase significantly as a result of our ageing population profile (Figure 4). Furthermore, there is emerging evidence that some modifiable risk factors, such as level of physical activity, smoking and mid-life obesity, are associated with the risk of dementia and cognitive decline[6], further underscoring the need to improve health literacy and support environments that promote health lifestyles.

Figure 4 - Increase in dementia associated admissions to Canterbury DHB hospital services



2.1.2 IMPACT OF THE CANTERBURY EARTHQUAKES ON POPULATION HEALTH

The Canterbury population continues to experience negative health consequences from the 2010 and 2011 Canterbury earthquakes and the 2016 Kaikōura earthquake. Prolonged levels of stress, anxiety and poor living arrangements continue to exacerbate chronic illness and increase demand right across our health system, but particularly across mental health, child and youth and emergency services.

The New Zealand Health Survey reported that 23% of our population have been diagnosed with a mood or anxiety disorder, compared with 20% of the population nationally. A recent research study used data from five New Zealand Health Surveys (2011/12 to 2015/16). This found survey respondents reported an initial improvement across a range of physical and mental health metrics (2011/12) but then worse health status in 2013/14, significantly so for men[7]. This is in line with the 'heroic/honeymoon/disillusionment/reconstruction' model of disaster response where the initial increase in sense of community gives way to poorer health outcomes in the medium term as people struggle with direct challenges such as damaged homes, and indirect challenges resulting from the earthquakes such as loss of jobs or changing places of work causing difficulties

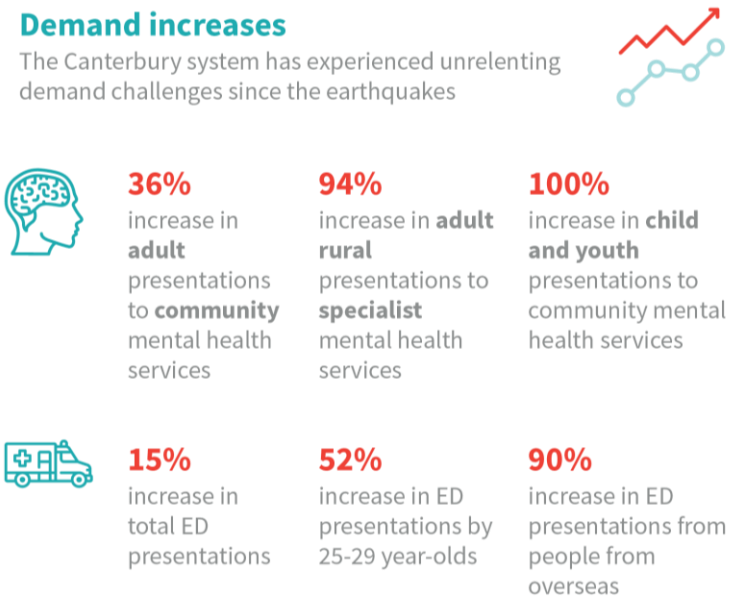
[6] Baumgart et al., Summary of the evidence on modifiable risk factors for cognitive decline and dementia: A population-based perspective. 2015

[7] Pledger, McDonald and Cumming, 2019. SF-12 indicators of health following the 22 February 2011 Christchurch earthquake.

for families with school runs etc. International research and post-disaster experience would indicate that this is not surprising, and we can expect these patterns to continue for upwards of a decade.

Young children are the most vulnerable and suffer the most long lasting negative effects into adulthood[8]. There is also evidence of intergenerational transmission of poorer health as a result of natural disasters. The Canterbury health system needs to understand and meet the increased demand for mental health support if we are to support lifelong wellbeing for our population.

Figure 5 - Canterbury health system demand increases



2.1.3 IMPACT OF THE MOSQUE TERRORIST ATTACK

On Friday 15 March 2019 two mosques in Christchurch, the Al Noor Mosque and the Linwood Islamic Centre, were targeted by a single shooter. Fifty one people died from their injuries, 49 people were hospitalised on the day of the shooting. Many of the injured will require long term interventions and rehabilitation.

In addition to physical injures, the attack will exacerbate mental health conditions in a population which has already been impacted by a series of natural disasters. The literature suggests that exposure to mass violence is associated with greater risk of mental health issues than exposure to natural or other disasters[9] although this will usually be short lived for most. Like our experience with the earthquakes, the majority of people recover with time, however others are at risk of experiencing more severe and long-lasting problems. International meta-analyses indicate that between 1.3 and 22% of people could be at risk of developing a post-traumatic stress disorder after experiencing a mass violence event.[10] The literature also indicates that other mental health disorders such as anxiety and depression are also increased after such events.

[8] Caruso. The Legacy of Natural Disasters: The Intergenerational Impact of 100 Years of Disasters in Latin America. The World Bank. 2017.
[9] Wilson – The Wiley Handbook of the Psychology of Mass Shootings. The authors notes though that mass shootings are relatively under-researched and tend to be case studies of specific events as opposed to meta-analyses. On average less than 10% of trauma survivors develop PTSD vs 10-36% for PTSD development among mass shooting survivors.
10 Wilson LC, A systematic review of probable post-traumatic stress disorder in first responders following mass-made violence. Psychiatry Research. 2015; 229: 21-26.

The mental health effects of the terrorist attacks on Christchurch mosques may be unique in:

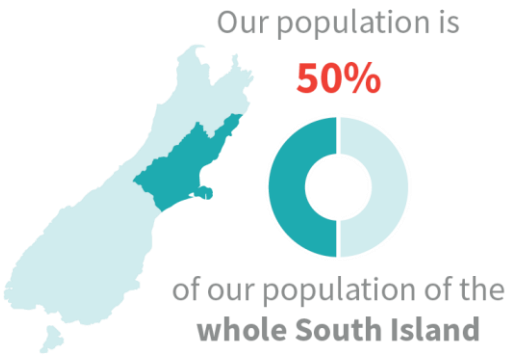
- occurring in a setting with the pre-existence of a major disaster within the last decade;
- the use of social media to livestream the attacks; the direct targeting of Muslims by a white supremacist, the scale of violence committed;
- the size of the Muslim community in Christchurch relative to the number of people directly affected, the diversity of that community;
- the reaction from the international community; and the reaction of the people and leaders of New Zealand[11].

In the aftermath of the attack, Christchurch Hospital developed a 'hub' for patients and families where financial, housing and immigration matters could be resolved for families directly impacted. General practice visits were made available free of charge and Canterbury primary mental health services worked closely with victim support and other community agencies to streamline access to help.

It is unclear what this further disaster will do to our population in terms of the post-disaster recovery model, coming as it did in what could have otherwise been the recovery period.

2.1.4 GEOGRAPHICAL PROFILE

The geographical area covered by the Canterbury DHB stretches from Kekerengu (240km north of Christchurch (Ōtautahi) to just beyond Ashburton (Hakatere) and inland to the Southern Alps. Christchurch is the main population centre with approximately 69%[12] of Canterbury residents.



The Canterbury DHB owns and operates six major facilities:

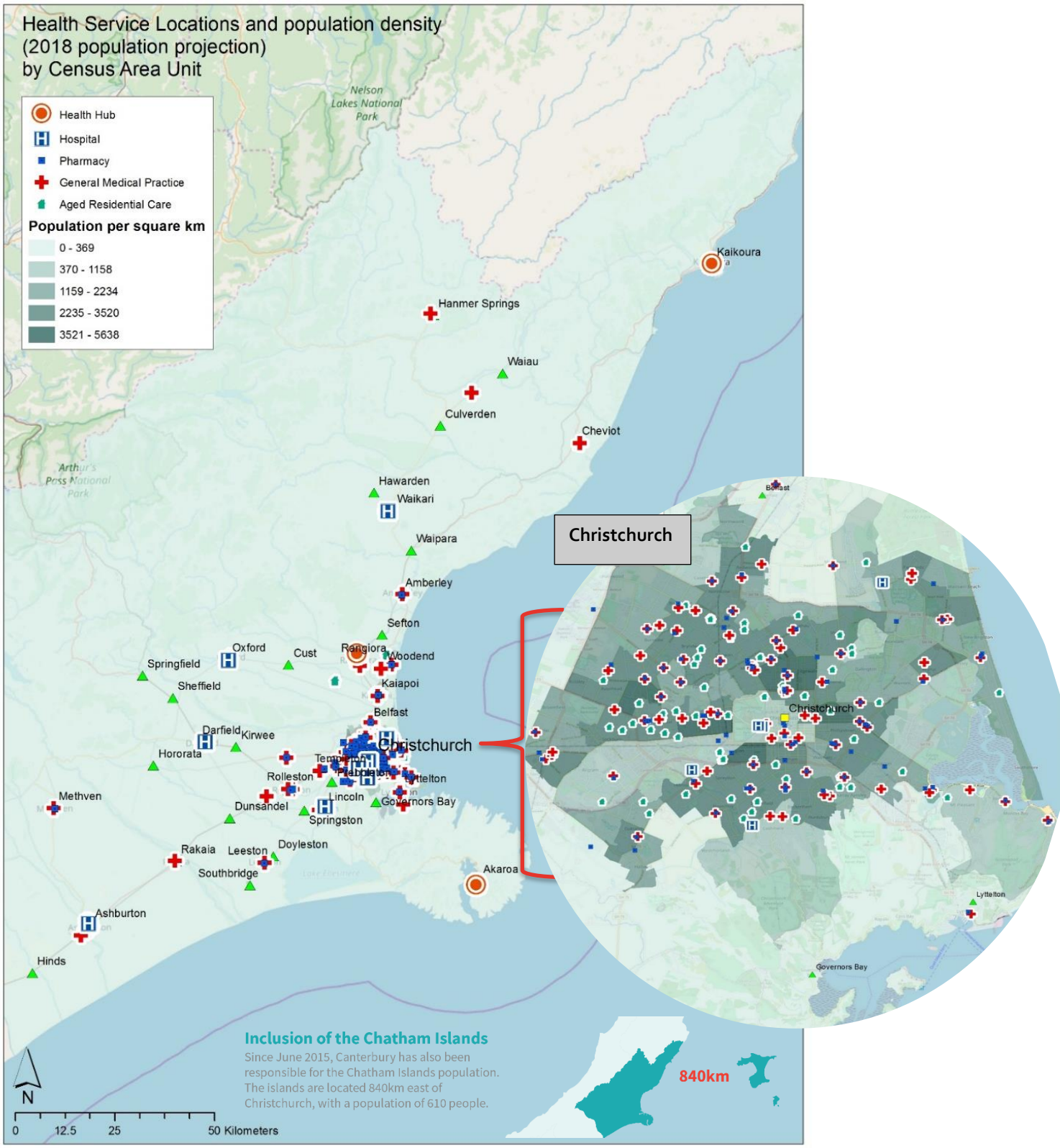
- Christchurch Hospital;
- Christchurch Women's Hospital;
- Hillmorton Hospital (inpatient and outpatient mental health services and community dental);
- The Princess Margaret Hospital (largely decommissioned following earthquake damage);
- Burwood Hospital (adult treatment and rehabilitation and older person's health); and
- Ashburton Hospital, approximately an hour south of Christchurch.

The DHB also owns and operates many smaller urban and rural facilities, including six rural hospitals and three health hubs (Figure 6) including the services for the Chatham Islands (Rēkohu/Wharekauri) and the Chatham Islands Medical Centre.

The wider Canterbury health system includes around 116 general practices, 115 community pharmacies, approximately 100 aged care facilities (in which around 12% of our population aged over 75 live) and over 50 mental health service facilities.

[11] Kerdemelides and Reid.Wellbeing recovery after mass shootings: information for the response to the Christchurch mosque attacks 2019.
[12] Christchurch City Council Territorial Authority population as a proportion of the total of the estimated populations for the 6 Territorial Authorities making up the Canterbury DHB region

Figure 6 - Canterbury District area and health care facilities

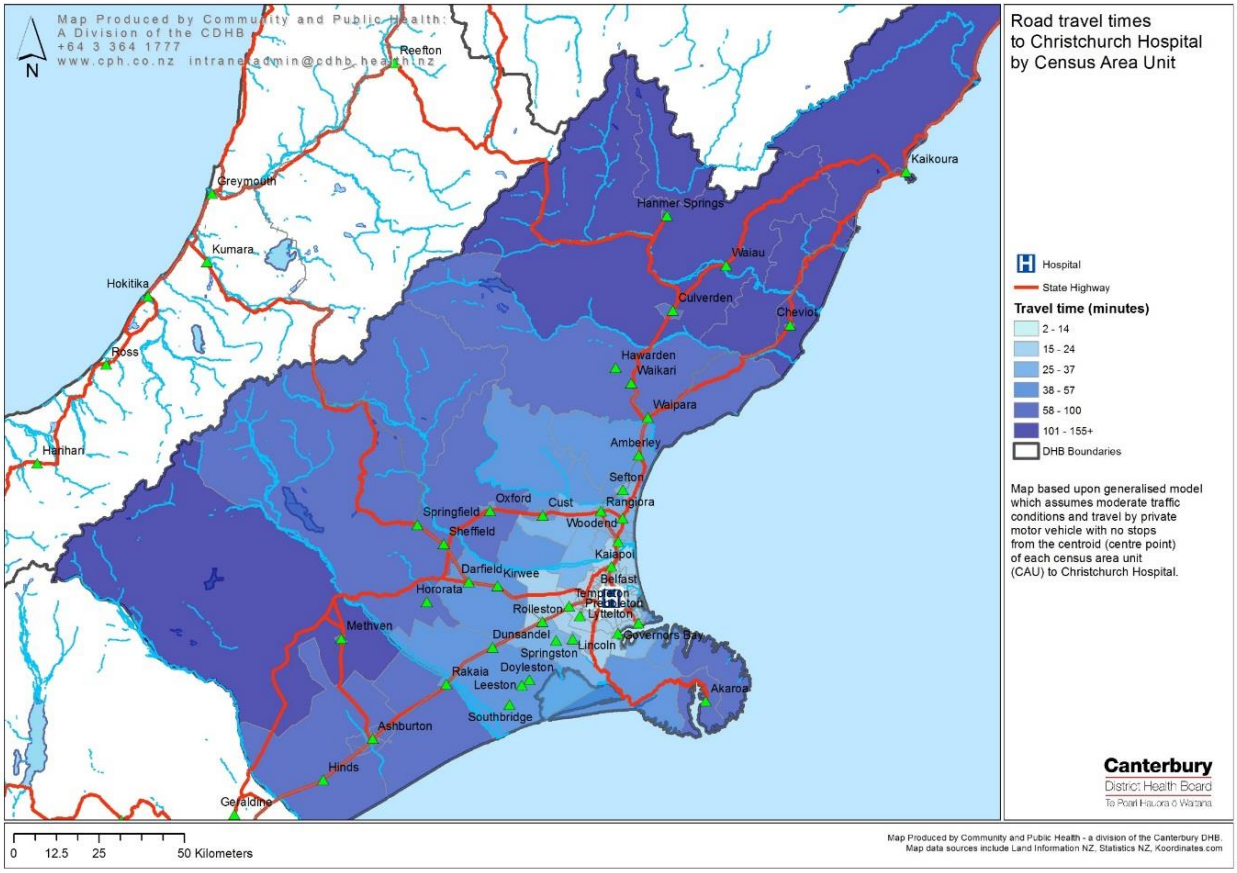


The Canterbury DHB is responsible for providing health services to one of the largest population centres in New Zealand at one end of the spectrum, and for providing health services to the Chatham Islands, which have distinct isolation and service access challenges, at the other. Figure 7 illustrates the challenges of

providing adequate access to secondary and tertiary level care facilities for our rural Canterbury population (Chatham Islands excluded), with large areas of our region being more than 100 minutes travel away from a main hospital.

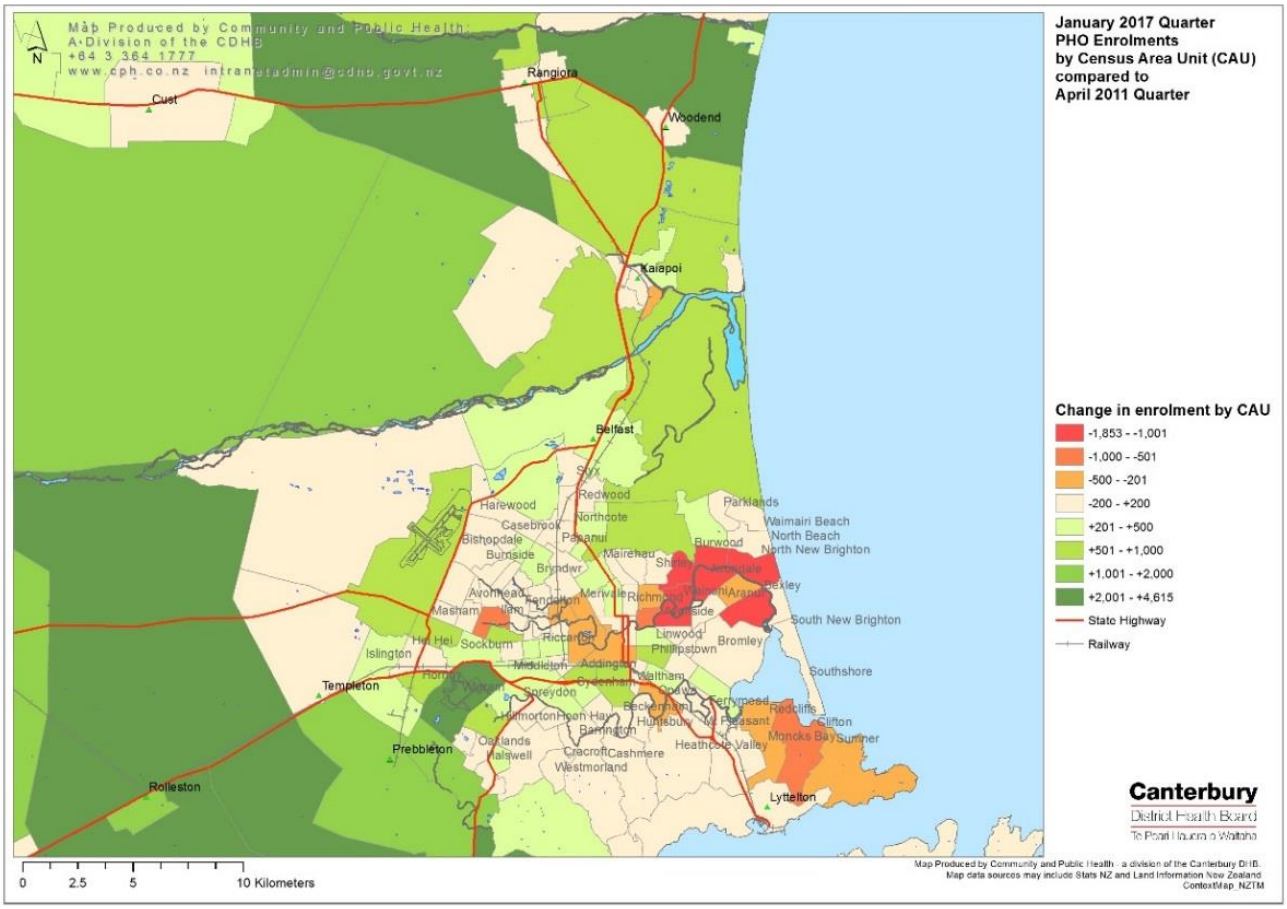
Furthermore, the Canterbury DHB provides secondary and tertiary services for non-Canterbury residents from the South Island (and half of the North Island for some conditions) through our regional services, which include spinal trauma and cancer services, and through our transalpine model of shared care to support the West Coast DHB.

Figure 7 - Travel times to Christchurch Hospital from across our region (excluding the Chatham Islands)



The situation is further complicated by the significant changes in population densities that have occurred post-earthquake and largely as a result of forced migrations from the red zoned areas, many of which are on the eastern side of Christchurch. This has led to populations in areas surrounding Christchurch, such as Selwyn and Waimakariri increasing significantly (see Figure 8). Selwyn district was the fastest growing district in New Zealand between 2006 and 2013, increasing by one third) and Waimakariri is the third fastest. Planning for services must now respond to these changes, and attempt to anticipate others, as the region continues to settle and employers move into refurbished/rebuilt facilities.

Figure 8 - Dispersal of Christchurch population into outlying area as shown by PHO enrolment changes



2.2 Canterbury DHB's Strategic Approach

Like many health systems worldwide, the Canterbury health system is grappling with how to meet the demands of a population that is both growing and ageing, and in which long term conditions and multiple long term conditions (co-morbidity), are increasingly prevalent. Future financial and workforce constraints are expected to further limit our capacity to meet demand and we also face a number of unique operational and population health challenges following the earthquakes.

Back in 2007, the Canterbury DHB undertook analysis that indicated that if nothing changed, the Canterbury health system would need another 500+ bed hospital by 2020, along with 20% more general practitioners and practice nurses and 2,000 extra rest home beds. This 'burning platform' inspired a major rethink of how services were organised and delivered.

Health professionals, clinical leaders, consumers and stakeholders from across the Canterbury health system came together to find a way to meet the growing demand in a sustainable manner, and co-created 'Vision 2020'. This process clarified the challenges the system was facing and provided participants with an opportunity to define what they could and would do to improve health outcomes for our population. It was apparent that we needed to do things differently, re-evaluate our relationships and work together to address our future challenges. Together we committed to a shared vision that recognised our future was not about hospitals, but about everyone working together as one team, to do the right thing for people, their families and the health system.

Our vision is an integrated health system that keeps people healthy and well in their own homes and communities. A connected health system, centred around people, that aims not to waste their time. The vision is underpinned by three strategic objectives that drive everything we do:

- The development of services that support **people/whanau** to stay well and take increased responsibility for their own health and wellbeing.
- The development of **primary and community services** to support people/whanau in a community based setting and provide a point of ongoing continuity, which for most people will be general practice.
- The freeing up of **hospital based specialist resources** to be responsive to episodic events and the provision of timey complex care and support and specialist advice to primary care.

A connected system.....centred around people....that aims not to waste their time

As a result of this collaborative, co-design process, we transformed the system, introducing more streamlined and efficient models of service delivery and taking a restorative and patient centred approach to care which moderated the growth in demand for hospital and residential services.

A key enabler in improving how we meet the healthcare needs of our population has been moving away from a traditional price/volume schedule in our provider arm. Under a price/volume schedule, hospitals are paid per procedure. Previously, departments wanting more revenue focused on 'doing more' to increase revenue. Focusing on reducing demand or introducing efficiencies would result in their budgets being cut. Instead, our focus is on managing resources rather than increasing revenue and if clinical areas implement efficiencies they are able to consider new technologies and approaches to provide services.

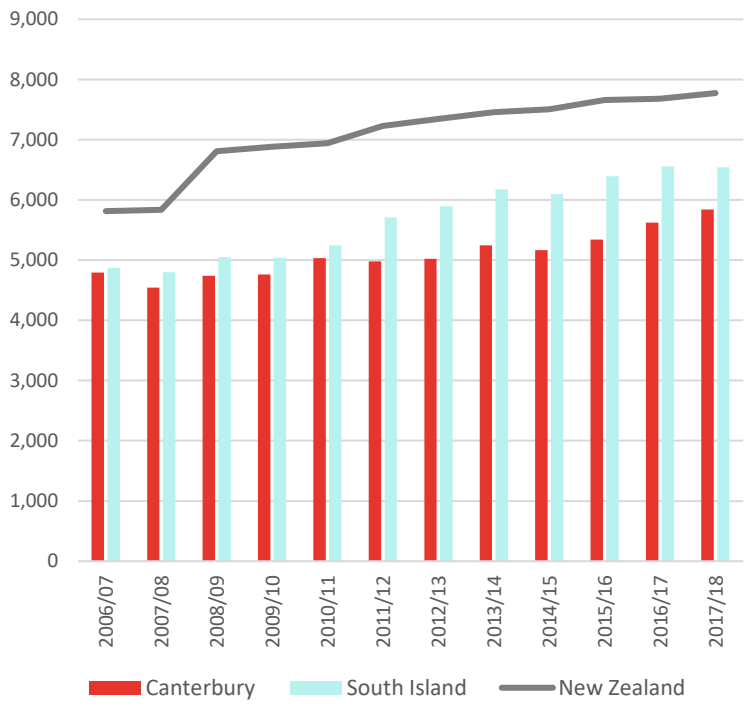
In our funder arm, an equally important shift has been towards an alliancing approach. This has replaced input defined, competitive and often 'fee per item of service' contracts with agreed 'pain/gain' contracts where 'everyone wins or everyone loses'. These contracts recognise that if one partner is struggling, it is in the overall interests of the health system for the others to help solve the problem rather than apply performance penalties. The alliance contracting approach is designed to create a joint incentive for both the referrers and the providers to manage the cost.

The Canterbury Clinical Network (CCN) alliance was formed in 2009 to bring together healthcare providers from across the system to work together to more effectively lead changes to improve health outcomes. Service level alliances and shared workstreams and programmes are clinically led and supported to ensure effective implementation. A co-developed 'system level measures improvement plan' with improvement targets provides evidence of impact. The alliancing approach pioneered by CCN has now been adopted nationally.

The idea is to create a 'high trust, low bureaucracy' approach to contracting that encourages innovation over the means of delivery because it is the broad outcome – 'What is best for the patient? What is best for the system?'-that is the overarching goal. The King's Fund

Vision 2020 and the strategic goals signalled a need to invest in community based care programmes that support people to stay well in their homes and communities whilst delivering health care services in a financially responsible manner. The Acute Demand Management Service (see sidebar) is one example of investing in an upstream initiative to reduce pressure on downstream, hospital based services. As a result of initiatives such as this, our rates of acute medical admissions are significantly lower than the South Island and national average rates (see Figure 9 below). As treatment is more costly to deliver in a hospital setting, this investment has supported us to meet increasing demand in a financially sustainable way. We continue to monitor our rate of acute medical admissions, a proxy indicator for management of long term conditions, and access to timely and appropriate treatment in the community.

Figure 9 - Rate of acute medical admissions to hospital (age standardised, per 100,000 people)



ACUTE DEMAND MANAGEMENT SERVICE

The goal of the Acute Demand Management Service (ADMS) is to prevent Emergency Department (ED) attendance and hospital admission by providing care in the community when it is safe to do so. It allows general practice and ambulance teams to provide or access a range of alternative acute management options. The service provides care that enables people who would otherwise need an ED visit and possible hospital admission to be treated in their own homes and communities. Services include observation, home visits, IV therapy, urgent tests/ investigations. Repeat home visits and follow ups are funded, for example for observation of a child suffering from gastroenteritis.

ADMS is managed through a Canterbury Clinical Network service level alliance and includes St Johns, Pegasus Health, Nurse Maude, general practices, ED, hospital specialists and afterhours general practice providers.

FALLS PREVENTION PROGRAMME

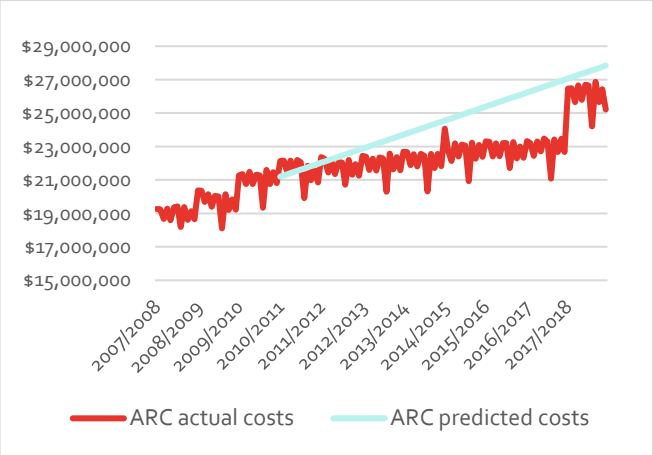
Around 22,000 New Zealanders aged 75+ are hospitalised each year for injuries due to falls. Older people who are injured as a result of a fall are more likely to lose confidence and independence, are at greater risk of falling while in our care, and stay in hospital longer. The Falls Prevention Programme was established in 2011 and focuses on three key areas – falls prevention in the wider community, in rest homes and whilst receiving care in hospital.

Following an initial home visit from a physiotherapist or registered nurse, a home falls assessment and hazard check is completed, and a personal falls prevention programme is tailored to improve strength and balance and reduce the risk of falls. A recent evaluation found that from February 2012 to February 2019, over 3,200 fewer people over 75 years presented to the Christchurch Emergency Department due to a fall, compared with expected volumes based on pre intervention trends. There were also 981 fewer than expected admissions for hip fractures, 327 fewer deaths post hip fracture than predicted and 12,500 fewer bed days occupied in hospital over the last 12 months.

Another key theme from the Vision 2020 redesign process, was how we were going to meet the needs of our ageing population. By better supporting people to stay well in their own homes through initiatives such as the Falls Prevention Programme (see side bar), we have been able to significantly reduce the proportion of people living in aged residential care (ARC) and their length of stay once there, creating savings to feed back into community based support mechanisms (Figure 10, noting that the recent jump is as a result of the pay equity agreement). These initiatives align with our strategy of 'prehab as well as rehab'; an approach that emphasises prevention, earlier intervention and education.

'No door is the wrong door' - referrals can come through general practice, secondary care, district nursing, St John

Figure 10 - Change in actual versus projected ARC costs from 2009/10



Community Falls Prevention

Our Falls Prevention Programme helps people to stay independent in their own homes.

In the last 7 years we have had:

3,291 fewer ED attendances

981 fewer hip fractures

66,881 fewer bed days for hip fracture patients

327 fewer deaths at 180 days

compared with expected levels for people aged 75 years and over, reducing demand on public health and social services

HEALTHPATHWAYS

HealthPathways provides assessment, management, referral and patient information and reference material jointly developed by hospital and general practice clinicians. HealthPathways is a user friendly, web-based system which is available to all general practices in Canterbury. It provides general practitioners with best practice guidelines (based on local, national and international information) as well as local information about local services. GPs can see easily which treatments can be managed in the community (including through referrals to another general practice) and what tests are required before referral through to secondary and tertiary services. Partnered by an electronic request management system (ERMS) to ensure referrals have all the information required, HealthPathways has increased the consistency and equity of care and reduced rates at which referrals are declined due to inadequate information being provided. Close to 700 pathways have been developed since the initiative began in 2009 and Hospital Pathways and Healthinfo (for the general public) are also now in place.

We are constantly re-evaluating our services and seeking to further optimise them for patients. Clinical pathways and service delivery models ('models of care') are reconfigured, with input from consumer groups, to address service gaps and improve access to the right services at the right time. Models of care are a key enabler and their optimisation is always addressed before consideration of any investment in assets such as buildings and clinical equipment when areas begin to feel capacity constraints. The clinician led Canterbury HealthPathways initiative is a good example of this approach and has been so successful that it has been adopted by other healthcare systems, both in New Zealand and overseas (see sidebar).

Connecting information systems, sharing patient information, data and evidence has been a key enabler of change and we will continue to invest in this area. We have put significant resources into the development of 'live data' systems where real time information on the day to day operations within our hospitals enables more responsive decision making and planning (see also section 3.8). Access to real time information at the point of care is helping us improve the quality and safety of the care we provide and reducing the time people waste waiting.

"The biggest waste we have in our health system is patient's time. Historically we have designed systems that build in waiting at every point and which bounce patients from one part of the system to another. By focusing on removing waiting we can make far better use of the existing resource". David Meates, Chief Executive, CDHB

By increasing the productivity of health services, integrating service delivery models, and expanding the role of primary and community service providers, we have been able to reduce the rate of acute (unplanned) hospital admissions and create capacity for additional planned activity. The evidence for the success of this approach can be seen in a number of external reviews of the Canterbury health system.

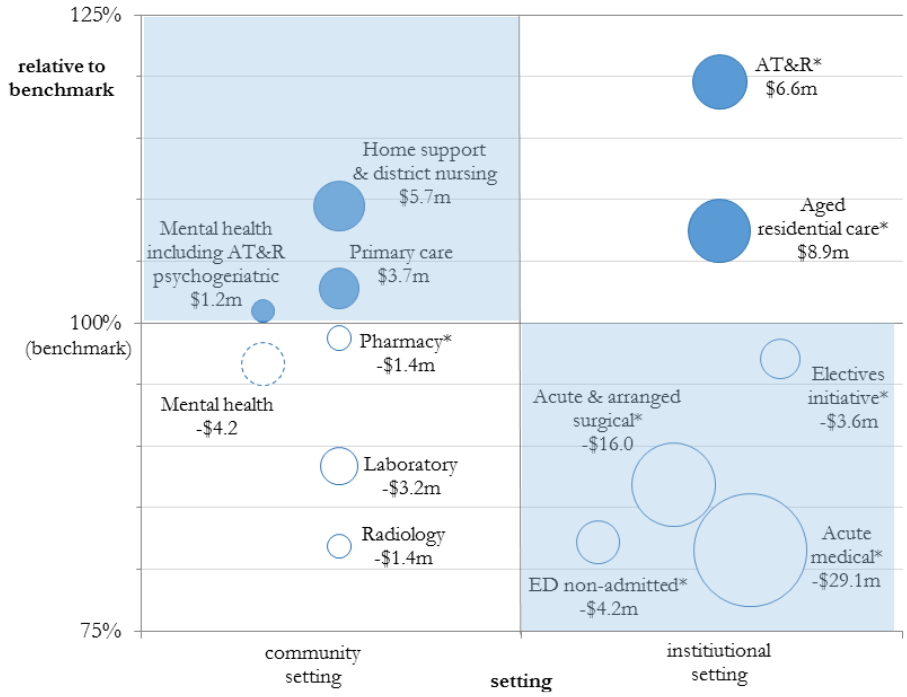
Recent analyses have shown that Canterbury has the lowest cost growth among similar sized DHBs, and our hospitals have been benchmarked against other large hospitals internationally as the most efficient of its peers across New Zealand and Australia.

For example, if Canterbury DHB followed New Zealand ED attendance rates, we would have had an additional 26,000 attendances in 2017/18 (we admitted 78% of the expected national rate); for acute medical admissions, our admittance rate is at 75% of the national rate which saved us 12,800 admissions in 2017/18.

In 2017, a benchmarking exercise was undertaken by an outside consultancy in which Canterbury DHB investment in different areas (both in community based services and services we provide directly) was compared with national per

capita averages[13]. The figure below shows the findings from this for the 2015/16 investment year. It should be noted that spending more or less than the national average is not inherently good or bad. For example, in some areas DHBs have a high level of discretion over investment, whereas in other areas, such as responding to acute care demand, there is little control. However, investment in community based services in response to local need (top left quadrant in the figure below) may help to reduce demand pressures downstream, in more expensive hospital based services (bottom right quadrant).

Figure 11 - Benchmarking exercise comparing CDHB to national per capita averages



The higher than average investment in the areas of primary care and home support and district nursing has the potential to mitigate acute hospital admissions downstream. Spending on hospital based adult treatment and rehabilitation services (AT&R) also appears higher than national averages and this is a focus area service optimisation going forwards.

The transformation made enabled the Canterbury health system to show incredible resilience following the 2011 earthquakes in which 185 people lost their lives and over 6,000 were injured. It has also enabled us to respond quickly and effectively to subsequent disasters. However, these services are also now struggling to meet demand, particularly for mental health support and our secondary and tertiary capacity continues to be substantially reduced.

The three strategic objectives continue to guide the direction of the Canterbury health system. While this strategy has enabled us to make significant improvements in the way we work, and, whilst we will continue to work collaboratively across the Canterbury health system to identify and implement improvements, this will not be sufficient to mitigate the increasing demand from a growing and ageing population. Investments over the next ten years will need to be made to enable us to continue to meet the needs of our population. In order to change the trajectory of increasing demand for healthcare services, we must also focus more on our first strategic objective of enabling people to take greater responsibility for their own health.

"Despite the challenges we face, the Canterbury health system is internationally recognised as a high performing, well integrated health system that puts the patient at the centre. Without this strong baseline performance, we would be unable to cope with the continued operational challenges of unexpected events and our growing population". Dr John Wood, Chair, CDHB

[13] Benchmarking the resource allocation of Canterbury District Health Board. Blick, G and Love, T, Sapere Research Group. July 2017

2.3 Policy Context

The Canterbury health system's vision is closely aligned to the Government's long term vision for New Zealand and the health sector, as articulated through the New Zealand Health Strategy with its central theme to support New Zealanders to 'live well, stay well, get well'[14]. The New Zealand Health Strategy notes that 'all kinds of factors influence a person's ability to live well, stay well, get well', and highlights that factors outside the health system strongly influence people's health and that good health brings benefits for other aspects of people's lives. For example, parents who have good health and mental wellbeing can support the social development, educational outcomes and lifelong experiences of their children. Our long term vision particularly reflects alignment with the Government theme 'Improving the wellbeing of New Zealanders and their families' and the four national priority outcomes:

- Supporting healthier, safer, more connected communities;
- Making New Zealand the best place in the world to be a child;
- Transitioning to a clean, green and carbon neutral New Zealand; and
- Ensuring everyone who is able to, is earning, learning, caring or volunteering.

Our direction and activities are also driven by national strategies such as He Korowai Oranga (the New Zealand Māori Health Strategy), Ala Mo'ui (Pathways to Pacific Health and Wellbeing), the Healthy Ageing Strategy and the New Zealand Disability Strategy. A number of Government reviews and inquiries will also be completed within the ten year period of this Plan and may influence service delivery; these include the Mental Health and Addiction Inquiry, Child Wellbeing Strategy and the wider review of the New Zealand Health and Disability Sector.

The Minister of Health's annual Letter of Expectations is another important guide for DHB decision making. In 2019/20 the Letter signalled a strong focus on equity, child and mental health and improving wellbeing though prevention, with better population health outcomes supported by a strong and equitable public health system and primary health care. Strong fiscal management was also a clear signal coming through in the Minister's expectations. In preparing Annual Plans for 2019/20 DHBs are encouraged to work closely with their local public health units, acknowledging that some of the biggest population health improvements can be enabled by the policy decisions of agencies outside the health sector by taking a 'Health in all Policies' approach. Strengthening local and regional alliances and the need to work alongside Māori and Pacific communities to improve health outcomes was also reiterated throughout the planning advice in 2019/20.

Important legislation includes the New Zealand Public Health and Disability (NZPHD) Act and the Crown Entities Act. The NZPHD Act includes provisions to recognise and respect the principles of the Treaty of Waitangi/Tiriti o Waitangi and highlights DHBs' responsibility to promote greater participation by Māori in the health and disability sector and to reduce health inequalities between various population groups (discussed further in the next section). The NZPHD Act also includes provisions for the DHB to exhibit a sense of environmental responsibility by having regard to the environmental implications of its operations and promote the reduction of adverse social and environmental effect on the health of people and communities (discussed further in section 2.5.1).

Alongside Government direction and formal legislation, DHBs also deliver services in accordance with the requirements of the Crown Funding Agreement (which includes an Operational Policy Framework and Service Coverage Agreement) and in alignment with their Statements of Intent, Statements of Service Performance and their Annual Plans, which are approved by the Minister of Health. As part of our accountability to our community and Government, we need to demonstrate whether we are meeting expectations, achieving our objectives and improving the health and wellbeing of our population. There is no single performance measure or indicator that can easily reflect the impact of the work we do and we cannot measure everything that matters for everyone. In line with our vision for the future of our health system, we have developed an overarching intervention logic and system outcomes framework.

The intervention logic diagram (Figure 12) helps to illustrate our population health based approach to performance improvement, by highlighting the difference we want to make in terms of the health and

[14] New Zealand Health Strategy Future Direction, Ministry of Health, 2016.

wellbeing of our population. It also encompasses national direction and expectations, through the inclusion of national targets and national and local system level performance measures. This is detailed in the DHB's Statement of Intent, alongside the measures of service performance that are tracked and reported annual in the DHB's Annual Report. Figure 13 shows how the measures throughout our Canterbury Outcomes Framework are aligned with the national system level measures (in red).

Figure 12 - Overarching intervention logic framework

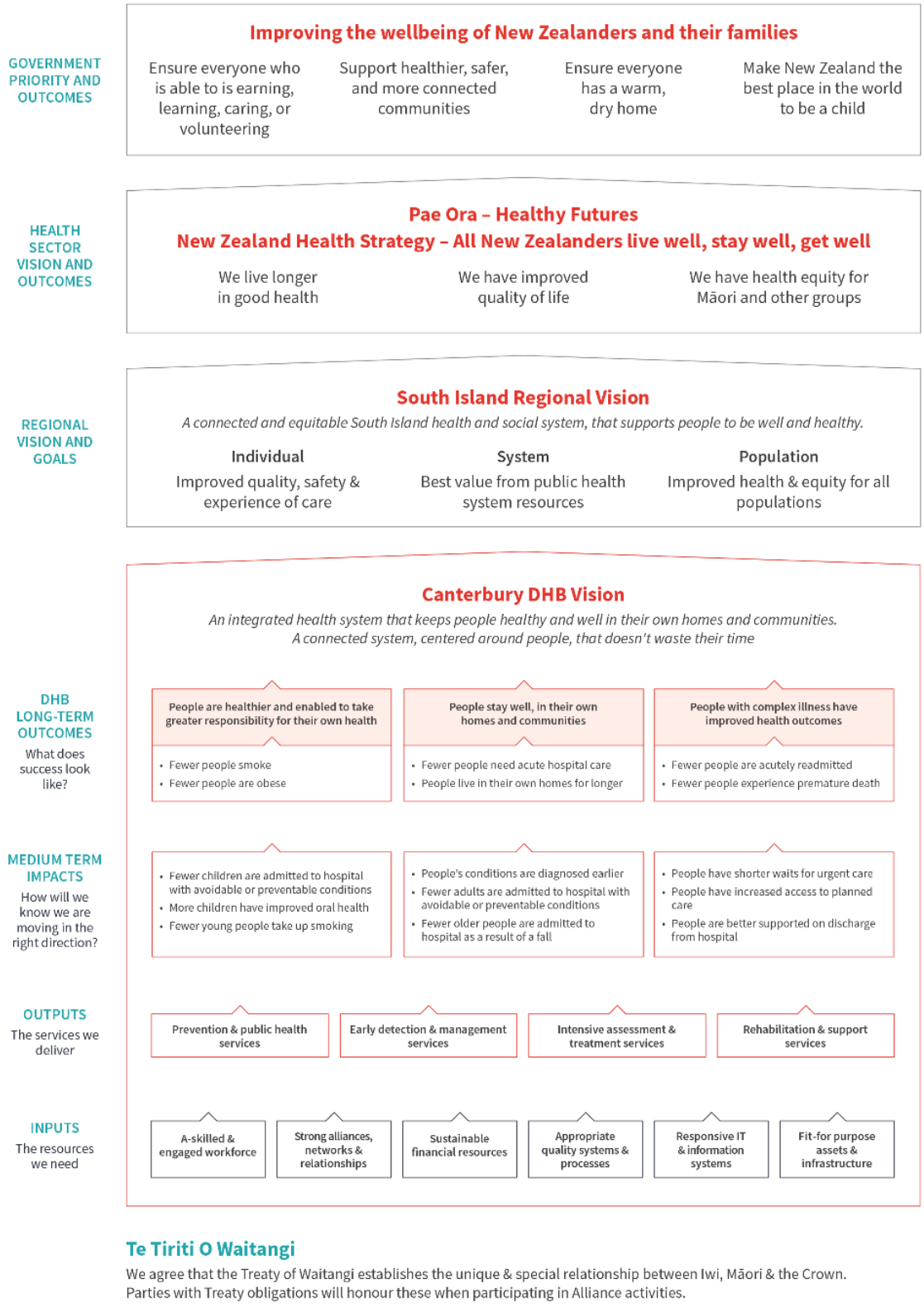
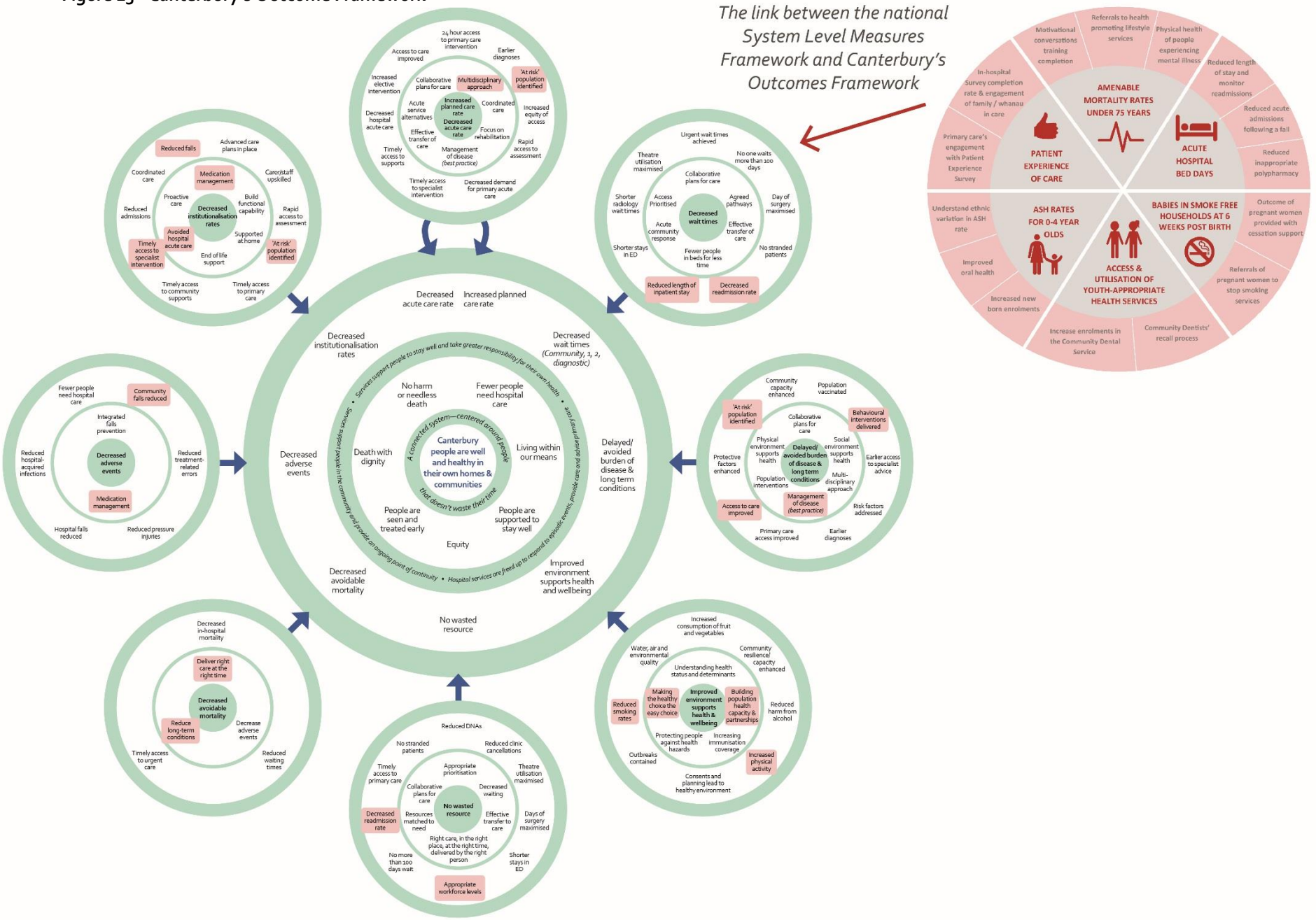


Figure 13 - Canterbury's Outcome Framework



The diagram also demonstrates how our work contributes to the goals of the wider South Island region, where the Canterbury DHB plays a significant role in the delivery of regional services. Our jointly developed South Island Health Services Plan outlines our regional direction, priorities and agreed work programme for 2019-2022. There are six regional priority focus areas: Data and Information; First 1,000 Days; Mental Health; Acute Demand Management; Social Determinants of Health; and Advance Care Planning.

Canterbury DHB has made a strong regional commitment and is engaged in a number of workstreams including cardiac, child health, older person's health, major trauma, mental health, cancer and public health. Canterbury also takes the lead for information services regionally, including development of HealthPathways, HealthOne and the rollout of the South Island Patient Information Care System (PICS). The regional Health Services Plan can be found on the Alliance website: www.sialliance.health.nz. Regional services are further discussed in section 3.4.

2.4 Equitable Health Outcomes

In 2019, a definition of equity was endorsed by the Ministry of Health as follows:

> '*In Aotearoa New Zealand, people have differences in health that are not only avoidable but unfair and unjust. Equity recognises different people with different levels of advantage require different approaches and resources to get equitable health outcomes.*'

There are marked differences in health outcomes in many metrics between groups depending on ethnicity, level of socio-economic status and disability, amongst other variables. Inequities in health outcomes cost us dearly as a society. For example, in 2012, it was estimated that total costs to society of ethnic inequalities in child health were over $62M per year nationwide[15].

The Canterbury DHB and wider Canterbury health system is committed to working towards eliminating inequities in health outcomes between different social groups. Inequalities in health outcomes arise partly from inequities in access to health services but also from many other factors such as housing, education and employment. As part of the Canterbury health system we have relatively more influence over equity of access to healthcare but we also participate in a 'Health In All Policies' approach to addressing inequalities through working with other agencies (described in the next section).

People living with physical or intellectual disabilities suffer from poorer health outcomes on average. For example, New Zealanders with intellectual disability (estimated to be 0.7% of the national population) appear to be at more risk of illness, disease and death and are estimated to have life expectancies of between 18-23 years less than national averages[16]. In the 2013 Stats NZ Disability Survey, 25% of Cantabrians[17] reported living with a disability. The most common type of disability is physical impairment with 12% reporting a disability that affected their mobility and 10% reporting hearing loss (that hearing devices did not eliminate).

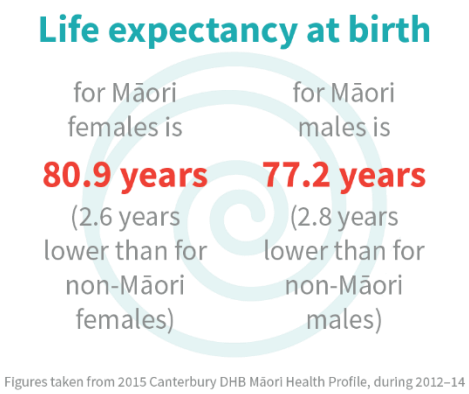
Globally, hearing loss is projected to move into the top ten causes of burden of disease by 2030 in middle to high income countries such as New Zealand as a result of ageing population structures. It is associated with depression, social isolation and cognitive decline.

The Canterbury DHB has developed a shared Disability Action Plan in collaboration with the West Coast DHB and has a Canterbury Health System Disability Steering group in place which has had input into the design of new buildings. All new builds/renovations have an accessibility survey which makes design recommendations. Another group that have poorer health status on average, are our Culturally and Linguistically Diverse (CALD) population, who are migrants and refugees from Asian, Middle Eastern, Latin American and African backgrounds. This population group experience issues in accessing healthcare, in part due to language barriers, particularly the women. It is currently hard to access data on this group and it would be useful from a planning perspective if we knew more to help us improve services.

[15] The cost of child health inequalities in Aotearoa New Zealand.
[16] Health Indicators for New Zealanders with Intellectual Disability.
[17] note these are regions not DHB areas

The latest 'Health Loss in New Zealand' report, for the period 2006-2016 found that, at a national level, health loss in Māori was almost 1.8 times higher than in non-Māori[18], with more than half of Māori health loss occurring before middle age.

If Māori had experienced similar rates of health loss to non-Māori at all ages, health loss among Māori would have been 42% less and that of the whole population 7% less[18]



Figures taken from 2015 Canterbury DHB Māori Health Profile, during 2012–14

The 2015 Canterbury DHB Māori Health Profile highlighted that during 2012–14, life expectancy at birth was 80.9 years for Māori females in the Canterbury region (2.6 years lower than for non-Māori females) and 77.2 years for Māori males (2.8 years lower than for non-Māori males). Whilst the life expectancy gap is lower than national rates, where life expectancy for Māori is lower than for non-Māori by just over 7 years and for Pacific Islanders by around 5.5 years, there is still considerable work to do here.

Observation of Ambulatory Sensitive Hospitalisations (ASH) admission rates provides an indicator of the accessibility and effectiveness of our primary care services for different sectors of our population. ASH refers to a basket of 27 conditions such as cardiovascular, respiratory and dental conditions and vaccine preventable diseases that, if treated effectively in the community, can avoid the need for more intensive and expensive hospital based care. Currently, ASH rates for adults are significantly higher for our Māori and Pacific populations than for rates for other ethnicities, but they are below national Māori and Pacific rates. For young children (0-4 years old) ASH rates are substantially higher for Pacific children.

The Health Quality and Safety Commission survey of patient's experience of primary care found that Māori, Pasifika and Asian patients are less likely than Pākehā to experience a 'joined-up' health services. It also revealed ethnic disparities in cost barriers to accessing healthcare with fewer than 7% of Pākehā stating that cost had ever stopped them from picking up a prescription compared with around a quarter of Māori. Designing services to better meet the needs of our Māori, Pacific and CALD populations is particularly important given these groups are expected to grow at a faster rate than the general Canterbury population over the next ten years.

A Southern Cancer Network project investigating cancer treatment pathways for Māori found that they were diagnosed later on average, were less likely to receive optimal treatment once diagnosed, were more likely to have co-morbidities and suffered higher rates of mortality

The Canterbury health system measures a number of equity related metrics for our Māori and Pacific populations and reports on these quarterly and annually. These are a mixture of both access and outcome measures and are used to inform service delivery improvements. These measures indicate that there are some areas in which inequalities are marked, such as oral health outcomes for children, and other areas in which we are doing better, such as vaccination rates (see Figure 14).

A number of initiatives are underway to learn from service areas in which we, or others, are doing well and use learnings from these to improve areas where inequity is still significant (discussed further in chapter 4), including for other population groups such as the Canterbury CALD population.

[18] After adjusting for age and population size. Health Loss in New Zealand. A report from the New Zealand Burden of Diseases, Injuries and Risk Factors Study, 2006-2016. Ministry of Health. Published 2013

Figure 14 - Māori and Pacific measures of access

Socio-economic factors also impact access to health care and equity of health outcomes. People from lower socio-economic backgrounds tend to have poorer health outcomes and are disproportionately affected by factors such as the obesogenic environment. The 2017 General Practice Workforce Survey found that 53.6% of respondents reported that patients enrolled in their practice frequently or very frequently defer appointments due to cost[19]. Inability to fully access primary and community care can result in poorer health outcomes as conditions are diagnosed late or not at all. It can also result in the need for more intensive or expensive health care later.

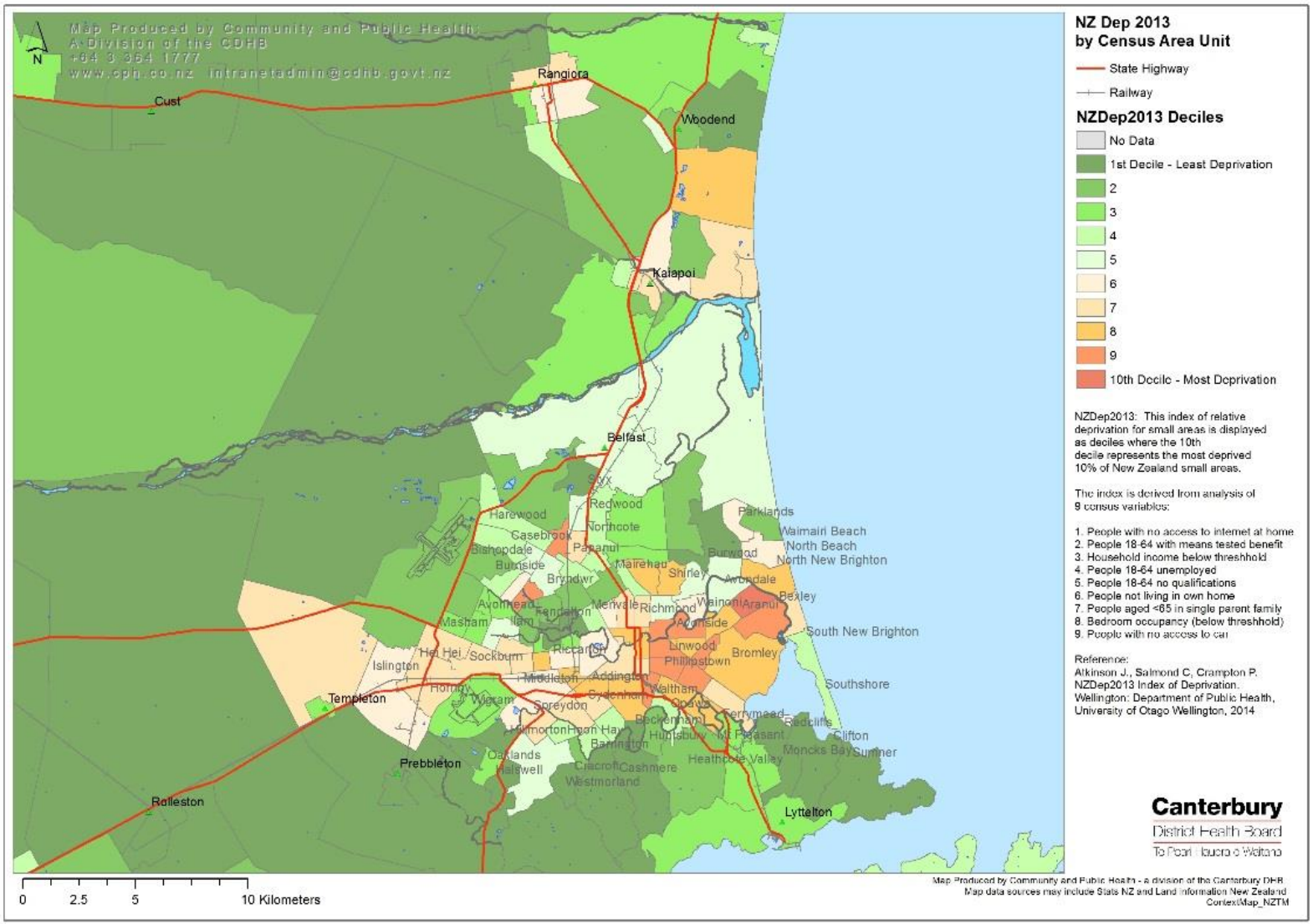
Population deprivation measures attempt to understand how poverty and deprivation impact on health status and need, and how this in turn impacts on healthcare provision. Deprivation is an important proxy for health

[19] Royal New Zealand College of General Practitioner. 2017 General Practice Workforce Survey. 2017

need. There are strong socio-economic gradients in health need and conditions and DHBs use deprivation measures to support the targeting of services to more deprived populations in an attempt to address equity issues. However this measure, in Canterbury, has failed to capture deprivation and the usual health gradients in an unstable population post-quakes. This is because there have been significant forced migrations from residential red zone areas, predominantly in more deprived areas of the city, into previously less deprived areas (as defined by the relatively low number of less deprived people who lived in these areas prior to the earthquakes).

As a result, the usual deprivation gradients are not seen in Canterbury using traditional deprivation calculation approaches, making it more difficult for us to plan and deliver services for lower income groups. Current estimates are that 9.5% of the Canterbury DHB population live in the most deprived quintile and 18% in the second most deprived. This does not correlate with other measures such as average household income.

Figure 15 - Greater Christchurch area deprivation maps from before and after the Canterbury 2010/11 earthquakes showing dispersal of lower socio-economic residents from red-zoned and other heavily impacted areas



Another equity factor for the Canterbury DHB to consider is driven by our status as a tertiary service provider. Service provision must be carefully managed to ensure that delivery of services to non-residents does not unfairly reduce access for our local population.

Our approach to addressing inequities is to take a system wide approach to identifying issues and developing solutions. Input is sought at governance and operational management levels (see sections 3.6 and 3.8). Monitoring social group differences in health can inform us about the impacts of structural inequalities and drivers of health in society[20]. It can also point towards services in which there are differences in access by different groups that targeted investment may be able to address.

A strength of our strategic approach is that, in placing the patient and their whānau at the centre of our model, the Canterbury health system offers a platform of services that healthcare professionals can select from to meet the needs of the person in front of them; instead of the patient needing to fit into existing larger services. Enhanced capitation has been used successfully to enable services that respond better to their local communities (see Travis Medical Centre case study). Our philosophy of supporting people to stay well in their own communities also aligns well with the Māori concepts of Mauri Ora, Whānau Ora, Wai ora.

[20] Braveman P. Health disparities and health equity: concepts and measurement. Annual Rev Public Health. 2006; 27:167–94.

Improving the patient experience through better service integration

Travis Medical Centre is a long established general practice in north-east Christchurch and one of the first groups to be supported by the Pegasus Integrated Family Health Services (IFHS) Programme. With the support of the IFHS Programme, Travis Medical Centre undertook a four year journey towards improving care for their patients and improving the sustainability of their model of care.

In 2009, the Travis Medical Centre team began to realise that the then model of care was becoming unsatisfying and increasingly unsustainable. There was a strong desire to do things better for patients, the business' sustainability and the practice team's professional satisfaction. The centre serves an ageing and increasingly complex population and the team felt there was significant unmet need that they wanted to address.

The centre enrolled in the IFHS programme in 2011 to complement existing practice improvement initiatives. A series of IFHS facilitated workshops, including provider partners, helped Travis Medical Centre to set a future vision and key objectives. Analysis undertaken early on identified that over 50% of consultations were acute presentations and that most of these occurred early in the day. Changing to viewing acute presentations as highly predictable daily occurrences, that could therefore be planned for, led to the introduction of early morning telephone consultations. These enabled the team to introduce a form of triage and the team found that in around 40% of instances, they were able to give advice which meant the patient did not need to visit that day and were also often able to arrange investigations for the patient to occur prior to their visit.

Capacity was found through a combination of process improvement, professional development for staff, technology investments, linking with other providers in the delivery of care and involving patients more in their care. For example, practice nurses were encouraged to undertake professional development that enabled them to conduct cervical smears or to start patients on insulin. Patient access to services has improved by improving access to urgent care, involving practice nurses more in the delivery of care, aligning with community pharmacy and freeing up GP capacity to spend more time with patients who require more proactive approaches to care.

As a result, Travis Medical Centre found that the practice nurses undertook 50% more consultations than before and without additional nursing FTE. A new care coordination function provides a link between general practices and other health and social services. The care coordinator supports the general practice team to identify patients with complex health needs, assists in the development of care plans and coordinates their care with other services.

An evaluation in 2015 found that the centre had realised an average of 25% capacity gain across the GPs, which has enabled a 14% increase in patient enrolment without increased resources. Practice nurses are providing more care to patients and patient satisfaction levels are high. A shift to more pre-planning of care is making the best use of valuable clinician time and enabling patients to take greater responsibility for their health outcomes.

Average ED visit rate

180/1000 – Canterbury

90/1000 – Travis MC

Reduced unnecessary **waiting** & improved **access** for patient care

Better relationships with community providers and associated with professionals and patients

Integrated Family Health Services Programme, Changing the Patient Experience: A Case Study for Integrating Health Services (2015), Pegasus Health (Charitable) Limited, Christchurch.

The Canterbury DHB has relatively little influence over many of the broader social determinants of health such as housing and working conditions. However, initiatives that address these are critical if we are to eliminate inequities. As such the Canterbury DHB contributes policy submissions to reviews of potential levers such as sugar tax and works with other agencies in a 'Health in All Policies' approach described in the next section.

> *"It should be noted that equitable care does not mean that everyone receives the same care. Instead, it means that care aims to achieve optimal outcomes for all groups of patients, even if achieving optimal outcomes means that care differs from person to person, and group to group. An important concept to understand is that quality improvement efforts, which improve health outcomes overall, do not necessarily decrease gaps in health outcomes. Healthcare organizations must tailor quality improvements to each patient population and target the root causes of inequities, and incorporate equity into routine quality improvement processes."*
> *Robert Wood Johnson Foundation*

2.5 Our Role as a Health-Promoting Health System

One of our key roles is in health promotion - using evidence-based health promotion strategies and supporting sustainable development approaches to improve, promote and protect the health of people and communities in Canterbury.

Health of individuals and populations is strongly influenced by broader social determinants and vice versa. These include availability and quality of housing, employment opportunities and participation in education. For example, the standard of homes with respect to warmth and dryness has a large impact on diseases such as asthma and Chronic Obstructive Pulmonary Disease (COPD) (see sidebar).

The Canterbury health system takes a 'Health in All Polices' approach by working collaboratively with agencies from different sectors to positively influence health and wellbeing in our community. Public health services in Canterbury are provided by Canterbury DHB's Community and Public Health Unit, which also supports the South Canterbury and West Coast DHBs. Community and Public Health's goals are to:

- Improve the health and wellbeing of our region, especially for children and young adults
- Reduce health inequalities especially for those of relative socio-economic deprivation
- Improve Māori and Pacific health outcomes
- Prevent illness and hospitalisation
- Work in partnership to achieve lasting change

In our role as a health promoter, we have invested in HealthInfo, a website designed to give people access to up to date, locally based information about health conditions, local support groups, medications, medical tests and procedures, end of life planning and tips for staying fit and well. HealthInfo includes a video tutorial to help people navigate the site and find the information that they need, has printable factsheets for people without web access and some sections are available in multiple languages.

The HealthInfo Canterbury website was developed by health professionals in the Canterbury health system to provide access to local and reliable health information to support Cantabrians to better manage their own health.

HEALTHY HOMES

Housing is a key determinant of health. Research has shown that low indoor temperatures, poor quality housing, dampness and mould in particular affect the respiratory health of children. The Canterbury health system has supported initiatives including the Healthy Homes initiative which ran from November 2011 to November 2014. The Canterbury health system partnered with other organisations, such as the regional council, PHOs and a local NGO (Community Energy Action), to improve housing conditions in 900 homes in greater Christchurch post-quake, selected from a list of people with high health need (those with two or more admissions for diagnoses affected by cold living conditions, such as respiratory disease).

For the 900 homes that received insulation, there was a 29% reduction in the number of hospital bed days in the 12 months following insulation compared with the 12 months prior. This equates to a reduction in hospital bed day costs of over $900,000.

The Canterbury health system provided 22% of the investment; return on the health system investment was achieved within 12 months and, assuming similar benefits over time, the total return on investment for all funders will be achieved within five years based on hospital admission benefits alone.

ALL RIGHT?

All Right? delivers visually engaging messages to support wellbeing and resilience. The highly visible campaign is backed up with resources which can be requested when needed. It is frequently evaluated for its effectiveness, with an evaluation in June 2017 finding that 81% of Cantabrians were aware of the campaign, with awareness being higher by those aged under 60.

All Right? has been successful in making people aware of looking after their own mental health (71%) and 41% reported having taken action as a result of what they have seen or heard (increasing to 57% amongst those who had seen six or more All Right? communications and hitting an impressive 85% amongst respondents who had seen messages on the All Right? Facebook page).

Critical to the campaign's success have been the strong relationships between key agencies, basing the messaging on local research to ensure the use of appropriate language in a local setting.

Following the Canterbury earthquakes in 2010 and 2011, an ambitious and unique public health campaign was launched to promote population-wide wellbeing and resilience. All Right? is a Healthy Christchurch initiative led by the Canterbury DHB and the Mental Health Foundation of New Zealand. It was launched in 2013 to help Cantabrians as the region recovered from multiple earthquakes and is funded by the Ministry of Health. All Right? is also supported by the Ministry of Social Development and many other organisation including the Red Cross, SKIP (Strategies with Kids | Information for Parents), Christchurch City and Waimakariri District councils

"I love the community spirit of the All Right? campaign. It makes me think about one of my favourite Whakatauki. "Ehara taku toa i te toa takitahi, engari he toa takitini ke.- My strength does not come from me alone, but also from others." All Right? survey respondent

As a member of the Greater Christchurch Urban Development Strategy Partnership, we are working towards making greater Christchurch a liveable, safe, sustainable and healthy place. The rebuild of greater Christchurch and other earthquake impacted areas such as Kaikōura, provides an opportunity to support sustainable development that promotes better population health. One area in which we contribute is by advocating for Canterbury initiatives to improve infrastructure that supports active modes of transport such as the Christchurch City Council Major Cycleways. These will help to counteract the 'obesogenic' environment that makes it harder for people to maintain healthy weights as well as being an environmentally sustainable form of transport.

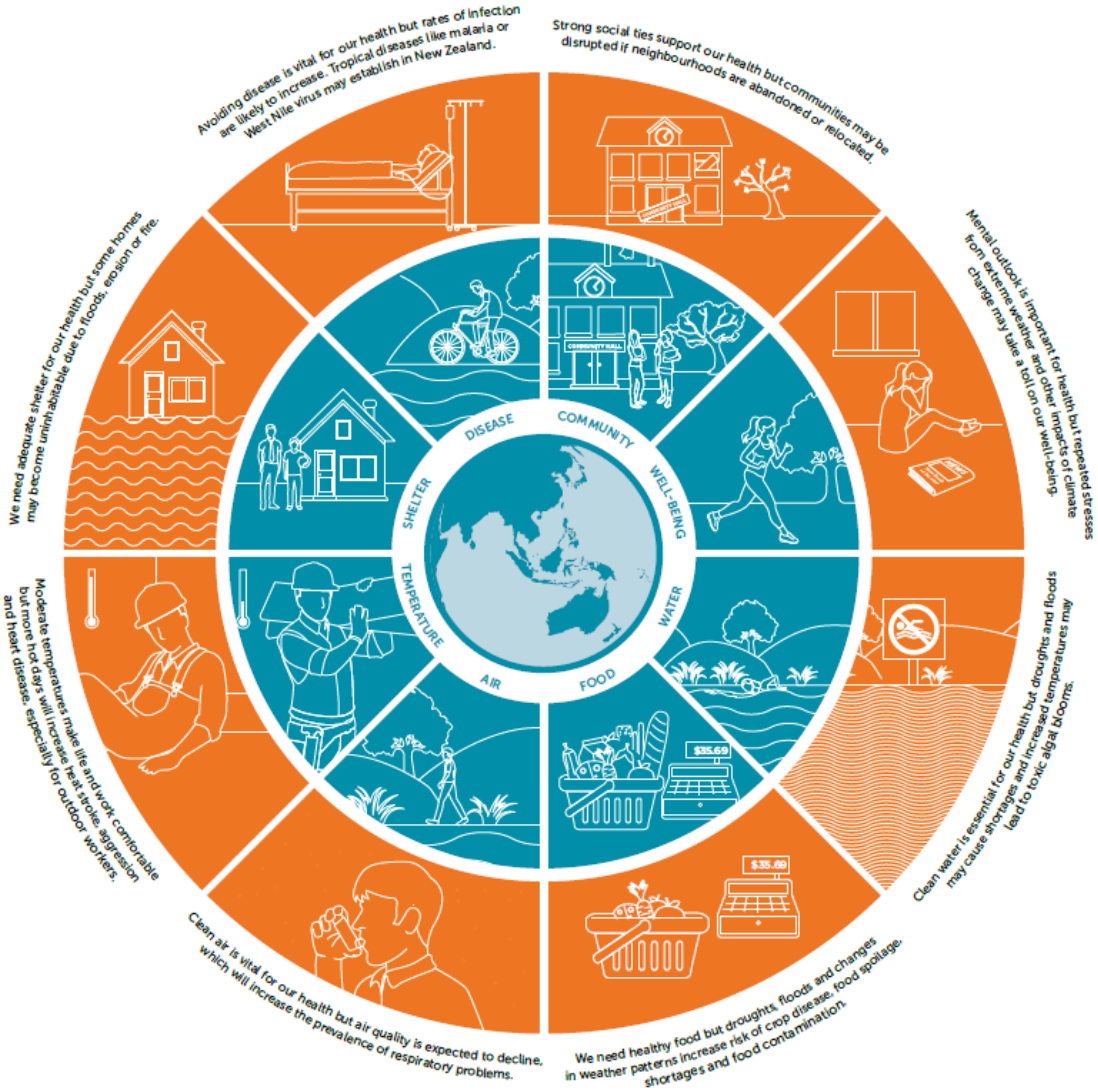
The design principles set by the Canterbury Clinical Board for the Christchurch hospital redevelopment include 'Health Promoting' so that our own DHB physical environment will actively support healthy choices and lifestyles for patients and whanau, staff and our Canterbury community.

2.5.1 ENVIRONMENTAL SUSTAINABILITY AND CLIMATE CHANGE

Human health is affected by the environment and population health is being impacted by climate change. Climate change is expected to impact our health more severely in the future, with more of us being affected. It is expected to exacerbate existing socio-economic and ethnic health inequalities, for example, increasing flooding may increase the problems of mould in homes[21]. Climate change is expected to directly impact health through increasing incidence of flooding, fires and heatwaves and indirectly though changing patterns of disease vectors such as mosquitoes, increasing allergens and impacts on air and water quality (Figure 16). It is also expected to have adverse impacts on mental health.

For Canterbury, it is anticipated that climate change will bring increased risk of sea level rise and concomitant flooding risk that will negatively impact low lying residential areas in Christchurch and beyond. Projections also indicate that there will be an increase in droughts for eastern areas which will increase pressure on rural communities, particularly North Canterbury, and the risk of fire is expected to increase[22]. Tackling climate change presents an opportunity to promote population health as measures to mitigate the impacts of climate change often have co-benefits for health.

Figure 16 - Building Blocks of Health Disrupted by Climate Change from Royal Society report[23]



[21] Royal Society Te Apārangi Human Health impacts of Climate Change for New Zealand, 2017
[22] http://www.mfe.govt.nz/climate-change/how-climate-change-affects-nz/how-might-climate-change-affect-my-region/canterbury
[23] Taken from Royal Society Te Apārangi Human Health impacts of Climate Change for New Zealand, 2017

ENERGY AND EMISSIONS SUSTAINABILITY

We monitor our energy use carefully for reasons of both financial and environmental sustainability. In 2017, we were awarded Energy-Mark® Silver certification that acknowledges our well-functioning energy management system, plans for monitoring and targets for improvement which we hope will lead to Gold certification next. The Canterbury DHB is now a fully CEMARS-certified organisation. The Certified Emissions Measurement and Reduction Scheme aims to rigorously calculate and then manage an organisation's carbon footprint. Our carbon emissions are now **20%** lower than they were three years ago partly as a result of the introduction of new environmentally-friendly biomass boilers at Burwood Hospital in 2016. These replaced old coal fired boilers that were long past their prime. We are currently planning to introduce a similar system at Christchurch Hospital as the hospital coal fired boilers are currently our largest single source of greenhouse emissions and are investigating options for replacing coal boilers at Ashburton hospital.

The Canterbury DHB is committed to both minimising the environmental impacts of our own operational activities and supporting sustainable systems that minimise negative health effects due to the environment as part of our role as a health promoting health system.

In 2017, the Canterbury DHB undertook an internal review of our responsibilities in this area, plus our current activity and activity in other parts of New Zealand and internationally in order to determine the next steps for us in addressing sustainability.

Some examples of initiatives to minimise our own impacts include implementing a Travel Demand Management programme, developed by the Greater Christchurch Partnership, as part of our staff wellbeing programme, to encourage staff to use active modes of commuting such as walking and cycling. The design principles set by the Canterbury Clinical Board for the Christchurch Hospital redevelopment include that it should be 'Environmentally Sound' – systems and process will be designed, built and operated to support environmental sustainability, including minimising the energy requirements of the building.

Our energy management policy includes the goal of 'Minimise(ing) pollution and carbon footprint by ensuring plant and building envelope efficiency.'

Minimising our energy use is also becoming a prerogative of sustainable financial management as the Emissions Trading Scheme (ETS) becomes fully operational and as the current one for two subsidy scheme was fully phased out in 2018 which could result in substantial increases to our ETS liabilities. We monitor and manage our energy use using the Energy-Mark® tool and have been recognised for the steps we have taken to reduce our energy use (see sidebar). We also monitor and manage our greenhouse gas emissions and again have won recognition for significantly reducing our carbon emissions over the last three years (see sidebar).

The task of getting the 'right' mix of health promotion, disease prevention, treatment and rehabilitative care will never be complete as the social and ecological environment is constantly changing. However the DHB has established a transalpine Environmental Sustainability Governance Group (in partnership with the West Coast DHB) to review and support approaches and initiatives to continue this work.

2.6 Funding Pressures

Funding from the Government, via the Ministry of Health, is the main source of DHB funding. Funding levels are set nationally using the Population Based Funding Formula (PBFF) which allocates funding based on the number of residents within each DHB catchment with adjustments made for age profile, socio-economic status, ethnicity and sex. This funding is supplemented by revenue agreements with ACC, research grants, donations, training subsidies, patient co-payments and service payments from other DHBs.

Like the rest of the health sector, the Canterbury DHB is experiencing growing financial pressure from increasing demand, rising wage settlements and treatment costs and heightened public expectations. However, unlike other DHBs, we are also having to manage the extraordinary impacts of the country's largest natural disaster including population funding shifts, increased service demand and the operational challenges of a significant repair programme.

Earthquake and rebuild related costs are evident in a number of areas: increased treatment costs, additional outsourcing to support service delivery while our capacity is reduced, and unplanned costs associated with repair work, building delays and capital charges. A significant proportion of our repair work is not covered by insurance proceeds. While we received the maximum $320M insurance payout under our collective sector policy, damage estimates were over $518M.

Our theatre and bed capacity was reduced by the earthquakes and the Christchurch Hospital redevelopment is behind schedule. While we wait for the new Hagley facility to be commissioned, we are incurring significant additional costs having to hire theatres and outsource surgeries. The delays are also impacting on our ability to achieve anticipated savings from the consolidation of services.

Included in the costs pressures related to the earthquakes are the depreciation and capital charges the DHB must pay to the Crown. Because these are driven off upward movements in asset valuations our repair work has resulted in significant additional unanticipated charges. In 2019/20 Canterbury will have to pay [redacted] in capital charges to the Crown, based on existing capital charge regulations (currently under review by Crown agencies).

In addition, recent Multi Employment Collective Agreement (MECA) settlement costs significantly exceeded the affordability parameters of the DHB, notwithstanding the partial funding provided by the Crown to offset some of the cost. The flow on cost of these settlements, along with the substantial claims of unsettled expired MECAs and expectations of staff on Individual Employment Agreements, will continue to put immense pressure on the DHB's financial sustainability in out years.

Demand patterns have also changed. In line with other international recovery profiles, the post-disaster impacts on the health and wellbeing of our population are being acutely felt. This is particularly evident in the increased demand for mental health services with new presentations to children's services especially high. Our ability to meet the associated increase in treatment costs has been exacerbated by the interplay between population changes and the national PBFF which has had a negative impact on our revenue. The funding formula was never designed to respond to the kind of dynamic population shifts and demand changes we have experienced. From Canterbury's perspective, the formula has not proved to be a flexible or sensitive enough mechanism in a post-quake environment.

DHBs have a relatively very small discretionary budget. For example, of the 2018/19 Canterbury DHB budget, 52% was allocated to 'must do' work, including meeting government targets such as Faster Cancer Treatment, 38% to 'should do' and only 10% remained for 'can do'. Only a small portion of the budget is available to redirect into work on prevention, but this investment must continue and grow, if we are to start to reduce the demand curve. Otherwise we run the risk of dismantling all the work we have done to ensure care is delivered in the right place and right time.

With increasing demand on publicly funded healthcare services, levels of unmet healthcare need can signal funding pressures. A recent study estimated the proportion of patients attending general practice who were unable to access clinically indicated services, as a way to measure unmet health needs in the Canterbury health system. This indicated that 3.6% of patients had a GP confirmed unmet health need with elective

orthopaedic surgery, general surgery and mental health being the areas of greatest need[24]. Another study, with a population survey approach, found that 9.3% of Cantabrians reported unmet need for secondary care[25].

2.7 Workforce

We know that our ability to attract, train and retain workforce will be critical to delivering to the needs of our population. There are increasing constraints on workforce, including global shortages for some roles and capabilities. Our workforce continues to be negatively impacted by the series of disasters our region has suffered, as well as from working in substandard conditions and through ongoing service relocations to be able to continue to deliver services.

A staff Wellbeing Survey conducted in 2016[26], found that our staff are highly engaged, with 89% feeling that they make a contribution to our success and 74% describing their job as fulfilling. However, 32% continue to report poor emotional wellbeing and many report poor physical working conditions. The survey spurred the development of 'Care Starts Here - Our People Strategy 2017-2022' to address the areas for improvement identified in the survey.

Our People Strategy identifies five pillars to support the organisation to deliver to our overall strategy in line with our stated goals and values:

- Everyone understands their contribution
- Everyone can get stuff done
- Everyone is empowered to make it better
- Everyone is enabled to lead
- Everyone is supported to thrive.

[24] McGeogh et al. Unmet need for referred services as measure by general practice. J. Prim Health Care, 2017

[25] Bagshaw et al. Pilot study of methods for assessing unmet secondary health care need in New Zealand. NZ Med J. 2017

[26] completed by over 4000 staff

2.8 Investment Logic

Having the right assets in the right place and managing them well is critical to sustainable provision of high quality and cost effective health services. As part of our approach to investment planning, we use service utilisation and system outcome data to ensure that we are investing wisely and using all of the resources at our disposal to deliver against our obligations, national expectations and our strategic goals, and improve the health and wellbeing of our population. This includes working with our alliance partners to first consider whether changes to the model of care (demand management and service delivery), staffing or data management can manage increasing or evolving demand for services.

As an example, when capacity constraints in plastic surgery outpatients clinics were identified, a clinically led change to the model of care was implemented which cut average waiting times from 196 days to 53 days (see sidebar).

Where modifying service delivery can no longer manage increased demand, capital investment is considered through our capital planning process (section 3.7) and supported by our Investment Logic Model.

Our current Investment Logic Model (ILM) is shown following (Figure 17). This was developed by holding a series of workshops with health system leaders, including clinical leadership, from across the Canterbury health system to define the challenges we will face over the next ten years. We then identified strategic responses to these challenges, and the benefits we expect from implementing these (see Table E). This work built upon a similar process that was undertaken in 2012 in developing our detailed business case for the Burwood and Christchurch Hospital redevelopments.

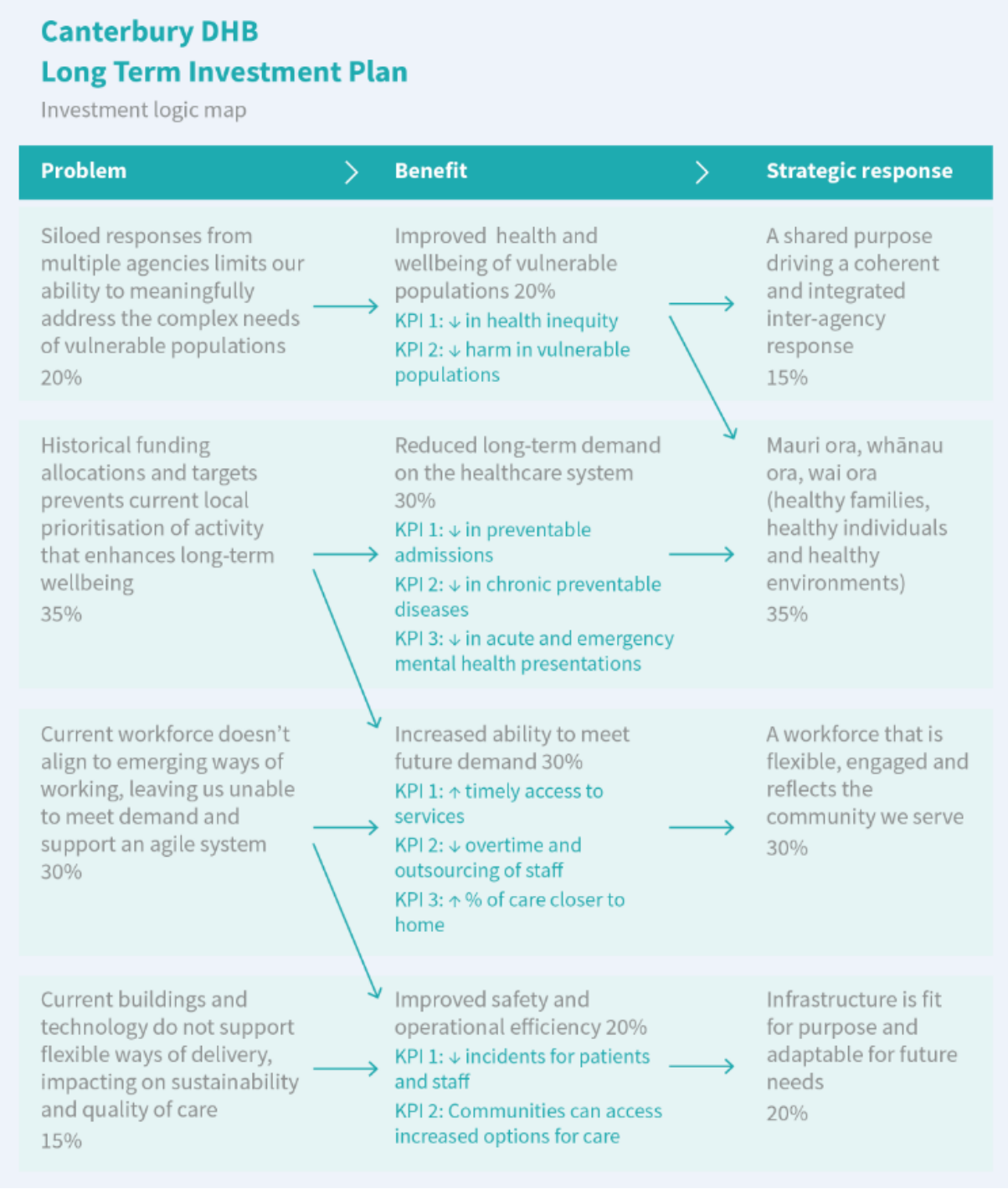
SKIN LESIONS

In 2008/9 outpatient clinics for plastic surgery were very busy with skin cancers and were unable to support care for patients with other conditions. Skin cancer patients were waiting over six months for treatment and GPs had limited options other than referral to plastic surgery. A working-group of GPs and plastic surgeons was formed to identify issues and potential solutions.

Minimum referral information was agreed between GPs and plastic surgeons and patient prioritisation thresholds were agreed and consistently applied. GPs were funded to carry out simple procedures. As not all GPs were experienced with skin cancer excision, training sessions were held with GPs working alongside plastic surgeons in "see and treat" clinics and an online tutorial was made available on HealthPathways.

In 2007 2,000 people waited an average of 196 days to get skin lesions removed. As a result of the change in the model of care, by 2011 4,100 people waited an average of only 53 days. Skin cancer referrals now have increased average complexity meaning that plastic surgeons are operating at the higher end of their scope and GPs are better able to manage their patients' needs. This approach delivers to our strategic goal of care closer to home that doesn't waste the patient's time and demonstrates our commitment to working collaboratively with our alliance partners to implement clinically led change.

Figure 17 - Investment Logic Map



The Key Performance Indicators (KPIs), highlighted in the Investment Logic Model, will enable us to monitor the progress towards the expected benefits of our proposed investment strategy. Measures that will allow us to track our progress against our ILM benefits and KPIs are shown in the table below. Previous business cases have been monitored for delivery of expected benefits – refer section 3.8.4.

Table E - ILM Benefits

ILM Benefit	Key Performance Indicator measures
Improved Health and wellbeing of vulnerable populations (20%)	KPI1: Decreased differential in amenable mortality (by ethnicity)
	KPI2: Decreased differential in outpatient care and procedures, including general practice (by ethnicity and other demographic factors)
	KPI3: Increased rates of planned care in primary care
Reduced long term demand on the healthcare system 30%	KPI 1: Reduced acute hospital bed days
	KPI2: Wellness of children, measured by: - Reduction in obesity - Improved oral health (caries free at 5 years) - Increase in children living in smokefree environment - Decrease in parents with addictions - Increase in children with completed vaccination schedule
Increased ability to meet future demand 30%	KPI 1: Increase in people seen within 60 days following specialist referral KPI 2: Decreased referral rates for specialist care (increased early intervention) KPI 3: Decreased sick leave among the DHB's workforce
Improved safety and operational efficiency 20%	KPI 1: Decreased hospital acquired conditions KPI 2: Improved $/capita spent (i.e. operating result excluding depreciation and capital charge) KPI 3: Deceased workplace incidents KPI 4: Increased proportion of virtual consultations

3 Operating Environment

In this chapter we describe our current operating environment. This includes the condition and functionality of our physical assets; buildings, infrastructure, clinical equipment, vehicles and our Information Systems portfolio. Many of our buildings were damaged by the Canterbury earthquakes and many continue to be below Building Act requirements for seismic strength. Our workforce, which is our most important asset, has also been adversely impacted as a result of the series of disasters, both natural and manmade, that have affected our region. We also describe the pressures being faced by our Alliance partners and discuss the additional considerations required of our role as a regional provider of last resort. Finally, we describe our governance and decision-making arrangements and how we use data to optimise service delivery and planning.

3.1 Physical Asset Portfolio

For the purpose of this Long Term Investment Plan (LTIP), the DHB has categorised its physical assets into four main groups as follows:

- Building, Infrastructure and Plant (including land)
- Clinical and Other Equipment
- Information and Communications Technology (ICT)
- Motor Vehicles (including Mobile Dental vehicles)

These physical assets are enablers through which we will support the continued transformation of our service models, improve the health and wellbeing of our population and ensure the future sustainability of the Canterbury and the wider South Island health system.

3.1.1 CURRENT PHYSICAL ASSET PORTFOLIO

Our existing asset portfolio amounts to circa $890M (book value as at 30 June 2019), rising to circa $2.92bn over the next 10 years. The indicative current and future portfolio book values are represented below.

Table F - Assets - Book Value

Book Value	Indicative Current Portfolio as at 2019	Add: Indicative Capital Investments over next 10 Years	Less: Indicative 10 Year Cumulative Depreciation (Note 1)	Indicative Future Portfolio as at 2029	
Asset Category	$M	$M	$M	$M	%
Building & Infrastructure Plant	[redacted]				
Clinical & Other Equipment					
Information & Communication Technology					
Motor Vehicles					
Total					

Note: An integral part of the [redacted] 'Building & Infrastructure' investment over the next 10 years is ICT and FF&E (clinical and other equipment) components associated with significant projects (e.g. Christchurch Campus Masterplan). The values of these components will only be determined as part of the detailed business cases of the respective projects. Hence, for simplicity and to avoid distorting the LTIP, they have not been segregated out in the above table, i.e. investment in ICT would be higher than [redacted]

The makeup of our building portfolio has undergone significant changes in recent years, partly due to the 2011 Canterbury earthquakes, but also in response to previously identified drivers for change in order to meet growing demand. Major changes have included the new builds at Burwood Hospital, the new Christchurch Hospital Outpatient Building, the Manawa shared facility in the Health Precinct, a new Health Hub in Kaikōura and Akaroa and the Integrated Family Health Centre at Rangiora. Progressing and underway are:

- The Christchurch campus Hagley Building
- The Christchurch campus Energy Centre
- Demolition of Diabetes Centre
- New development at Hillmorton for the relocation of Specialist Mental Health Services stranded at The Princess Margaret Hospital site, which has been largely decommissioned.

These investments and the rationale for them are described in the following chapters.

3.1.1.1 Impact of the Canterbury earthquakes on our facilities

The 2011 Canterbury earthquakes were hugely damaging to our facilities. As a result of the earthquakes, the Canterbury health system immediately lost:

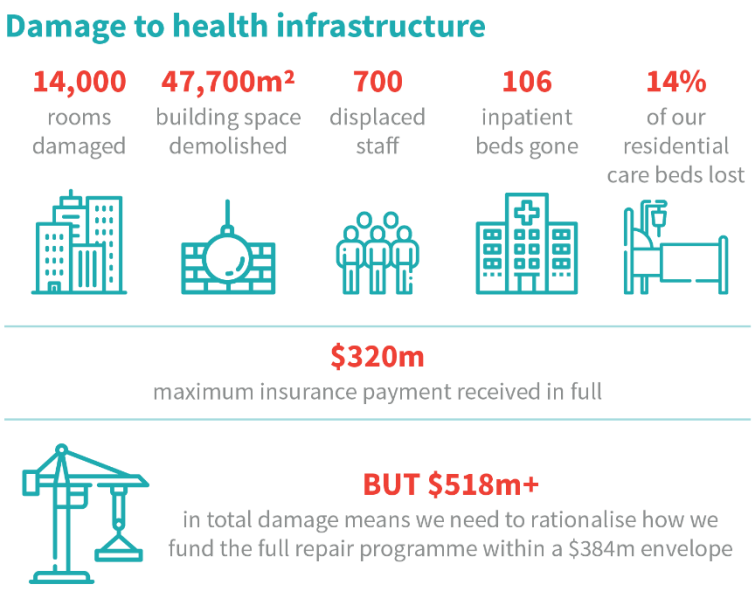
- 106 acute hospital beds
- 630 ARC beds
- 1 general practice lost and a number of general practices and pharmacies had to be relocated
- 8 NGOs were displaced
- 14,000 rooms damaged and 47,000m² building space demolished

To address the bed loss due to the earthquakes, there was reconfiguration of space across DHB facilities which added around 66 beds, leaving a bed operating deficit of 40 beds.

The 2012 Detailed Business Case for the Christchurch campus redevelopment, which outlined the need for beds that were fit for future purpose, had been started before the earthquakes. It was in developed in response to poor facilities that were no longer capable of supporting adequate patient care. The Christchurch campus Hagley building, planned for opening in November 2019, will only bring Canterbury's bed numbers back close to pre-earthquake numbers.

Whilst all proposed benefits from the 2012 Detailed Business Case have been realised from facilities that have been commissioned to date, we must still address the poor standard of existing medical and surgical beds. In addition, our current investment strategy must now meet the demands of a more rapidly growing population than was previously forecast.

We also need to consider that a significant proportion of the repair work needed following the earthquakes, will not be covered by insurance proceeds. While we received the maximum $320M insurance pay-out under our collective sector policy, damage estimates were over $518M. Our repair programme has required ruthless prioritisation to remain affordable.

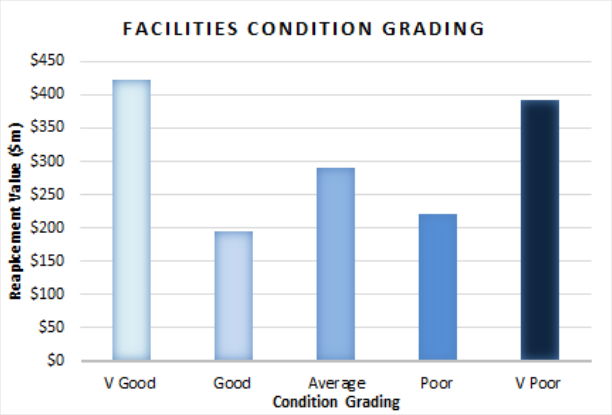


3.1.2 CURRENT STATE OF OUR ASSETS

3.1.2.1 Condition and Functionality of Building and Plant

Based on a 2018 condition assessment (a combination of on-site and desktop assessments[27]) about 40% of our building stock is in the poor to very poor categories. This together with the significant book value of these assets highlights the importance of making appropriate lifecycle decisions based on risk and criticality.

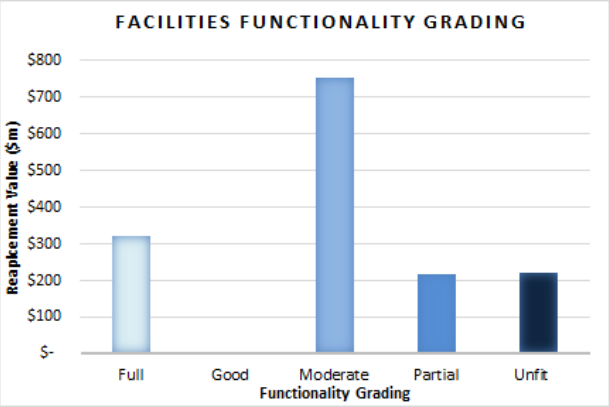
Figure 18 - Facilities Condition Grading



As at the end of 2018, there are 14 currently occupied buildings[28] that are earthquake prone (i.e. 33% or less) at the required Importance Level[29] (IL, refer also appendix 10.2.1).

Over 70% (by value) of our buildings are largely fit for their intended purpose (moderate functionality rating or better). While almost 30% are below the required fitness for purpose. We continue to actively manage these to achieve the best and most appropriate use from them. The current state of the DHB owned facilities' functionality is as shown below:

Figure 19 - Facilities Functionality Grading



All of our existing facilities are fully used/occupied by services and we still have staff and services operating from temporary locations (temporary leased buildings or portacoms).

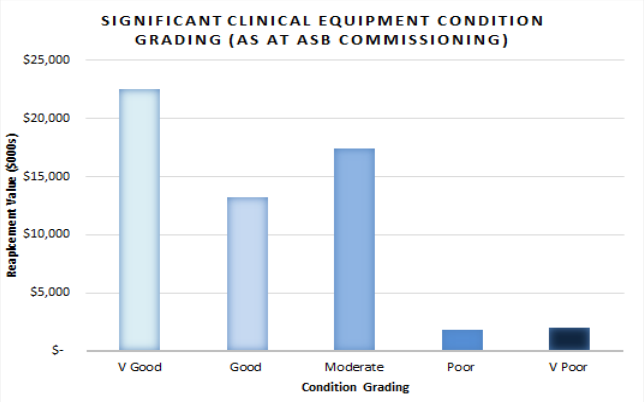
[27] Building condition assessment conducted in accordance with "Initial Guidance for the Preparation of Long Term Investment Plan in the Health Sector" (4 November 2015, Appendix 2(A)).
[28] Full list available in our 2018 Asset Management Plan.
[29] Recent change to the Building Act 2004 which includes the Building (EQ Prone buildings) Amendment Act came into force in May 2018. The impact of the change is being assessed by our Site Redevelopment team.

3.1.2.2 Condition and Functionality of our Clinical Equipment

The wide range and large quantity of clinical equipment has meant that our focus has been on closely managing high-value and critical items. As part of our asset management strategy, we are implementing an improvement plan that will, over time, improve the management of our clinical equipment. In the meantime, the forthcoming commissioning of the Hagley building will be accompanied with substantial additions and replacement of our equipment, giving us the opportunity to better capture and manage condition and performance of assets from time of commissioning.

The commissioning of Hagley in late 2019 will have a significant impact on the overall condition of our clinical assets. The following figures represent a projection of the condition of our clinical asset portfolio post Hagley commissioning.

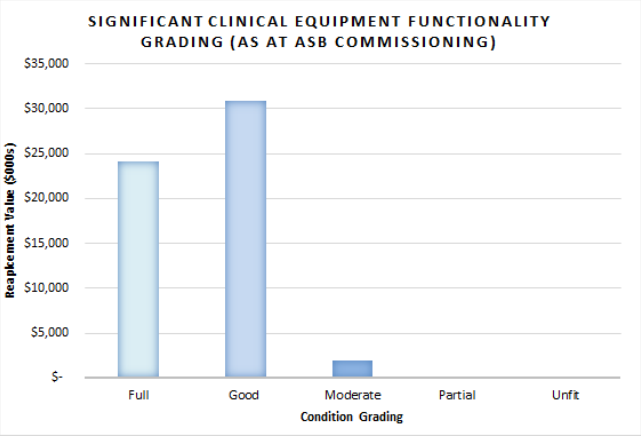
Figure 20 - Significant Clinical Equipment Condition Grading



We expect that approximately 62% (by value) of our significant clinical equipment will be at a "Good" condition and above compared with 44% reported in 2016.

By the time Hagley is commissioned, about 96% (up from 43% in 2016) of our significant clinical equipment stock will be 'fully fit' or a 'good fit' for their intended purposes.

Figure 21 - Significant Clinical Equipment Functionality Grading



3.1.2.3 Condition and functionality of our Vehicle Fleet

Motor vehicles are a small but essential part of our asset portfolio and fulfil a vital role in the delivery of our community based model of care.

Canterbury DHB is participating in 'green the fleet' – a joint initiative with Christchurch City Council, Ara Institute, Environment Canterbury, Meridian Energy and others in which a shared fleet of 52 electric vehicles is available for staff travel

Based on 2018 stocktake, our fleet of 363 vehicles includes 18 specialist dental vans. 55% of our transport vehicles are over 12 years old with an average ANCAP rating of only 2.5, and a high average odometer reading of 136,000 kilometres. In the financially constrained environment and with competing asset management priorities, we are investigating a more effective replacement programme aimed at improving safety and cost-effectiveness of the assets.

The dental vans constitute a vital part of our service delivery model, while accounting for a significant portion of our capital investment in vehicles. The Level 1 and 2 units are planned for replacement in the 2021/22 and 2022/23 financial years respectively.

3.1.2.4 Condition and Functionality of Information Systems

The Information Systems portfolio plays an ever increasing role in the implementation of our organisational strategies aimed at providing an effective, efficient, and integrated healthcare system. Since the last LTIP, we have implemented a new Patient Information Care System that will eventually be South Island wide. This replaced two outdated DHB legacy patient administration systems which were more than twenty years old.

A further area of investment has been the transformation of the Human Resource technology to digitalise paper based processes to reduce overall system costs for staff administration and improved usability for staff.

We have also begun implementing an electronic medication management system as part of an approved national initiative. This will improve medicine management, resulting in improved patient safety and more efficient processes, for example integration of electronic prescribing, recording, reconciliation and decision support analysis. Further work in this programme is described in later chapters.

Another core area of Information Systems investment since the last LTIP is HealthOne. HealthOne provides a central infrastructure that enables a patient's health information from primary, secondary and community providers to be viewed by health professionals, in an electronic health record. It was developed in partnership with the DHB, Pegasus Health and Orion Health. This has been predominantly implemented in Canterbury and the roll out to the rest of the South Island DHBs is now underway.

As we prepare for the commissioning of Hagley, and in response to the evolving role of information technology, we have implemented significant changes in both the organisational structure and management of our Information Systems portfolio. Our asset management strategy has shifted towards:

- Increasing use of "Software licences As a Service" (SAAS)
- Continuing to outsource our server and storage infrastructure and move to the cloud (Hybrid IAAS/PAAS)
- Expanding the use of virtual desktops rather than traditional desktop computers
- Expanding the use of mobile devices and progressing with the transformation towards electronic workflow to improve efficiency and continue with our "Paperlite" strategy.

This strategy has the implication of a movement from our historical capital based funding to operational funding for assets.

As identified in this investment plan, we anticipate a [redacted] capital investment in specific information technology projects, from a total capital of [redacted]. We have a high confidence level in the apportionment of this to cover future technology costs including movement to the operational funding of assets. Most software and infrastructure is currently funded "as a service" from operational funding and the capital investment for these projects is largely related to implementation costs and unlikely to change significantly.

3.1.3 CURRENT CAPACITY STOCKTAKE

As at end of April/early May 2019 the DHB completed a capacity stocktake (to inform the National Asset Management Plan, Appendix 10.1). This current state did not include the Hagley capacity which is due to be commissioned in November 2019 but we are expecting to refresh our capacity stocktake post Hagley commissioning.

3.1.4 ASSET MANAGEMENT

Canterbury DHB is deemed a Tier 1 investment-intensive agency by the New Zealand Treasury in recognition of the size of our asset portfolio and investment intentions, combined with our management of assets that are considered service critical at a national level. This highlights the importance of managing our assets competently and providing the best possible outcome from our investments.

3.1.4.1 Our Asset Management Strategy

With our organisational objectives aligned with delivering to the New Zealand Health Strategy, our asset management is guided by three key principles:

- Living within our means
- Exhibit environmental responsibility by having regard to the environmental implications of our operations
- Meet Government expectations including financial and operational management of assets.

In recognition of the role of assets as enablers in delivering organisational objectives and principles, we are focused on:

- Delivering affordable and sustainable asset solutions in collaboration with our communities and partners
- Remaining service driven and fully aligned with evolving models of care
- Focusing on delivering outputs and improving resilience at a systems level
- Elevating our asset management maturity to internationally recognised best practice.

Our asset management strategies, endorsed and supported at the highest levels of the organisation, are summarised in the table below.

Table G - Asset management strategies

Strategy	Key Considerations
Procurement decisions and ownership models will be tailored to deliver the best overall outcome.	• Service driven • Guided by community input / collaborative • Affordable on a Whole of Life Cost basis • Cognisant of technological change
We will remain future focused.	• Responsive to evolving Models of Care • Responsive to demographic projections • Questioning like-for-like • Cognisant of technological change
We will consolidate our asset holdings to maximise utilisation and reduce costs but do so without compromising minimum output expectations.	• Maximising use of existing assets • Disposing of assets that are not aligned with future direction and projections • Adopting fleet options wherever possible
We will base decisions on risk to delivering outputs rather than on providing assets.	• Resilience will be a key driver • System level focused • Risk based decision making • Output focused

Strategy	Key Considerations
We will focus on improving asset management practices at CDHB using IIMM as an implementation guide and in alignment with ISO55000.	• Review of AM organisational structure • Structured approach to improvements • Improving ICR rating
We will prioritise environmental sustainability when renewing or managing our assets but do so in conjunction with our financial and budgetary responsibilities.	• Facilities development and management • Emissions measurement and management

3.1.4.2 Asset Management and Performance

The Canterbury DHB's Asset Management Plan (AMP) helps inform the capital requirements and investment decisions in the short and medium term and informs capital prioritisation decisions and annual planning processes. It has a ten year horizon and is refreshed annually. The AMP identifies the condition of the assets and any planned refurbishment, upgrades or replacements.

We have aggregated our assets into three major portfolio areas that cover the majority of those assets considered significant (critical) to the delivery of core services. As part of the management of our assets, and to improve our investment thinking, we are working with the Ministry of Health, Treasury and fellow DHBs on the establishment of a core set of asset performance metrics and underlying criteria for each asset portfolio. This will help to ensure we are investing wisely and that the assets we have in place meet industry standards.

We have developed a set of developmental performance metrics, for use in internal management and decision-making processes, including relevant indicators of past and projected performance (appendix 10.2).

3.1.4.3 Asset Management Maturity

Acknowledging the direct correlation between delivering best value for money from our asset investments, and the organisation's asset management capability, we have embarked on a five year improvement programme[30] aimed at elevating our performance in this area. Using industry best practice, and aligned with Treasury's ICR process, we are targeting achievement of a Low Advanced level of asset management capability.

3.1.5 KEY ASSET MANAGEMENT RISKS

3.1.5.1 Building and Plant

Building Performance – Seismic and Health & Safety Legislation compliance

Patient and Staff safety is compromised due to:

- Buildings that are still occupied but deemed to be earthquake prone and/or contain critical structural weaknesses that have not been repaired or upgraded, because the buildings are:
  - Planned to be demolished, but replacement facilities have not yet been completed
  - Critical to service delivery and there is no alternative location identified, so works cannot be completed
  - Service delivery decisions outside of the DHB's control mean the building's future is uncertain
- Key infrastructure (water, power, medical gas etc.) which supplies IL4 facilities but is located within, or passes through, structures that are less than 67% of IL4.

[30] Refer Canterbury DHB Asset Management Improvement Plan, 2018

- Buildings that have been partially repaired or upgraded, but the structural capacity is not yet at the required level of performance.

Note: In relation to single storey timber framed buildings that are <33% NBS, Canterbury DHB has accepted engineering advice that these buildings do not pose a significant risk to the safety of users. The risk referred to in item i above relates to larger multi-storey structures of heavy construction.

Delayed Hospital Redevelopment Projects – Operational and clinical impact

Specialist Mental Health Services (SMHS) remaining on The Princess Margaret Hospital (TPMH) site are causing significant clinical and operational risks. The TPMH campus, which contains several heavy construction multi-storey buildings with brick veneers, of which some are earthquake prone and contain critical structural weaknesses, has been fully vacated other than Block C, which is still occupied by SMHS services (Mothers & Babies, Eating Disorders and Children &Young Persons), and the Heathcote building, which is still occupied by Older Person's Health and Rehabilitation community teams and the Complex Needs mental health inpatients.

In 2012, as part of the detailed business case for the Burwood and Christchurch Hospital redevelopments, the plan included the mental health services currently located on this campus to be relocated; partly to Christchurch Hospital campus and partly to Hillmorton Hospital campus. The detailed planning has since confirmed that there is inadequate available space in Parkside (Christchurch Hospital) for the relocation of the services as originally intended. With isolated SMHS continuing to be located on TPMH, this poses operational and clinical risks and increased operational cost.

The detailed business case to relocate the Mothers & Babies, Eating Disorders and Children & Young Persons (excluding Child & Young Persons outpatient service) was approved by the Ministers of Health and Finance in December 2018. However, the current project timeline is for these services to continue to occupy their current facilities until end 2022/early 2023, more than three years away.

Facilities Capacity - Hagley and Christchurch Hospital redevelopment stage 2

Our capacity to deliver services in a sustainable manner is impacted due to:

- Delays in the significant redevelopment projects. As such we are already facing increasing pressure across all parts of the Canterbury health system just to maintain and sustain current service levels. Canterbury's current population at 578,340 is already above the figure of 568,000 not forecast to be reached until after 2025/26. This is a significantly faster rate of increase of surgical demand than forecasted. Current modelling reconfirms the deficit for operating theatres immediately after the opening of the new Hagley facility. We are thus faced with the compounding impact of having to continue to outsource (due to delay in our ability to bring back outplaced and outsourced surgical activities), and also to increase our outsourcing (due to surgical demand increasing at a faster rate than forecast), in order to meet the demand. This makes for a more expensive model of service delivery.
- The Christchurch Hospital redevelopment Tranche 1 project is to deliver additional theatre and bed capacity, so any delay in the decision making for this project will have further compounding impact on our ability to meet clinical demand.

Financial Constraints - Managing funding and financial costs to achieve financial targets

The capital funding risk, in relation to both the uninsured portion of seismic repairs/ upgrades and the increase in construction costs related to facilities development, earthquake repairs and upgrades, has contributed to our ability to manage the funding and financial costs and their impact to achieve required financial targets across the DHB, while still providing the required volume and range of services.

Clinical Equipment and Information Systems risks

As part of the annual planning process, all capital requirements are reviewed and prioritised such that the comparatively lower priority requirements are intentionally deferred. However, these deferred requirements may still include high risk potential end of life items, which if they fail, will require unscheduled replacement

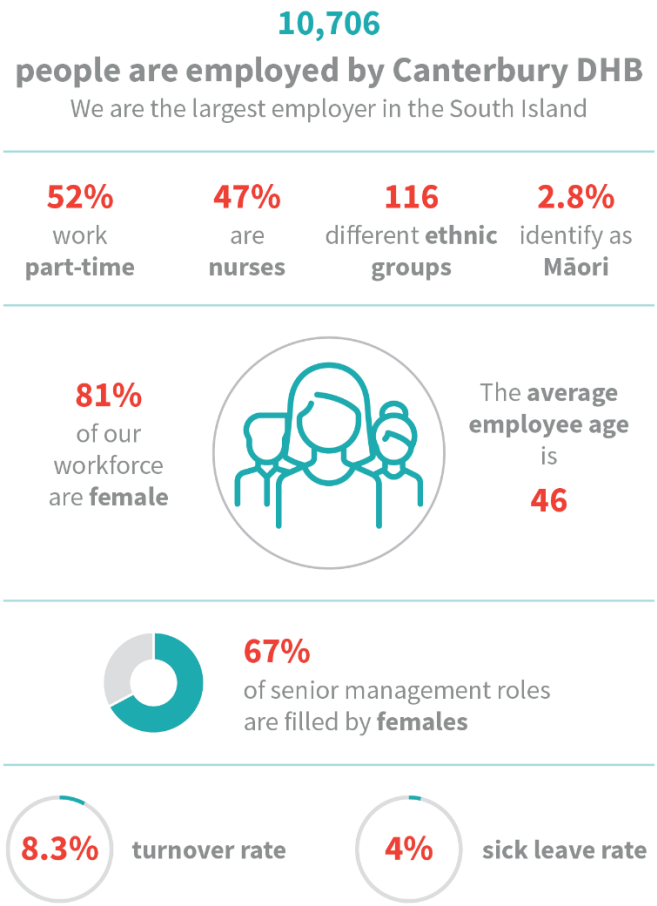
that can cause some level of unplanned disruption to the service or less efficient operational workarounds. Furthermore, to support the increasing level of services, additional clinical equipment is required resulting in the need for a step change in the baseline capital budget just to maintain the asset management requirement of our asset fleet.

Similarly, for Information Systems, with our progressive transformation towards electronic workflows and a fully integrated health system, for Canterbury DHB and also regionally, there is increasing Information Systems infrastructure and our reliance on this infrastructure has escalated.

For both these asset categories, within such a financially constrained environment, there is a challenging balance of financial risk and operational risk, as we prioritise to fund the asset management requirements to meet the operational requirements.

3.2 Workforce

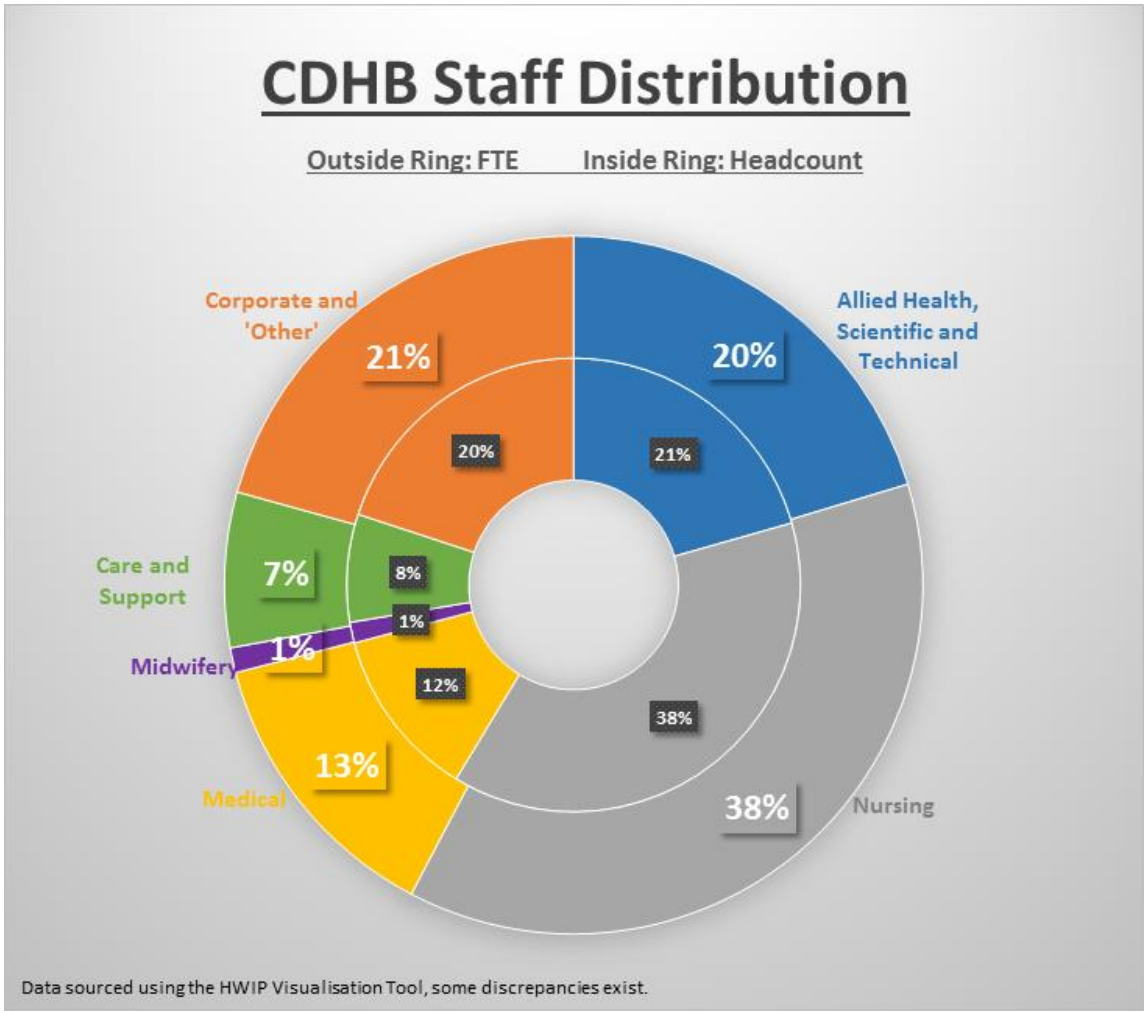
Our staff are our most valuable asset and account for around 67% of our in-house Provider Arm annual operating spend. The Canterbury DHB is the single largest employer in the South Island. We employ more than 10,700 people across our hospital and community sites, equating to approximately 8,254 full time equivalent staff members[31]. The NGOs and private organisations we work with and fund together employ at least this number again.



All figures supplied by People and Capability as at 31 May 2019

[31] As at 30 June 2019

Figure 22 - CDHB Staff Distribution



Our staff continue to face unprecedented challenges, both at home and at work. The DHB is working hard to maintain a safe environment and ensure the wellbeing of our staff as we shift people, patients, and services to make repairs and complete construction. We have implemented a number of initiatives to mitigate disruptions, however construction noise, service relocation and parking issues continue to cause stress for staff and patients alike. Rates of sick leave are higher than national rates, reflecting the series of traumatic events that the Canterbury population has experienced. At 8.3% our current turnover rate is lower than the national average of 9.5% but is significantly higher in areas such as mental health (11.4%) and rural hospitals (14.3%), impacting service provision, continuity of care and staff wellbeing for those carrying additional load.

Sickness absence was not historically an issue for Canterbury DHB but levels have been increasing since 2014/15 when the predicted impacts of the Canterbury earthquakes began to manifest on our staff. Figure 23 shows the typical wellbeing effects of a disaster. The March terror attacks are also expected to have significant impacts and this is expected to manifest over the coming months and potentially years. A significant proportion (around 22%) of staff with over 10 days' sick leave taken are or were on unpaid leave.

Figure 23 - Typical wellbeing responses phases after a disaster, taken from Britt et al., 2012[32]

Whilst there are a number of evidence-based pieces of research into the effects of traumatic events on a sample population, there's unfortunately very limited information on the cumulative effect of the multiple significant events on a single population in the same geographical area.

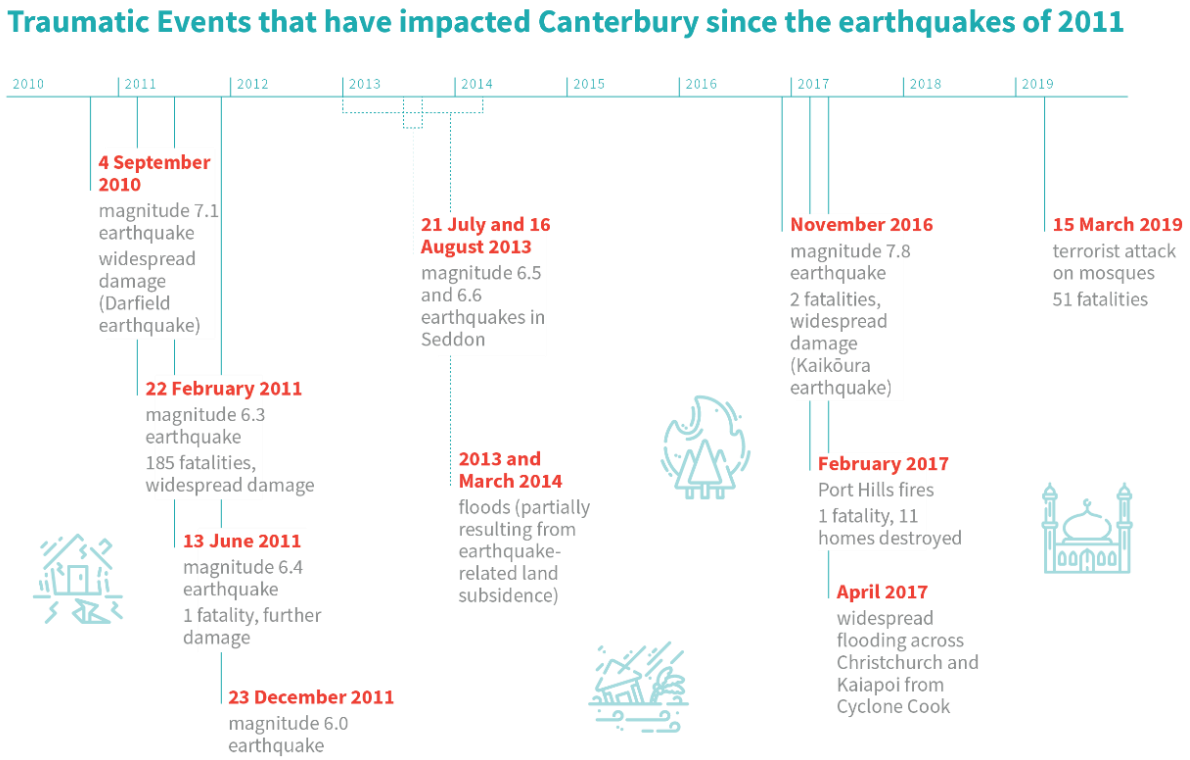
Canterbury DHB has been tracking the impact of all traumatic events on the workforce, which could be considered indicative of the population, using both qualitative and quantitative methods. If these events were isolated and aligned to the literature, which matches a typical population's normal response to a single event (Britt et al., 2012), our population would likely show a typical heroism/denial/disillusionment/exhaustion/ experimentation/reconstruction response.

However, based on the insights we've gathered over the last 10 years, we've interpreted that some of our people have not had the opportunity to recover from these events, causing the population to experience a diminishing state of natural resistance impeding movement into the reconstruction phase (as per the response curve). The anecdotal evidence that we're seeing is a diminished individual and collective resilience, where 'resilience' encompasses a person's ability to bounce back (reconstruction phase).

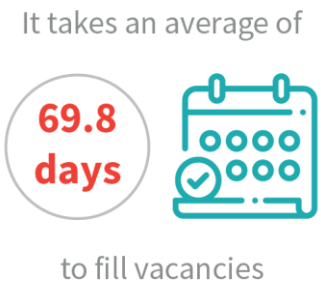
Our aim, as one of the largest employers in Canterbury, must be to take our unique experiences and to role model actions that serve to repair and build our people's ability to recover, and ultimately grow, from adversity; taking us to a place where we're stronger and more resilient than before.

[32] Britt E, Carter J, Conradson D, et al. Resilience framework and guidelines for practice: Report for Ministry of Social Development. Christchurch: University of Canterbury. 2012.

Figure 24 - Traumatic Events that have impacted Canterbury since the earthquakes of 2011



Our workforce is also ageing with almost half of our workforce now aged 50 or more. Furthermore, we are competing with a global shortage with many health professionals able to earn significantly more overseas. Recruiting and retaining sufficient numbers of health professionals is expected to be one of our largest challenges over the next ten to twenty years.



MANAWA

Manawa is a partnership between the Canterbury DHB, Ara Institute of Canterbury and the University of Canterbury (UC) who have come together to create a collaborative shared facility. Located within the Te Papa Hauora Health Precinct adjacent to Christchurch Hospital, the building is home to over 2,000 Ara students and 70 FTE staff as well as CDHB staff and UC Health Science academic staff and students.

Manawa has a clear focus on education, research, simulation and innovation. It promotes cross disciplinary teaching and research, while the shared use of spaces enables greater assimilation of education and research into clinical practice, as well as the integration of the entire health journey of education, research and training.

Manawa is a health innovation reference site to model, test and benchmark clinical equipment, technologies and environments prior to introduction into the clinical environment and also provide education and outreach opportunities for the wider Canterbury health system.

We work closely with local training providers, primary care and aged residential care to implement a whole of system approach to developing and recruiting our nursing and allied health workforce. A good example of this is our relationship with the Ara Institute who share space with our workforce development in the new Manawa building (see sidebar).

The DHB is currently working on a long term nursing workforce development plan, examining future nursing roles and pathways for advancing nurses to ensure people are working at top of scope. The DHB is also working on the development of an Allied Health Strategy to support the re-orientation of allied health, with a stronger focus on wellbeing, prevention, early intervention and enablement.

In addition, the DHB remains fully committed to providing a high standard of education and training for our Resident Medical Officers (RMOs) and meeting all our obligations and requirements for prevocational and vocational training in accordance with the Medical Council of New Zealand and Vocational Specialist Colleges. This is evidenced by the establishment and ongoing support of clinical governance and operational structures and processes, such as the Medical Education and Training Unit, to support education and training for RMOs across the DHB.

Our workforce is currently unrepresentative of the ethnic make-up of our community, for example, Māori make up 9.1% of the total Canterbury population but just 2.8% of our workforce[33]. A number of initiatives are underway to address this, described in chapter 4.

Figure 25 - Nursing Workforce Ethnicities

Our rural population is diverse, can be socio-economically disadvantaged, and can have a transient workforce with high health needs. Increased numbers of tourists can also result in increased demand on trauma and health services at particular times during the year within rural communities. Because of their isolated location and health population

[33] This figure is likely to be understated. In April 2019, 18% of staff had no ethnicity declared, of those who did 3.4% identified as Māori.

needs within these settings, rural clinical staff require generalist skills to deal with a broader range of medical events and need to work at the top of their scope. However, they experience greater challenges in accessing professional development and peer clinical support due to their isolation and ability for backfill. Recruitment to rural areas is harder, particularly when there are few opportunities for partners. It is also difficult to manage succession planning effectively when there is little depth in most roles.

The DHB is committed to working with partner organisations, PHOs and general practice on a rural sustainability programme to identify challenges, develop resilient primary care service models and support equitable access to services for our rural population. This work is being led by the Rural service level alliance, under the CCN district alliance (see section 3.3).

3.3 Primary and Community Care Pressures

Primary and community care is a critically important part of the Canterbury health system. In Canterbury, a collaborative alliance approach to working has supported the integration of primary and community care with secondary and tertiary services. This collaborative approach is demonstrated through the CCN district alliance, the broadest health alliance in the country where clinically led groups engage in the design and development of services to improve the health outcomes of the Canterbury population. Canterbury's alliance has twelve system partners, an independent Chair and a small programme office funded by the DHB. This integration is support by initiatives such as HealthPathways and HealthOne.

There are three Primary Health Organisations (PHOs) in Canterbury:

- Pegasus Health Limited (our largest PHO to which around 85% of Christchurch general practices belong);
- Christchurch PHO (supporting a smaller urban-based group of general practices); and
- Waitaha Primary Health (supporting largely rural based general practices).

The fact that general practice is well organised in Canterbury is considered a key contributor to the system's successes such as low ASH rates and Acute Bed Days relative to national rates. However, the contribution of primary care is increasingly hampered by capacity constraints. This is occurring for a number of reasons including population growth, particularly in areas where rapid population expansion occurred post-quakes without the associated addition of general practice capacity (e.g. Selwyn District).

Primary care capacity has also been affected by the shift to primary care of services traditionally provided by specialist services (in a hospital setting) and the increasing complexity of care provided through general practice as our population ages and more people are living with long term conditions. For example, general practices are now funded to undertake spirometry testing to aid in the diagnosis of chronic obstructive pulmonary disease (COPD, one of the drivers behind ASH rates) and excision of skin lesions. Such initiatives align with our vision of integrated care, as well as enabling GPs to work at the top of their scope (thus increasing job satisfaction), but contribute to capacity demands. Urgent care and observation services are also increasingly provided by primary care.

Pressure also arises from patients seeking to access care differently, for example in times outside work hours or online. The growing demand for mental health services and the increased prevalence of some long term conditions also changes the level of demand and services sought through the general practice. Changes in national policy, particularly those that seek to improve people's access to services through reductions in co-payments (for example), also influence the demand on general practice services.

According to the 2017 General Practice Workforce Survey[34], 10.7% of respondents reported working in a practice with a 'closed book', i.e. are no longer accepting new patient enrolments. In addition, 28.8% of GP respondents from Canterbury reported that their general practice has a vacancy. At a national level, over 25% of respondents intend to retire within the next ten years and most of those, as well as the majority of those

[34] Undertaken by the Royal New Zealand College of General Practitioners, with approximately 2,500 respondents nationwide, hence small sample size for Canterbury-specific

intending to retire within ten years, have either already reduced their hours or are intending to do so, which will exacerbate capacity issues in general practice.

The sustainability of many general practices in rural areas is further threatened by recruitment pressures with the use of locums increasing costs and ability to provide after-hours/urgent care. Community care services are facing similar pressures with a number of home based support services in rural areas constrained. The recent pay increase for nurses on the MECA agreement with DHBs is likely to result in primary and community based services experiencing even greater struggles in recruiting and retaining nurses.

"I would again like to acknowledge the remarkable role that primary and community care provide in the integrated Canterbury health system…it underpins that we need every part of our health system to be working for every part of our health system to work" – David Meates, Chief Executive, CDHB

3.4 Regional Service Pressures

Canterbury provides an extensive range of highly specialised services to people from other DHBs where the service or treatment is not available. We also deliver specialist clinics and surgery in other regions to support people throughout the South Island to receive care as close to home as possible.

The services we provide on a regional basis include eating disorder services, brain injury rehabilitation, child and youth inpatient mental health services, and neonatal, cardiothoracic, neurosurgery, paediatric oncology, endocrinology, mental health forensic and spinal services. This regional demand is complex in nature and has been growing steadily.

We work regionally through the South Island Regional Alliance to address our shared challenges and develop more effective and responsive health services that make best use of scarce specialist resources. This includes the collaborative development of shared regional treatment pathways for conditions such as cancer.

7,000
people from other regions were discharged from one of our hospitals in 2017/18

9.5%
increase in regionally-referred hospital admissions

61,155
outpatient appointments

52%
increase in regional outpatient appointments in the five years to June 2017

The South Island Alliance governance structure incorporates a Regional Capital Committee which reviews capital investment proposals in accordance with the agreed regional service strategy and planning, and a Strategic Planning and Integration Team (SPaIT) of clinical leaders and senior management, which supports an integrated planning approach.

Canterbury DHB has also developed a formal transalpine partnership with the West Coast DHB which includes shared clinical pathways and shared staffing resources between the two DHBs. This includes a joint chief executive, as well as corporate service teams. To support sustainable service delivery on the West Coast, we provide more complex specialist services with Canterbury specialists providing regular outpatient clinics and surgical lists on the West Coast and we have agreed a fixed funding agreement for these services. This arrangement enables more equitable access to highly specialised services for the population of the West Coast and supports improved workforce planning between both DHBs.

3.5 Governance

The Canterbury DHB Board is responsible to the Minister of Health for the overall performance of the DHB. The Board delivers against this responsibility by setting strategic direction and policy that is consistent with Government objectives, meets the needs of our population and ensures sustainable service provision.

As an owner of Crown assets, the DHB is also accountable to Government for the financial and operational management of those assets and delivery of this LTIP and the associated asset management planning, is part of the Board's delivery against this accountability.

Four advisory committees assist the Canterbury DHB Board to meet its responsibilities including three statutory committees, the Hospital, Community and Public Health, and Disability Advisory Committees and a Quality, Finance, Audit and Risk Committee. These advisory committees comprise of a mix of Board members and business or community representatives. As part of Canterbury DHB's commitment to shared decision making, service providers, clinical and cultural leaders also regularly present and provide advice to the Board.

The Quality, Finance, Audit and Risk Committee supports the Board by reviewing, monitoring and endorsing the DHB's asset and risk registers, facilities earthquake programme of works and asset plans including this LTIP.

Manawhenua Ki Waitaha is a collective of the seven Ngāi Tahu Rūnanga representatives within Canterbury and are mandated by Ngāi Tahu to have a treaty based relationship with the DHB. This group works in partnership with the DHB, the three Canterbury PHOs, other iwi and Maata Waka groups to improve outcomes for Māori in Canterbury and the DHB has a Memorandum of Understanding with Manawhenua Ki Waitaha to this effect.

3.6 Alliance Partnerships

We are strongly committed to working collaboratively with the many health service providers, organisations and agencies who have a shared interest in improving the health of our population. Our formal partnerships are described in the following sections.

3.6.1 CANTERBURY CLINICAL NETWORK (CCN)

The CCN is an alliance partnership of healthcare leaders, professionals and providers from all sectors of our health system including primary care, radiology, laboratory, pharmacy, district nursing and home and community support, St John ambulance services and the DHB. The CCN has been in place since 2009 and pioneered the health alliancing approach in New Zealand. It is a critical enabler of our vision of an integrated healthcare system.

Through the alliance, we work with our partner organisations to determine and design the most appropriate and effective service delivery models for our health system. Clinical and operational staff from across the DHB sit on the CCN level alliances and workstreams to provide input into direction. The collective work programme of the alliance forms the basis of the DHB's Annual Plan and feeds into the DHB's asset and investment planning.

The Te Kāhui O Papaki Kā Tai (Māori reference group) and Pacific reference group are supported by Pegasus Health and have close links to primary care, the DHB and the CCN. Māori and Pacific caucuses within the CCN alliance provide representatives for service level alliances, development groups and workstreams and meet regularly to identify strategies and initiatives to improve health outcomes for Māori and Pasifika.

3.6.2 SOUTH ISLAND REGIONAL ALLIANCE

The South Island regional alliance has brought together clinical and operational staff from the region's five DHBs to work collaboratively to deliver a sustainable health and disability system that is best for people, best for system. The work of the regional work streams and service level alliances feeds into the DHB's annual planning including the DHB's action plans, production plans and asset plans. The South Island Health Services Plan is developed alongside the DHB's annual accountability documents and is approved by the five South Island Chief Executives and Chairs.

3.6.3 REALIGN (CHRISTCHURCH HOSPITAL CAMPUS) ALLIANCE

In 2015 we established a clinical alliance on our Christchurch Hospital campus. 'Realign' is the name given to the way Christchurch campus leaders are working together to improve care. There are two service level alliances focused on adult acute care and surgical services, and four work groups looking at emergency department interface, patient overflow, seven day working and theatre utilisation. Service planning includes the impact of any service model changes driven through the Realign project work.

3.7 Operational Management

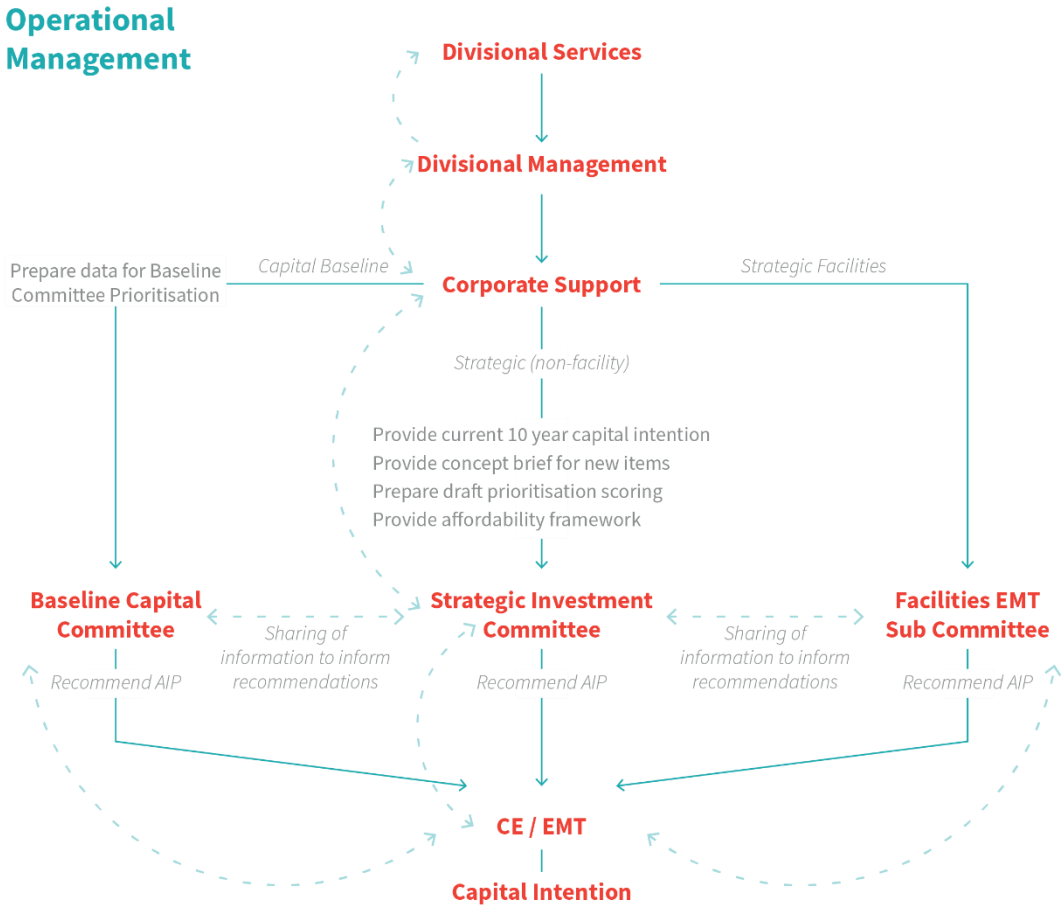
Operational management has been delegated to the Chief Executive. The Chief Executive is supported by an Executive Management Team (EMT) who provide clinical, strategic, financial and cultural input into decision making and have oversight of quality and safety.

The DHB has a clear decision making and accountability framework that enables our system leaders and community to provide direction and monitor service delivery and performance. This includes the development of a number of committees and clinical and operational leadership groups and key roles within the organisation who provide oversight of service direction and delivery.

In terms of long term investment planning, EMT is supported by:

- The Planning and Funding Division which is responsible for determining how best to invest the funding we receive from Government together with service redesign/transformation. This includes the Decision Support team, who support decision making with demand forecasting and the ongoing monitoring of the performance of our health system.
- The Corporate Finance team for the financial sustainability of the investment plan.
- The EMT Facilities sub-committee for governance over the rebuilding of DHB infrastructure (facilities) to support the DHB's system wide clinical services plan and the facilities master plan. This committee also prioritises and recommends the facilities and facilities-related investment for earthquake repairs and upgrade and redevelopment.
- The Baseline Capital Prioritisation Committee for recommendation on the prioritised list of annual baseline capital requirements for clinical equipment, building and plant, and Information Systems equipment based on operational risk and the asset management requirements. This committee focuses on the capital requirements to maintain the current fleet of assets within the hospital campuses to enable the delivery of existing clinical services to meet the current and forecast needs of the population.
- The Strategic Investment Committee for prioritisation and recommendation of strategic (non-facilities) investments over a ten year horizon on a rolling basis. This committee focuses on the capital investments to enable transformation of DHB health system, to provide new clinical services or new ways of delivering care to patients.
- The Te Tumu Whakahaere Forum is chaired by the DHB's Executive Director of Māori and Pacific Health and supports a collective approach to Māori Health across the DHB.

Figure 26 - Our Baseline and Strategic Investments Governance Structure



3.7.1 PRIORITISATION AND DECISION-MAKING PROCESS

The DHB's capital investment prioritisation process is overseen by the Executive Management Team to ensure the process takes into account alignment with the DHB's Vision and delivery against the Canterbury DHB Outcomes Framework in terms of improving the health and wellbeing of our population, and the timing of the hospital redevelopments, the Canterbury DHB's regional and transalpine commitments and the overall affordability of the capital intentions.

As part of this process a ten year capital intentions plan is developed and reviewed annually. Our ten year capital intention plan includes strategic investments, facilities/earthquake programme of works and baseline requirements. The capital intentions budget is based on high level indicative estimates for the planned investments, and these are updated as more detailed planning progresses to improve costing accuracy. Every investment outlined in our capital intention is still subject to a detailed business case review and approval process, in line with the DHB Delegations Framework as well as external processes including gateway review, Capital Investment Committee consideration, and the approval of relevant ministers or Cabinet, depending on the level of investment. Our baseline capital prioritisation process is a tested process and has been in place since 2009, with continued refinement and enhancements since then. On an annual basis, our services refresh their three years rolling asset management requirements and rank the priorities using the DHB's standard baseline ranking tool which is based on four criteria:

- Status of current equipment
- Equipment function
- Impact of non-replacement or clinical benefits
- Likelihood or probability of risk or benefit becoming real over the next 12 months.

The Baseline Capital Prioritisation Committee further assesses based on the operational risk and impact organisation wide and recommends a baseline 'Approved In Principle' budget allocation to EMT that is commensurate with the acceptable risk, based on the available information.

The strategic investment concepts (i.e. investments that transform our way of working in line with our Vision) are prioritised by the Strategic Investment Committee using our strategic prioritisation tool. This prioritisation tool assesses the:

- Value of investment based on key performance areas of focus, clinical effectiveness, whole population health effectiveness, sustainability and the risk/opportunity/compliance
- Achievability of the investment based on the delivery risk such as level of innovation required, reputation risk and
- Recommends an 'Approved In Principle' budget allocation to EMT.

As a result of the 2010/11 significant earthquakes, Canterbury DHB has developed and been using the Facilities Decision Making Framework since 2012. Based on the experience our Site Redevelopment has acquired since the earthquake, the DHB has redeveloped a resilience based decision making and prioritisation framework for facilities. The outcomes of this framework inform the investment priorities of the earthquake damaged facilities. Based on the pilot of this resilience based framework on the remaining earthquake damaged buildings on the Burwood Hospital campus and the earthquake damaged buildings on Hillmorton Hospital campus, at the July 2018 meeting the Board approved the rollout of use of this revised framework for the rest of the campuses. The resilience based framework is based on criticality criteria such as:

- Occupancy
- Importance of post-disaster functionality
- Risk to neighbouring structure, key access routes or critical infrastructure during an earthquake/risks from hazardous substances
- Acuity or sensitivity of service
- Ease/difficulty of relocation services
- Health system failure potential.

The Facilities Subcommittee of the EMT ensures the alignment of the decision making and prioritisation process for facilities investments are aligned to our facilities master plan and strategic goals and objectives.

3.7.2 CAPITAL EFFICIENCY

Our Capital Investment Policy is to gain maximum value from our investments over the whole investment life-cycle. The policy outlines that Canterbury DHB:

- Will undertake capital investment in a controlled and prudent manner to ensure all demands for capital funding are equitably and carefully prioritised and are consistent with national, regional and Canterbury DHB service priorities
- Shall only commit to capital investment upon approval of a suitable business case, by the Canterbury DHB delegated authority (under the Delegation to Staff Policy), and in accordance with both the Canterbury DHB Asset Management Policy and Procurement Policy.

Implementation of approved business cases follows the Canterbury DHB Project Management Framework to enable effective project management and to ensure achievement of the agreed project deliverables and benefits.

An integral part of our capital efficiency focus is the ongoing process of reviewing and assessing our asset base and land that may be surplus to health service requirements in the foreseeable future. Any surplus assets/land will be earmarked for disposal in accordance with due process set out in the New Zealand Public Health and Disability Act. Proceeds from such disposals will be reinvested for health services, health capital investment and/or repaid to the Crown. Further commentary and analysis on land disposal and assets capital efficiency is set out in section 8.5.2.

3.7.2.1 Procurement Process

We have in place a DHB Procurement Policy, which adheres to the Cabinet-mandated Government Rules of Sourcing. The financial thresholds outlined in our Procurement Policy are set to ensure:

- The most appropriate procurement method is applied in sourcing good and/or services for competitive pricing
- The most appropriate resource effort at the same time the most appropriate documentation and methods that mitigate risk and ensure adherence to the Government Rules of Sourcing are considered.

Our existing evaluation process requires appropriate stakeholders (with technical, user/clinical, finance, probity and procurement expertise) are selected to be part of the Evaluation Team, and ensures the required level of evaluation, including the whole of life costings comparison, is undertaken.

We will continue to look for ways to ensure the procurement process is efficient and effective in providing resources that are appropriate (fit for purpose) and cost effective. For example, for our construction projects, we use preferred panel consultants to provide more agility in the procurement process for building works consultants. The plan is for this framework to be rolled out to establish preferred panel quantity surveyors, mechanical and electrical engineers and architects and IT consultants.

As part of the whole of life financial assessment of assets, CDHB has an ongoing process to work with suppliers on potential procurement options, such as leasing, in particular for high cost clinical equipment. This process includes careful consideration to ensure that it is a viable long term and sustainable asset based funding solution that will improve the efficiency of operations, whilst ensuring the ongoing operating cost does not significantly outweigh the capital cost. This is evidenced by the reagent rental model, in which an analyser is provided by a diagnostic company in exchange for the guaranteed purchase of reagents for use with the equipment, reduces or removes the upfront capital outlay and has been used successfully by Canterbury Health Laboratories. Another mechanism being used to reduce capital costs is to lease clinical equipment with upgrade clauses.

Where appropriate, we will continue to include equipment leasing options as part of our capital investment and capital efficiency decision making processes.

For ICT, both infrastructure and services as an outsourced service (IAAS and SAAS) are already well embedded in our investment structure and assessments. This is evidenced by a number of cloud risk assessments for clinical and non-clinical applications hosted in the public cloud submitted to the Government Chief Digital Officer (GCDIO) and have a significant hybrid cloud transformation plan underway which has been regularly reported to the MoH. We have also been on IAAS for a decade.

3.7.2.2 Project Management

Once approved, capital projects are executed with the level of project management appropriate to the scale of the project and/or any risks associated with the works. External specialist project managers and consultants are engaged as required and appropriate to assist our in-house project management capability for building and plant, clinical equipment and ICT equipment.

Over the last 2 years, we have developed and implemented Project Management Frameworks, How To Guides, Project Profiling tool and templates. We have also implemented and configured KeyedIn as our P3M tool. The Project Management frameworks and artefacts and KeyedIn are being piloted for ICT projects and the pilot is near completion. Piloting of these frameworks, artefacts and KeyedIn have also been rolled out to Facilities projects.

The Corporate Support service provides the Project Management Office role and also monitors project deliverables and benefits against the approved capital business cases.

3.7.2.3 Capital Recycling

For facility investments, we continue to investigate options such as use of Public Private Partnership Models, joint funding model with communities. Examples of successful model include the mix of DHB funding and community donation for Kaikōura Health Te Hā o Te Ora and the recently completed Akaroa Health Centre.

We continue to investigate leasing option for new builds to release capital whilst enabling co-location of services to encourage collaboration, efficiency and innovation. Examples of successful models include 32 Oxford Terrace where our various corporate services are co-located with the South Island Alliance Programme Office (SIAPO), resulting in more integrated ways of working. The Manawa partnership described in section 3.2 is another successful example of this. We are in the process of discussing with NZ Artificial Limbs Service (NZALS, who need to rebuild their building currently located at Burwood Hospital campus) the potential for NZALS to build on a Canterbury DHB ground lease to co-locate NZALS with NGO services displaced from CDHB buildings due to earthquakes.

3.8 Our Planning Approach

Canterbury DHB undertakes planning on a number of levels. The South Island Alliance is key to planning at a regional level where a common performance framework is adopted across the five DHBs. This framework identifies expected outcomes which drive district planning documents. The regional planning allows the sharing of investment priorities across assets including facilities, clinical equipment, information services and workforce.

Through our District Alliance we develop and agree annual work programmes with our partners across the Canterbury health system. Capital planning is managed through the ten year capital plan prioritisation process. A single underlying data platform informs long-term projections through to production planning on a rolling cycle basis and down to daily delivery.

In order to be able to forecast accurately and plan effectively, we have invested in data systems which provide information that supports patient care, production planning and strategic planning as well as enabling us to monitor progress against our outcomes framework and identify areas of patient journey that can be optimised. Data on patients' journeys through our system is near real-time enabling managers to respond quickly to changing demand.

The two key principles that underpin our data informed approach are that there is one version of the truth to source, validate and store information in a single location and that we manage 'by fact not anecdote' – making information available in a timely and easy to use manner to support informed decision making.

Our Data Warehouse brings data together from all internal input systems such as the new South Island Patient Information Care System (SI PICS) and Scope (theatre management) together with input data from external systems such as the Electronic Request Management System (ERMS) used by most general practices. This infrastructure is extended to our South Island partners as we have commenced the journey to a regional data warehouse.

Canterbury DHB's investment in modern data analytics capability allows us to optimise service design and meet our obligations to be fiscally prudent through reducing waste, duplication and costs across our system.

3.8.1 INFORMATION MANAGEMENT SYSTEMS USED TO MANAGE PATIENT HEALTH

A number of innovative information technology platforms are being used to support patient management as visualised in Agnes' Health Journey. If general practitioners need to make a referral, they can do so using the Electronic Request Management System (ERMS) in which they are guided through the information needed for triaging by services required across the system, not just in hospital. Together HealthPathways and ERMS have reduced wastage in our system through significantly reducing the number of referrals declined, either due to inadequate information being provided or due to the tests/investigations requested being deemed unnecessary by the relevant hospital specialists.

A new initiative, the South Island Patient Information Care System (SI PICS) tracks hospital care for patients. SI PICS will be implemented throughout the South Island to support regional approaches to care and will also support enable improved monitoring of inequities between different ethnic and geographical groups.

For example, HealthOne ensures vital, reliable info is available to clinicians at the point of care. Clinicians are able to view key information and notes made by other clinicians who have been caring for the person. The system also enables role specific info sharing between general practice teams, pharmacists, hospital clinicians, private hospital clinical teams and community nurses, thus supporting our vision of a truly integrated healthcare system. HealthOne is underpinned by Health Connect South, a clinical information system which is common across all the South Island DHBs, therefore supporting a regional approach to care.

HealthPathways, the web based system available to all general practices in Canterbury, which provides locally relevant, clinically led guidance for almost 700 care pathways was discussed in section 2.2. HealthPathways sister sites include: HealthInfo which provides up to date information for the public to support self-management; Hospital HealthPathways to support hospital clinicians with evidence informed standardised care; Allied Healthways to support allied health workers across the system; and Leading Lights which creates clear health information for schools and teachers to manage their students as well as pathways to health services.

GPs and Practice Nurses

Hospital clinicians

Allied health clinicians

Schools

General Public

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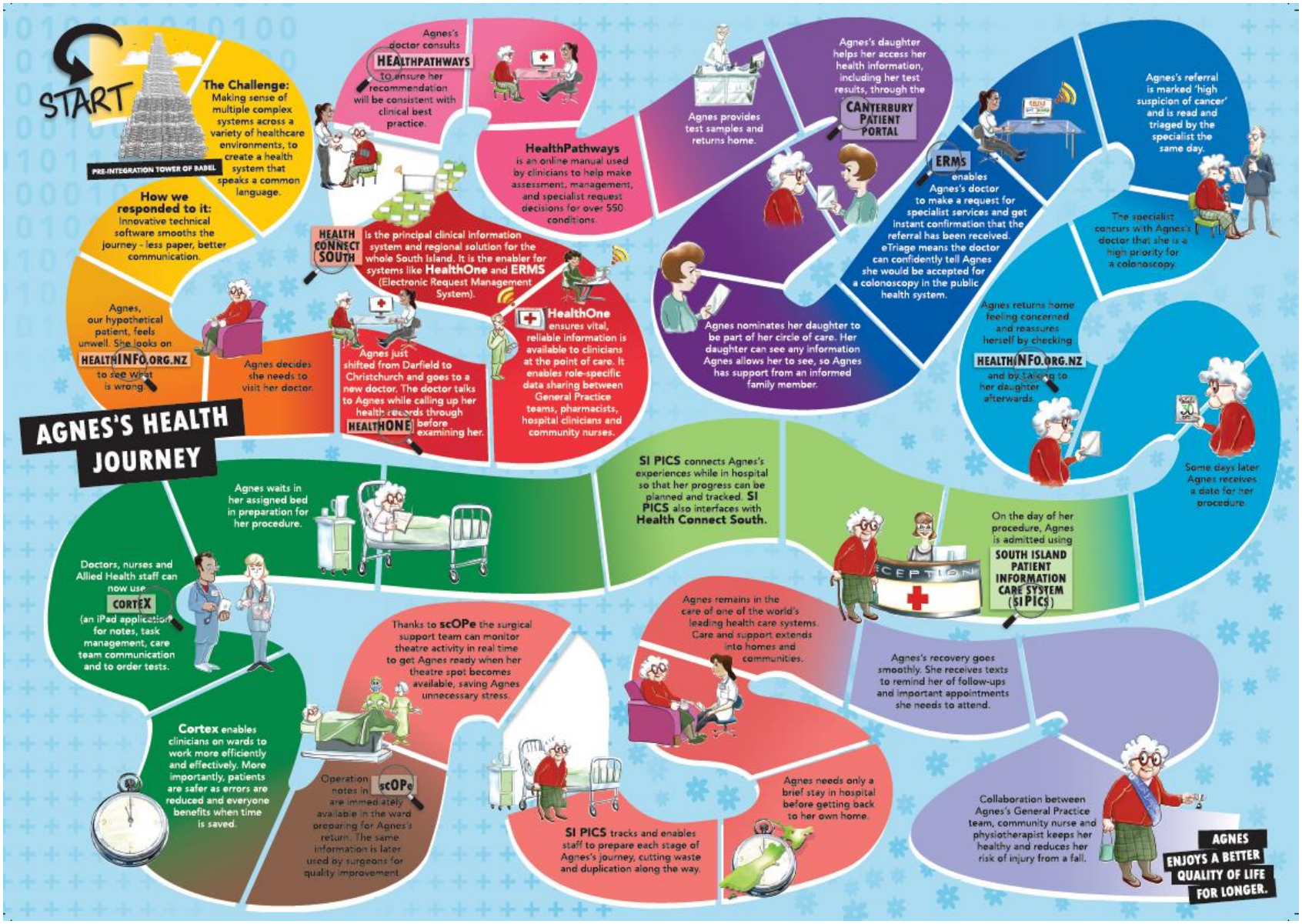
Figure 27 - Agnes' Health Journey



3.8.2 MANAGING PATIENT FLOWS THROUGH OUR SYSTEM

For short term planning, there are a number of ways in which clinical teams and operational managers are supported through provision of near real time data which enables them to see pressure points and predict short term resourcing requirements. Accessible through a convenient, single gateway, managers can view all parts of the system, including ward occupancy, what is happening in theatres and Emergency Department (ED) and other services across all of our hospitals.

Figure 28 - Ward Occupancy

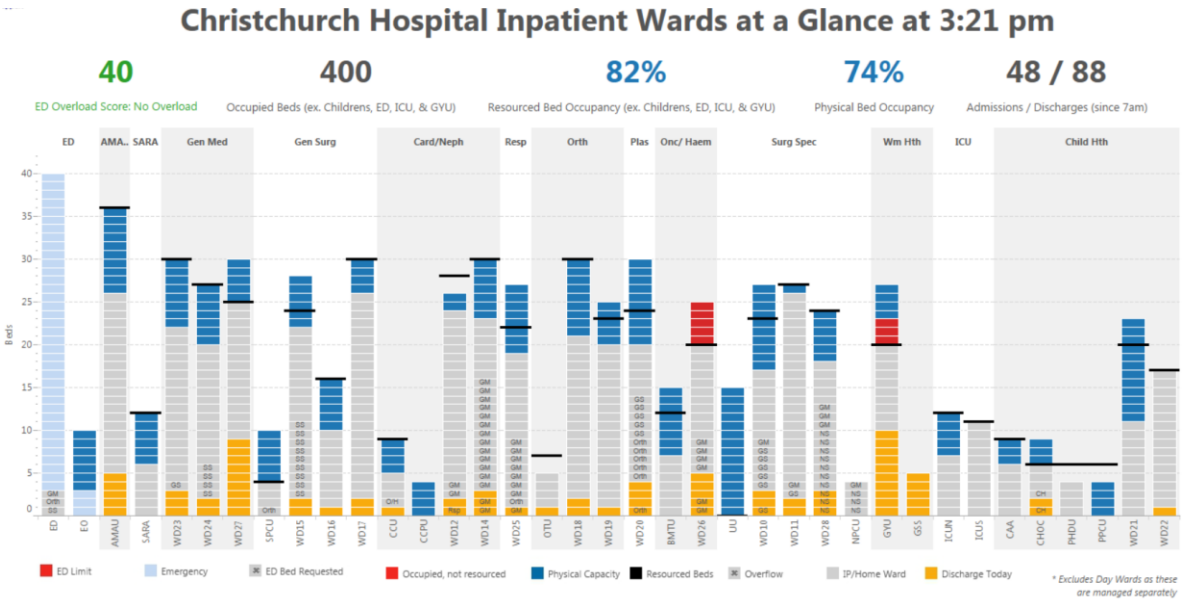
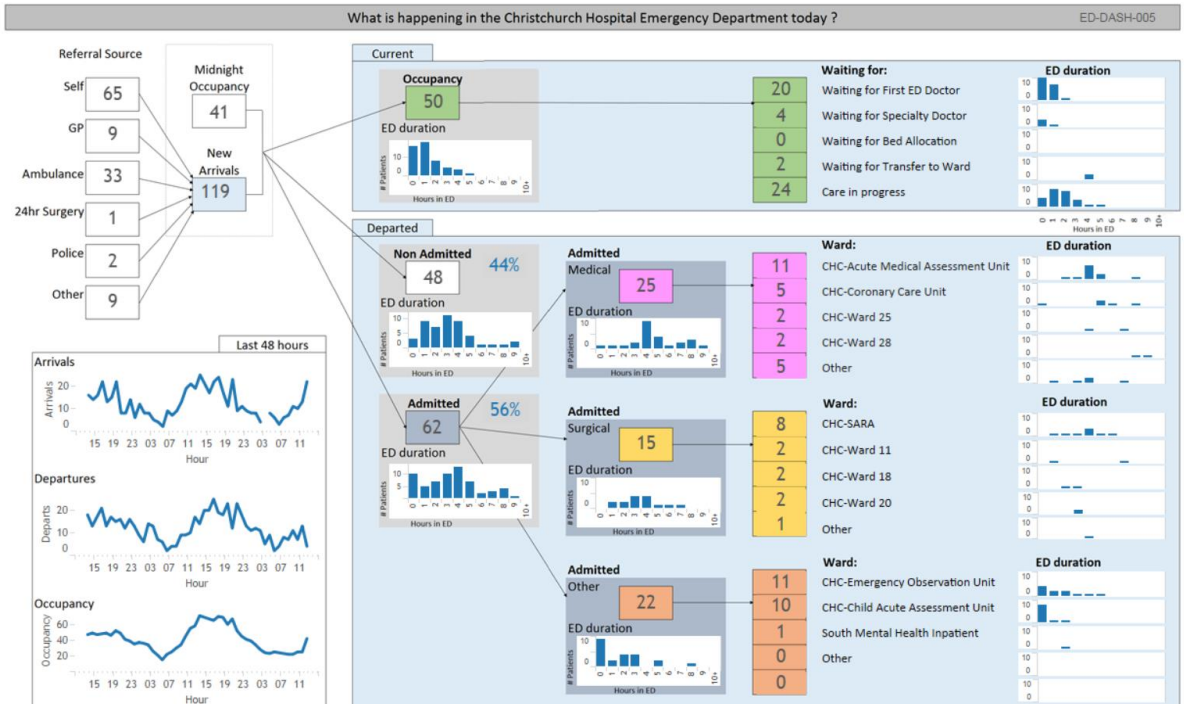
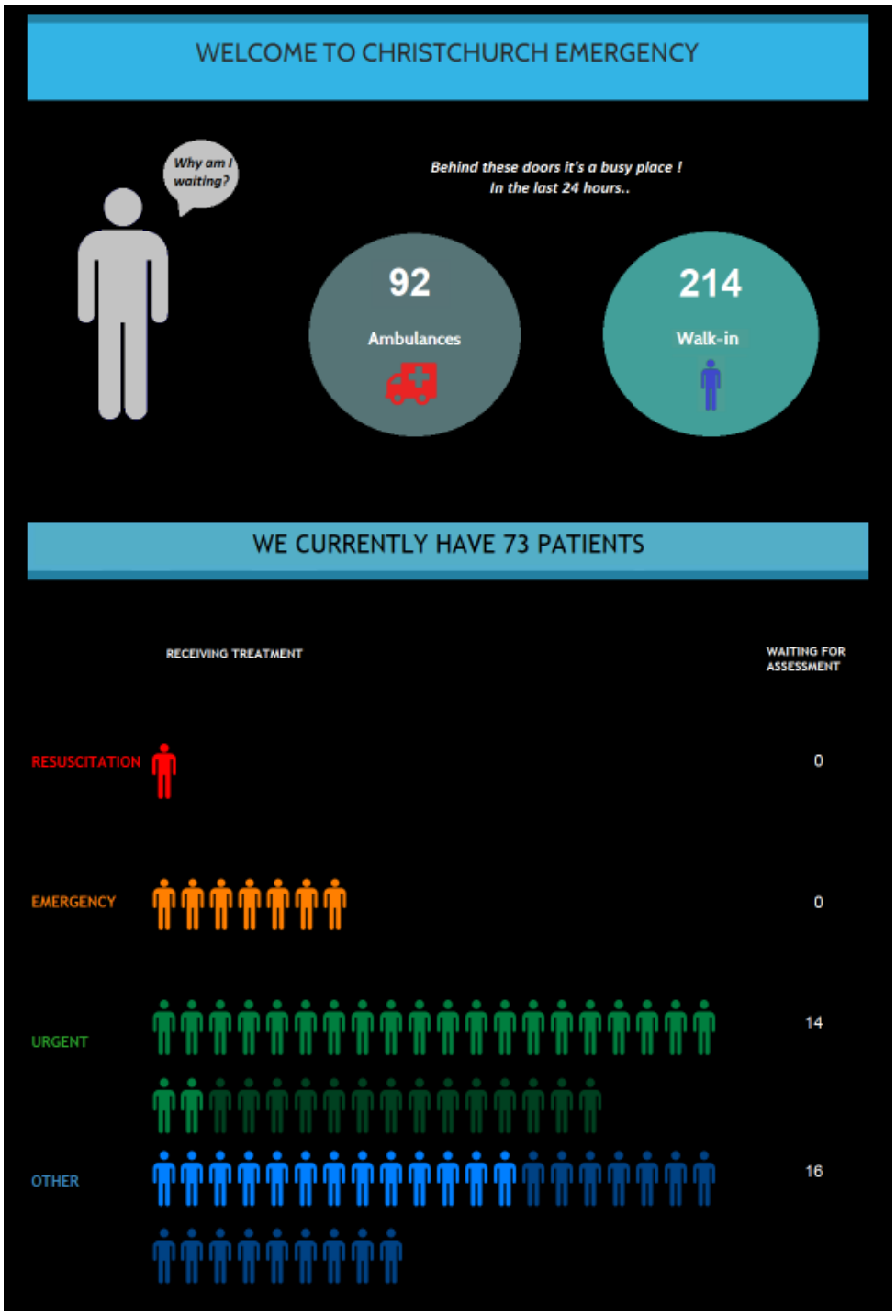


Figure 29 - Emergency Department Activity



Updated every 5 to 15 minutes, this data is also displayed on screens throughout our hospitals and is available to general practitioners who help us to manage demand when there are longer wait times in the ED. The information shows the patients' journeys through our ED – where they came from, how long they waited for

treatment and where they went to afterwards. The public are made aware of information that helps them to understand their journeys.



3.8.3 MEDIUM TO LONG TERM PLANNING

The Canterbury DHB Statement of Intent is refreshed every three years and updated annually. The document sets out our medium and long term outlook including our strategic direction, the outcomes we are seeking in terms of the health of our population and our financial forecasts. It also includes the DHB's Statement of Service Performance for the coming year. The Statement of Intent guides the annual planning through the development of the DHB's Annual Plan, which set out annual performance expectations against national priorities and targets. The linkages between the DHB's planning documents is highlighted in Figure 30.

Figure 30 - Relationships between DHB planning documents

Relationships between DHB Planning Documents

- **Annual Report**

  The Annual Report provides a detailed view of the DHB's achievements over the past year against the intentions stated in its SPE. The Report covers the services delivered, standards achieved and financial performance. The results feedback into the next annual cycle of direction-setting and planning.

- **Statement of Performance Expectations (SPE)**

  The Statement of Performance Expectations outlines the DHBs performance targets for the coming financial year. It should be read in conjunction with the DHB's Statement of Intent and focusses on performance against the DHB's strategic goals but encompasses national direction and expectations, through the inclusion of national targets and system level measures. The SPE also sets out the DHB's financial forecast for the year. This document is used by auditors at the end of the year and performance is reflected in the DHB's Annual Report.

- **Annual Plan**

  The Annual Plan outlines the key activities the DHB has planned for the coming financial year. It articulates those activities that will promote the DHB's strategic priorities, address risk and harm and deliver on sector outcomes. A key focus of the Plan is the DHB's commitment to actions that will meet the annual expectations of the Minister of Health, which are delivered in an Annual Letter of Expectations to the sector. This is contained in the Plan along with an overview of how the DHB intends to finance activities in the coming year. Annual Plans are approved by the Ministry of Health.

- **System Level Measures (SLM) Improvement Plan**

  System Level Measures Improvement Plans are part of the DHB's annual planning process and provide an opportunity for DHBs to work with their primary, secondary and community care partners to improve health outcomes of their local populations. The Plans set out actions to deliver improvement against a core set of national system level measures and identifies anticipated improvement in terms of health gain for the population, in areas of priority for the region. Canterbury's SLM Plan is developed and agreed by the three Canterbury PHOs and the DHB and approved and monitored by the Canterbury Clinical Network District Alliance. Commitments are reflected in the DHB's Annual Plan.

- **Public Health Action Plan**

  The Public Health Action Plan describes the public health services that will be provided or funded by the DHB and its Public Health Unit in the coming financial year. The Action Plan also highlights key relationships with other agencies and reflects the contractual commitments aligned to national funding. Canterbury's Plan is completed by Community & Public Health (its public health unit) and is seen as a companion document to the Annual Plan.

- **Long-Term Investment Plan (LTIP)**

  The Long-Term Investment Plan is a 10-year Plan that is completed by the DHB describing the rationale and pipeline of investment required to deliver on the DHB's vision and strategic objectives. The LTIP guides departments in their asset and resource planning and helps to provide the sector with context for future investment. While LTIPs have a 10-year outlook they must be formally refreshed every three years against the DHB's short and medium-term intentions to ensure investment decisions are aligned with broader activity and strategy.

- **Asset Management Plan (AMP)**

  The Asset Management Plan is a 10-year Plan outlining the DHB's strategy for managing its infrastructure and assets to deliver an agreed standard of service. The AMP also highlights how the DHB intends to improving its asset management practices at a strategic and operational level as a mechanisms to support the delivery of the DHB's vision. The Plan supports capital prioritisation decisions and annual planning processes and is refreshed annually.

- **Statement of Intent (SOI)**

  The Statement of Intent is a 3-year Plan, completed by the DHB outlining the DHB's vision and strategic objectives and identifying its medium-term goals and aspirations, in terms of health gain for its population. The SOI articulates how the DHB plans to manage its business in order to deliver on its goals and objectives and how it proposed to assess its performance. This document guides departments in setting up their annual plans and performance reporting.

- **Regional Services Plan (RSP)**

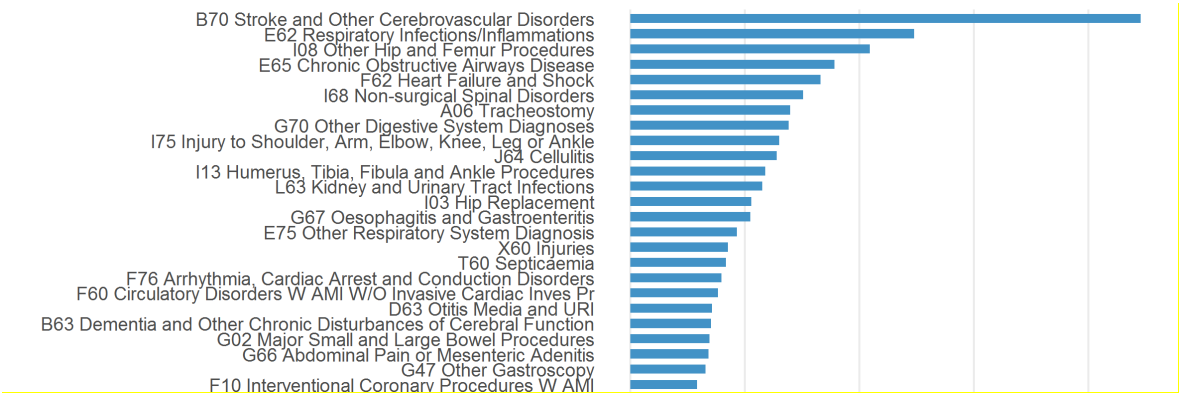
  The Regional Services Plan is a 3-year Plan, completed by the South Island Alliance Programme Office on behalf of the five South Island DHBs. The RSP provides a mechanism for DHBs to document their regional collaboration efforts and align service and capacity planning in a deliberate way. The Plans include national and regional priorities and have a specific focus on reducing regional service vulnerability and inequities in access or outcomes between DHBs. This document guides departments in setting annual plans and supports longer-term asset planning.

Long term planning is supported by the aggregation of near real time, analytical data which allows us to view patient flows across the delivery arm, integrated with information provided by our external providers and external data sets such as collections housed by the Ministry of Health and Stats NZ. Information is extracted from the Canterbury DHB Data Warehouse (accessing the DHB's patient management systems) and is

analysed to understand service provision and trends over time. These planning tools generate service demand forecasts on a 4-10 year basis, outlined in the next chapter.

Our understanding of health need among our population is informed by service utilisation and coded clinical data. Figure 31 highlights the impact that the health conditions such as stroke and other cerebrovascular conditions, respiratory conditions and COPD, as well as hip/femur fractures have on acute bed day rates. Initiatives that aim to prevent or reduce the prevalence of these conditions, often effectively in primary care settings, are more likely to be cost-effective and help to maintain system sustainability.

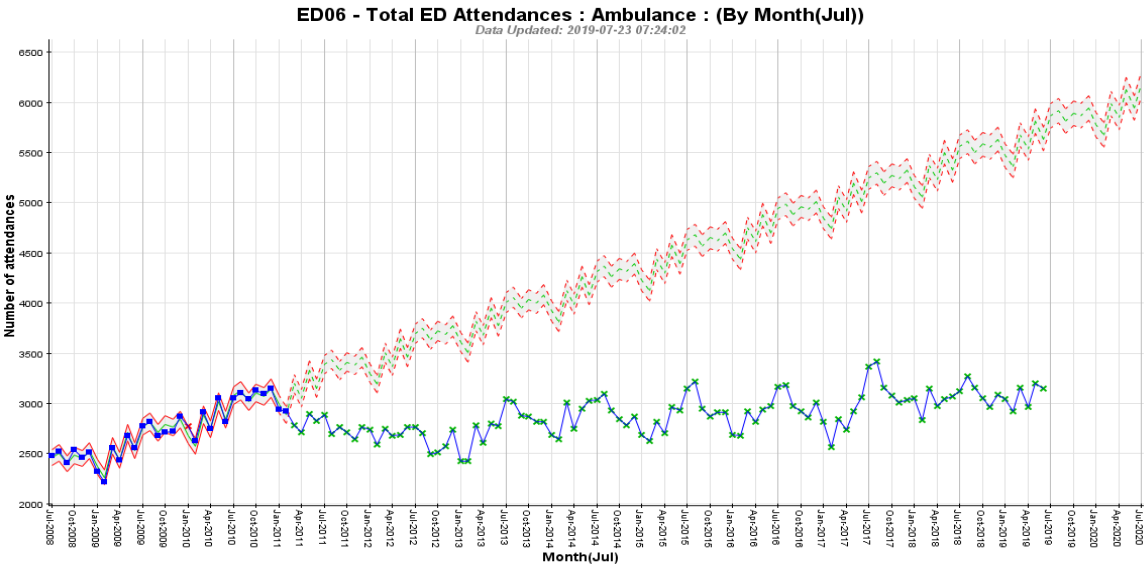
Figure 31 - Top 25 Diagnosis-Related Group (DRG) conditions underlying acute bed day rates



Statistical Process Control analyses are used to monitor patient treatment journeys to understand normal variation from 'special cause' variation which must be explored and may be key to identifying processes that can be improved. We closely monitor key outcomes through our Canterbury Outcomes Framework and the national System Level Measures Framework in which we scrutinise important metrics such as the acute hospital beds days and length of stay for hospital admissions (Figure 13). Through this approach patient journeys are highlighted, improvement frameworks developed and specific areas are targeted for improvement.

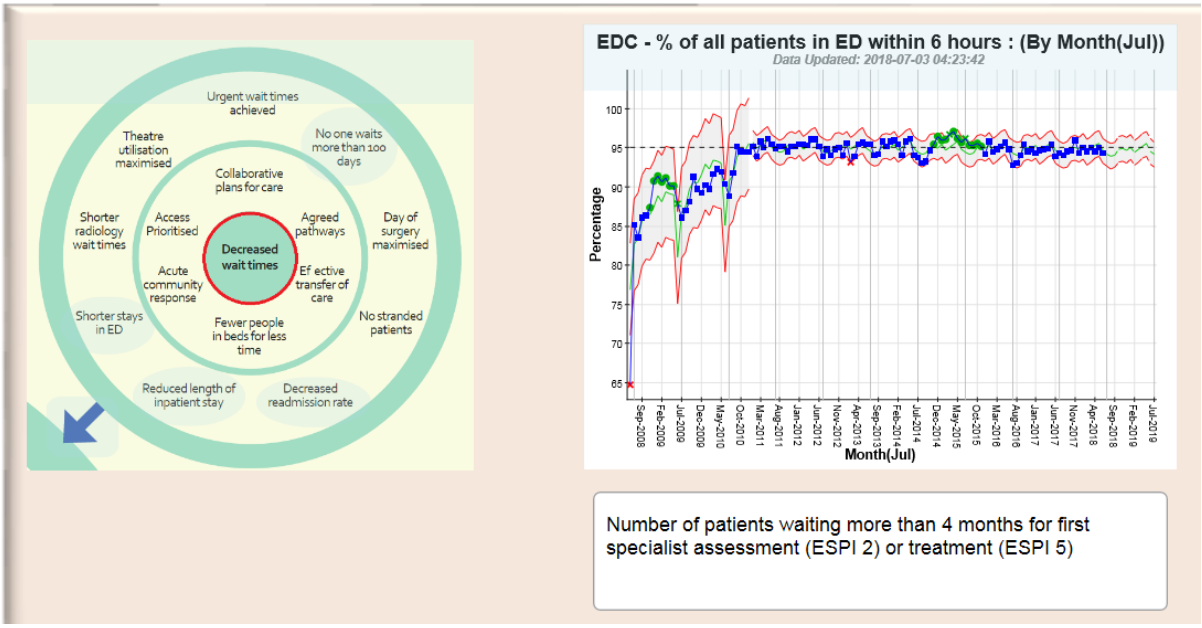
This level of analysis allows us to discover, evaluate and visually represent the system changes we have made. For example, by developing a system-wide approach to managing people with COPD, clinicians across the system all play a role as part of boarder team to manage people with this disease in the community. Our St John Ambulance partners enacted the COPD algorithms endorsed by clinicians across the system to support people to be managed in their own homes and communities. This approach is used for other conditions and has had a profound effect on Ambulance transfers to ED (Figure 32 - ED Attendances).

Figure 32 - ED Attendances



At a high level, we monitor our performance in the long term against a core set of desired population outcomes, which help to evaluate the effectiveness of our strategies and investment decisions. Our goals are captured in the DHB's System Outcome Framework which defines success from a whole of health system perspective and is used as a means of evaluating the success of our collective initiatives. The framework helps to illustrate our population health and an outcomes-based approach to performance improvement. It also encompasses national direction and expectations, through inclusion of national targets and system level measures. Contributory factors are presented in the System Outcomes Framework allowing identification of system to be planned and monitored. This can only be achieved by working as an integrated system with everyone participating for the benefit of our population. The aim of identifying opportunities and developing interventions leads to a more sustainable system, clinically and financially. An example of the Outcomes Framework analytical systems is shown in Figure 33.

Figure 33 - Decreased Wait Times Summary

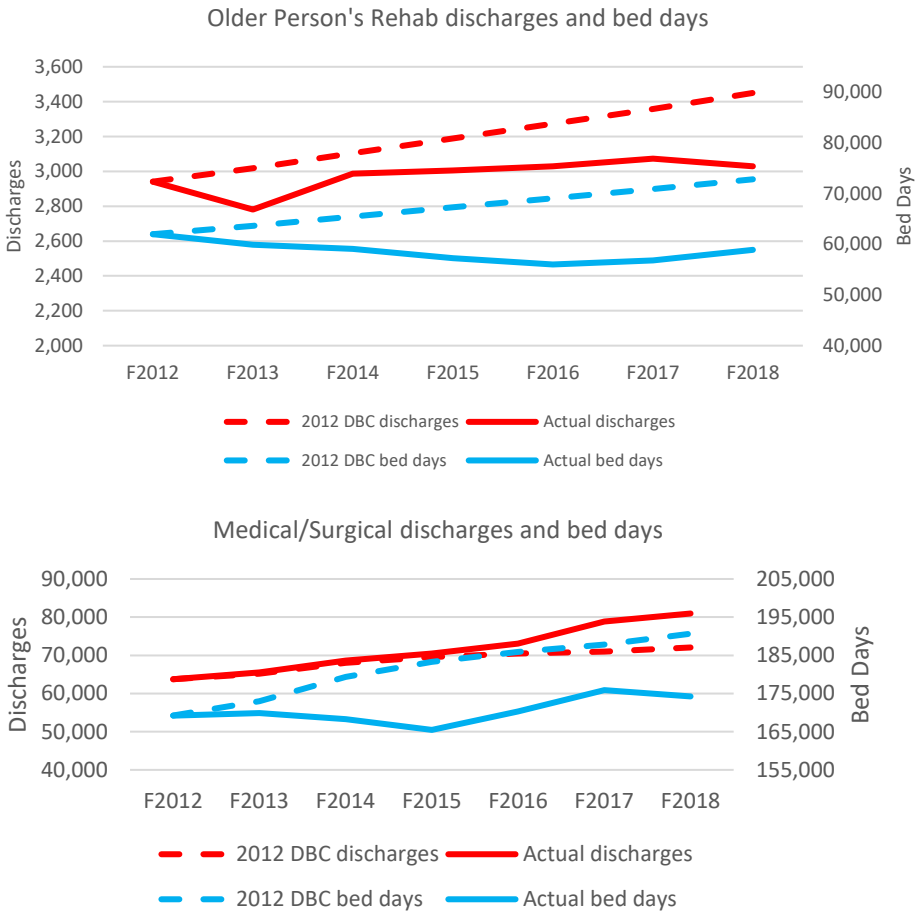


3.8.4 MONITORING PROGRESS

We evaluate the impact of our interventions and investment decisions through monitoring expected outcomes developed as part of our Investment Logic Mapping process that underpinned the 2012 Christchurch campus DBC and the Burwood hospital redevelopment. This guides a disciplined approach to benefits realisation against investments. Three quantifiable areas of anticipated benefits in patient care are average length of stay, hospital bed day utilisation and aged residential care (ARC) consumption.

After accounting for demographic growth, assumptions in the DBC indicated that demand would be modifiable to create efficiencies in length of stay of 5% for general medicine, cardio/respiratory, acute general surgery, elective general surgery, acute orthopaedic surgery and elective orthopaedic surgery. In 2014/15 compared with 2011/12 (baseline for the DBC) the standardised acute length of stay had decreased by 8%, the elective length of stay decreased by 6.2% and the acute medical length of stay decreased by 10.2% (shown in Figure 34 below). This is achieving better than projected benefits and shows stronger performance than national changes. The expected benefits with regards to bed days were also exceeded, see Fig 32. With our relatively aged population, utilisation of ARC in Canterbury has been high relative to other DHBs. Through a series of interventions the DBC assumed that rest home bed days per population would reduce to the national average by 2020. Following implementation of the DBC, rest home level care had 193,261 fewer bed days in 2017/18 compared with 2009/10 and on a population rate basis, Canterbury's aged residential care utilisation has fallen to South Island rates.

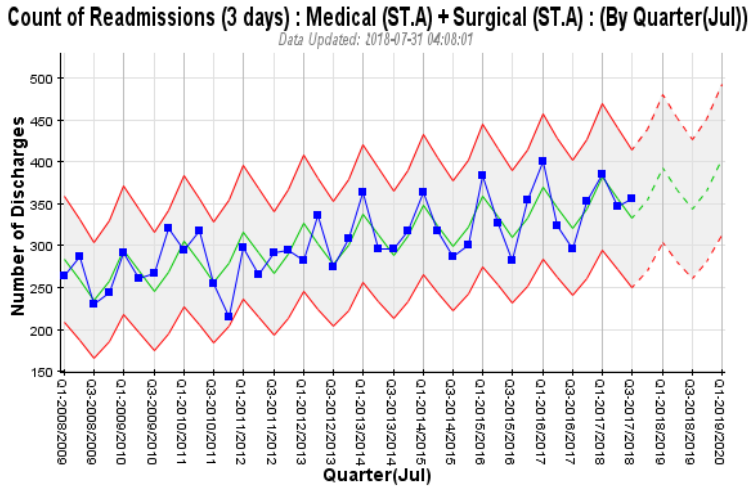
Figure 34 - Gains in bed days following the previous Christchurch campus build and Burwood development

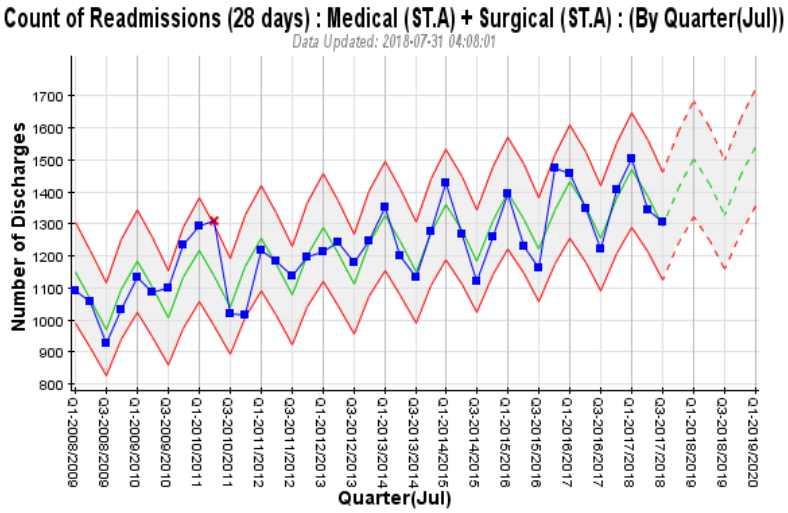


The performance indicators associated with the Benefits Realisation Model and the DHB's Outcomes Framework are regularly reported to our Board and Alliance Leadership Team. They are also reflected in the DHB's Statement of Intent and reported against in the Annual Report at the end of each financial year.

The performance of health system is best monitored longitudinally for patient outcomes. This focuses on our ability to keep people healthy for longer, preventing onset or deterioration of long-term conditions and supporting people to achieve their health goals. We also monitor counter measures such to ensure the interventions and system improvements don't have unintended impacts. In our efforts to reduced length of stay in hospital and get people homes as quickly as possible, there is a risk of hospital readmission especially if the right community supports and services are not in place. Currently Canterbury readmission rates fall within the lower quartile of the 20 DHBs however these rates have increased and continue to be monitored. The three-day readmission rates may represent a 'failed discharge' and therefore provide insight into how hard we are pushing the system (Figure 35).

Figure 35 - Count of Readmissions (3 & 28 days)





3.9 Progress since the 2016-26 LTIP

Since the previous LTIP in 2016 a number of investments have been completed including: the new build at Burwood (wards, outpatient and admin, back of house and boiler house); the new Outpatients building at the Christchurch health precinct; the co-location of Manawa education facility with Ara Institute and University of Canterbury at the Christchurch health precinct; and implementation of SIPICs and Health Connect South. Progress has also been made on the Hagley (Acute Services Building) facility and the Energy Centre on the Christchurch Campus and work has commenced on the new Hillmorton development for Specialist Mental Health Services which are currently stranded on the Princess Margaret Hospital site.

Burwood Hospital

Burwood Hospital is one of New Zealand's centres of excellence for rehabilitation and elective orthopaedic surgery. The hospital opened its new main entrance doors to patients and visitors in mid-June 2016, including 88 elderly patients transferred from The Princess Margaret Hospital.

Christchurch Outpatients

Five storeys high, the new building provides 10,500m2 of state-of-the-art facilities for more than 20 different outpatient services at Canterbury DHB, including Diabetes and Endocrinology, the Blood Test Centre, Hospital Dental, Canterbury Eye Services (Ophthalmology), Haematology, General Medicine, Gastroenterology, General Surgery, Infectious Diseases, Dermatology, Respiratory, Cardiothoracic, Cardiology, Neurology, and Urology.

Manawa

Opened in July 2018, the Manawa health research and education facility is a collaboration between Christchurch's health and tertiary education sectors. As well as lecture rooms and flexible learning spaces, tutorials and large group sessions, a simulation floor enables large-scale simulations in real world healthcare environments

Cortex

Cortex enables digital progress notes and task lists from across Nursing, Allied Health and Doctors to be accessible from point-of-care devices. This means the care team has immediate access to accurate information about their patients. Cortex has now been implemented for General Surgery, Paediatrics, Spinal Orthopaedics and Orthopaedics and is being rolled out to other services.

SI PICS

The rollout of SI PICS is a significant achievement, replacing three outdated software systems in Canterbury, with two of them being more than 20 years old. More than one million patient records have now been successfully transferred into SI PICS. This is one of the largest health software programmes undertaken in New Zealand – certainly in the past decade. SI PICS works in conjunction with the existing South Island-wide clinical portal Health Connect South and is a step closer to the vision of a fully integrated electronic patient record.

Health Connect South

Health Connect South is the principal clinical information system and regional solution for the whole South Island. It interfaces with SI PICS and HealthOne, enabling role-specific data sharing across general practice, pharmacy and hospital services.

4 Future Investment Drivers

The strength of our Alliance partnerships and wealth of data from across this system mean that we have a clear picture of the state of the Canterbury health system today. This chapter talks about the challenges we believe our system will face in the next ten plus years. Our growing and ageing population underlies much of the pressure we anticipate but this is not the whole picture. Increasing prevalence of long term conditions that require ongoing health interventions are exacerbating the pressures of an ageing population. Treatment is also increasingly complicated due to the presence of co-morbid conditions. The ability to recruit and retain skilled healthcare workers is likely to become even harder. New technological options such as diagnostics at the point of care and mobile-assisted self-management must be judiciously introduced so we get the benefits without crippling the system.

This chapter outlines the areas in which we are expecting particular demand increases or changes and also the vision for each of these areas.

4.1 Service Demand Forecasts

The following are areas of particular focus for the Canterbury health system for the period of this LTIP. These were identified by leaders from across the Canterbury health system during the engagement process for this Plan. Note that whilst we have considered demand in the next ten years and beyond, we present projections for up to four years in general as they can become too inaccurate in the later years.

4.1.1 EQUITY OF ACCESS TO HEALTHCARE AND OF HEALTH OUTCOMES

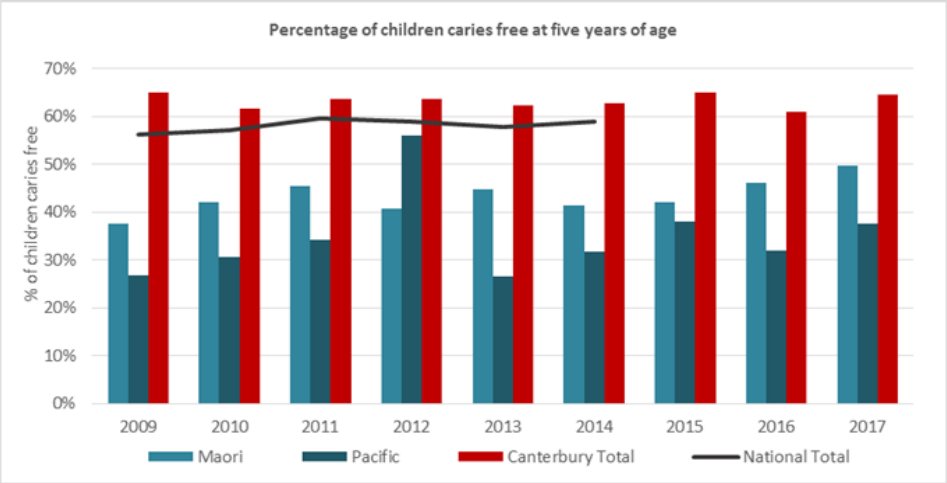
Health equity means that no-one is prevented from attaining their full health potential due to social constructs such as race, ethnicity, gender, sexual orientation or socio-economic status. As a health system, Canterbury has identified equitable health outcomes as an overarching goal. In Canterbury, there are still concerning gaps in access to services and in health outcomes that we must work to eliminate. Addressing inequities in health outcomes requires taking a population-based approach that acknowledges the impacts of wider social determinants of health, such as housing, employment and food security. Targeting resources in proportion to need is a key tool in seeking to eliminate inequities. This approach recognises the continuum of need and aims to improve health outcomes across the board whilst simultaneously seeking to improve the health of the most disadvantaged the fastest. Such interventions must be carefully designed using appropriate data to avoid excluding or stigmatising some of the target population. The Canterbury health system alliancing approach supports us to address inequities through taking an integrated approach to designing system level interventions. Service design within the alliance is clinically led, with input from representatives from the Māori and Pacific caucus and external stakeholders such as Child, Youth and Family where appropriate.

Our Māori, Pacific and Asian populations are projected to grow by 23%, 25% and 30% respectively over the lifetime of this plan. The proportion of Cantabrians living with disabilities is also likely to increase given the rising prevalence of long term conditions such as diabetes and our ageing population. This section highlights some particular areas of concern but it is important to remember that significant gains in equity of health outcomes will only be made in a system that that encourages healthy lifestyles, improved health literacy and engagement with health services as well as one where the broader determinants of health, such as employment opportunities, housing and wealth distribution are also addressed.

4.1.1.1 Oral Health

Oral health is an area in which there are clear differences between ethnic groups. Dental health problems cause significant personal, societal and economic costs and are the fourth largest contributor to Canterbury's ASH rate for 0-4 year olds[35]. As Figure 36 shows, the proportion of Māori and Pacific children who are caries free at five years of age is much lower than average.

Figure 36 - Percentage of children caries free at five years of age by ethnicity



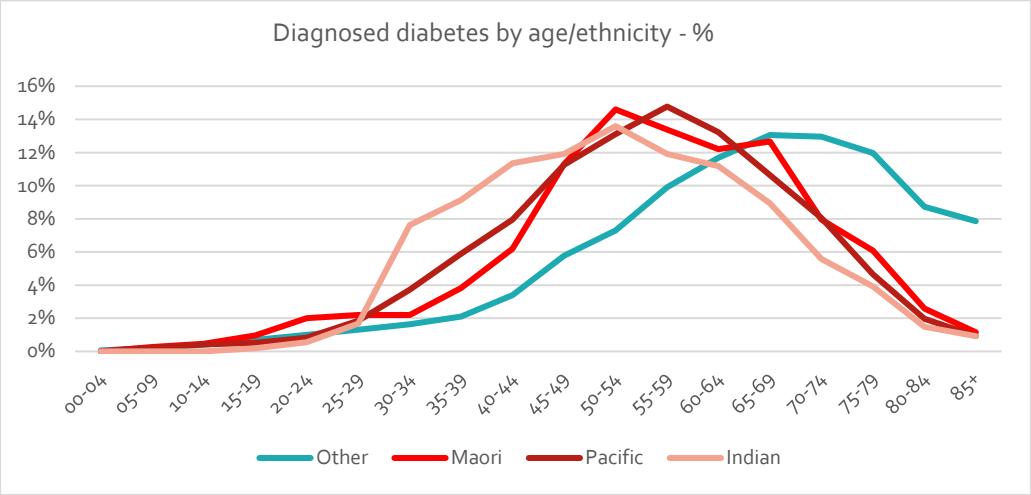
Our Community Dental Service is already struggling to meet demand and the expected population increase over the next ten years, particularly in our Māori and Pacific communities, will place even more pressure on this service. Community dental vans currently visit all schools every year and the increasing population will result in more schools to visit. Canterbury currently does not add fluoride to its water supply, unlike many other areas.

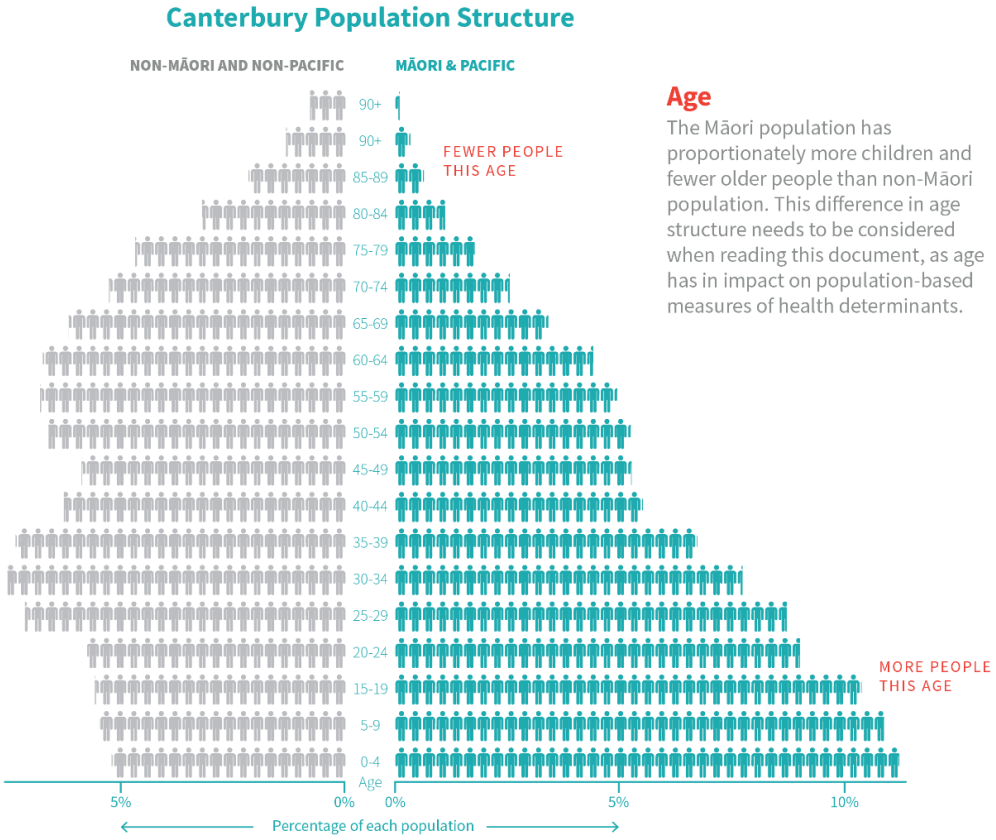
4.1.1.2 Diabetes

There are marked differences in the diabetes burden across different ethnic groups. The age-standardised data show that the relative risk for our Māori population is 1.64 and the Pacific population risk is even higher at 3.98. Our Māori, Pacific and Indian populations are diagnosed with diabetes at younger ages (Figure 37). This is of particular concern as these populations have significantly younger profiles and are growing at higher rates than other ethnicities and hence this will significantly increase demand on diabetes-related services.

[35] with a rate of 618 per 100,000 at December 2017

Figure 37 - Diagnosed diabetes by age/ethnicity





4.1.1.3 Screening Services

An area in which targeted investment may be needed to increase the level of service in order to address inequities in health outcomes is in breast and cervical cancer screening. Currently cervical screening rates are significantly lower for our Māori and Asian populations, and breast screening rates for Māori and Pacific fall below the rates of other ethnicities.

Māori are 40% less likely than non-Māori to have a cervical smear and four times more likely to be diagnosed with cervical cancer

Figure 38 - Breast screening Aotearoa coverage by ethnicity in the 2 years ending 31 March 2018 for women aged 50-69 years

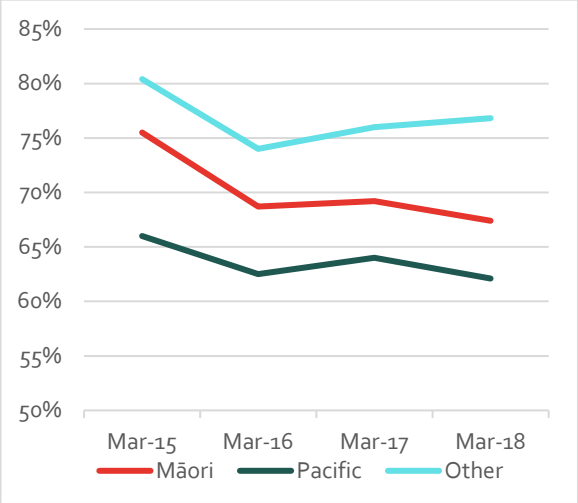
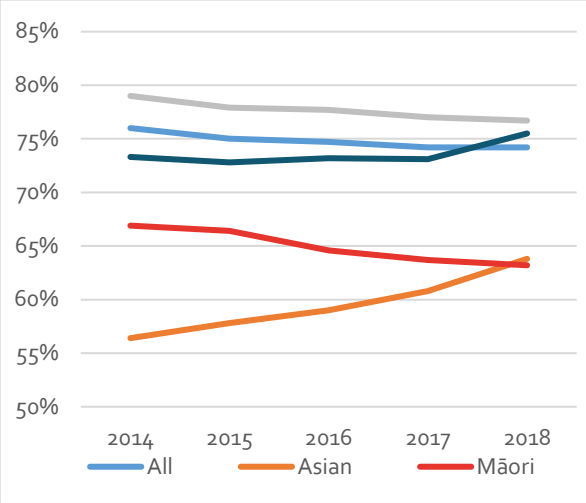


Figure 39 - Cervical screening rates by ethnicity



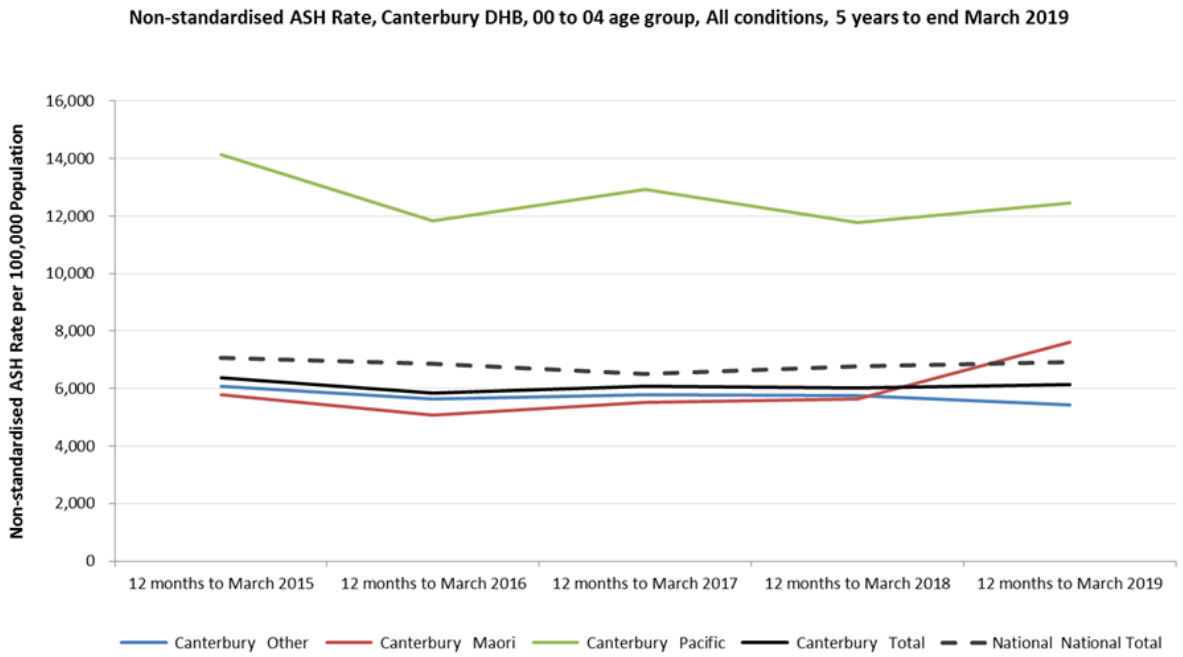
The cervical screening environment is likely to change over the lifetime of this plan as, at a national level, the direction is towards providing the vaccine more widely, so screening will become less important. We have recently changed our breast screening providers and are monitoring to determine whether screening rates for Māori and Pacific populations improve.

He Waka Tapu, a Kaupapa Māori health provider, has an outreach service that goes into factories to try to increase screening rates

4.1.1.4 ASH Rates for Children

Ambulatory-sensitive hospitalisation (ASH) rates are monitored as they provide an indication of how well primary and community health care is functioning. For young children (0-4 years old) ASH rates are substantially higher for Pacific children and have increased recently for Māori children, see Figure 40.

Figure 40 - ASH rates 00-04 age group



Whilst ASH rates have been closing, additional focus is required to close the gap to improve outcomes for Pacific children. Research using a Talanoa[36] methodology on the views of Pacific families whose children had been admitted to hospital and health professionals working in primary and secondary care included that:

- Pacific families needed a relationship with general practice teams that was based on trust, respect, and cultural sensitivity, an understanding of the Pasifika worldview, and that allowed more time, accessibility, and advocacy. However, they did not always find these things in their general practice. Families were prepared to wait for a thorough assessment in hospital instead of a short timeslot in general practice, and they missed Pacific staff or staff with cultural competency to understand their needs and relate to their lives.
- Clinicians viewed families of admitted children as having poor health literacy and education, a lack of support systems in place, and unable to fully utilise the health system because of communication and understanding barriers.
- Views were shared in both groups on the importance of cold, damp and overcrowded housing; financial barriers to accessing primary care including general practice debts; presentation to hospital due to transportation, access and appointment barriers in general practice; and the difficulty of enrolling in primary care due to temporary immigration status.

A series of initiatives are underway or about to start that will seek to address Pacific ASH rates for 0-4 year olds in light of these findings, as described in section 5.2.1.2.

Māori ASH rates for 0-4 year olds are comparable with non-Māori, partly as a result of work undertaken through the SI Alliance Child Health Quality Programme and learnings will be shared with this group.

[36] In Talanoa methodology, the social, political, intellectual and cultural legitimacy of Pacific peoples are taken for granted and Pacific cultures, knowledge and values are accepted in their own right (taken from waikato.ac.nz)

4.1.1.5 Ethnicity Data Capture

Recording more accurate data on ethnicity will help us to plan and implement service improvements for our population. The Canterbury Health System Level Improvement Plan has a target to improve the accuracy of ethnicity capture of new-borns enrolled in general practices as any inaccurate capture here follows the newborn's registration into other services. Improvements have already been implemented for community dental services which will allow us to monitor and manage access to dental services by ethnicity more effectively. Accurate capture of ethnicity data was also identified as a priority recommendation from the Southern Cancer Network's Cancer Pathways for Māori project.

4.1.1.6 Deprivation Related Inequities

Deprivation impacts strongly on health care and health outcomes. In Canterbury socio-economically deprived people are hospitalised with preventable conditions at almost twice the rate of those less deprived. The population shifts post-quakes have made it harder to target services to lower income groups.

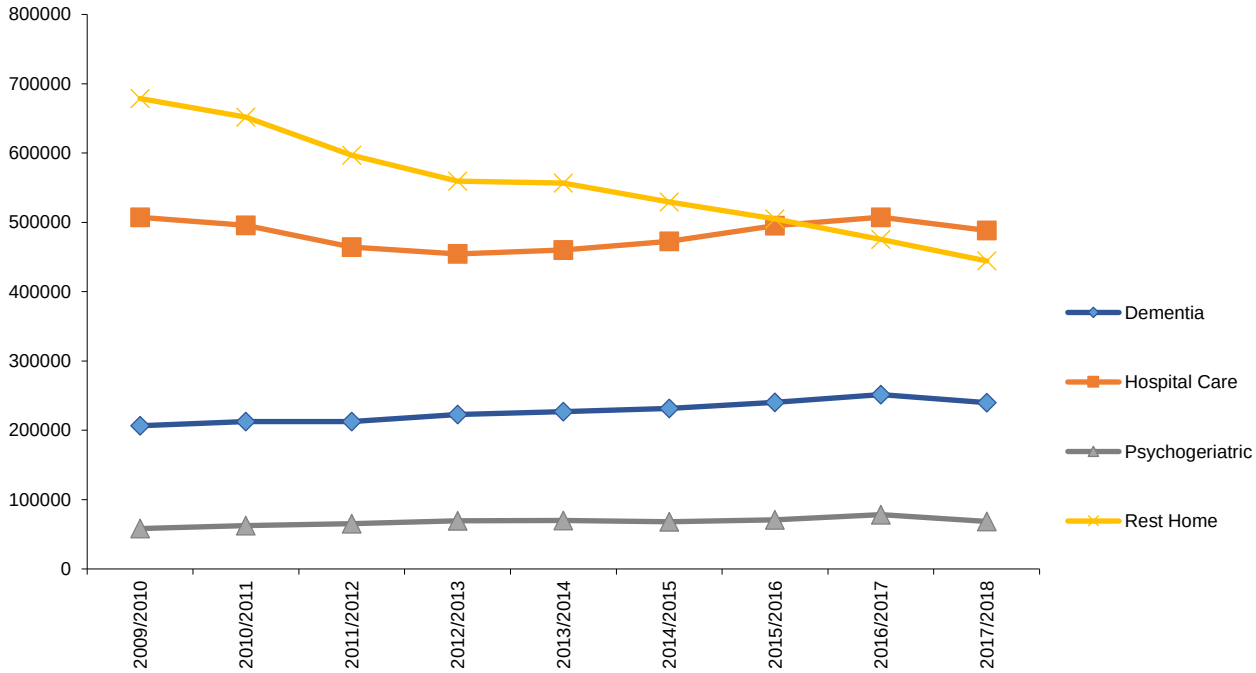
VISION: DIFFERENCES IN RATES OF AMENABLE MORTALITY, OUTPATIENT AND PRIMARY CARE AND PROCEDURES BY ETHNICITY (AND DEPRIVATION WHERE MEASUREMENT IS POSSIBLE) ARE FURTHER REDUCED

4.1.2 OLDER PERSONS' HEALTH

The Canterbury health system faces the same challenges as other DHBs of an ageing population and rising numbers of people suffering from age-related conditions (e.g. dementia). However our 65+ population is the largest of any DHB, and the proportion of elderly people is higher than the national average, making these issues more acute. Older Person's Health (OPH) provides rehabilitation, sub-acute medical care, stroke services, ortho-medicine and surgical medicine treatment to Canterbury residents aged 65 or older (or 50 years and older for Māori and Pacific Island people). Guided by the New Zealand Positive Ageing Strategy (2001) and the Health of the Older Person Strategy (2002), the Canterbury health system aims to support people to "age in place", which means supporting our elderly to participate fully in decisions regarding their health and wellbeing and continuing to live in the community where possible. We do this by focusing efforts to provide clinical services and community based supports that enable people to stay well and as active as possible in their own homes and reduce the risk of entry into Aged Residential Care (ARC).

Our OPH service is based on a hub and spoke model with hospital level care delivered at our Burwood hospital facility, upgraded in 2016, supported by community based teams who provide home-based allied health care alongside services delivered by external providers. Services such as CREST (Community Rehabilitation and Enablement Support Team) and the Stroke Rehabilitation service have enabled us to effectively manage demand for hospital and aged residential care-level services (see Figure 41).

Figure 41 - Older Persons Services - ARC bed day volumes



A key pressure will be in sustaining this model as the population grows and ages proportionately. The over 65s population is projected to increase from 16.1% of the population currently to 19.4% in 2027/28, putting additional pressure on a service that is already struggling with capacity constraints. The very old population is particularly expected to increase, with the number of people aged 80 years old and over projected to increase from 22,770 (or 3.9% of the population) in 2019/20 to 32,020 (or 5.1% of the population) in 2027/28.The increasing levels of obesity are compounding the pressures as, for example, requests for access to bariatric equipment, which incur additional costs, are also becoming more prevalent. There are increasing impacts of psychogeriatric conditions such as dementia. The proportion of clients[37] identified as cognitively impaired has increased from 4.21% in 2013 to 14% in 2018. Wait time for an interRAI assessment currently has a median of 35 days and we have one interRAI assessor per 900 of the over 65 year old population.

For the home based support providers this means the types and frequency of supports are both more intensive and frequent, e.g. multiple visits over the day requiring more than one carer. For the clinical teams the complexity and fragility of most clients will increase.

Another significant pressure for this area is in recruiting and retaining sufficient healthcare workers as this is one of the biggest areas of growth for the allied health workforce. A multi-disciplinary approach to care is critical, for example, psychological support is needed for managing chronic pain and interventions such as pacemakers.

VISION: EARLY INTERVENTION AND THRIVING COMMUNITY PROVIDERS SUPPORTS OUR ELDERLY TO PARTICIPATE FULLY IN DECISIONS REGARDING THEIR HEALTH AND WELLBEING AND TO CONTINUE LIVING IN THE COMMUNITY FOR AS LONG AS POSSIBLE

[37] of clients of the interRAI (a tool which enables comprehensive clinical assessment of older people) and which is used to evaluate whether entry into ARC is required

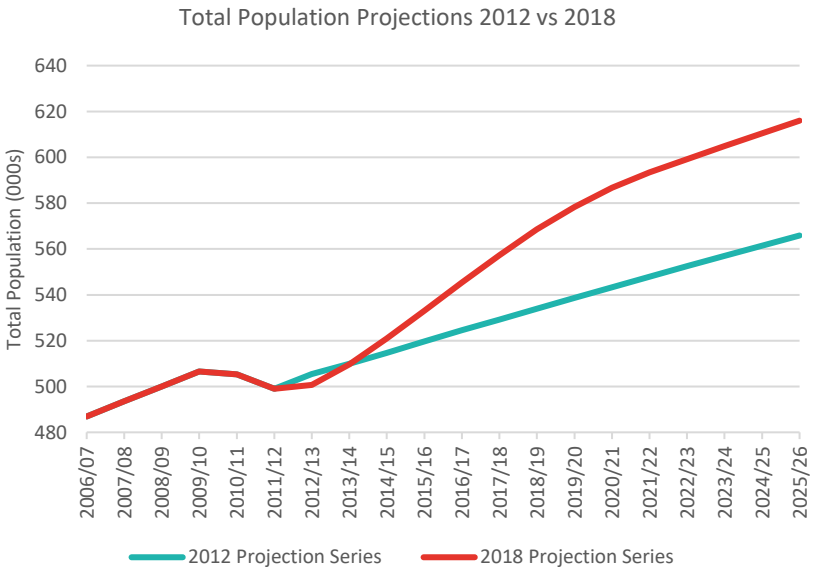
4.1.3 MEDICAL-SURGICAL

In accordance with our third strategic goal of 'People receive timely and appropriate complex care', we are committed to ensuring that our hospital facilities are appropriately sized and up to relevant standards. Our aim is to support community and primary care to keep people well in their own homes and communities, freeing up hospital based care for episodic and complex care and for specialist advice to primary care.

Initiatives such as the Falls Prevention and Acute Demand Management Service have helped reduce the total number of bed days despite the total number of adult discharges increasing due to higher than projected population growth. The national OS3 average length of stay measure for inpatient medical and surgical events shows Canterbury has amongst the lowest average lengths of stay for any DHB and is the best-performing large DHB. Across all Medical, Surgical Acute and Surgical Elective events, Canterbury DHB recorded 14,000 fewer bed days than was expected in 2016/17, 11,500 bed days for Christchurch Hospital events alone. This represents a benefit of about 45 beds.

The Canterbury population showed a minor reduction after the earthquakes, but then population growth resumed quickly. Importantly, this growth was at a higher rate than was predicted at the time that the 2012 Canterbury DHB Facilities Plan DBC was developed. As an example, the 2018/19 funded Canterbury population of 567,870 was not expected to be reached until 2026/27 under the 2012 population model projections, eight years later than is being experienced[38]. Under current projection assumptions, by 2025/26 (the last year included in the 2012 projections) the population will be more than 50,000 people (9%) larger than was originally modelled (Figure 42)[39]. Whilst the current Christchurch campus Hagley build will ease pressure in the short term, we will quickly outgrow these facilities due to the higher than expected population growth.

Figure 42 - Population Projections 2012 vs 2018[40]



[38] 2012 population projection series only extended to 30 June 2026, when the Canterbury DHB population was projected to rise to 568,020. The current projection series has the 2019/20 population at 578,340, far in excess of this figure.

[39] Assumptions – ACC-funded service delivery has been included at the current rate and are assumed to stay at this level

[40] Since 2012 Stats NZ have continually updated their projection models. The current population projections currently use Census 2013 as a base data set, and are using updated assumptions for fertility and mortality rates, and for net migration.

Other factors driving increasing demand in this area include the retirement of key surgeons in smaller centres, and new destination policies for areas such as trauma and vascular. For example, "stroke clot retrieval" or endovascular thrombectomy is an interventional radiological procedure provided within a short time of symptom onset (mostly within six hours but that is changing over time) for a select group of stroke patients with proximal anterior circulation occlusion. It refers to the percutaneous endovascular removal of occluding thrombus from proximal cerebral arteries in patients suffering from an acute ischemic stroke. It is a part of the National Services Group pathway for rollout across the country. In the National Services Implementation plan, Canterbury DHB is the South Island hub for Stroke Clot retrieval. After a period of work on ensuring all South Island DHBs could take and transmit scans into our system, we started providing the service from 01 July 2019 to all South Island DHBs.

VISION: MAJORITY OF SURGERIES ARE BROUGHT BACK IN HOUSE, REDUCING COSTS AND ENABLING CARE TO BE DELIVERED BY AN INTEGRATED TEAM IN A TIMELY MANNER

4.1.4 ADULT REHABILITATION (INCLUDING SPINAL INJURY CARE)

Canterbury DHB provides a range of specialised adult (16-65 years old) rehabilitation services, including a comprehensive spinal impairment service and a neuro-rehabilitation service. Burwood Hospital, which includes our specialist brain injury rehabilitation service and spinal injuries unit, is the focal point of adult rehabilitation services, offering comprehensive services including Allied Health and pain management. Christchurch and Ashburton Hospitals also provide Allied Health and medical support, together with a small number of specialist community providers. Canterbury DHB also provides community based teams, including speech and language therapists and occupational therapists, who accept over 1000 patients annually for specialist support to remain in their own homes and communities. The service is capacity constrained largely due to population growth, with, for example, the time from referral to appointment with the Adult Community Therapy Service at over 50 days in 2016/17 and a sharp increase in the number of referrals declined due to lack of capacity.

Demand increases due to population growth are compounded by the complexity of cases. A significant proportion (estimated at around 20%) of patients have a range of complex health issues, including social and mental health, but generally not related to one particular specialty. These patients need holistic and individualised overview and coordination of their needs. There is an under supply of suitable slow stream and transitional rehabilitation beds for under 65 year olds in the community.

There are also workforce issues in this area with scarce rehabilitation consultants as rehabilitation medicine training has been unable to meet the demand New Zealand wide.

4.1.4.1 Spinal Service

The Burwood Spinal Unit (BSU) was designated as one of two specialist spinal centres nationally by the Spinal Cord Impairment Action Plan 2014-19 (a joint initiative between ACC and MOH). Its catchment covers all of the South Island and up as far as New Plymouth across to Hastings (see Figure 43). Spinal trauma patients are particularly complex, requiring significant theatre time as well as a comprehensive suite of supporting services. The BSU provides acute and rehabilitative services, elective surgery, pressure area management, outpatient clinics, lifelong surveillance and reassessment services as well as ventilator management services to patients across New Zealand. It admits around 45-50 acute traumatically injured, 40-50 acute non-traumatic impaired and approximately 160 non-acute admissions per annum with an average length of stay of 26 days, although some patients remain for 3-6 months rehabilitation. The BSU consists of a 26 bed ward plus 4 transitional rehabilitation beds in the adjoining hostel and has not had any upgrades aside from minor room reconfigurations since it was built in 1979.

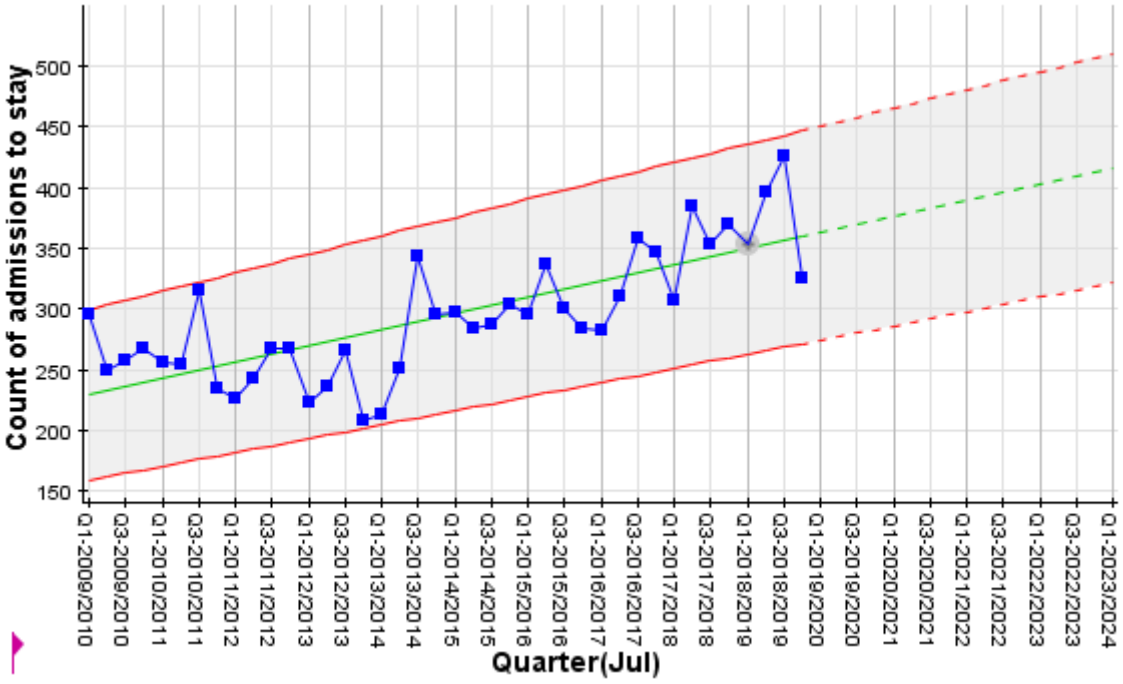
Figure 43 - Spinal service catchment area

Almost 60% of patients admitted to the BSU live outside the Canterbury DHB area. The average age of patients admitted has been increasing in recent years (now at around 50 years old), partly due to the overall ageing of the population and also as more people enjoy pursuits that can lead to spinal trauma. Māori are disproportionately represented in the spinal impaired population. Furthermore, patients that have a current spinal cord impairment are now facing age-related issues as life expectancies have increased. Such patients frequently experience shoulder-related injuries from long term wheelchair use and general age related impairments that are more complicated to manage due to their reduced mobility. As for many hospital based services, the increasing proportion of patients who are clinically overweight or obese has implications for staff safety in safe handling and equipment issues, bringing additional complications and expense.

Other demand challenges currently facing the service include the cost and sustainability of providing an acute spinal service as the two-site destination policy for traumatic spinal injury has grown to spinal impairment and referrals now for a range of other spinal conditions. Equally the rehabilitation service is facing greater referrals for non-acute management of spinal impaired patients across the catchment without corresponding capacity or funding. Spinal services experiences a greater inter-district flow as the service accepts non-traumatic patients from across the catchment. These factors, together with an increase in the number of road traffic accidents, have seen increasing demand for spinal inpatient services (Figure 44).

Outreach services for spinal patients are expensive as they involve multi-disciplinary teams and, in the case of patients from outside Canterbury, transport costs, including to the North Island. As well as increasing patient numbers, planning and funding of this service must take account of the increasing costs of the radiological tests required. As for rehabilitation services generally, finding appropriate community placements is difficult.

Figure 44 - Admissions to spinal inpatient services



There are currently unacceptable levels of risk to this service under the current model of care where the rehabilitation team provide 24 hours cover for new acute injuries, in conjunction with the acute orthopaedic surgeons. This is not sustainable in the long term unless rehabilitation training incorporates acute management. The rehabilitation services should link in at the earliest opportunity for acute spinal cases to ensure that specialist rehab care is initiated as soon as possible and complications and co-morbidities are minimised.

This area also faces future workforce constraints, with rehabilitation consultants hard to recruit and retain. The nursing workforce faces challenges with physically heavy workloads of this work, also due to ageing and bariatric trends. Many of the nurses are themselves ageing and experiencing injuries from lifting.

4.1.5 RADIOLOGY AND DIAGNOSTICS

Radiology and diagnostics are services to other parts of our healthcare system, including beyond Canterbury, making it particularly important to take a system-level view of service development in these areas. Some of these services are provided directly by Canterbury facilities/subsidiaries, providing important resilience against external price increases.

4.1.5.1 Radiology

Canterbury DHB radiology services provide secondary and tertiary services to people in Canterbury and the wider South Island plus some community referred services. Radiology services are heavily information technology dependent and need their systems to interface with others across the South Island. The South Island DHBs are working towards a functionally single radiology solution to enhance patient care.

As for other parts of the health system, demand for both Canterbury DHB and community provided radiology services is increasing, due to our increasing, and ageing, population. There is also increasing demand resulting from referrer side activity including new or alternative therapies and nationally driven screening initiatives, such as bowel cancer screening. Additional pressures come from shorter turnaround requirements for ED referrals, stroke service, cancer streams etc. related to national and other indicators/targets. Technological improvements in radiology such as lower dose scanning, are driving demand through increasing the scope of

the therapies and from enabling patients to have more scans safely. Changing drug regimes, such as Multiple Sclerosis therapy, have led to greater demand for MRI.

Demand management for radiology services has been successfully implemented to mitigate increasing demand. For example, community-referred radiology pathways have been standardised across the Canterbury health system, resulting in increased access to diagnostics, fewer declined referrals, better outcomes and reduced wait times. Referrals for all modalities outside plain X-ray are now triaged.

The national 'Choose Wisely' campaign encourages clinicians always to think carefully before recommending procedures or tests. Our maternity services have reduced the number of ultrasound scans as the former 'dating scan' at six weeks provided very little additional information but could lead to further unnecessary investigation and anxiety. Not only is this better for patients, it's also better for our system and contributes to an efficient use of resources

The challenge over next ten years is to continue to meet demand, especially with new uses for the imaging technologies, such as interventional radiology where radiology is used in real-time to support surgeons, e.g. stenting and cancer. A major demand pressure over the lifetime of this LTIP will be in matching workforce to demand as there is a national shortage of radiologists. There will also be a need for scheduled replacement of MRIs within the ten year period of this LTIP.

4.1.5.2 Pathology and Laboratory Services

Canterbury DHB pathology and laboratory services are delivered through Canterbury Health Laboratories (CHL), an operating unit of our provider arm, who provide testing for all inpatient services as well as some community/outpatient testing. Based across the road from the main Christchurch hospital campus, CHL is the largest laboratory in the South Island and one of only two tertiary-level reference and teaching laboratories in New Zealand. With the largest catchment area of any medical laboratory in New Zealand, CHL delivers core medical diagnostic services, as well as a diverse range of specialist testing disciplines. CHL performs over four million tests annually and conducts more than 2,000 different types of tests, compared with less than 200 at most other laboratories. It acts as one of the major referral laboratories for all other medical laboratories in New Zealand, receiving specialist and reference referral work from all DHBs. CHL also makes contributions to the wider healthcare system through supporting system resilience by providing contingency and backup pathology and laboratory services, contributing to training and development of the national workforce and through partnering with international research collaborators, including on major international disease studies and pharmaceutical trials. Having a publicly owned, tertiary level laboratory enables the wider healthcare system to retain the ability to respond to national system directions, such as research to support national strategies, as well as providing resilience against private sector pricing regimes which may be driven by international factors. With its status as a tertiary level laboratory, it is particularly important to take a regional and nationwide approach to service planning.

Cancer referrals from across the South Island are supported by CHL's pathology and laboratory services

Internal and external audits of the existing laboratory facilities have declared them as no longer fit for purpose. The current 8,500m^2 main laboratory facility was built in 1988, when manual laboratory processes were the standard. Since then, processes have become more automated, test volumes have increased and standard issues relating to ageing building infrastructure have emerged, exacerbated by the Canterbury earthquakes. The current configuration and layout now cause congested conditions that result in significant operational inefficiencies and in turn place patient sample flow and timely care at risk as well as negatively impacting on staff wellbeing and safety.

As a result of the building shortcomings and an increase in the standards required for accreditation and certification of laboratory facilities, our accreditation is at risk. Loss of accreditation would have significant consequences, not only for Canterbury but nationwide as CHL would have to stop undertaking reference work for other laboratories. In some cases, tests would need to be referred to overseas laboratories, significantly increasing wait-times for patients as well as financial costs. Loss of accreditation would also impact on the professional training provided by CHL and could result in loss of economies of scale which would make the whole service less cost-effective.

1 in 3 HEALTH PROBLEMS SEEN BY GPs REQUIRE PATHOLOGY

As with our other services, this area is also expected to experience increasing demand over the next ten years from our increasing population, exacerbated by the ageing profile of that population. In addition, increasing demand pressures are expected to result from national initiatives such as the National Bowel Screening Programme and a new forensic coronial service in partnership with the Ministry of Justice.

The workforce in this area is also ageing and, whilst increasing automation will mitigate some of this risk, it will also change how we work. Laboratory and pathology services also need to be flexible in the face of disruptors such as increasing use of point of care diagnostics.

A number of demand management strategies have been implemented to mitigate these risks/pressures, such as the nationwide Choosing Wisely campaign which encourages clinicians to consider carefully before ordering tests or recommending procedures. While useful, these initiatives cannot compensate for the constraints of the building, meaning that investment in our laboratory facilities is needed to mitigate the risks and avoid unacceptable service loss.

Other pressures impacting on this area include the introduction of next generation pharmaceuticals requiring radiological monitoring, genomic testing and other diagnostics which impact on the provision of other services, e.g. radiology. As an example, the new monoclonal antibody pharmaceuticals for multiple sclerosis require significant MRI scans for safety. This creates a short-term bottleneck for diagnostic services but will ultimately provide benefits to patients and the system by slowing the deterioration of this disease.

VISION: RADIOLOGY AND DIAGNOSTIC SERVICES ARE A KEY ENABLER FOR CLINICIANS, ARE DIGITALLY ENABLED AND BASED IN FIT-FOR-PURPOSE

4.1.6 WOMEN'S AND CHILDREN'S HEALTH

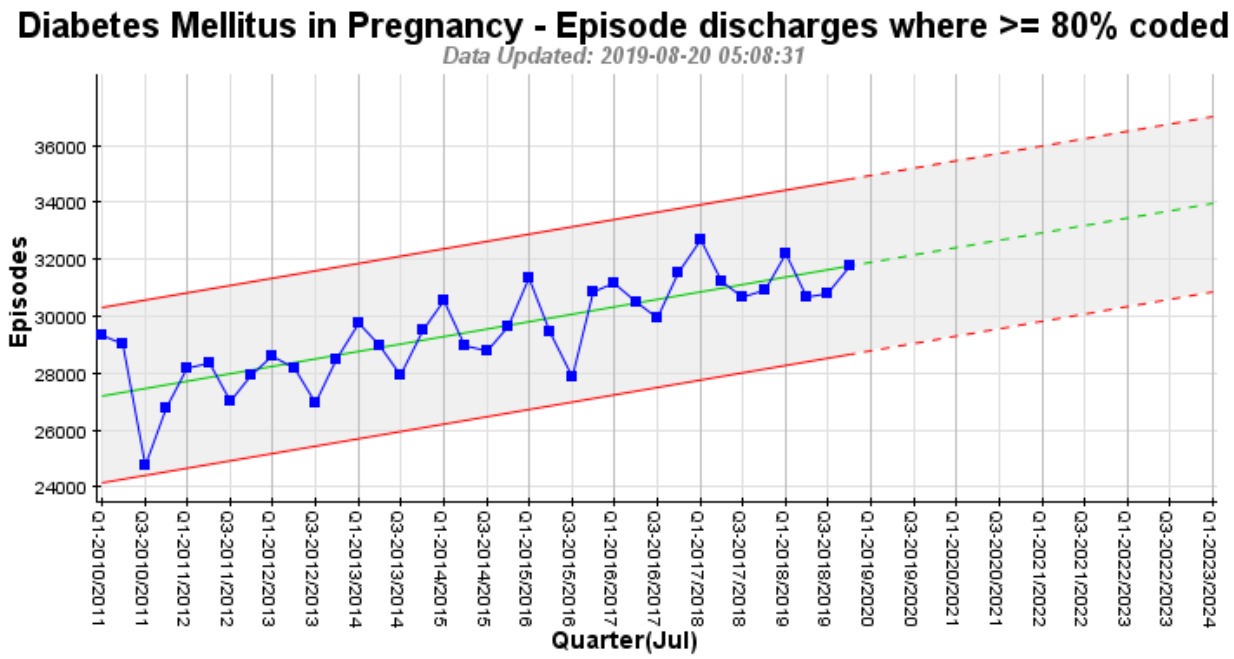
There are a range of birthing facilities available to women in Canterbury. Christchurch Women's Hospital (CWH) is the only tertiary facility and also accepts referrals from the West Coast as well as throughout the South Island for women who are presenting with complex pregnancies. Women on the Chatham Islands have antenatal and postnatal care provided by a Lead Maternity Carer (LMC) and leave the Chatham Islands to birth. In November 2015 and April 2016 respectively the new Rangiora and Kaikōura health hubs were officially opened. Providing new and fresh facilities for the community and continued provision of antenatal, intrapartum and postnatal care, these will deliver our commitment to have better access to services closer to home.

Currently, around 85%[41] of women give birth in CWH which is placing this hospital under immense pressure and reducing its capacity to deal with more complex births. A relatively high proportion of admissions to CWH birthing suite are for pregnant women with unrelated illnesses and who are not in labour. The Neonatal Intensive Care and Special Care Wards are frequently operating at or over capacity (72% of days at or over 100% in 2017/18). Births are projected to increase by around 5.5% from 6,441 births in 2017 to around 6,800

[41] Source – Canterbury DHB Maternal Quality and Safety Annual Report 2016/17

total births per year by the 2028 calendar year[42]. This relatively small increase in births is exacerbated by the increasing proportion of mothers giving birth who are obese and/or have diabetes, with for example 21.8% of mothers giving birth in 2015 classified as obese. This has a significant impact on maternity resourcing as obese mothers require a double slot for caesareans and more scans. Anecdotally, CWH is also dealing with increasing problems with drug/alcohol use and family violence. Midwives are hard to recruit and retain with current turnover rates of hospital midwives at around 11% and around 7% of positions in Women's and Children's Health vacant[43].

Figure 40 - Increasing rates of diabetes in pregnancy



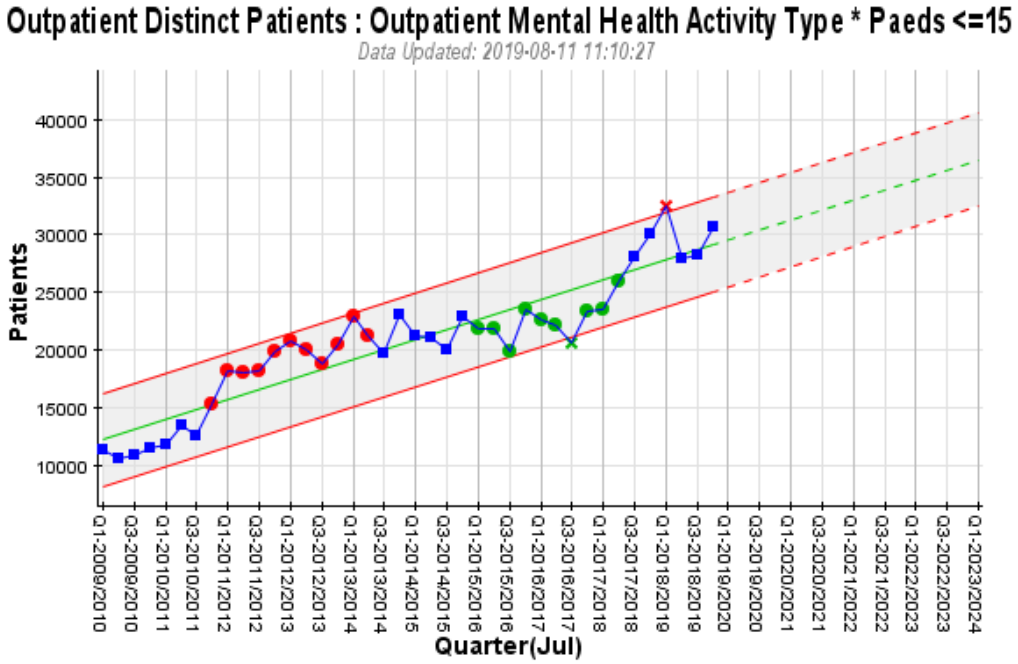
Two key areas of concern in the area of children's health are the rising rates of rheumatic fever and elevated rates of mental health issues following the Canterbury earthquakes. Rheumatic fever was once rare in Canterbury but with increasing numbers of people moving back into Christchurch and increasingly living in overcrowded, poorly insulated and ventilated homes, we have seen an increase in the number of cases from 14 to 48 in the last five years. Mental health concerns are much more widely acknowledged and understood as Canterbury follows patterns seen internationally in which it has been observed that young children are particularly affected by large natural disasters[44].

[42] Data source – Stats NZ – applied trendline to 2028

[43] Source – P&C dashboard from March 2018 – [redacted]

[44] Caruso World Bank paper

Figure 45 - Under 16 years patients reported with Mental Health Activity



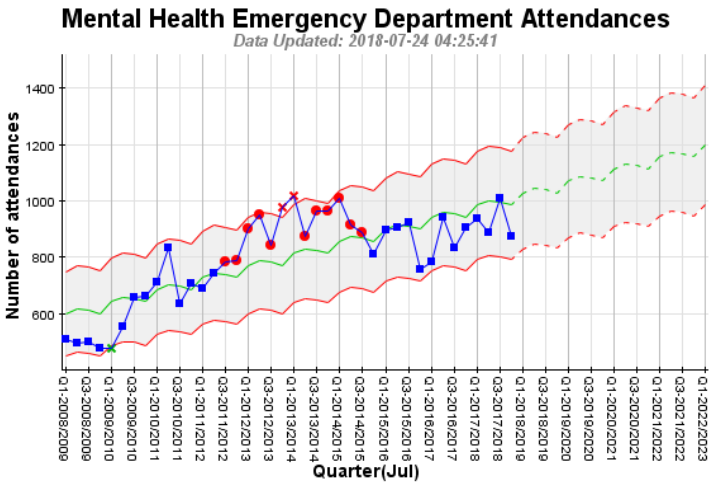
VISION: WOMEN BIRTH IN COMMUNITY BASED PRIMARY BIRTHING UNITS WHERE APPROPRIATE, SUPPORTED BY TELEHEALTH-ENABLED SPECIALIST CARE WHERE NECESSARY. CHRISTCHURCH WOMEN'S REGAINS CAPACITY TO DEAL WITH THE INCREASING NUMBER OF COMPLEX PREGNANCIES AND BIRTHS

4.1.7 MENTAL HEALTH SERVICES

The Canterbury health system has developed highly effective ways of working across sectors to address the mental health needs of our population. We take a consumer-based approach, in which service entry criteria are agreed across the system rather than set by individual organisations. Data is collected which enables a system-wide view of activity and which is routinely shared with service partners to improve service delivery. Mental health service leaders came together within days of the February 2011 earthquake to prepare for increasing demand and rapidly implemented streamlined systems to enable people to access care quickly. Funding of additional services, such as Brief Intervention Counselling, in which people could access up to five counselling sessions free of charge, were also put in place to support our population.

Whilst Emergency Department mental health attendances have stabilised over the last three years they have done so at an admission rate approximately 50% higher than before the earthquakes.

Figure 46 - Mental Health Emergency Department attendances



The terror attacks of 15 March 2019 are expected to significantly impact the mental health of our population, particularly those directly affected. Services will need to be developed/expanded to manage these needs. An overview of the literature suggests the intensity of symptom trajectories are likely to vary over time and among groups, and depend on pre-existing risk factors (including young age, female gender, low socioeconomic status), high incident exposure (close proximity to the event or psychosocial proximity to deceased), poor social support structures. Locally those most at risk would be people highly exposed to the event, those from the targeted Muslim community, emergency responders, and potentially those with a loss

MANA AKE

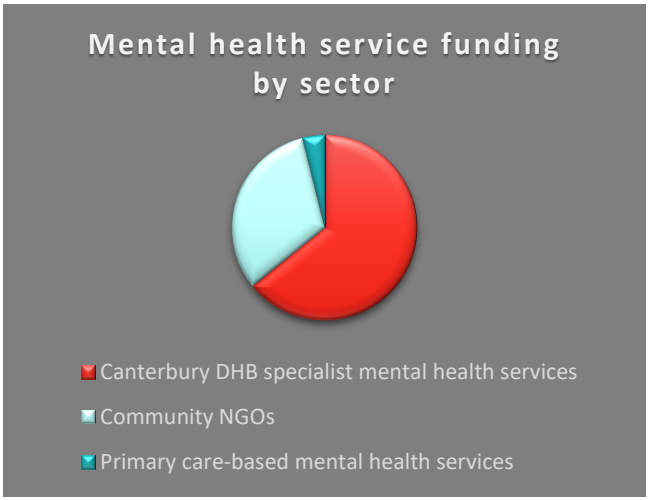
The Mana Ake – mental health in schools- programme launched in March 2018 takes a collaborative, cross-sector approach to supporting school children in years 1-8 living with the legacy of earthquakes across Canterbury. It uses an alternative model of development – the four pillars of wellbeing in Te Whare Tapa Whā. Multiple agencies are involved in designing and developing the programme.

Delivered via the Canterbury Clinical Network and in partnership with agencies such as the New Zealand Police and health providers, the service provides social workers, whānau ora kaimahi and counsellors to support children at schools and at home.

The service is being progressively rolled out to schools, with the first two Kāhui Ako (school clusters) being chosen as they have significant diversity and provide an opportunity to improve equitable access to health support and services. One of these school clusters also reflects population shifts post-earthquake.

of income and/or concerns about residency status/ability to stay in New Zealand. Canterbury DHB Specialist Mental Health Services (SMHS), is the major provider of mental health services in the Canterbury region. Community NGOs and primary care-based mental health services are also a crucial, and increasingly important, component of service delivery.

Figure 47 - Mental health service funding by sector



SMHS provides five core clusters of services; adult services, forensic services, intellectually disabled persons' health services, speciality and addiction services and child, adolescent and family services. We also provide a tertiary service for the South Island region within the context of the South Island Alliance. These services are currently provided from three hospital campuses: Hillmorton Hospital, Burwood Hospital (Older Persons Mental Health) and The Princess Margaret Hospital (TPMH), with some services located at other community sites across greater Christchurch.

The poor conditions of our PMH and Hillmorton facilities are increasing staff stress and hence turnover rates. This is further supported by the recent Ministry of Health-led facility clinical fitness for purpose report which assessed

these facilities as inadequate[45]. A number of services are 'stranded' at TPMH since Older Person's Health service moved to the new Burwood facility, meaning that the services remaining at TPMH have had to contract in emergency medical cover and security, further increasing costs and leading to inefficiencies.

In addition, the mental health workforce is ageing, with the average age of mental health nurses at around 55 years old, and an increasing number of agencies (both within Canterbury and nationally/internationally) are competing for a limited pipeline of qualified staff.

There is agreement across the health system and our inter-sectoral partners that the status quo for mental health service provision will not meet the needs of our population. The system is too focused on mental illness and requires reorientation towards a wellbeing system that aims to support people to stay well and healthy and in their own homes. This system must be culturally appropriate and responsive to the diverse cultural practices of our population as well acknowledge the strong linkages between mental and physical health.

The 2018 Mental Health and Addiction He Ara Oranga Inquiry will drive new responses to the transformation of mental health and addiction services for people with mild to moderate conditions. This will involve community NGO responses in an integrated approach designed to keep people well. The Canterbury health system has the flexibility and collaborative relationships already in place to be able to deliver to this approach.

VISION: A SERVICE THAT IS RE-ORIENTATED TOWARDS WELLBEING, SUPPORTING PEOPLE WITH TIMELY COMMUNITY-BASED EARLY INTERVENTION AND WITH THE CAPACITY AND CAPABILITY TO DELIVER HIGH QUALITY CARE FOR HIGH NEEDS PATIENTS

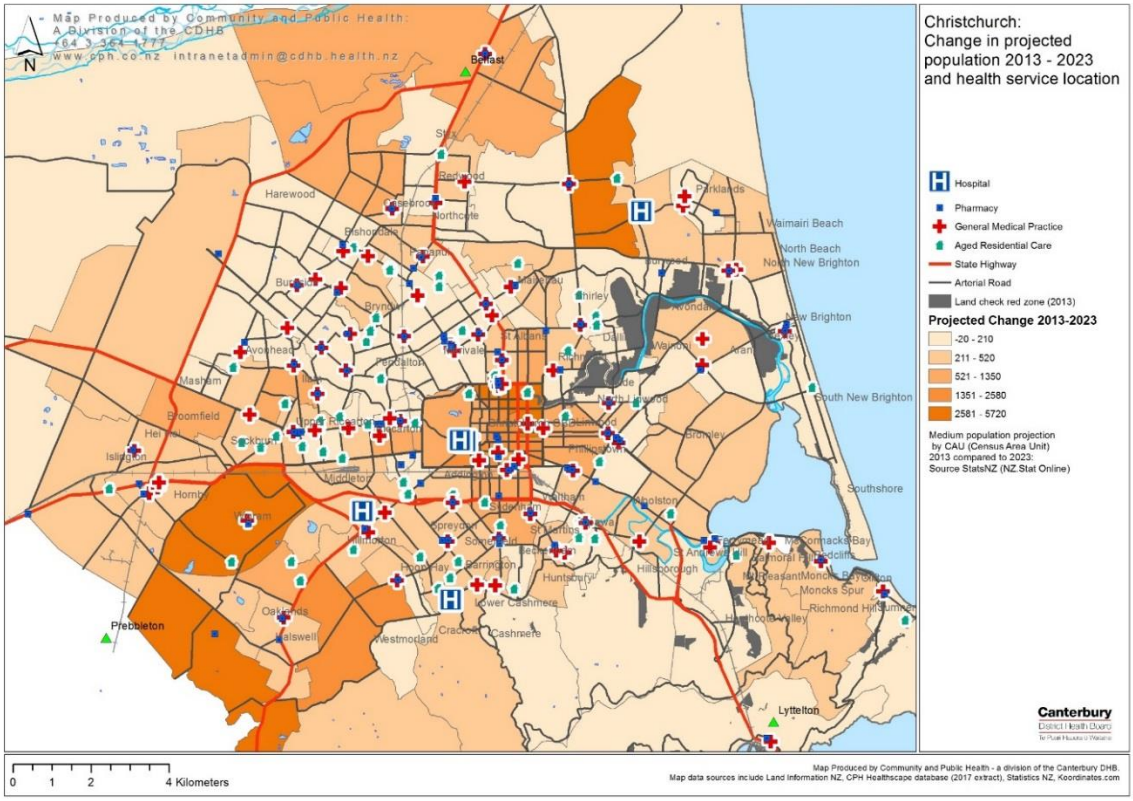
4.1.8 RURAL HEALTH

Our aim in rural health is to meet the needs of our rural populations (both in Canterbury and on the Chatham Islands/Wharekauri) through delivering high quality services that are close to home as well as being financially sustainable. As for health systems nationally, the biggest challenge for us in achieving this is in attracting and retaining the appropriate clinical workforce. Rural clinical vacancies are consistently higher (at around 15% in March 2018) and the primary sector also struggles to source rural health practitioners.

In planning rural health services we also need to be adaptable to changing population demographics. Two of New Zealand's fastest growing districts are in Canterbury (Selwyn and Waimakariri), both of which grew significantly following the Canterbury earthquakes, partly due to mandated population shifts from red-zoned areas in Christchurch's east.

[45] Clinical Facility Fitness for Purpose report, March 2019.

Figure 48 - Change in projected population 2013-23 and health service location



Developing the necessary health infrastructure in areas which previously were relatively sparsely populated is a major undertaking. Together with the general ageing of our population, we expect demand for community based care, including palliative services, to outstrip the capacity of district nursing services in the near future. Changing models of farm ownership are impacting our rural population with increasing consolidation of farm ownership and increased use of migrant workers, leading to more transient communities who are less connected to the health system. A flow on impact is that organisations such as St Johns are struggling to maintain the needed volunteer workforce in some rural areas. Our rural population is also susceptible to the anticipated effects of climate change as increasing numbers and severity of droughts are likely to exacerbate the financial and social stresses and hence impact the mental health of these communities.

The lack of high speed broadband access in some rural areas constrains service delivery and limits our ability to support services using telehealth and decrease practitioner isolation. Health consumers increasingly expect rural health services to be better integrated and to be able to access both telehealth and services such as ARC and dementia-level care close to home.

The Canterbury DHB owns the general practice on the Chatham Islands/Wharekauri. The buildings and assets were assessed in 2015 and it was estimated at this time that around $1.4M investment was required to bring the facility up to being fit for purpose. Significant investments have already been made into telehealth and X-ray facilities to enable improved service delivery closer to residents' homes and to reduce transportation costs.

VISION: HIGH QUALITY CARE FOR OUR RURAL COMMUNITIES, DELIVERED BY RURAL GENERALISTS WORKING AT THE TOP OF THEIR SCOPE. SERVICES THAT ARE CLOSER TO HOME, SUPPORTED BY SPECIALISTS VIA TELEHEALTH

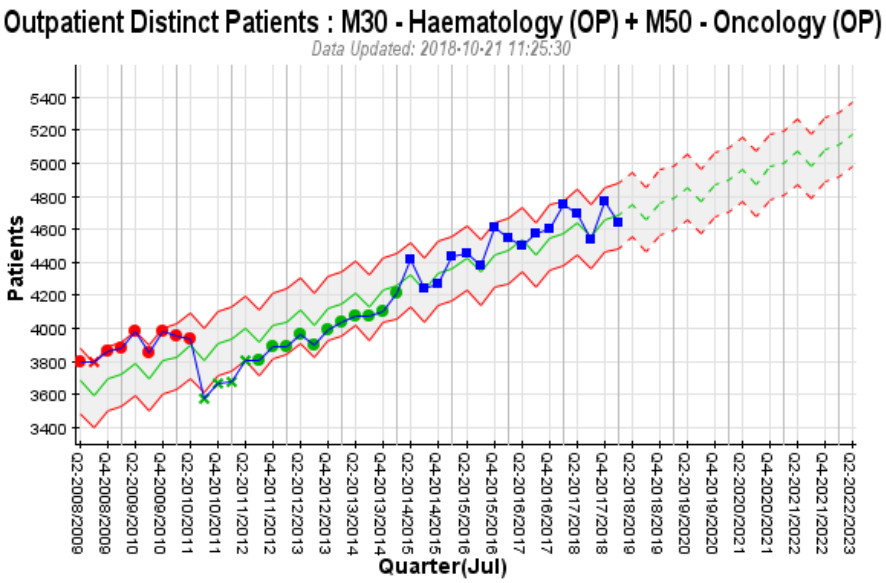
4.1.9 HAEMATOLOGY AND ONCOLOGY

The Canterbury DHB Haematology and Oncology service is one of the four Cancer Centres in New Zealand and is the tertiary referral centre for the South Island. The service is multimodality and multidisciplinary and requires precise coordination of multiple internal and external service providers to produce optimum results for patients. In addition to medical and radiation oncology services, there is a medical physics team and a clinical trials unit that has strong links with the University of Otago. Canterbury DHB is part of the Southern Cancer Network, which promotes improvement in coordination of population programmes for prevention and screening and in quality of treatment. The service offers high dose rate brachytherapy (a type of internal radiation therapy) and currently operates four Linear Accelerators (Linacs) out of a land-locked facility on the Christchurch Hospital campus, with no ability to expand. Three of the Linacs require replacement in the next two years, involving a six month decommissioning and commissioning process.

Canterbury's population is over represented in oncology First Specialist Assessments (FSAs) with 13% of FSAs nationally compared with 11.6% of the population. Our age profile is similar to other areas but the population cancer rates across all ages are higher than most comparator DHBs. We have higher oncology discharge rates (46% above national) than comparative DHBs (except Capital and Coast).

The service is experiencing increasing outpatient volumes as shown in Figure 49. Chemotherapy day ward attendances have increased 20% in the last four years.

Figure 49 - Haematology/Oncology outpatient volumes



The service is expected to come under additional pressure over the lifetime of this plan as a result of the following factors:

- Our growing elderly population
- The increasing prevalence of obesity and lifestyle diseases
- Changing regional service models which are expected to increase the numbers of tertiary inter-district referrals
- Earlier detection of cancer via more sensitive diagnostics
- Increasing complexity of treatment – for example, gastric cancer in 2003 would have been treated with surgery and support care. In 2017 the treatment pathway includes pre-operative chemotherapy and radiation therapy, surgery, post-operative chemotherapy, with a widening array of potential drugs and new radiation treatment modalities such as hypofractionation and stereotactic radiotherapy.
- The need to address inequities in access to treatment and outcomes for Māori and Pacific populations

There is an estimated 10% year on year increase in pharmaceutical cancer treatments anticipated, requiring day ward facilities, chairs for treatment delivery, patient consultation, education and assessment space as well as back of house facilities. Delivery of modern radiation therapy requires substantial investment in hardware with appropriate facilities, e.g. radiation planning CT and MRI scanners (different requirements to diagnostic radiology), quiet spaces for treatment planning, dosimetry and contouring.

VISION: EARLIER INTERVENTION REDUCING THE NEED FOR INPATIENT STAYS. ENABLING OUR POPULATION TO MAKE HEALTHY CHOICES. A CULTURALLY RESPONSIVE SERVICE DELIVERY MODEL

4.1.10 REGIONAL SERVICE PRESSURES

Canterbury DHB has an important role as a tertiary provider of a number of services on a regional or even national level. In addition to our transalpine partnership with the West Coast DHB, we also provide spinal injury services (for people based from the mid-North Island south), paediatric oncology (lower North Island and down) as well as vascular and cardiac services beyond our borders. Some of the DHB areas we support themselves have a high proportion of over 65 year olds. In addition to bringing people to Canterbury DHB facilities for treatment, in some areas we send our specialist staff to other areas to support follow up care, for example for spinal trauma rehabilitation.

The South Island DHBs established an alliance framework in 2011 in order to advance the implementation of regional service planning and delivery. Inter-district flows (IDFs) are expected to increase due to rising numbers of tertiary referrals for highly specialised services such as clot retrieval and head and neck cancer theatre sessions, which have quadrupled over the last four years due to increased flows from Nelson Marlborough DHB. In addition, the recruitment of specialised services to smaller rural areas will remain problematic, meaning that Canterbury DHB, as the provider of last resort for the South Island, will pick up temporary secondary flows to allow our colleague DHBs time to recruit. Some of these flows may become permanent due to ongoing recruitment challenges.

7,000
people from other regions were discharged from one of our hospitals in 2017/18

9.5%
increase in regionally-referred hospital admissions

61,155
outpatient appointments

52%
increase in regional outpatient appointments in the five years to June 2017

4.1.11 SERVICE DEMAND FORECAST SUMMARY

The sections above highlight areas where we know we will need to plan and invest carefully to mitigate and/or manage demand. The expected impact of different investment regimes on the goals we have for these areas has been considered has part of our long term investment planning process, described further in chapter 6. Our health system is a complex interactive system in which each identified area affects the other areas and changes in one area will result in changes in others; our planning recognises these interactions.

4.2 Future Workforce Drivers

Global competition for skilled people, the expectations of younger generations of employees, the impact of emerging technologies, and rapidly changing demographics in the workplace are all ongoing challenges for the New Zealand health system.[46]

Key issues that will affect workforce planning and development over the lifetime of this Plan include:

- Impact of an ageing workforce, plus rising number of employees affected by increasing long term health conditions such as obesity levels, cancer, heart disease and diabetes, affecting our ability to maintain consistent staffing levels
- Areas where there is particularly demand or where recruitment is very tight globally, for example radiology and mental health professionals
- Changing patterns of disease and an increase in long term conditions
- Very high levels of attrition (14%+ p.a.) in rural and mental health care
- An increasing emphasis on harassment, pay equity and civil workplaces in employment law. Also the increase in paid parental leave from 18 weeks as at May 2018 to 26 weeks from 1 July 2020.
- Growing Māori and other ethnicities in Canterbury driving need for a workforce that reflects our population
- MECA agreement negotiations
- Greater focus on leadership with specific models of team leadership for healthcare
- Increasing focus on health and wellbeing in the workplace, plus increased demands for flexible/mobile working
- The need to develop skills to work alongside new technologies, e.g. robots and the use of AI in training

The age, ethnicity and economic status of our future population and a changing demographic of the **nursing workforce** forecasts some very serious implications for nursing services. The number of nurses over 40 years of age likely to retire between now and 2035 is significant while the current influx from younger nurses feeding in from the undergraduate programme may not be sufficient to replace the numbers leaving the workforce. Nursing workforce and nursing education planning strategy needs to be responsive to this, thus ensuring that we can provide the right nurses at the right place and at the right time. Nursing recruits are in high demand and many of our nurses are being drawn overseas.

Initiatives already underway to make the best use of our nursing workforce include nurse-led clinics and the introduction of nurse

KORIMAKO AND TOLOA INITIATIVES

Korimako is a Canterbury health system nursing workforce initiative developed in partnership with Pegasus Health, Te Maui Collective and Canterbury DHB. The role provides a new Māori graduate registered nurse the opportunity to complete a year working in both primary care and the community. The new nurse works 2.5 days per week in a general practice team and 2 days per week in a Māori NGO.

A key goal of the initiative is to strengthen the cultural appropriateness of our care and support our workforce to better reflect the community it serves. This is critical to providing equitable access and improved outcomes for population groups with poorer health outcomes. This is especially important for Māori where the disparities in health status continue to persist and remain a priority for health care planning across the health system(s).

Toloa is the equivalent for Pasifika nurses. The initiatves allow the nurses to see patients across the health continuum from general practice presentation to the care that is provided in their homes.

[46] Transition 2012, http://www.cdhb.health.nz/About-CDHB/corporate-publications/Documents

prescribers in the community setting. Further initiatives are described in the Workforce section in chapter 5.

The **allied health, scientific and technical (AHS&T) workforce** is a very diverse group. The workforce plan for this area is about to be reviewed. A number of AHS&T workforce areas are expected to face changing or increasing demand over the next ten years, including:

- Clinical engineering and medical physics
- Cardiac and sleep physiologists
- Laboratory staff, who will be impacted by changes in national screening programmes as well as impacts from automation of some testing
- Data scientists, clinical informatics as well as engineers
- Change in imaging workforce as virtual/augmented reality technologies impact how we train people and deliver services
- Community 'restorative care or enablement' and older adult rehabilitation services

The potential for AHS&T professionals to undertake roles of an inter-professional nature, top of scope, or extended scope is a key function that will enable and support the delivery and sustainability of future medical services.

A number of areas of our **medical workforce** are expected to be under particular pressure over the next ten years. The increasingly specialised nature of many medical areas means that there are lots of smaller departments with only a few key staff. This can cause these services to be vulnerable, particularly as we are the provider of last resort for the South Island and must often absorb patient flows from our smaller colleague DHBs when they have key vacancies. The recent changes to the MECA agreement, coupled with changing expectations of hours of work and increasing numbers wanting to work part time will present challenges for our medical workforce over the next ten years. The expectations of patients and their families/whānau with regard to the type, efficacy and timeliness of care are also increasing pressure on the **medical workforce**. Consultations are becoming more complex as a result of increasing co-morbidities. Clinicians are using clinical software solutions that are often not interoperable and risk wasting valuable time in already short appointment slots. There will be increasing staffing challenges for areas related to ageing such as oncology, orthopaedics and diabetes.

The age of the **midwifery workforce** is increasing and presently not enough new undergraduates are entering education to meet future demand. Two thirds of Canterbury's core midwife workforce is aged 45 years or older. The Ministry of Health project that in ten years, Canterbury will have 16 less core midwife FTE filled compared with 2018 if we continue to do what we do now. As the number of babies being born in Canterbury is expected to increase over the next decade, it is important that we start to plan this workforce and what is needed in the future. We are also heavily reliant on our community workforce – the LMC midwives who will similarly be affected by these changes unless we address overall undergraduate education numbers, recruitment and retention into all parts of the maternity system.

Primary sector staffing pressures also include the expected numbers of GPs planning on retiring within the next ten years.

4.3 Information and Communication Technology Drivers

Our overarching goal is connecting health information platforms to share information more easily and to better enable frontline staff to look after patients. This is captured in our strategic statement:

> *A digitally enabled health community that assists integration, creates equity of secure access to health information, minimises risk of human error and supports Cantabrians to remain well and healthy in their own homes.*

The following are areas in which we will need to invest to get the right information in the right place at the right time to the right people to deliver a patient-centric view of health data:

- Investment in the transformation of clinical paper-based forms and processes to digital, optimised to improve all of system efficiency and make information more accessible to clinicians and patients
- Continue to expand the shared health information platforms Health One and Health Connect South by incorporating data from additional health and social sector organisations including better integration of hospital and community pharmacy data
- Continue to develop the SIPICS platform and roll out wider across the region with a view to improved standardisation of business process, improved data quality and more efficient services for patients.
- Investment in the transformation of back office administrative and operational paper-based forms and processes to digital to improve timeliness and currency of information and reduce administration costs
- Investment in improved capability to deliver South Island wide regional and New Zealand wide national Information Systems services to improve secure access to health information about Cantabrians wherever they are seeking care and to reduce overall costs for the New Zealand health system
- Investment in more effective disaster recovery, expanded cyber-security capabilities and the refresh of aged Information Systems hardware and software assets to reduce risk for unplanned failure impacting our ability to deliver Information Systems services and provided improved experience for CDHB staff
- Investment into capabilities that support mobility for staff
- Investing in 'analytics at the edge", where analysis is done near the source of the data

To deliver cost effective and efficient Information Systems within the context of a constrained budget and a fast moving sector will require careful consideration of what could/should be insourced vs outsourced. It will also mean careful assessment of which evolving areas of Information Systems, e.g. the use of avatar computer service delivery modules to support people to self-navigate the health system, will deliver the greatest benefit within our patient-centric approach. Our guiding Information Systems framework is shown in Figure 50.

Figure 50 - Information Systems Framework

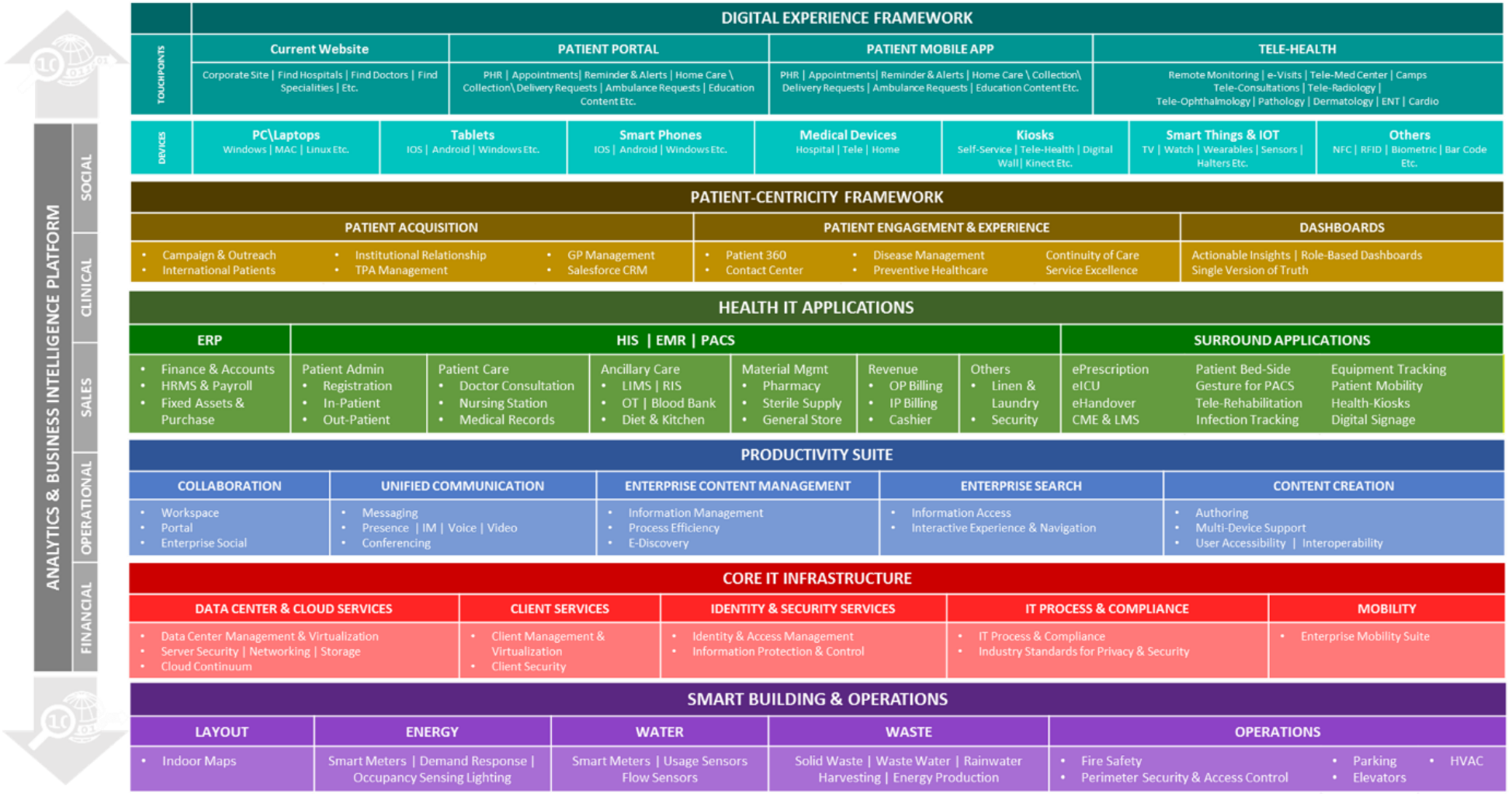
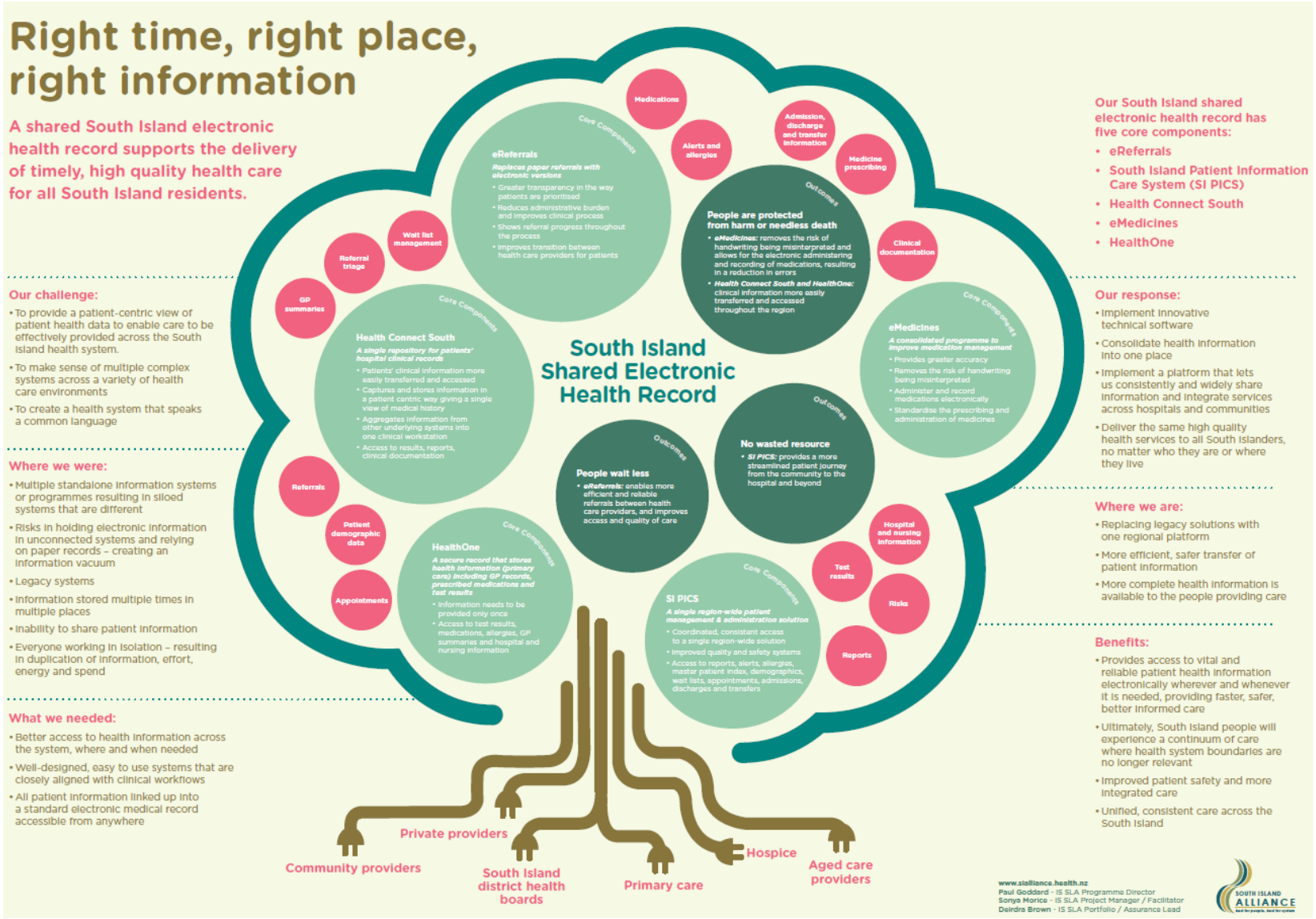


Figure 51 - South Island Shared Electronic Health Record



5 Investment Plan

This chapter describes investments we know we will be making over the next ten years. These are described for each of our system enablers; service design, workforce, clinical equipment, partnership approach, Information Systems, data and analytics and facilities. These investments will deliver to our strategic goals and will contribute to realising the expected benefits of our investment logic model. They will help to mitigate the expected increase in demand from our growing and ageing population and we highlight how we expect them to address the particular pressures in our ten strategic focus areas.

5.1 Investment Approach

Canterbury DHB works with a clear vision to invest in the health and wellbeing of the population in order to reduce the ongoing reliance on complex, facility based care. Good data analytics, evidence and consumer engagement underpin the investment process. By working with communities Canterbury DHB has been able to reduce the reliance on hospital interventions and long term care facilities. The investment strategies of the health system are focused on furthering that direction recognising that despite all efforts the growing and ageing population will still require secondary and tertiary level intervention. Canterbury DHB also recognises that we remain the provider of last resort for the South Island and lower North Island.

Our investments are aligned to national and regional settings.

- The national long term vision for health services as articulated through the New Zealand Health Strategy
- The regional vision of a sustainable South Island health and disability system focused on keeping people well and providing equitable and timely, access to safe, effective, high-quality services as close to people's homes as possible
- The regional transalpine commitment to improving the health services and alignment between the individual South Island DHBs
- The local vision of a truly integrated Canterbury health system - a system that keeps people healthy and well in their own homes, by ensuring the right care and support is provided in the right place, at the right time, by the right person
- The desired health and system outcomes in line with the Canterbury DHB's outcomes framework and within the affordability framework.
- A sustainable model of health service delivery that contributes to the wellbeing of the population

In line with our Investment Logic Model (section2.8), we will ensure our investments support:

- A shared purpose driving a coherent and integrated interagency response
- Mauri ora, whanau ora, wai-ora (healthy individuals, healthy families, healthy environment)
- A workforce that is flexible, engaged and reflects the community we serve
- Infrastructure that is fit for purpose and adaptable for future needs
- Primary/community based upstream healthcare to reduce downstream secondary and tertiary costs
- Our population to manage their own health
- Support our older people to live well in their own homes and communities for as long as possible
- Equity in health outcomes
- The needs of our rural populations
- The delivery of government expectations
- Respond to the implications of climate change for our population and as an operator of many facilities, as well as population health impacts for our population

- The development of Information Systems that provide an integrated single source of the truth and that enable different parts of the system to treat the same patient in an integrated way and utilise the data to design optimal service delivery

5.2 Planned Investments

In line with our investment approach described in section 2.8, we employ a data driven approach to understanding areas under increasing or changing demand pressures. This determines whether changes to the model of care, staffing, developing alliance partnerships or enhanced use of data will mitigate demand before we consider investing in new or redeveloped facilities. This section describes the known significant investments we will be making during the lifetime of this LTIP to manage increasing and changing demand.

5.2.1 SERVICE DESIGN

This section describes where we are expecting to invest in new service design/models of care to manage/mitigate increasing demand in line with our vision of providing care closer to the person's home. The Canterbury Initiative approach discussed in chapter 2 describes the principles we utilise to enable change and continuous improvement in our health system. Supported by HealthPathways it has been highly successful in implementing new models of care that address demand more effectively from both the patient and system perspectives. It takes a data-driven approach to identifying areas of potential quality or service improvement and aligns strongly with the 'Choosing Wisely' national approach to ensure health resources are prioritised for optimum outcomes at the system level. The Canterbury DHB will continue to invest in this clinician led programme as a key enabler of change. Our alliance approaches working within the hospital setting, across the community (the Canterbury Clinical Network (CCN)) and across the South Island, provide us with a broader canvas to enable service redesign across the whole health system and implement changes effectively.

Strategic initiatives to manage demand through developing improved models of care are described in the following sub-sections.

5.2.1.1 Maternity Services

Over the last 12-18 months we have been re-evaluating how we deliver maternity services. While the maternity system performs well with positive outcomes for most, there is a pressing need to address equity and to evolve our service to meet the changing health status of women from diverse backgrounds. We need to identify different ways of working aligned to the goals of the Canterbury health system, national health frameworks and alliances with other sectors. A draft maternity strategy has been co-designed with a range of people including service providers, non-government organisations, and most importantly consumers; women and their whānau/family. Underpinning this approach is an urgent need to redirect service flow away from the tertiary maternity facility and empower primary units to manage the care of women and their babies as appropriate. If we can ensure that women are able to give birth at the most appropriate level of care we will be able to direct resources to better support mothers and babies most at risk which will lead to better outcomes for all . We note that Canterbury has a high rate of caesarean sections both acute and elective and more recent research has highlighted the lifelong, health and wellbeing impacts of a caesarean section. We envisage that this new approach will assist in reducing the likelihood of a caesarean section and thus improve longer term outcomes.

Key principles of the proposed strategy are:

- Equity of outcomes and access for all Canterbury women to our maternity system/services
- Women, their partners and whānau, are supported and enabled to take greater responsibility for their own health whilst pregnant
- Women stay well when pregnant in their own homes and communities
- Women or their babies who are unwell when pregnant receive timely and appropriate care

Equity underpins all government and health system priorities. Our services must be delivered in ways that meet the needs of our population which is becoming more diverse. Canterbury DHB is also a part of the

South Island Alliance and our secondary/tertiary maternity services are accessed by women and babies across the South Island so consideration of their needs and expectations is also required. As a result, we must invest in services that provide greater opportunities for healthy women to birth in their own communities when clinically appropriate, preserving tertiary services for high risk mothers and their babies thus delaying the need for capital investment in expanding tertiary services and making best use of scarce health workforce.

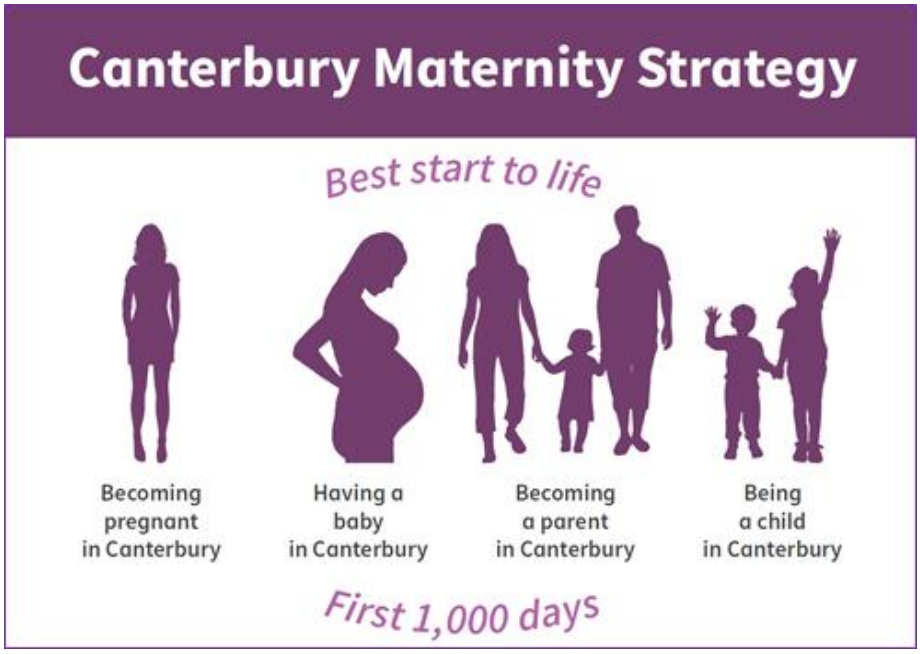
During 2017 6,400 babies were born in Canterbury. 82% of those babies were born at Christchurch Women's Hospital (CWH), a secondary/tertiary hospital designed for women and babies needing the highest level of care. CWH is already over capacity for present day demand. During the span of this LTIP, births are projected to increase, meaning that service provision needs to continue developing primary birthing. Canterbury has community midwifery led birthing units (primary birthing units) located in Kaikōura, Rangiora, Lincoln, Ashburton, Darfield and also contracts St George's Hospital to provide birthing and postnatal care. Over time, our aim is to change culture around birthing so that birthing at a primary birthing unit is preferred, leaving CWH for those who are medically complex, or who have risks for intervention. To support this, we will work with investors to develop and operate a central city primary birthing unit. The Rangiora maternity facility is a good example of where are a purpose built facility encourages LMCs and mothers to utilise services outside CWH. We propose expanding the Rangiora Health Hub with outpatient facilities about to open and an EOI for general practice development on the site about to be released. A similar model is under development in Rolleston to replace the earthquake damaged Lincoln facility. The Council owned development will include a general practice, a radiology provider and a DHB run maternity facility.

We are investigating better use of technology to assist women to travel less when they are not Christchurch based. In addition, we will develop an alongside midwifery unit for women who are not suitable to birth offsite, but who are medically and obstetrically stable to birth in a unit on the CWH site. This follows the models used elsewhere in the world for these women so that they can rapidly access secondary/tertiary care should they need it.

In developing our maternity strategy we have recognised that healthy birthing is part of a broader context in which the first 1,000 days has a dramatic impact on lifelong health. We will support fathers and wider family/whānau to play an important role in a child's infancy, childhood, adolescence and ongoing life.

Our overarching strategy for this area is to invest in developing systems that support primary birthing, including the eventual development of an alongside unit on or close to CWH.

Figure 52 - The four pillars of our proposed maternity strategy



5.2.1.2 Equity of Access and of Outcomes

Improving equity of access to services requires careful service design which can improve access for the target or at risk population. By centring our service delivery around the person and his/her whānau, this ensures that services meet the person's needs rather than expecting people to fit into the needs of services. This simple concept supports us to deliver services equitably. Our acute demand service, where general practice can access funding to support at risk patients to stay well in their own homes, is a good example of this approach. As services are based on need, those with greater need are targeted resulting in higher utilisation rates for Māori and Pasifika populations. This section describes some specific initiatives we are investing in to progress towards our goal of improved health and wellbeing of vulnerable populations. To make significant progress towards equity of health outcomes however, requires a genuinely cross-sector approach which we revisit later in our Improvement Plan (chapter 9). Improving equity of outcomes for Māori is first and foremost in our approaches.

The CCN has a number of service level improvement areas, and equity is an underpinning theme of these. This clinically led alliance has a focus on service and system integration and improvement, including the investment in strategies identified through clinical leadership. This has contributed to Canterbury having lower population rates and smaller equity gaps for ED attendance, ASH rates and improved life expectancy compared with national rates. Some of the planned system investments within the lifetime of this plan are shown in Table H.

Table H - Planned system investments

Area and Issue	Planned service investment responses
Ethnicity data capture – to work towards equity of access and ultimately of outcomes, accurate ethnicity data is needed	The CCN has a goal of increasing the accuracy of ethnicity capture of newborns on enrolment into general practice as this follows them into other services. Mechanisms - upskilling midwives on the 2017 Ethnicity Data Protocols.
Supporting timely access to physiotherapy for high risk populations	If patients requiring orthopaedic and MSK physiotherapy have a Community Services Card (CSC) and meet clinical criteria as assessed by a centralised triage service, they can receive DHB-funded care at private physiotherapy clinics in the community. This community care is being well used by practices with risk high populations and provides patients with more convenient care
Cervical screening – improving uptake rates for priority groups	This initiative will establish where there is a shortage of smear takers and explore how to increase coverage to improve access. It will explore the potential for employer funded cervical smear tests for priority groups and other ways to increase access to free screening tests.
Community dental care – reducing the differentials in oral health for under 5 year olds	Work with community dental services to develop a recall system targeted at need and identified risk and develop a programme that strengthens caregivers understanding of oral health
Ambulatory Sensitive Hospitalisation (ASH) rate for 0-4 year olds. The priority here is to reduce ethnic variation in ASH rates between Pacific and Total populations	A number of initiatives are being implemented to address this, including referring children attending ED and/or Children's Acute Assessment Unit to a Whānau Ora navigator, and offering free care at After Hours for Māori and Pasifika children if there is no space at their enrolled general practice.

Area and Issue	Planned service investment responses
The LinKIDS child health coordination service – a Canterbury initiative focused on connecting children with health services, and ensuring children receive services in a timely manner.	This service will continue to expand; connecting children to health services by enrolling infants in health services at birth, and ensuring that children who move to Canterbury are also connected with these services; supporting families who are not engaging with health services including missed immunisation, oral health or B4SC service, and timely Rheumatic Fever treatment and referring to services such as Young Parents Support Service.
Supporting our Pacific population by delivering services in a manner that aligns with the Pasifika view of health	To support this work Canterbury DHB and Pasifika Futures jointly appointed a Pacific Portfolio Manager to support implementation of innovative approaches to the funding and delivery of health services for Pasifika peoples

There will be increased focus on delivery of services that align with Pacific view of health. We have a partnership with the Pasifika whanau ora organisation Pasifika Futures to co-design and co-fund strategies that ensure we deliver services through culturally appropriate models and through a Pacific led workforce and that make a difference for Pasifika people.

5.2.1.3 Older Person's Health

The biggest driver of increasing hospital based care is the ageing of the population. Canterbury DHB has been successful at reducing the rate at which the older population attends ED, is admitted acutely, or requires long term care but the increasing population over 75 is still the key reason for expanded hospital capacity and increasing expenditure on pharmaceuticals, cancer therapies and long term supports. Canterbury DHB's core strategy has been to support people to live well and healthy in their own homes and communities. A number of interlinking service responses enable this to function but at its core is an orientation to empowering general practice, pharmacy and community providers to provide a flexible and personalised response to older people when they become unwell, frail or lose their resilience. As we progress we will look more to the community and other Government agencies to support key elements such as good housing, social connectedness and good nutrition.

Supporting people to manage their own health and needs requires more innovative approaches to support people engaging in their communities and locating groups and services that can support people to self-manage. An example of enabling communities to support to each other is the WellConnectedNZ interactive map which aims to bring people together through the events and initiatives that occur locally[47].

Our investment in the development of electronic shared care plans including acute care plans, personalised care plans and advanced care plans (via HealthOne) has begun to enable reliable care to support the person's goals. Clinicians across the system are able to access a shared plan to ensure care is integrated and standardised regardless of where that care is provided. Our model which supports people to remain well and healthy in their own homes and communities also supports people to restore their health in their own homes. Our community based restorative model supports people to complete their rehabilitation with support in their own homes. Rehabilitation in peoples' natural environments provides good outcomes and will be increasingly important into the future. We will continue to invest to support clinicians to provide care plans that improve integration and outcomes across the system.

5.2.1.4 Rural Health

Over the last three years a number of Canterbury's rural communities have developed new models of care that identify opportunities for service improvements while ensuring the sustainability of rural health services. In 2018/19 the implementation of the Hurunui and Oxford models of care resulted in a collaborative after hours arrangement across five general practices and St John being established in the Hurunui region, protocols for

[47] WellConnectedNZTM Te Ranga I te Tira – www.wellconnectednz.org, funded until September 2019

local observation services (that reduce the need to transport people to an urban hospital) being developed, and support provided to general practice for stabilising patients while awaiting their transportation to hospital. This work will continue and include further work on a restorative community service. By assisting people to access these services locally, these initiatives will contribute to optimising Canterbury's acute bed day rate.

We will continue to seek opportunities for primary care led rural health services to be supported by secondary and tertiary care based in Christchurch via virtual consultations and visiting specialists. The use of general practice led flexi beds will allow people to remain in local rural communities while they can be observed by clinical teams. The investment in this area will take the form of increased training, capability for virtual consults, enabling technology to support telehealth, and collaborative facilities that integrate health, community and social services.

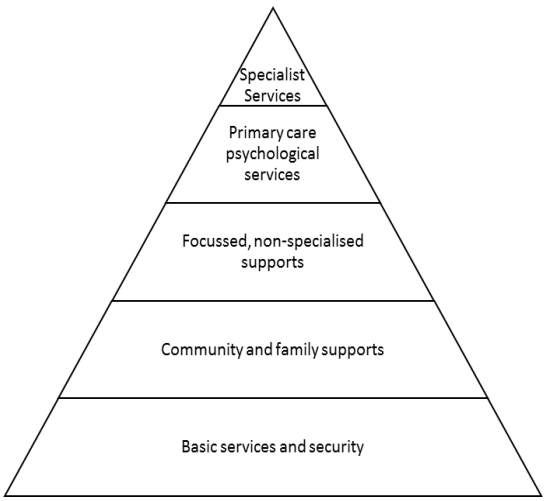
New facilities that enable this approach include Akaroa, Kaikōura and Rangiora. The Council's Rolleston development where we will have a maternity unit provides an opportunity for further development of health hubs located in rural and semi-urban areas which reduce the load on the main Christchurch Campus whilst providing services locally that are integrated across primary, community care with explicit DHB and hospital based support.

This distributed model of service delivery has economic benefits for small communities as well as reducing the demand on expensive secondary/tertiary urban facilities.

5.2.1.5 Mental Health

There is agreement across our alliance partners that the status quo will not meet the needs of our population. The system is currently too focused on mental illness and needs to be reoriented towards a wellbeing system that supports people to stay healthy and well in their own communities. Recent research supports this approach[48]. The reorientation will require physical, social, cultural, policy and spiritual environments that support wellbeing and will require cross-sectoral engagement and partnerships.

The World Health Organization model provides a useful framework guide the reorientation of our system responses. Investing in keeping people well, active and engaged has strong economic benefits for New Zealand as well as the affected communities and individuals. We will invest greater effort in working with social services to achieve benefits in health and our society to create supportive environments that promote the resilience of our people and allow them to thrive (addressing the lower levels of the pyramid below).



[48] Mulder Rucklidge Wilkinson 2017

Ensuring the services support the development of upstream primary and community services to prevent the development and exacerbation of mental health problems. Keeping people well requires the collective efforts of people across the system and we will continue to develop and invest in models based in the community. The mental health nurses in the Police Watch House initiative described in the side bar is a good example of cross-sectoral integration in delivering mental health services. Ensuring service providers are connected through electronic health records and shared health plans is key to achieving better, more equitable outcomes. A collective response will deliver greater benefits than the sum of individual approaches.

While much investment will be community focused, we need to ensure our specialist services are provided in a timely manner in therapeutic environments by highly skilled clinicians.

WATCH HOUSE NURSES

Mental health nurses have worked alongside the police in the Watch House/Custody Suite since 2008. They carry out mental health assessment of inmates who the police are concerned about as well as providing guidance on the safe management of detainees in the custody suite. Watch House nurses also provide a liaison function for frontline police, advice to specialist police teams, training to police graduates and specialist training has also been developed for local police negotiating team. A new process was established in 2017 in which the Watch House nurses provide out of hours and weekend mental health assessment to support the Specialist Mental Health Service Single Point of Entry. This enables front line police who are concerned about a person's mental state to access advice and expert skills around the clock. The nurses are an integral part of the Watch House team and highly valued by police as part of an integrated response—undertaking 2,575 assessments in 2017. Working in collaboration ensures more positive outcomes for people with mental health or alcohol or other drug issues.

5.2.2 WORKFORCE

This section describes some of the initiatives we will be implementing to mitigate or reduce workforce constraints. The 'Care Starts Here' strategy described in chapter 1 will address areas for improvement identified by staff. It provides an important platform from which we can support our staff and address recruitment and retention challenges and higher than normal sick leave post-disasters. Table I describes what our vision is for each of the five pillars.

Table I - The five pillars of our people strategy and vision for these

	People Strategy Pillar	What does success look like in 2022?
	**Everyone understands their contribution**	A culture of connectedness, engagement and communication
	**Everyone can get stuff done**	People and team-friendly systems, processes and ways of working
	**Everyone is empowered to *Make It Better***	Service improvement and innovation through co-design
	**Everyone is enabled to lead**	Widely distributed clinical and operational leadership
	**Everyone is supported to thrive**	Continuous team and individual development

The Canterbury DHB workforce previously was characterised by lower than average staff turnover and very low sick leave. The ongoing pressures of a post-disaster environment has impacted on sick leave with increases over the last 5 years from 3.2% to 4.5%. It's not clear what impact this will have on turnover and our ability to recruit a high quality workforce.

Our payments for sick leave is forecast to hit $24M by the 2019/20 financial year unless we can intervene to reduce this. We are targeting $4M of savings for year one identified by the occupational health review, with a two year look ahead and reduction in sick leave hours of 17%. In addition, our annual leave liability has increased 8% since FY2016/17, driven largely by leave revaluation as a consequence of MECA settlements. It is important to note that 22% of the current sick leave is unpaid reinforcing the Canterbury wide issue of a fragile, unwell work force.

The development of a sustainable workforce means analysing and assessing the makeup of our workforce to maximise efficiencies and balance of different professions to achieve the best possible outcomes for our population while ensuring financial sustainability for the organisation. Promoting a safe, supportive and healthy work environment and the expansion of flexible working options will enable a culture that attracts clinicians and allied staff to Canterbury. Figure 53 describes the approach we are taking at the organisation-level to optimise our people resource management.

Figure 53 - Optimisation of our staff at the organisation-level

There are also strategic workforce development initiatives addressing the needs of our core workforce groups.

To combat our ageing **nursing workforce**, we will increase recruitment of both newly qualified nurses, and nurses who have recertified. In addition we will upskill many existing registered nurses to enable them to work at the top of their scope. We will continue to take a collaborative approach with primary care and community providers, including ARC, and leverage our Manawa training partnership.

To attract and retain the required nursing workforce will require some radical redesign of the structure of the nursing workforce including:

- Development of a career progression process that supports retention of nurses within the profession
- Flexibility of work schedules and environments to meet the needs of nurses across the continuum in balance with the needs of the health system for safe staffing levels
- Redesign work to enable nurses entering the third age to remain active in direct nursing care roles
- Investment in education and training that is designed to support nurses in staying current with technological advances, including information technology that enhances the capacity of a potentially reduced nursing workforce.
- Adapting our leadership structures to meet the needs of a future workforce with a changing skill mix in workforce.

The Gerontology Acceleration Programme (GAP) is an example of a career development initiative that supports nurses to practice in a range of settings whilst undertaking post-graduate study, enabling them to further develop specialist gerontology nursing knowledge, leadership skills and an understanding of the gerontology care continuum of care (see sidebar).

The whole GAP experience is one of my outstanding achievements as a Registered Nurse. It helped me to be more patient and understanding towards the complex needs of an older person as well as helping me to be a better nurse as a whole. It connects our understanding about older people wherever they are

Allied health, scientific and technical staff are our second largest workforce grouping at around 1600 Full Time Equivalents (FTEs). This is a complex workforce, encompassing 91 professions and 25 assistant roles. One of the areas of allied health where we are expecting significant growth is in Adult Treatment and Rehabilitation, for example in exercise physiologists and psychologists to assist people managing long term conditions. In some areas there may be shifts between

GERONTOLOGY ACCELERATION PROGRAMME (GAP)

GAP involves the rotation of registered nurses across different clinical settings including ARC, general medicine and older person's health, which may include older person's mental health. Parallel to this nurses undertake postgraduate study and are offered 1:1 mentorship.

GAP consistently receives positive feedback from participants completing the programme, with post-programme reflections and comments including:

"Taking part in the GAP has been an amazing experience. It has given me more of an understanding and appreciation of working in both a residential care facility and the acute setting. This increased knowledge can now be shared with my colleagues and current patients to facilitate a smoother transition between sectors."

In total, 24 nurses participated in GAP, four more commenced in June 2019.

public and private delivery of services, e.g. podiatry, ophthalmology and physiotherapy, where there is one model of care but different employment options. As in other areas, we need to consider where a specialist workforce is required and where a generalist workforce is more appropriate. We will continue to support career development with the expansion of AHS&T dedicated education units and development of an AHS&T internship programme for all new graduates employed across the Canterbury and West Coast health systems. Defining career pathways and frameworks will further support recruitment and retention. We will seek opportunities to collaborate in recruitment, interviewing and selection processes across both the Canterbury and West Coast health systems. In line with the Kaiāwhina workforce model we will implement a framework for delegation and skill sharing. We will also promote and facilitate skill sharing between professions to support developing generalist capability. Development of Allied Healthways (similar to Hospital and Community HealthPathways), will further support our workforce.

Growing and sustaining our **medical workforce** will require understanding and managing the impacts of changes to the MECA agreement, the changing demographics of this workforce and the increasing specialisation in many areas. There are no easy fixes and we need to ensure that any initiatives in reducing pressure must be scalable, sustainable and suitable for our local conditions. For example, the development of nurse practitioners and senior nurse led clinics will require sustained investment to develop and retain a pipeline of these nurses who are in high demand and often able to earn significantly higher salaries overseas.

A number of initiatives are underway in response to capacity pressures on general practice, led by the CCN alliance. These include co-development of new Integrated Family Health Centre hubs in currently under-served areas, maintaining the existing collaborative approach when identifying services that can be shifted from secondary to general practice. A Primary Care Capability service level alliance is focusing on progressing initiatives that will support increased capacity and capability of primary care, with an initial focus on capacity within general practice. This includes strengthening the services provided through Integrated Family Health Services to increase the uptake of innovative changes in models of general practice care and the uptake of shared care plans.

5.2.3 CLINICAL EQUIPMENT

We have a broad clinical equipment asset base which requires investment to replace or upgrade in order to maintain existing diagnosis, treatment and rehabilitation health services to the people of Canterbury and the wider South Island. In addition, we need to provide additional equipment to create the required capacity to meet the forecast increase in demand.

There will be a step change in our clinical equipment asset base following the commissioning of the Christchurch campus Hagley building, which means a step change in the baseline capital requirement in around seven to ten years' time.

Some of the planned investment in high technology clinical equipment over the next 10 years includes:

- **Radiology and Nuclear Medicine** - Existing fleet replacement of CT, MRI, Digital Subtraction Angiography, C-Arm and Spec CT imaging equipment
- **Oncology -** Existing fleet of four Linear Accelerators (Linacs) and Brachytherapy replacement is required over 2022 to 2026. Due to spatial constraints preventing us having a "replacement" bunker, our replacement strategy is compromised, resulting in loss of capacity and/or increase in cost to outsource and additional shifts each time we replace a Linac.

  An additional linear accelerator is required to meet the demand of the South Island. The forecast demand is indicating the need for additional capacity by circa 2020 but we are constrained by availability of space to install this additional Linac. This installation has to be timed and planned with the availability of the new Cancer Centre.

- **Cardiology -** Existing fleet of two Cath Labs replacement is required 2020 and2027 with an additional Cath Lab capacity to meet forecast demand by 2020/21

- **Community Dental -** Existing fleet of 18 units of Level 1 self-drive mobile units and four units of Level 2 trailer mobile dental units are due for replacement over 2021 to 2024.
- **Canterbury Health Laboratories (CHL) -** Existing equipment is being replaced with automation technology as part of the overall automation strategy. The spatial and layout constraints of the facility are limiting the ability to replace with this new automation technology and forcing intentional deferment to time with the CHL redevelopment.

5.2.4 ENABLING OUR PARTNERSHIPS

Canterbury DHB adopts a collaborative approach to system integration and service design. It is underpinned by a series of alliance models. The DHB funds a large portfolio of contracts, some of which we have no discretion over as they must be implemented as a matter of Operating Policy Framework, MoH/Minister direction or similar, such as capitation funding for general practice. Other contracts – those that are classed as 'need to do', are for services where we are largely substituting for constrained hospital based capacity such as radiation therapy, radiology, elective surgery. Finally there is a smaller subset of contracts, which account for less than 5% of our total funder arm spend, where we have total discretion; these are typically contracts that advance our strategic goals, such as the Acute Demand service described earlier, HealthPathways, CREST (community rehabilitation service). The services provide investment that is designed to reduce demand on more expensive specialist hospital services where it is safe to provide these in community settings. This investment relies on an integrated system in which specialists provide support and expertise to their community based colleagues.

As part of improving how we work and to enable optimising our use of resources, we are undertaking a systematic review of our funder arm contracts in 2019/20.

We will take a whole of system approach to improving productivity of our funder arm contracts, using the information and analytical tools described in section 3.8 (Our Planning Approach) to get the best outcomes within the resources we have. The review of each contract is aimed at maximising the value across all areas of expenditure and reducing costs where possible.

The Canterbury Clinical Network (CCN) has recently come together to refresh its strategy. As part of this process, CCN reflected on what has worked well in the past and where change has not been effected as well as hoped to learn from these experiences. The key principles of CCN's approach going forwards are shown in Figure 54.

Figure 54 - Canterbury Clinical Network's strategic principles

We should...

... keep	... change	... engage
• Empowerment, permission and leadership • Regenerating the leadership • Providing local solutions • Structure • Rules of engagement • Consumer focus and involvement • Using data to inform • Collaboration and trust • Momentum • Creativity and innovation	Focus: • Mental health and wellbeing • Resourcing/ workforce • Who the system isn't working for – address equity and health literacy Consumers/ community engagement: • Person/whānau centred in work we want to do – access/equity • Increase engagement with and responsiveness to the wider community • Hear voices beyond those just around the table through other mechanisms Membership: • Refresh/reinvigorate • Ensure it reflects our community • Introduce right people, right perspective, right mandate, and right data • Cross-sector, particularly social services Behaviours: • Move away from default behaviours influenced by the effects of colonialism. • Bravery – to cut activity if not valued/successful	• Other parts of the sector, consumers • Advocacy groups, councils, and grass root organisations • Inter-sectorial partners • Determine extra partners needed in public and private sector (e.g. food industry)

Where should efforts be focused going forward?

Collective scope
- Equity should have action areas with outcomes reviewed over time
- Stop work that gives CCN a provider / payment agency role
- Have clear rules around transitioning work to business as usual and the expected timeframes (12-24 months)
- New work should have clarity and visible end goal

Collective effort
- Take a different approach to prevention
- Efforts need to be person-centred, inclusive of whānau
- Local solutions to local problems

Community engagement
- Improve engagement between alliances
- Effectively engage with our communities

Alliance
- Rename to encompass future scope, beyond health
- Review success measures – is success that partnerships continue when SLA ends?
- Share lessons of cross-agency projects (Mana Ake, Corrections)
- Scope of Alliance – thinking/ doing/ supporting project management

Shift to wellbeing model
- Shift from 'clinical' to health/ social
- Focus on the whole person

5.2.5 INFORMATION SYSTEMS

Information Systems are an increasingly important enabler for the Canterbury health system. The principles that underpin our Information Systems investment decisions are:

- The consumer and provider experience is our key driver for change – reliability and usability makes them want to engage with the system
- System information technology planning and decisions enable 'one-care team'
- Data is our system 'Taonga'. The value of data is recognised and protected
- Our system is digitised, standardised, measurable and can be analysed to achieve continuous improvement

- System partners are aligned to make decisions based on what is best for the individual and whānau and best for the system as a whole
- Systems are designed to be future-proofed, secure and optimised for users and support a 'paper lite' approach

Planned Information Systems investments, their status and whether they are local or regional are shown in Table J.

Table J - Planned Information Systems investments

Initiative	Timeframe and Status	Description
Cortex, Clinical Cockpit and End of Bed Chart	2019-2020 CDHB In progress	The investment of Cortex, Clinical Cockpit End of Bed Chart to replace paper-based charts and forms used across CDHB hospital facilities with digital equivalents to reduce the need to access paper-based records.
ICNET Expansion	2019 Regional In progress	Expansion of our South Island wide infection control recording and reporting system to integrate data from additional laboratories and DHBs to improve management and visibility of infection control measures.
Electronic Referrals	2019-2021 Regional Approval in progress	Continued expansion of electronic referrals for community and secondary care across the South Island DHBs to improve timeliness and quality of the referral process.
PC, Laptop Refresh, Windows 10, Office365	2019-2020 CDHB In progress	Currently the median age of desktop and laptop computers across the DHB is 8 years. This investment upgrades, repairs or replaces these aged computers and deploys Windows 10 to address issues with slow and inoperative computers across the DHB and provide access to modern office productivity tools. This is planned to complete in FY19/20.
Hybrid Cloud Disaster Recovery	2019-2020 CDHB/Regional In progress	This investment improves our disaster recovery capability for CDHB and the regional/national services we host so that in the event of a catastrophic failure of our primary data centres we can continue to provide Information Systems services for care of patients. This is planned to complete in FY19/20.
Laboratory Information Management System Refresh	2019-2020 CDHB In progress	This investment updates the systems used to manage tests ordered, performed and reported at Canterbury Health Laboratories and other multilab partners as the existing systems are over 10 years old and no longer meeting clinical business needs for the users of the systems.
Regional Service Provider Index	2019-2021 Regional In progress	Investment in partnership with the Ministry of Health to establish a single authoritative database of clinical staff for South Island DHBs to reduce duplicated processes and administrative time for these clinical. Although initially proposed and funded by the South Island DHB as regional project, the Regional Service Provider Index is now intended for use by all national DHBs.
Nurse Resource Capacity Planning Tool	2019-2022 CDHB Approved	Manual nurse workload management is unable to take into account patterns of fluctuating patient numbers and patient acuity. It is time consuming and subject to error, impacting patient and staff safety and increasing staffing costs. A Nurse Resource Capacity Planning Tool is proposed to be implemented in FY20, in line with the nursing MECA agreement. This will also enable access to the workload management programme available via DHBNZ.
HealthONE	2019-2020 Regional In progress	Continued expansion and refresh of the platform
ERMS	2019-2020 Regional In progress	Continued expansion and refresh of the platform into an expanded online tool
Strata	2019-2020 CDHB In progress	Algorithm based community referrals management replacing care coordination centres

5.2.6 FACILITIES

Canterbury DHB completed its Vision 2020, health services plan, facilities master plan and clinical services plan in 2009/2010, just prior to the first significant earthquake in September 2010. Whilst a number of the principles in these strategic documents remain pertinent, the resultant impact of the earthquakes meant that we had to reconsider our facility strategy.

This section describes the investments in facilities that are already in progress or that have been approved.

5.2.6.1 Christchurch Campus

The Christchurch Hospital Hagley building ("Hagley"), referred to in the 2012 DBC as the Acute Services Building, is currently under construction and due to be occupied in November 2019. This building incorporates two towers on the podium structure which will provide for 317 replacement adult inpatient and short stay beds, plus 70 paediatric beds. The podium will bring additional operating theatres, meaning our outsourcing costs will be reduced, albeit only for a few years, enabling more integrated service delivery. It will also provide upgraded space for our intensive care and emergency departments.

The Hagley building was planned for prior to the earthquakes and was intended to replace facilities that were no longer fit for purpose- not as a replacement for capacity lost as a result of the earthquakes. As a result the Hagley building will bring a net additional 30 adult inpatient beds and 11 additional paediatric beds to the campus as we will exit Riverside building as a clinical space and reduce the capacity of some Parkside building wards for repair. In addition, the population projections used in the 2012 business case significantly under-estimated population growth post-earthquake, with the current population being 40,000 higher than 2012 estimates .

Before we can realise the efficiencies completion of this building will allow, we need to undertake the significant migration of existing services into the new building and the repatriation of outsourced services. New Zealand's largest ever hospital migration, it will be a sizeable and complex piece of work for our teams in the coming year. Almost 3,000 staff and up to 300 patients will need to migrate into the new building over less than two weeks.

Maps showing the existing Christchurch campus buildings and proposed new layout are shown below.

Figure 55 - Christchurch Hospital site, existing buildings

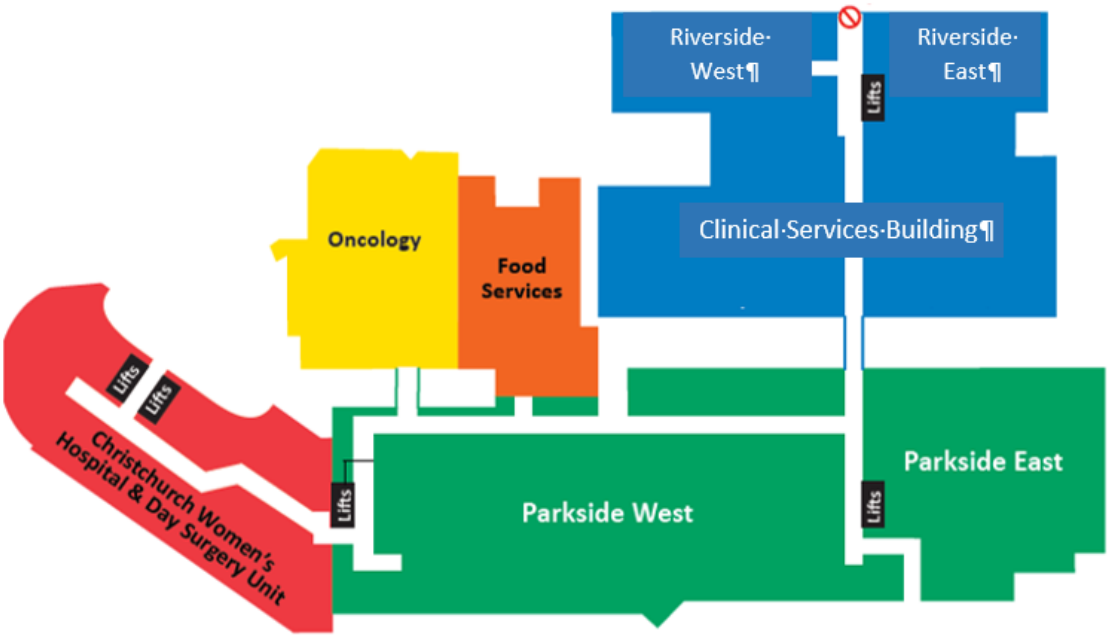
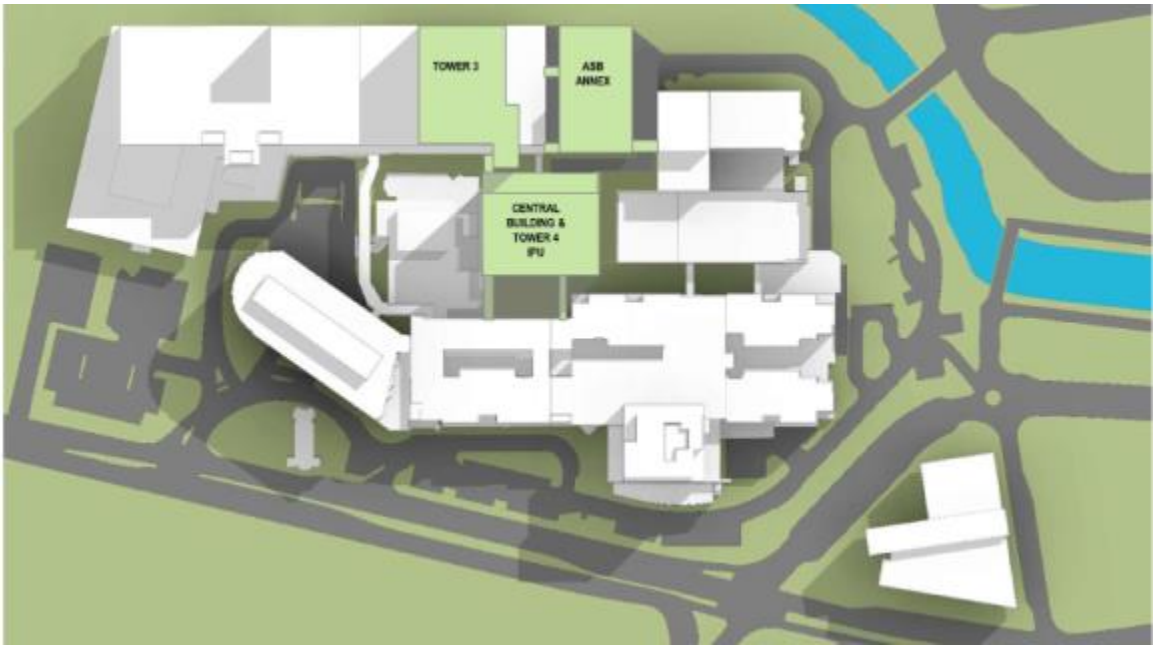


Figure 56 - Proposed new layout for Christchurch campus



The new Hagley building will deliver the following:

- 62,000m² of floor space
- 30 additional medical and surgical inpatient beds
- 11 additional paediatric beds including a new eight bed Paediatric High Care Unit
- five additional adult ICU beds
- 12 theatres in Hagley which provides ten additional theatres overall as two existing theatres will be downgraded to procedure rooms

The additional operating theatre capacity will help to alleviate the demand described in chapter 4 However, this relief will be short lived as rising demand due to faster than planned growth in our population, together with increasing flows of tertiary referrals from outside Canterbury, mean that further capacity is expected to be required within two years of Hagley being opened (see chapter 7). There is room on the Hagley podium for a third tower of 160 beds. Furthermore, a new central podium with a fourth tower could accommodate 233 additional beds. In addition to the Hagley building, a new energy centre is being constructed for the Christchurch Hospital Campus. This is to replace the existing boiler house for Christchurch Hospital campus, which is severely damaged, assessed as 30-40% IL4 in terms of seismic performance and is currently operating outside of its consent parameters due to necessity. There is urgency with this development as this is a high risk for the DHB, in terms of business continuity of critical service provision to Christchurch Hospital campus and the Canterbury Health Laboratories, in the event of another significant earthquake.

As of 1 July 2015, the Ministry of Health has taken responsibility to managing this project and it has submitted a single stage business case (November 2015) to build a new energy centre and demolish the existing boiler house. This business case has been endorsed by the HRPG at the December 2015 meeting. Design is underway. Completion of this facility and the handover to the DHB is expected to be in 2021/22.

5.2.6.2 Specialist Mental Health Services – Hillmorton Campus

As described in chapter 4, a number of specialist mental health services are currently stranded in substandard facilities at the largely decommissioned TPMH campus. The March 2019 Clinical Facility Fitness for Purpose Report, led by the Ministry of Health, identified a lack of fitness to provide the right care for these complex mental health patients in a safe manner for both staff and patients. A DBC for investment in new facilities on

Hillmorton Hospital campus was approved in December 2018 by the Minister of Health and Minister of Finance. This is to enable the relocation of the following mental health services from TPMH campus:

- 13 bed Mothers and Babies and Eating Disorder regional inpatient and outpatient services
- 16 bed Child Adolescent and Family (CAF) inpatient service, and
- 16 bed high and complex needs inpatient service

Excluded from the approved scope is the Child, Adolescent and Family (CAF) outpatient service and community building. The DBC assumes a property will be leased and fitted out for the CAF outpatient service. We will progress appropriate options to ensure best-practice service delivery to this patient cohort. This redevelopment is being project managed by Canterbury DHB with occupation expected by end of 2022/beginning of 2023.

5.2.6.3 Spinal Unit – Burwood Campus

As described in chapter 4, our spinal service now supports patients with spinal injuries from Hawkes Bay/New Plymouth south and is expected to experience significant growth in demand over the next ten years. The model of care has already been reviewed and changes implemented to support service delivery. Originally constructed in 1979, the Burwood Spinal Unit also sustained significant damage in the Canterbury earthquakes. To help realise benefits from the new model of care and to address the earthquake damage, the unit will be repaired and upgraded, which requires services to be decanted whilst work is underway. Whilst no extra beds will result, the newly refurbished rooms will be more flexible enabling improved patient flow and a better rehabilitation environment and improved experience for patients.

5.2.6.4 Optimising Site Use

A detailed master plan is underway to outline the options for the future of the Hillmorton site and provide increased granularity for service delivery as well as planning for optimising the campus into the future. This master plan explores capacity, service delivery and coherent service use in relation to the existing site as well as planning other off site requirements. This is a unique opportunity to ensure services and patients are grouped to maximise site and workflow efficiencies. We have yet to determine the future of the former Christchurch Women's Hospital site in the central city. Over the coming year we will also consider the future use of our rural hospitals.

5.3 Investment Risks and Issues

Key strategic risks that are evaluated when considering our investment strategy are shown in the table below.

Table K - Key Strategic risks

Key Strategic Risk	Description
Patient Safety	Our ability to deliver services that are clinically safe
Equity	Equitable access to health services and striving for equitable health outcomes for all Canterbury population groups.
Workforce	This includes our ability to support capability development and retain staff in key areas
Capacity Management	This describes our ability to manage capacity across the whole system in a business as usual situation (i.e. including the usual seasonal peaks and troughs)
Capital Risk	This assesses financial capital risk. It assumes the status quo remains for the capital charge regime
Total Cost of Ownership	This strategic risk describes the total cost of ownership of assets over their lifetime. It assumes the status quo remains for the capital charge regime
System Resilience	This relates to our ability to cope with the next unexpected natural or manmade disaster
Regional/Tertiary Provider Risk	This describes the risks to our ability to provide services to the South Island and beyond

These risks are explored further in chapter 6 where we describe possible investment scenarios.

5.4 Key Constraints and Dependencies

There are a number of constraints and dependencies that impact on our ability to deliver to our long term vision. A key constraint in Canterbury is meeting the requirements of the Building Act. We have buildings that are earthquake damaged and earthquake prone (as that term is defined), of which we have a prescribed timeframe to achieve compliance with the code/ statutory requirements. We still have services in temporary accommodation while we attend to remediation of earthquake damage. Furthermore, CDHB began investigating its existing passive fire protection PFP) for its Christchurch Hospital campus buildings in 2016. We have discovered there are PFP compliance issues that require rectification, noting that fire protection is a specified system requiring compliance for Building Warrant of Fitness.

5.4.1 BUILDING ACT COMPLIANCE

The Building (Earthquake-prone Buildings) Amendment Act 2016 introduced major changes to the way earthquake-prone buildings are identified and managed under the Building Act. There were two key changes that had implications for the DHB as follows:

1. The addition of "…or part of a building" to the definition of EQ prone has brought several additional current DHB buildings within the definition of EQ prone.

   For example: Parkside Panels that, due to the low capacity of the external concrete panels at level 2 and above when assessed as an IL4 building, are now an EQ prone "part" under the new definition. The panels do not affect the capacity of the overall structure (i.e. they could detach and the building's overall strength would not be diminished) so were not previously considered earthquake prone under the old Act.

2. The timeframes for dealing with earthquake prone buildings has been reduced by half for "Priority Buildings" to seven years and six months. Hospital buildings are generally included in the definition of Priority Buildings.

The impact of the number of Canterbury DHB buildings being re-categorised as earthquake prone and the reduced timeframes to achieve compliance is driving the prioritisation of investment.

Damage to our buildings and infrastructure from the Canterbury earthquakes far exceeded the insurance available (the cap on Canterbury DHB's insurance was reached early). Accordingly there is limited insurance money available to attend to additional remedial and upgrade works required to achieve statutory compliance.

5.4.2 PASSIVE FIRE PROTECTION COMPLIANCE

Passive fire protection provides the initial protection from smoke before the detection systems and sprinklers activate, and continues to reduce the spread of flames and smoke to other areas of buildings. Fire Protection is a specified system requiring a compliance schedule to be issued for Building Warrant of Fitness. Canterbury DHB began investigating its existing passive fire protection (PFP) within the Christchurch Hospital Campus buildings. Given its legacy buildings, works undertaken over time and new code requirements, we have discovered there are passive fire rectification requirements to be undertaken. We have since implemented a fully integrated passive fire management system to ensure works going forward are using Canterbury DHB accredited installers and approved materials. However rectification works required to achieve compliance based on an indicative six years completion is putting pressure on the investment priorities. Furthermore, the delays in developing a cohesive masterplan for the Christchurch Hospital Campus are hampering earthquake and passive fire rectification works, putting even more pressure on our ability to meet Building Act requirements.

Constraints in relation to building code or site access requirements are discussed in the individual business cases for these proposed investments.

5.4.3 COMPLIANCE WITH NATIONAL POLICIES AND STRATEGIES

Investment decisions are also constrained by the need to deliver to national policies and strategies such as the new bowel screening initiative. As an example, due to physical capacity constraints the bowel screening initiative will be delivered as a mixed model of in-house and outplaced activity. This increases the operational costs of services delivery which will exceed the funding available.

Further changes to national polices and strategies may require a rethink of our long term investment strategy but are less likely to impact on the investments described in this chapter as these are known investments. Similarly, any changes to the DHB, or primary care, funding model may impact on our investment plans.

PASSIVE FIRE PROGRAMME

Passive fire protection provides the initial protection from smoke before the detection systems and sprinklers activate, and continues to reduce the spread of flames and smoke to other areas of buildings. Following the Canterbury earthquakes and subsequent building inspections, we became aware of some areas in our buildings that need rectification. We began our Passive Fire Protection programme three years ago to address these shortcomings. The programme takes a fully integrated approach to fire protection, incorporating supply, inspections, testing and training.

The programme recently won a 'Highly Commended' in the James Hardie Innovation Award category of the New Zealand Building Industry Awards 2019, with building industry leaders hailing the innovative approach.

The Site Redevelopment Project team, who led this initiative, have since been approached by a number of other DHBs, Ministry departments as well as private health providers and will share leanings to support them to manage their own passive fire issues.

5.5 Change Leadership

Health is a complex and constantly changing area, requiring mature and agile leadership that can support innovative ways of working. In Canterbury, we operate a network structure across the whole health system that acts as a source of innovation and continuous improvement that complements the traditional hierarchical structure. This dual operating model allows us to not only meet the day to day challenges of running a health system but also enables people working within the system to innovate, a necessity in an environment where change is the norm. Leadership sponsor a network of people working across the Canterbury health system who have a mandate to respond to new and unpredictable challenges in a rapid and responsive way. This helps to break down silos and promote a whole of system viewpoint in problem solving.

Our community based alliance, the Canterbury Clinical Network (CCN) is effective because it engenders trust between providers across the Canterbury health system that has built up over years. Canterbury DHB acts as a facilitator and partner with other providers to develop pathways of care that integrate services across our system; investing and reinvesting is a collaborative process. CCN takes a collective impact approach to addressing the needs of vulnerable patients. We share insights and learning from real time patient data with our alliance partners and have a joint orientation towards measurable goals. Clinicians from across the system are brought together through the Canterbury Initiative and funded to identify service and quality improvements, solve problems and support more efficient use of resources.

6 Investment Scenario Assessment

In this chapter, we describe a number of different investment scenarios. These have been selected to demonstrate the consequences of altering the level or timing of investment in all the asset classes – physical assets, workforce and community based care. The scenarios are evaluated against a number of financial, risk and qualitative criteria. We also consider their expected impacts on our ability to deliver the expected benefits of our Investment Logic Model and on the ten strategic focus areas.

6.1 Optimal Service Levels with a Balanced Portfolio Approach

Determining how to best invest to deliver to the needs of our population and of those who depend on us for tertiary services requires acknowledgement that services across the health system are inextricably linked. Investment, or disinvestment, in any one area will have flow on effects on other services. Resources are always constrained, meaning there are tensions between delivering to the immediate and urgent as well as investing enough in services that would change the demand curve in the longer term. The lack of a true measure of health need to inform the population based health funding model continues to challenge Canterbury as our population experienced dynamic (and ongoing) shifts following the earthquakes. This has been reflected in a significant decrease in deprivation as measured by NZDep 2013 through forced migration from higher deprivation red zone areas to pepper potted relocation in less deprived areas. Furthermore, the asset changes forced by the earthquakes have overburdened our system in an unplanned way with capital and assets. The constrained physical assets created by earthquake damage have led to increased costs as we have had to outsource significant portions of our core activity to the private sector and maintain inefficient services in facilities that are not fit-for-purpose.

Our core vision is a system that supports people to stay well in their own homes and communities, and reducing inequalities in health outcomes and whilst working with other sectors on the broader determinants of health. In developing our investment strategy for the next ten years we have tried to balance the needs of many areas that are expected to face significant pressures without causing new problems in other areas due to disinvesting in those. We will improve our financial position without doing this at the expense of the health of our most vulnerable populations, recognising that the risk of constraining service delivery is that we disproportionately impact these populations. However we must repair or replace buildings that are earthquake-damaged and that are not fit for purpose, particularly the Christchurch campus and the Hillmorton campus. In developing our investment strategy, we have taken on board feedback from multiple reviews of our system performance and have also learned from previous investment decisions.

6.2 Investment Scenarios

In developing this Long Term Investment Plan, six scenarios were modelled and evaluated. The purpose of these hypothetical scenarios is to illustrate the likely impacts of different investment approaches. In addition, consideration of a 'do nothing' scenario in which options of no investment along with continuing to operate Parkside building at Christchurch Hospital at current bed numbers without remediation is discussed.

Canterbury DHB faces some unique challenges which limit the options for investment. A combination of already committed investment on the Hillmorton and Christchurch campuses interacting with the need to address earthquake damaged infrastructure driven by compliance with the Building Act and the Health and Safety Act force a continuation of capital works at both sites. From a strategic perspective Canterbury DHB continues to focus on using community based options to reduce the size and scale of facility investment and where possible manage timeframe delays. As an example, the 2008 assessment of future bed requirements on the Christchurch campus forecasted a need of 360 additional beds by 2020. Despite more rapid population growth than projected, Canterbury DHB has limited hospital demand such that only 30 additional inpatient beds will be delivered in Hagley in 2019/20 restoring the number of beds to pre-quake levels. The following scenarios test the impacts of further delays in core infrastructure delivery and a disinvestment in the

community based services. This enables us to test the balance between facility and community based responses.

A separate 'do nothing' option is discussed, however this section does not form part of the scenario analysis as it is not tenable for the Board to consider ongoing non-compliance with the Building (Earthquake-prone Buildings) Amendment Act 2016. Canterbury's unique position of extensively earthquake damaged infrastructure results in a 'do minimum' scenario that requires significant investment in facilities which do not deliver improvements in effectiveness and efficiency.

These scenarios provide the framework to assess the options and take into account a number of interplays such as risk, timeframe, optimising the use of the earthquake insurance settlement proceeds (the DHB received the maximum pay out under the capped national DHB insurance policy), affordability and alignment with asset management planning. Managing uncertainty of delivery of the outlined investments is inherent in the delayed scenarios described below (Scenarios C and F). In addition, Canterbury has demonstrated its resilience to cope with uncertainty and delays over the last eight years. The risks arising from delays in the delivery of new Hagley facility have been mitigated by community-based interventions that have proven successful in managing demand to avoid system failure. These investments will require revisiting and innovative new approaches may be required to manage possible time delays, albeit our ability to make further inroads may become increasingly difficult (Scenario A).

The scenarios vary the timing or level of investment in three of the Canterbury health system's key enablers: physical asset portfolio, our workforce and our community partnerships. This allows us to explore, for example, how changing our investment into community based services interacts with investment in capital. We looked at what impact these interactions would be expected to have on our ability to meet the increasing health needs of our growing and ageing population. All the asset classes are interdependent, making this analysis difficult, therefore we have focused on particular aspects. As an example, investing in physical assets such as theatres increases the pressure on our staffing and service models to maximise the benefits realised from such capital investments by extending operating theatre and clinic hours. Further information on how the scenarios were modelled is provided in appendix 10.3.

6.2.1 'DO NOTHING' SCENARIO IS NOT AN OPTION

One of the questions for developing this LTIP is to consider: what is the minimum possible investment that could be made to ensure ongoing sustainability? This usually involves an option that explores staying within current (and future projected) funding levels without further investment, i.e. with no additional funding. The second element of this scenario involves 'sweating' current assets with no further investment; in this case continuing to use the Parkside building on the Christchurch campus site at full capacity.

Continuing to operate the Parkside building in its current form and capacity is not a legally viable option. The building sustained damage from the earthquakes and requires repairs and seismic upgrades. The building (including links) is classed as an earthquake-prone building under the Building (Earthquake-prone Buildings) Amendment Act 2016 which, being a 'priority building' must be completed within seven years and six months (i.e. 2023/24). The building also requires passive fire protection rectification work to achieve compliance with Building Warrant of Fitness requirements.

Failure to remediate earthquake prone buildings within the prescribed timeframe or to achieve Building WOF compliance are both breaches of the Building Act. The Board may be found liable for continuing to knowingly operate non-compliant buildings, and be subject to a fine or conviction. In addition the building currently falls far short of Australasian clinical standards, presenting increased risks to patient and staff safety. Refurbishment would require the wards to be reduced from six bed pods to four to meet the standards which would reduce bed capacity in Parkside. As well as being expensive, remediation of Parkside to meet the Building Act requirements necessitates invasive processes which will significantly reduce the available bed capacity while work is done to attach external panels from inside the building (i.e. in the ward space). Given the 'do nothing' scenario is not legally viable and will not meet projected capacity requirements, it has not been included as scenario for assessment and therefore addressing the underlying population demand requires further investment.

6.2.2 UNDERLYING INVESTMENT ASSUMPTIONS

All of these scenarios assume the following:

- A minimum core investment to 'keep the lights on'
- Investment in facilities where the business case has already been approved will continue as per their detailed business cases
- Hagley Towers 1 and 2 are implemented and commissioned as planned
- The resource optimisation described in section 5.2.2 (Workforce) and 5.2.4 (Enabling our partnerships) is achieved which will address the current overspend issue
- Existing clinical pathways will continue to be utilised and new clinical pathways will be developed where appropriate
- Information Services investment in line with section 5.2.5
- Investment in clinical equipment also proceeds in line with section 5.2.3
- There are no policy changes that result in significant changes in service demand
- Our engagement in the mandated Care Capacity Demand Management programme will guide efficient patient:staff ratios to support our rostering.

Importantly, we cannot predict the timing of natural and other disasters. Any further disasters will likely impact our assets and/or service demand and would then necessitate a revision of our investment strategy.

Each of the scenarios envisage the Parkside building will be refurbished by early 2021 and the western section of the Riverside building demolished in early 2022. The transfer of the stranded mental health services still at TPMH would proceed as per the agreed business case and the Specialist Mental Health Service Acute Inpatient Facility and Forensic Unit would be available from early 2027 and 2028 respectively. The proposed Oncology centre would be commissioned by mid-2026, enabling addition of a further Linac to help us meet demand for cancer treatment and a new Laboratory facility would be commissioned by mid-2025. A Selwyn Maternity facility, including other health and social services developed by the Selwyn District Council, would be available from mid-2021 to enable us to meet primary birthing and other demand from a rapidly increasing population to the south of Christchurch. Further information on proposed investments is provided in the next chapter.

The following scenarios provide a range of investment options for assessment. Rather than representing a series of options from which one can be selected, they represent a single underlying demand challenge in which the risks can be mitigated to differing degrees based on the choices made. Each scenario is a risk proposition has been assessed for its ability to meet projected demand, operational financial impacts and against identified risks.

The unmet need for each investment scenario is represented in hospital bed deficits which have been costed using caseweight discharges which will require outsourcing. In this way the costs of not investing can be compared with the costs of investment.

6.2.3 INVESTMENT SCENARIOS

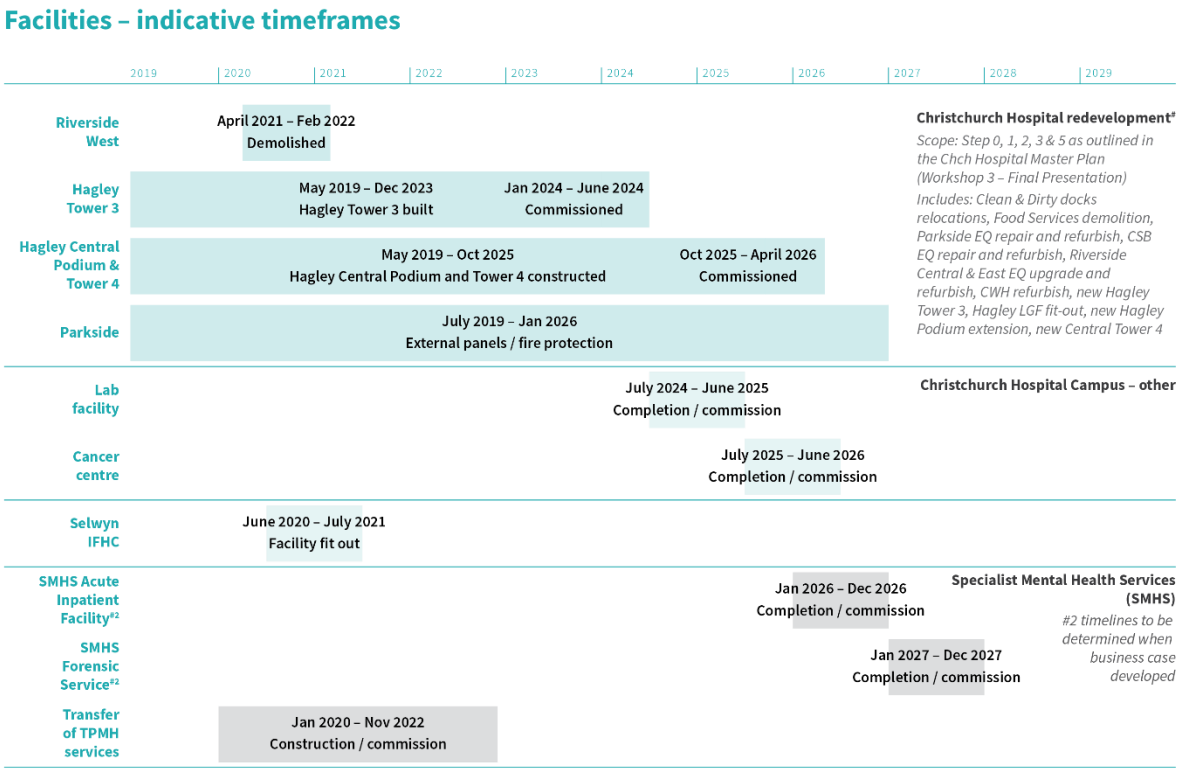
Aspirational Scenario (A)

In this scenario, facilities investment and the timing of delivery of facilities meets expected population growth and projected demand (shown in the timeline in Figure 57). In addition, this scenario incorporates increased investment in community based care to reduce downstream service demand, resulting in a 5% reduction in acute admissions for modelling purposes. Interventions would focus on proactive management of people with long-term conditions and frailty-related health issues who can be supported by clinical teams in their own homes and communities. Intensive assessment and monitoring are key features to ensure flexibility in providing additional support in a timely manner. One of the major risk factors for hospitalisation and entry to Aged Residential Care is loneliness and this investment would explore working with non-health agencies to develop visiting programmes to support those people identified as lonely. Achieving a further five percent is possible but will require more sophisticated interventions including increased clinical services provided in people's homes which will be exponentially more expensive. Meeting population growth requires at a

minimum that Hagley Tower 3 be available for use from around July 2024 and Central Podium Tower 4 from around May 2026.

In addition to implementing the demand management investments described in chapter 5, this scenario would see increased investment in acute demand (hospital avoidance) services and community and primary based mental health.

Figure 57 - Facilities investment to meet expected population growth



Intermediate - Balanced Scenario (B)

In this scenario, the investment in facilities and timing of facilities delivery is as per the aspirational scenario A (Hagley Tower 3 July 2024 and Central Podium Tower 4 May 2026). In this scenario we maintain but do not extend our current levels of investment in community based care to continue to demand management at existing resourcing levels and as described in chapter 5. By not increasing community investment, we recognise this will place pressure on our ability to manage the expected increase in demand caused by ageing and increasing size of our population. In this scenario, we would invest in our workforce to ensure there are enough staff to capitalise on the benefits offered through increased capacity of the new or refurbished facilities. This will in part be afforded by the transfer of outsourced and outplaced surgical activity through externally contracted services moving back in-house with this resources being used to employ staff. This process has commenced with the employment of theatre nursing and specialist medical staff as we await delivery of the New Hagley facility, but despite the new facility we will re-enter bed capacity deficit by FY2021 and theatre capacity deficit by FY2024.

This scenario aims for a realistic investment level and provides new facilities in a timely manner that will meet the projected demands and reduce operational expenditure associated with facility delay.

Intermediate - Delayed Investment in Facilities (C)

In this scenario, Hagley Tower 3 is delayed by one year (July 2025) and the Central Podium and Tower 4 is delayed by four years (May 2030). These delays will help to manage the national capital investment envelope. The community investment remains the same as in scenario B where we maintain but do not extend our

current levels of investment in community based care to continue to demand management. Delay in investment in facilities will create operational expenditure increases due to the increased bed deficit which will be evident in increased outsourcing costs. In this scenario there is no change to current levels of investment in workforce.

The bed deficit will be most pronounced in the years before towers 3 and 4 are commissioned. Without 'safe' capacity (i.e. raw capacity versus demand) there is a deficit of 135 beds in FY2025 and 138 beds in FY2029.

Intermediate - Reduced Investment in Community Based Care (D)

Facilities would be delivered as per scenario A (Hagley Tower 3 July 2024 and Central Podium Tower 4 May 2026) but there is a reduction in investment in community based care. One way of reducing investment requirements for Canterbury DHB is to consider reducing operational expenditure which is discretionary expenditure. Key Ministry of Health documents include the Operational Policy Framework and the Service Coverage Schedule which define services a DHB must deliver. After these obligations are met, Canterbury DHB has relatively little discretionary resource to invest in strategic activity. A reduction of investment in hospital avoidance activity is one option which the DHB could make to reduce operational expenditure.

This has been modelled in a number of ways using acute medical admission rates as a proxy for community care disinvestment:

- Using the current New Zealand average acute admission rate;
- Using the Waitematā acute admission rate as the Waitematā DHB region has a similar age profile (although their population has a different ethnic profile and fewer rural residents);
- Using Auckland DHB acute admission as they have a similar complexity and mix of services.

The Waitematā rates are shown in the figures and used for the scenario assessment while the New Zealand and Auckland rates are described in the text.

Intermediate - Clinical Workforce Capped (E)

Facilities would be delivered as per scenario A (Hagley Tower 3 July 2024 and Central Podium Tower 4 May 2026) but investment in our clinical workforce is capped or reduced in some areas. In practical terms decreases in staffing ratios would result in dispersion of work across staff. We have modelled 'churn' for inpatient services which considers the processes that take extended periods of time during a patient's stay. For example, admission and discharge processes remain constant pieces of work regardless of how long the stay is. Measures of churn increase as length of stay reduces.

As volumes of inpatient admissions increase (as modelled) the capping of a workforce means the same number of people will be required to do the increased amount of work, effectively slowing production, leading to a longer length of stay and less throughput. This reduces the beds available and has the same impact as reducing bed capacity in this scenario by over 80 beds (for more information, refer appendix 10.3.

For modelling purposes, capping the clinical workforce has been evaluated by extending the average Length of Stay (LOS) by 5% and CWD by 5%. This decline in performance is aligned to a decline toward (but still better than) other large comparator DHBs' performance for LOS.

Do Minimum Scenario (F)

Facilities are delayed as per scenario C (Hagley Tower 3 in July 2025 and the Central Podium and Tower 4 in May 2030), plus a reduction in community investment as per scenario D and in the workforce as per scenario E. In effect, this scenario is a combination of the risks we are managing.

The 'do minimum' scenario represents the investment that would still need to be made if there were no new facilities approved. Existing facilities would still require extensive repair and refurbishment to achieve occupational or regulatory compliance (Building Act, 2016 and Australasian clinical standards).

This level of investment for a 'do minimum' scenario is unusual reflecting some of the complexities we need to account for in a post-disaster environment which has left damaged facilities and legislation that has become more stringent to better recognise the risks we face.

6.3 Assessment of the Investment Scenarios

The six investment scenarios described above were modelled to estimate the effect on bed numbers. The results of this versus the total expected beds for each scenario are shown in Figure 58 below. Figure 59 shows the same modelled bed demand against the expected 'safe' capacity, which includes 64 freeboard beds to accommodate peak service periods such as during winter influenza season.

Figure 58 - Modelled bed demand against total expected bed capacity for the six scenarios from FY20 to FY31

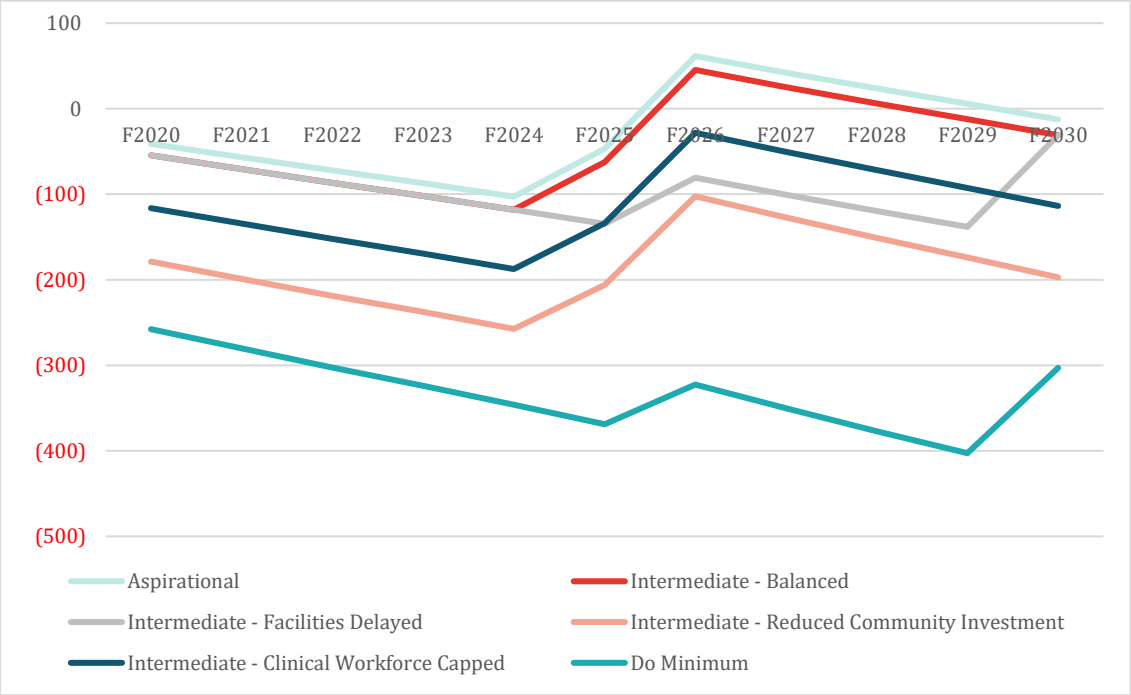
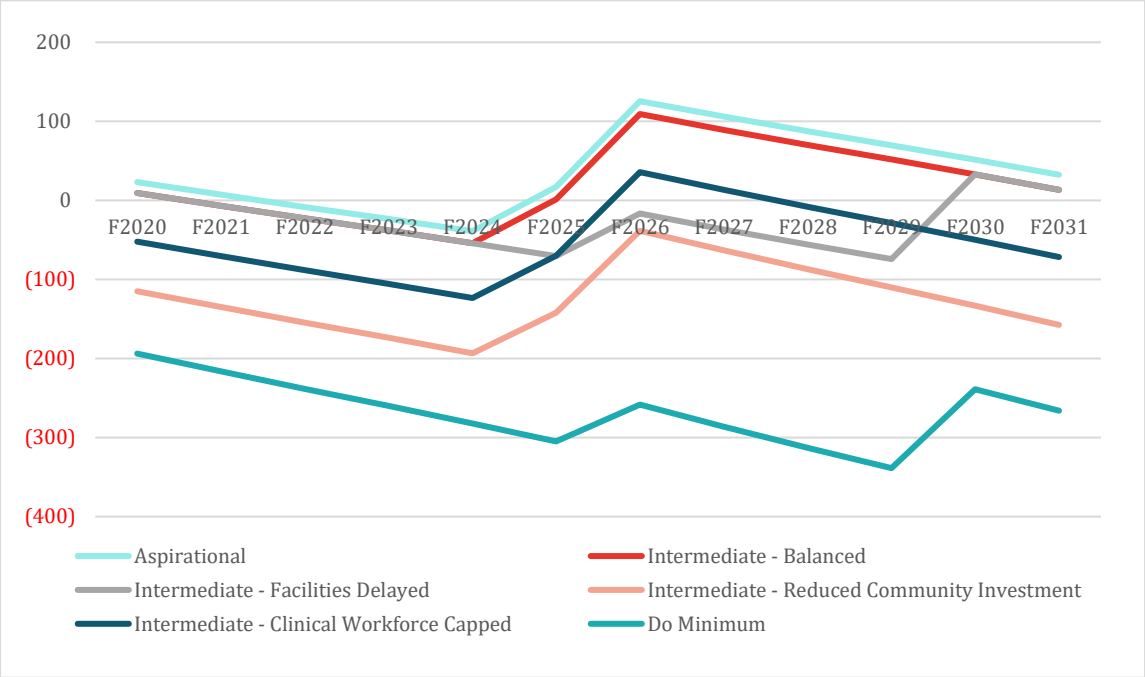


Figure 59 - Expected demand against 'safe' capacity



The link between delayed facilities delivery and bed deficits is obvious. However, reducing investment into community based care or workforce has a significant negative impact as shown above. For workforce, reduced staffing levels results in lengths of stay increasing as patients are not discharged in a timely manner. Lengths of stay also increase with reduced community investment as there are fewer community based care options to which patients can be discharged and this is further exacerbated by increasing flows into secondary and tertiary beds as patients who would otherwise have been cared for in the community are admitted into hospital beds.

Bed deficits have significant implications for DHB service levels and financial performance. The scenarios were evaluated for their expected impacts on our financial performance and system risks as well as for this impact on our ability to deliver the benefits described in our investment logic model (section 2.8) and to manage the expected increasing/changing demand of the ten strategic focus areas outlined in chapter 4. These evaluations are described in the following sections.

6.3.1 FINANCIAL ASSESSMENT OF THE SCENARIOS

The bed demand modelling compares bed numbers for each of the six scenarios, including known new capacity, with demand forecasts based on the population modelling presented in chapter 2. The potential financial implications of each scenario have been evaluated by using the projected total caseweighted discharges (CWD[49]) that exceed capacity. By using the national 2018/19 CWD price we can represent the financial cost of outsourcing to meet demand.

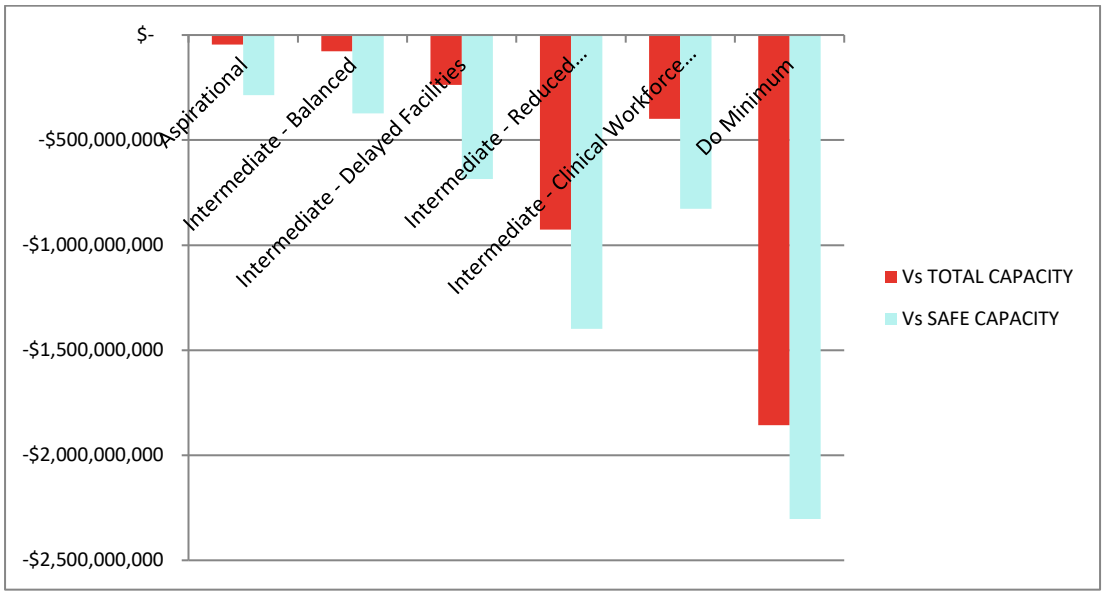
The comparison shown in Figure 60 below demonstrates the shortfall in 'safe' capacity for each of the bed demand scenarios. Safe capacity includes headroom of 64 beds against an annual average demand, to allow for operational capacity and patient safety during periods of peak load.

The financial impact of these bed deficits, using the 2018/19 caseweight discharge price of $5,068 and assuming an overhead rate of 20% (conservative) for outsourcing was then calculated for each of the scenarios. The modelled costs for each of the years of this LTIP are provided in appendix 10.3. Cumulative costs over the LTIP period (noting that surpluses cannot be banked) vary from [redacted]

[49] https://www.health.govt.nz/system/files/documents/publications/new-zealand-casemix-system-an-overview-dec15_0.docx

[redacted].

Figure 60 - Case weight discharge shortfall costs over 10 years for the six scenarios (2018/19 CWD costs and assumes 20% overheads incurred by outsourcing)



6.3.2 RISK ASSESSMENT OF THE SCENARIOS

The six scenarios have been evaluated for their expected impacts on the key strategic risks described in section 5.3. The likely impacts of each of the scenarios against these key strategic risks were estimated out of 5 with a score of 5 being the most positive risk assessment and 1 being the worst.

Table L - Scenario Risk Assessment

Scenario	**A** Aspirational	**B** Intermediate - Balanced	**C** Intermediate - Facilities delayed	**D** Intermediate - Community investment reduced	**E** Intermediate - Clinical workforce capped	**F** Do minimum
Modelled bed deficit in 2025	*-47*	*-63*	*-135*	*-206*	*-134*	*-369*
Patient Safety	5	5	3	2	2	1
Equity	5	5	2	1	3	1
Workforce	5	5	3	3	2	1
Capacity management	5	4	2	1	1	1
Financial Capital risk	1	1	1	1	1	5
Total Cost of Ownership	5	4	3	2	3	1
System Resilience	4	3	2	1	1	1
Regional/Tertiary Provider risk	5	5	2	3	2	1

Whilst the financial capital risk is worst in the scenarios in which the facilities are delivered to our preferred timeline, the estimated total cost of ownership is lower over the lifetime of this LTIP. The aspirational or intermediate -balanced scenarios provide much greater opportunities for delivering high quality, equitable

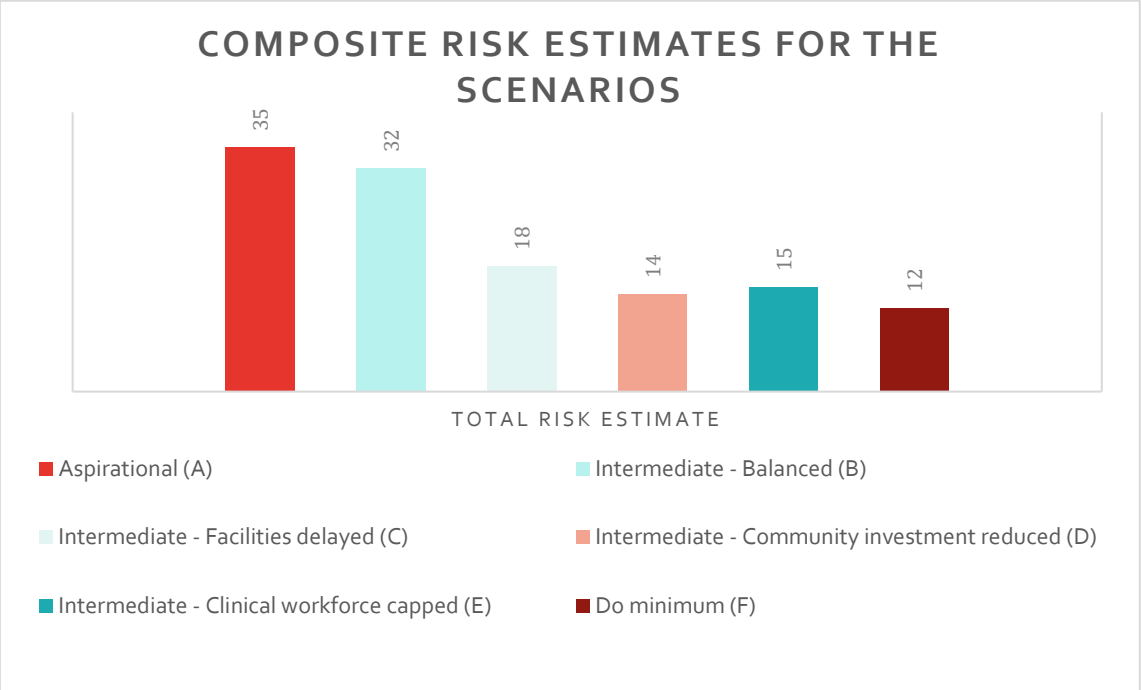
care, including to residents of other regions in our capacity as a regional provider of specialist services. The summary of the risk scores for each of the scenarios is shown in Figure 61 with the vertical axis giving the total calculated score.

Each of the scenarios presented is a mitigation approach to manage risks above. The mitigations revolve around:

- Matching facilities investments to meet population demand
- Designing further interventions that keep people well and healthy and allow them to remain in their own homes and communities - new approaches will require greater sophistication and intersectoral collaboration with non- health social service providers
- Reducing investment in community hospital avoidance
- Capping growth in staffing
- Delaying investment in facilities.

All scenarios assessed have residual risk that cannot be mitigated in realistic ways that recognise the constrained nature of investment resources in New Zealand. Affordability remains a challenge that interacts with increased operational costs which requires a pragmatic approach to ensuring total cost of ownership is lower over the lifetime of this LTIP.

Figure 61 - Composite risk estimates for scenarios. In this instance, a high score denotes a better assessed risk outlook for the Canterbury health system



6.3.3 QUALITATIVE ASSESSMENT OF THE SCENARIOS

In this section we describe the estimated impacts of each of the proposed investment scenarios on the expected benefits of our Investment Logic Model and on the ten key focus areas described in chapter 4. The Investment Logic Model describes the key challenges for the Canterbury health system together with expected benefits of investing to overcome these. The expected benefits of our Investment Logic Model are:

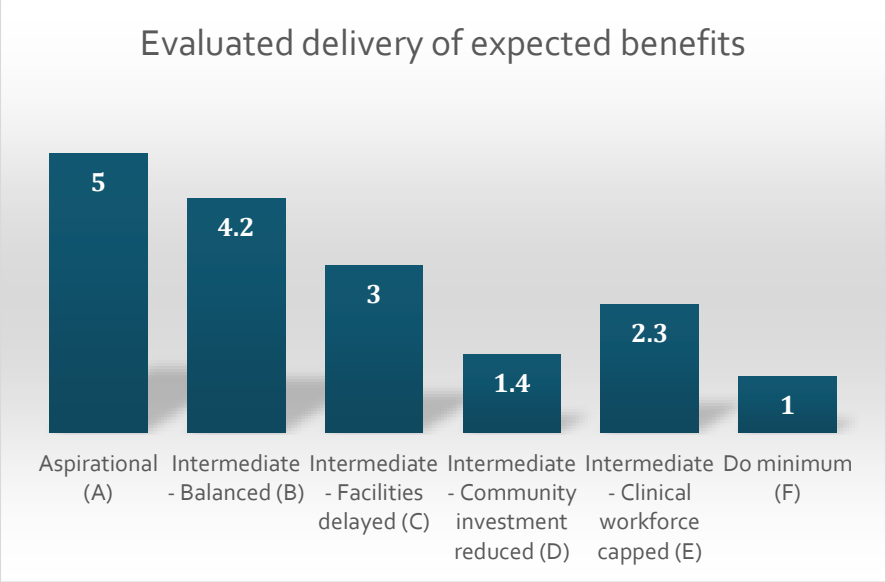
- Improved health and wellbeing of vulnerable populations (20%)
- Reduced long term demand on the healthcare system (30%)
- Increased ability to meet future demand (30%)
- Improved safety and operational efficiency (20%)

These are similar in some ways to the key strategic risks but describe Canterbury-specific goals for our investments. The evaluated scores for each of the scenarios for the expected benefits of the ILM are shown in Table M - Scenarios - Expected Benefits Evaluation. Weighted composite scores for each of the six scenarios is shown in Figure 62.

Table M - Scenarios - Expected Benefits Evaluation

	Scenario	Aspirational A	Intermediate - Balanced B	Intermediate - Facilities delayed C	Intermediate - Community D	Intermediate - Clinical E	Do minimum F
Expected Benefit	Improved health and wellbeing of vulnerable populations (20%)	5	4	3	2	2	1
	Reduced long term demand on the healthcare system (30%)	5	4	3	1	2	1
	Increased ability to meet future demand (30%)	5	4	3	1	3	1
	Improved safety and operational efficiency (20%)	5	5	3	2	2	1
	Total	**20**	**17**	**12**	**6**	**9**	**4**

Figure 62 - Score describing evaluated delivery of expected benefits for each scenario, incorporating benefit weighting



As with the financial and risk assessments, significant negative impacts are seen from delaying facilities or reducing investment in either community based care or the clinical workforce.

Finally, the six scenarios were each evaluated for their ability to support demand over the lifetime of this LTIP for the ten service demand areas highlighted as of key strategic focus in chapter 4.

Table N - The ten areas of strategic focus and the vision statements for these

Focus area	Vision
Equity	Differences in rates of amenable mortality, outpatient and primary care and procedures by ethnicity (and deprivation where measurement is possible) are further reduced.
Older person's health	Early intervention and thriving community providers supports our elderly to participate fully in decisions regarding their health and wellbeing and to continue living in the community for as long as possible
Medical-surgical	Majority of surgeries are brought back in house, reducing costs and enabling care to be delivered by an integrated team in a timely manner
Adult rehabilitation	Continuity of care across the Canterbury health system, with appropriate staffing enabling us to continue as a tertiary provider of complex spinal services for much of the country
Radiology and diagnostics	Radiology and diagnostic services are a key enabler for clinicians, are digitally enabled and based in fit-for-purpose facilities
Women's and children's	Women birth in community based primary birthing units where appropriate, supported by telehealth-enabled specialist care where necessary. Christchurch Women's regains capacity to deal with the increasing number of complex pregnancies and births
Mental health services	A service that is re-orientated towards wellbeing, supporting people with timely community based early intervention and with the capacity and capability to deliver high quality care for high needs patients
Rural Health	High quality care for our rural communities, delivered by rural generalists working at the top of their scope. Services that are closer to home, supported by specialists via telehealth
Haematology & Oncology	Earlier intervention reducing the need for inpatient stays. Enabling our population to make healthy choices. A culturally responsive service delivery model
Regional services	Services that are high quality and cost effective, planned in collaboration with our regional partners

Table O - evaluated impact on strategic focus areas – 5 is the most positive score.

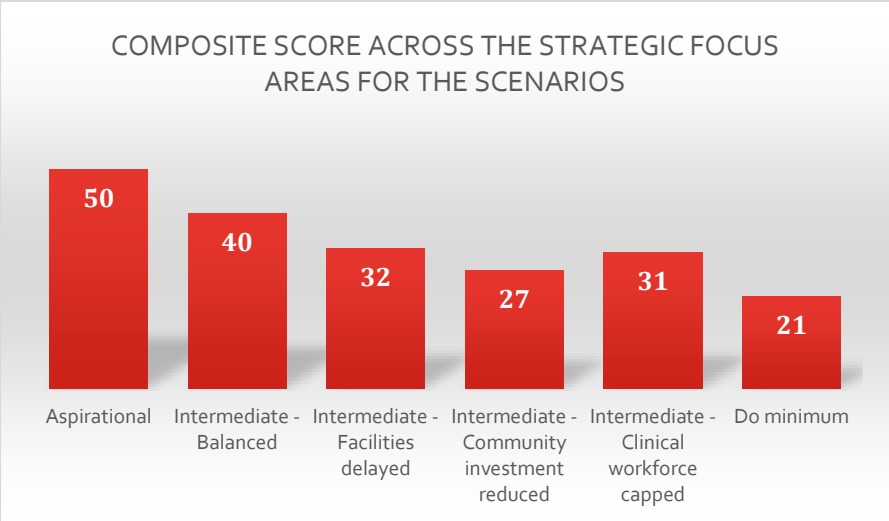
Scenario	Vision for area	Aspirational A	Intermediate - Balanced B	Intermediate - Facilities delayed C	Intermediate - Community D	Intermediate - Clinical workforce capped E	Do minimum F
Equity of access	Differences in rates of amenable mortality, outpatient and primary care and procedures by ethnicity (and deprivation where measurement is possible) are further reduced.	5	4	2	1	3	1
Older person's health	Early intervention and thriving community providers supports our elderly to participate fully in decisions regarding their health and wellbeing and to continue living in the community for as long as possible	5	4	3	2	2	1
Medical-surgical	Majority of surgeries are brought back in house, reducing costs and enabling care to be delivered by an integrated team in a timely manner	5	4	2	3	3	2
Adult rehabilitation	Continuity of care across the Canterbury health system, with appropriate staffing enabling us to continue as a tertiary provider of complex spinal services for much of the country	5	4	4	2	3	2
Radiology and diagnostics	Radiology and diagnostic services are a key enabler for clinicians, are digitally enabled and based in fit-for-purpose facilities	5	4	4	3	4	3

Scenario	Vision for area	Aspirational A	Intermediate - Balanced B	Intermediate - Facilities delayed C	Intermediate - Community D	Intermediate - Clinical workforce capped E	Do minimum F
Women's and children's	Women birth in community based primary birthing units where appropriate, supported by telehealth-enabled specialist care where necessary. Christchurch Women's regains capacity to deal with the increasing number of complex pregnancies and births	5	4	4	4	4	4
Mental health services	A service that is reoriented towards wellbeing, supporting people with timely community based early intervention and with the capacity and capability to deliver high quality care for high needs patients	5	4	4	3	3	2
Rural Health	High quality care for our rural communities, delivered by rural generalists working at the top of their scope. Services that are closer to home, supported by specialists via telehealth	5	4	4	3	4	3
Haematology & Oncology	Earlier intervention reducing the need for inpatient stays. Enabling our population to make healthy choices. A culturally responsive service delivery model	5	4	3	3	3	2
Regional services	Services that are high quality and cost effective, planned in collaboration with our regional partners	5	4	2	3	2	1

Of these areas, older person's health, equity and our ability to function as a regional service provider are the worst affected in scenarios C-G.

The Composite scores for these are shown in Figure 63 below.

Figure 63 - Composite score across strategic focus areas for scenarios



6.3.4 ASSET ASSESSMENT OF THE SCENARIOS

The implication of the six scenarios for our physical assets as well as workforce and partnerships are described below.

Facilities, Information Systems and Clinical Equipment

As the Aspirational (A), Intermediate – Balanced (B), Intermediate - Reduced Community Investment (D) and Intermediate - Clinical Workforce Capping (E) scenarios share the same facilities timeframes, they are assessed together, as are Intermediate - Delayed Facilities (B) and Do Minimum (F) scenarios. Scenarios B and F will lead to greater pressure on facility bed capacity which risks service failure at times of peak demand of acute hospital bed utilisation during winter.

Construction and commissioning of the facilities to meet the preferred timeframe underpinning scenarios A, B, D and E has the following expected impacts:

- Conducive buildings that support the wellbeing of staff and patients
- New buildings will be fully wifi-enabled, allowing use of networked clinical devices. This will enable our progression towards a truly electronic health records system, electronic tasks management workflow. Existing refurbished buildings will have more reliable wifi-enabled communication.
- Avoiding proceeding with remaining earthquake repairs for buildings or parts of buildings which have no future long term (intentional deferment), such as the Food Services building
- Enabling the progression of earthquake-prone Parkside external panel remediation timing as planned
- Avoiding replacement of plant where risk of failure is manageable over this duration of this option
- Equipment capacity can be increased in line with demand volume such as additional radiology equipment, patient beds, bedside equipment
- An additional Cathlab is forecasted to be required circa 2021. This will mean a minimal delay of 3 to 4 years
- The preferred timing of the proposed new Oncology facility aligns with the next replacement cycle of the Linacs from 2025/26 onwards. This would enable Linacs to be replaced straight into the new building enabling a more efficient migration planning
- Commissioning of a new Pathology and Laboratory Services facility to create a fit for purpose design and infrastructure that would enable service consolidation and flexibility in use, to improve service delivery and make efficiency gains. This would permit the retention of multiple accreditations, including IANZ and other compliance and reference laboratory requirements.

The delayed construction and commissioning of Hagley towers 3 and 4 underpinning investment scenarios D (Intermediate - Delayed Facilities Investment) and F (Do Minimum) are expected to have the following impacts:

- Wasted investment in renovating buildings based on current service locations and model of care, rather than future service locations and model of care. Existing spatial constraint preventing roll out of digital health technologies, such as wifi networked medical devices and VDIs for clinical use
- Wasted investment in buildings or parts of building with no future long term role, in terms of EQ repairs, plant replacement and PFP rectification due to the increase risk because of the prolonged period for new and upgraded buildings
- Hospital certification non-compliance risk & wasting further investment on interim mitigation plan
- Delay in remediation of earthquake-prone Parkside
- Delay in passive fire rectification works
- Physical bed & theatre capacity unable to meet demand
- Delay in providing conducive buildings that support the wellbeing of staff.

6.4 Preferred Way Forward

Whilst the 'Aspirational' scenario is best placed to deliver the benefits outlined by our Investment Logic Model, we have chosen scenario B as our 'preferred' scenario in the context of the pressures on the whole New Zealand health system and the constraints in the capital envelope. This scenario represents a pragmatic compromise between financial restraint in the shorter term and investing to reduce the cumulative financial deficit over the lifetime of the LTIP. Whilst the risk ratings are higher than for the aspirational scenario, patient safety would not be compromised to the extent expected in scenarios C-F and it represents acceptable progress towards our goal of achieving equitable health outcomes. Delivery of the facilities on this preferred timeframe will reduce the risk of service failure in the face of growing demand. Continuing to invest in community based care will reduce pressure on downstream services and is particularly effective in supporting our Māori, Pacific and over 65 population. Maintaining our workforce enables us to capitalise on the facilities investment and support our workforce who are critical to our success. Investing in this scenario would mean we could make best use of our workforce and alliance partners and make meaningful progress towards our vision for our key service focus areas, providing a strong platform from which we can continue to improve our financial position.

Only one scenario (Scenario A) considers increasing investment in community based care to reduce downstream service demand. Canterbury has been successful in moderating demand for acute medical beds through a combination of reducing length of stay and hospital avoidance interventions in the community resulting in acute medical admission rates 20% lower than the national rate. However, we are cautious about our ability to extend this impact without exponentially increasing the costs of services due to the concentration of complexity in those people being admitted. Increased investment is likely to provide diminishing returns.

7 Preferred Way Forward

We have chosen scenario B – the Intermediate – Balanced scenario as our 'preferred' scenario in the context of the pressures on the whole NZ health system and the constraints in the capital envelope. The preferred scenario would see investment into facilities timed to enable us to better meet the needs of our growing population as well as our commitments as a regional provider. We also describe proposed investments to enable the health system to operate efficiently and effectively with investment in Information Systems, clinical equipment and service design that together with the proposed new and refurbished facilities would support an integrated, whole of system, approach that that prioritises supporting people to remain well in their own homes, then meet the need for more complex services in facilities that are digitally enabled and fit for purpose.

This chapter describe the investments that would be made in this scenario and the timing of these plus explanation of how we believe these investments are necessary for the Canterbury health system

7.1 Proposed investment in managing demand closer to home/more efficiently through hospital system

Canterbury DHB has invested in wide range of programmes that aim to support people to stay well and healthy in their own homes and communities – and out of our health institutions. These investments have resulted in acute medical admission rates 22% below the national average. Without this investment Canterbury would require over 100 additional beds to cope with demand. Ongoing investment in these services will continue throughout the period this LTIP with adjustments as required to optimise service delivery and meet the needs of Canterbury's population while avoiding the need for capital investment in hospital facilities. The key programmes involve integration between specialist, general practice and community providers. These include: Acute Demand Management; 24 Hour Surgery (after hours general practice and urgent care); community based equity strategies; support for rural general practice; the first 1,000 days; primary and community Mental Health; falls prevention; and Care Planning including advance, acute and personalised.

Whilst we are not signalling any new community investments during this LTIP, we will continue to seek ways to improve patient flows through the system. For example, our resource optimisation taskforce will include maximising roster arrangements to reflect seasonal difference in staffing requirements, the transition of service delivery that currently occurs in hospitals to less resource-intensive settings in the community. The Acute Demand Management programme will continue to push boundaries for community-based acute care to improve the patient journey and experience. The underlying infrastructure of HealthPathways will continue to ensure rapid of rapid of new clinical pathways and services.

7.2 Proposed investment in clinical equipment

This section describes proposed investments in clinical equipment during the lifetime of this LTIP.

Over the next 10 years, as part of our management of the existing clinical equipment, there is a requirement for renewal of current clinical equipment (as part of business as usual asset management). An investment ranging from $15 to $20M per annum of investment to renew/replace and increase our clinical equipment to ensure clinical service continuity. The spectrum of our clinical equipment stock is huge ranging from patient beds to high technology diagnostic equipment such as MRI scanners. Some of our high cost clinical equipment fleet replacement requirements over the next 10 years include:

- CT scanners (diagnostic and planning) fleet replacement over 2021 to 2028

- MRI scanners fleet replacement over 2025 to 2029
- Spec CT scanners fleet replacement in 2022 and 2030
- Digital subtraction Angiography equipment replacement over 2027 and 2028
- Linear Accelerators fleet replacement in 2020, 2021, 2023 & 2026
- Cath Lab equipment replacement in 2020 and2027
- Anaesthetic machines fleet replacement over 2021 to 2024
- Core Lab High Volume Automation system replacement in 2020

There will be a step change in our clinical equipment asset base following the commissioning of the Christchurch campus Hagley building, which means a step change in the baseline capital requirement in around 7 to 10 years' time.

Bowel Screening Equipment

In our 10 year capital intention plan, we have $1.9M approved in principle for bowel screening equipment to enable us to meet the requirements of the new national bowel screening initiative. This would enable investment in reprocessing equipment.

AS/NZS 4187:2104 established a five year period ending in December 2021 for compliance to all of endoscopy drying standards. Technically CDHB had until December 2021 to make these changes. However due to the implementation of bowel screening programme (BSP), this date has accelerated to January 2020 as the BSP has mandated these requirements must be in place prior to DHBs undertaking bowel screening. We are scheduled to start BSP in May 2020. In addition, repeated equipment breakdowns and relocation requirements for new facilities has played a part in the decision to invest now.

Additional Linear Accelerator

The Southern Cancer Network demand forecast is a need for a tenth Linear Accelerator for the South Island by 2020/2021. This is confirmed by recent CDHB demand forecast as well. This means a fifth Linear Accelerator for CDHB to meet the forecast South Island wide demand. Due to the spatial constraint of the existing Oncology building, the additional fifth Linear Accelerator is intentionally timed around 2025, in line with the proposed Cancer Centre facility.

Additional Cath Lab

There are currently two Cath labs on the Christchurch campus. Existing demand means that some procedures are outsourced to an external provider. A third Cath lab will be available to meet current and projected demand following the opening of the Hagley building, a fourth Cath lab is envisaged, however ongoing monitoring and projection of demand will guide the need for investment to maximise current/future approved investments.

7.3 Proposed investment into Information Systems

A number of investments are required to support our vision of *a digitally enabled health community that assists integration, creates equity of secure access to health information, minimises risk of human error and supports Cantabrians to remain well and healthy in their own homes*. This requires transformation of clinical paper based forms and processes to digital, enabling optimised system efficiency and ensuring information is more accessible to clinicians and patients. The expansion of shared health information platforms across the South Island region and integration with NZ wide national Information Systems services will improve secure access to health information about Cantabrians wherever they are seeking care and to reduce overall costs for the New Zealand health system.

Key Information Systems investments of the next 10-year period together with summary description are outlined below.

Initiative	Timeframe and Status	Description
interRAI Consolidation	2019 Regional Planned	Consolidation of the interRAI system currently operated by both TDHB and CDHB into a single national system operated by CDHB. Consolidation into a single system improves accessibility to information about patients in community care and reduce overall operation and administrative costs.
Electronic Medications Refresh	2019 CDHB Proposed	Upgrade of our existing MedChart electronic medications software to introduce safety and workflow improvements including future dose withholding, dose interval proximity and an administration time schedule to enable adjustment to prescribed timings by administrators.
HRIS, HR File, HR Record	2018-2021 CDHB Proposed	Digitisation of our paper-based employee files and processes to a single centralised source of truth at the individual level to enable accurate and timely reporting and improved access to and the updating of employee information for employees, their managers and administrative staff.
Virtual Desktop Refresh	2019-2020 CDHB Proposed	Replacement of existing 6-year old virtual desktop hardware and software with modern technology to resolve performance and reliability issues experienced by staff. The existing technology has had extremely successful up take by staff as it supports easy mobility. As a result of the up take by staff is out of capacity and performing poorly.
On-premise File Server Refresh	2019-2020 CDHB Proposed	Although the Hybrid Cloud Disaster Recovery project will most infrastructure to public we will always maintain critical services including security, building management and point-of-care clinical services on premise. The existing software and hardware servers used to provide these services are out of capacity and aged. This project replaces the aged software and hardware so that we can continue to provide reliable on-premise operation for the DHB.
Laboratory E-ordering (Hospital & Community)	2019-2022 CDHB Proposed	In Canterbury, laboratory tests are currently ordered through a paper based system which relies on manual entry and reporting. Implementation of an electronic ordering system has the potential to reduce manual transcription errors, enhance patient safety and provide clinicians with better information at the point of care. It will also improve visibility of test referrals at a system level, offering the opportunity to improve equity of access to care. A potential solution is currently being scoped for expected implementation within the next three financial years.
Anaesthetic Electronic Record	2019-2020 CDHB Proposed	This investment would replace our current paper-based system with the aim of improving patient safety by reducing the risk of drug errors. It will also improve access to, and analysis of, anaesthetic data. This is proposed to be implemented within FY2019/20.
Health One and Health Connect South	2020-2022 Regional	This investment continues the expansion of both Health One as the electronic health record for primary health and Health Connect South for the electronic medical record for secondary care. At the completion of this investment, all South Island health care providers will be able to contribute and access patient information held in these systems.
Nursing E-Observation (Phase 2)	2020-2021 CDHB Proposed	This investment continues the transformation of existing paper-based forms used by nursing to digital and optimises the workflow for these forms to reduce staff administration time and improve quality of the information collected.

Initiative	Timeframe and Status	Description
Advanced Analytics Data Labs	2021-2023 Regional Proposed	CDHB is in the process of establishing a regional data warehouse to collect and structure information about the operation of the South Island health system to provide accurate reporting at a system level of the function of the health system. This investment establishes an improved capability to collect and analyse the information held in the regional data warehouse to improve efficiency of operation and reduce costs of technology.
Patient Portal	2021-2024 Regional Proposed	This investment establishes a South Island wide portal to allow all patients and their delegates to access their primary and secondary health records to allow them to better manage their own care.
Patient Self Care	2023-2026	Currently CDHB is considering approaches to provide information to patients to help them manage their health in their homes. This investment builds on the electronic health record and patient portal to incorporate comprehensive care plans developed in conjunction with the clinical care team, community health providers, the patient and their family.

Our approach to implementing information systems that enable system improvement and provide flexible infrastructure which underpins future systems, means key investments are prioritised earlier during the period of this LTIP. These will allow system improvements to be achieved and benefits to be realised over the period of this LTIP.

7.4 Proposed investment into facilities

Canterbury's vision is to empower our population to live well and healthy in their own homes and communities. Investment in community approaches that prevent reliance on complex, facility based care will ultimately ensure better outcomes for our communities and is financially beneficial to New Zealand. This requires balanced investment driven by advanced data analytics, evidence and consumer engagement that meets the demand of our growing ageing population but continues to moderate reliance on hospital interventions and long term care facilities. The preferred investment approach recognises facilities for secondary and tertiary level services will be required to meet the demographic changes in our population, but balances that with lower cost investment into models of care that change this trajectory.

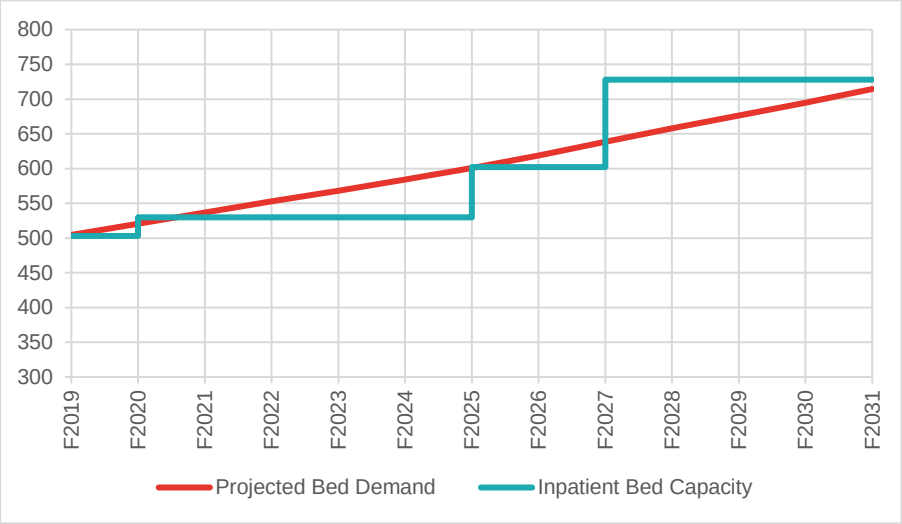
7.4.1 CHRISTCHURCH HOSPITAL CAMPUS REDEVELOPMENT (TRANCHE 1)

The proposed investment into Christchurch Hospital is designed to integrate into the approved Hospital Redevelopment business case. Following delivery of the new Hagley Building there is a need to refurbish and renovate the Parkside building to accommodate the remaining clinical services that are not relocating to Hagley.

The need for the Hagley facility to meet the needs of our growing population was established prior to the Canterbury earthquakes. The subsequent earthquake-driven loss of bed capacity and current need to exit earthquake-prone buildings (with an anticipated loss of 182 beds in the Riverside and 42 in the Parkside facilities) mean that further development is essential to meet projected demand. Adult inpatient beds are projected to rise from just over 500 currently to more than 670 needed by FY2028/29[50]. The figure below shows projections for overnight inpatient ward bed demand (i.e., excluding day case and short stay units), along with current and anticipated capacity additions. Canterbury's demand mitigation model of care has resulted in hospitalisation of our population (and avoiding increased capital investment in hospital beds), however there is now a clear case for increasing bed and theatre capacity driven by our increasing, and ageing, population. The latest demand modelling, using data from 2011/12 to 2017/18 projects that demand has outstripped capacity for this area.

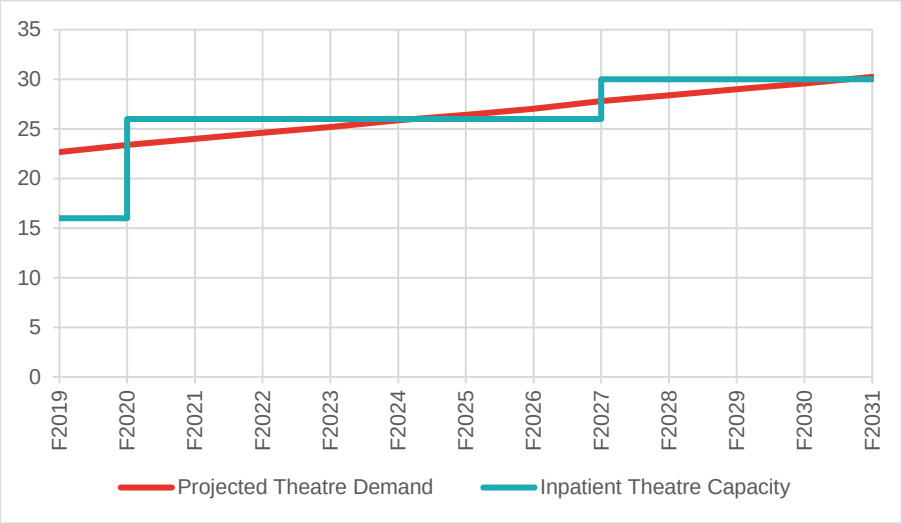
[50] Using 2018/19 base projections, adult inpatient beds excluding Gynaecology

Figure 64 - Bed Demand versus Planned Facility Capacity



Completion and occupancy of Hagley will increase total theatre capacity on-site from 16 to 26 theatres, which has been planned to allow the DHB to return currently outsourced and outplaced activity to the campus at reduced operational costs. However, increasing demand for theatres, together with the practicalities of running theatres for different specialties, means that this increase in theatre capacity is expected to be consumed quickly. Modelling shows that additional theatre capacity will be required within two years of Hagley being opened if we are to avoid the cost premiums associated with continued outsourcing of theatre activity. Outsourcing is in any event being increasingly constrained by the availability of suitable events as private theatres do not have supporting Intensive Care or staffing to be able to take more complex cases. Outsourcing conservatively incurs a cost premium of around 20% per caseweight. The figure below shows the theatre demand and capacity expected, including bringing on additional theatres in 2023/24 to be able to meet demand.

Figure 65 - Theatre Demand versus Planned Facility Capacity



In addition, Parkside building has sustained damage due to the earthquakes and requires seismic upgrade. Also, based on the latest legislative requirements, Parkside, including the links is considered as earthquake prone, due to the earthquake prone precast panels. The Passive fire protection compliance requirements has affected Building Warrant of Fitness and will continue to do so until remediation works have been undertaken. This investment comprises a series of related projects linked to the hospital redevelopment programme with renovation, earthquake repair and seismic upgrade work. It encompasses Parkside and adjacent buildings, i.e. Riverside, Clinical Services Building (CSB) and Food Services.

The master planning of the Christchurch Hospital campus is nearing completion, with the detailed business case for Tranche 1 works to be completed by Sept 2019. Tranche 1 included refurbishment and structural upgrade, EQ repairs of existing buildings (minimal/moderate/high refurbishment of Parkside, CSB, Riverside), demolition of Food Services building and Riverside West, relocation of clean and dirty docks, new builds (Hagley Tower 3, LGF fit out and Central Podium and Tower 4). The detailed business case for this investment will require approval by the Minister of Health and Minister of Finance. These business cases will provide for base fixtures, furnishings and equipment and Information Systems. Hagley Tower 3 is required to be commissioned by 2024/25 followed by Central Podium and Tower 4 in 2025/26.

Summary of new Christchurch Hospital campus building works under this proposed plan[51] which would:

- Develop a third tower with 160 beds on the Hagley Building podium with associated supporting spaces
- Fit out the lower ground floor of the Christchurch Hospital Hagley Building (due for completion in November 2019) with approximately 3,000m^2 of workspaces by internalising the vacant under croft. Fit out of new café in lower ground floor
- Staged refurbishment of existing facilities in the Parkside building to enable the short term requirement to decant Riverside and medium to longer term requirement to decant the Central Services Building (CSB). This would provide IL3 rating in Parkside only
- See the decanting of all inpatient services from Riverside to enable the demolition of Riverside West and refurbishment to accommodate clinical workspace and support functions such as clean and dirty loading docks
- Fit out of new kitchen in lower ground floor, Christchurch Women's Hospital
- Build a new IL4 Central Building, with approximately 2.059m2 floor area with podium accommodating:
    - Level 2: 3 Catheter Labs 927m2
    - Level 1: Surgical Suite with 4 theatres and PACU
    - Ground floor: Pharmacy and Ambulatory Clinics
    - Lower Ground: Back of House and Supply for Pharmacy
- Build Tower 4 (160-233 beds) to accommodate clinical support such as back of house, pharmacy, surgery (4 operating theatres) with supporting PACU and catheter labs (3) inclusive of CCU and inpatient services plus support spaces: inpatient units.

Summary of refurbishment works to existing facilities:

- Minimal/moderate refurbishment to remaining Inpatient Units in Parkside (utilisation of 6 bed wards to 4 bed wards). Alternatively, significant works might be required if Tower 4 is not achieved in the medium term by 2026.
- Minimal refurbishment including additional power and data to vacated areas to enable departmental workspace in Parkside requirements to be addressed.
- Moderate to major refurbishment to accommodate clinics decanted from Riverside to vacated areas in Parkside and to accommodate medium to long term departmental workspace in Riverside (including asbestos removal, internal fabric update and supporting services such as additional power and data).

New build and existing assets are expected to support projected 2026 demand (inclusive of two inpatient units recommended for expected accelerated service demand as a result of population growth consistently above projections for last six years) and prepare the site for Clinical Services Building decant and long term precinct and site infrastructure renewal.

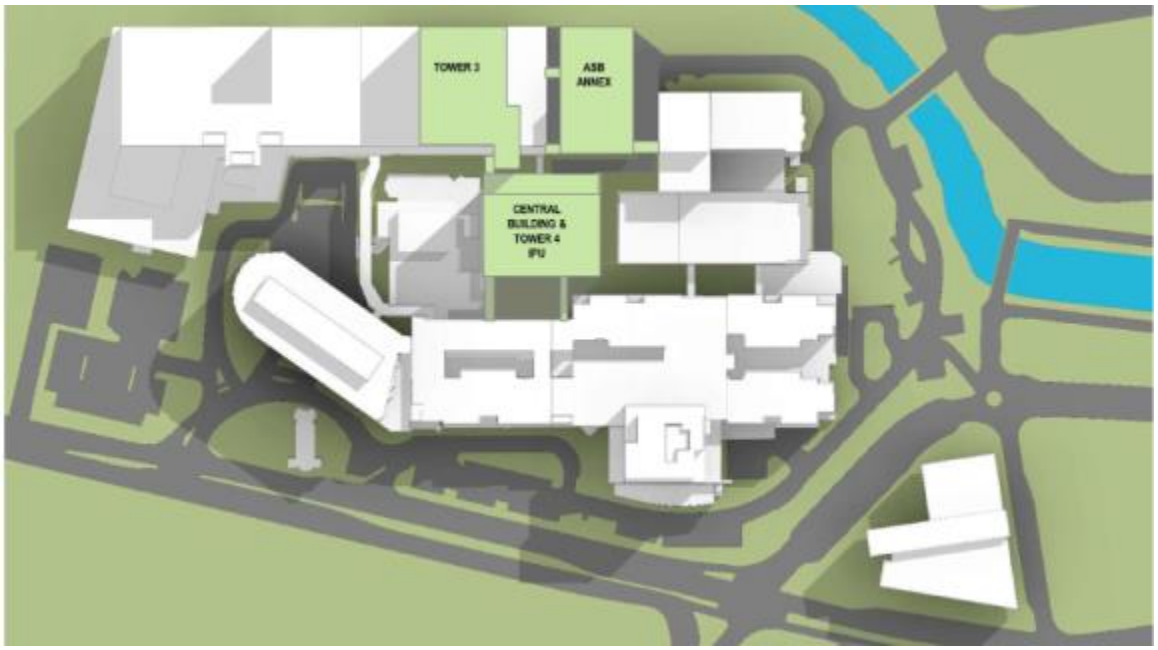
[51] For the purposes of this LTIP, we have aligned this section with the June version of the Christchurch Master Plan

The proposed Christchurch Hospital Campus Masterplan would enable whole of site connectivity and provide for full adaptability and expansion of facilities across the site to meet future demand through provision of:

- A link corridor in front of Oncology (new freestanding IL4 link) from ASB to Women's and Parkside connecting ASB to CWH on Level 1, and ASB to Parkside on Lower ground and Ground (already in place)
- An internal link in Central Building between ASB, Central and Parkside on Ground Level and Level 1 (lower ground has external connection only)

These proposed investments would provide improved patient environments, offering a reduction in clinical risks including falls and infections which is expected to reduce average lengths of stay.

Figure 66 - Map of Proposed Facilities Investments



7.4.2 HILLMORTON HOSPITAL SPECIALIST MENTAL HEALTH SERVICES

Investment to replace the 'stranded' inpatient specialist services (Regional Eating Disorders, Regional Mothers and Babies, Regional Child, Adolescent and Family (CAF) and Canterbury High and Complex needs (non-forensic) from The Princess Margaret Hospital (TPMH) site to the Hillmorton Hospital site has been approved and will take place during the term of this plan.

In addition work is underway to assess the options and develop a business case for the relocation of CAF outpatients and work space that are currently 'stranded' at TPMH.

SMHS Forensic Service Facility (Hillmorton Hospital Campus)

This facility provides a regional service covering Canterbury, South Canterbury, West Coast and Nelson Marlborough DHBs, for patients, many of whom have a history of serious mental illness, violence and management issues. Many patients are admitted via the prison and court system. Funding for all forensic services is via a national top slice recognising that patients are moved across the country within the corrections system and within the health system.

Admission for medico-legal court assessment and preparation can bring individuals into the facility who face serious charges (murder, severe violence) thus require a high level of security and comprehensive anti-ligature features.

Patient and Staff Safety
The current environment is not conducive to managing patients in crisis, with inadequate space to provide care which will enable de-escalation and provide safety for specific patient needs, i.e. for women, people with particular disabilities such as autism. Seclusion is currently the only option in many cases, and this can often exacerbate the patient's distress, leading to an unacceptable risk of patient and staff harm. Reducing the use of seclusion is a CDHB patient safety priority and SMHS has actively reduced the use of restraint and seclusion resulting in a significant reduction in seclusion in other SMHS areas. People in the justice system and those whom are violent to others are at increased risk of violence to self (including suicide). There have been two suicides in this facility which contemporary anti-ligature building features would have prevented.

Condition, Age & Design of Existing Building
The existing facility constructed in 1990 does not currently provide adequate security for the inpatients. The building has experienced heavy use and is in a poor state of repair with severe corrosion of steel window frames, 70% of the roof condition ranges from moderate to poor and 25% of the electrical systems condition is poor to very poor. The compromised windows and secure doors pose a serious risk of a security breach.

Review of heating/cooling system in Te Whare Manaaki concluded that the building due to its age and services condition will require extensive upgrade works, with estimated cost of replacement of more than $2M. This is a secure facility and there is a lack of secure decant options should the system fully fail.

The design of the existing building does not provide flexibility for redesign without significant cost or disruption to service and limits the options to solution (restricting our model of care transformation). Replacement options investigated showed that it is not economical to replace or fix, due to the anti-ligature requirements, condition of the building, and building compliance requirements due to the extent of the building changes. High level cost indication ranges from circa $9M (custodial grade) to $8M (sealed windows). To ensure adequate safety for patients and staff, comprehensive anti-ligature features and security requirements are required which can only be adequately provided by a purpose built facility. Continued investment in this 30 year old facility for interim measures is not prudent.

Additional Demand
In July 2018 the government announced an increase of 600 prison beds in Canterbury. This is a 45% increase on the current 1,400 beds and will significantly increase demand on SMHS Forensic services. These prison beds are due to come on line at the end of 2019.

This includes 122 additional beds at Christchurch Women's prison. Women prisoners use Forensic MH services at twice the rate of male prisoners. Currently there is no dedicated Women's inpatient forensic MH service in the South Island. The growth in the prison muster since establishment of the forensic facility has actually been closer to 300%, essentially without additional resources to manage this. In addition there has been substantial relative growth in remanded prison populations, who are far more resource intensive to manage.

In our submission for Health capital consideration, CDHB has indicated a commissioning requirement of 2026/27 indicative timeline.

SMHS Acute Inpatient Service Facility (Hillmorton Hospital campus)

Patient Safety:
The Specialist Mental Health Acute Inpatient Service has acutely unwell mental health patients who often have made suicide attempts or are at risk of attempting suicide. Key safety interventions in treatment plans include the levels of observations and determining if the patient requires being treated in a High Care Area. The windows in individual bedrooms and bathrooms currently have been restricted to an opening of 50mm. The High Care Areas currently have a sliding grate opening to provide ventilation. Incidents have included patients having committed suicide and attempted suicide utilising the opening of window (including sliding grate) as a ligature point. There have also been multiple completed suicides using doors and ensuite bathroom fittings which could have been avoided with contemporary anti-ligature building fixtures, fittings and design.

TE AWAKURA

Te Awakura has experienced increased demand following the Canterbury earthquakes and operates from facilities that are not configured for the provision of safe, effective mental health care. After a spate of serious assaults on nurses, consultation was undertaken with staff. They described feeling unable to maintain a safe environment for consumers or for themselves due to threatening and, at times, assaultive behaviour by a small number of consumers. A number of initiatives were then put in place including the temporary placement of security into the Te Awakura building to provide rapid assistance to staff when required. Security guards are provided with an orientation to Te Awakura to increase their understanding of the consumer base and their own role. They receive four days of training in de-escalation and effective, early communication techniques and in the use of restraint should they be directed to assist. Preliminary feedback from nurses has been very positive and a formal evaluation is about to begin.

The current environment is not conducive to managing patients who are extremely distressed, vulnerable or in crisis, with inadequate space to provide contemporary care which will support de-escalation. Seclusion is currently the only option in many cases, and this can often exacerbate the patient's distress, and lead to an unacceptable risk of patient and staff physical and psychological harm. Reducing the use of seclusion is a CDHB and HQSC patient safety priority. To enable patients to be treated in a more therapeutic environment and reduce the incidence of staff assaults, low stimulus areas are required.

The optimal capacity for mental health acute inpatient services is 85% occupancy. Occupancy in Te Awakura (the acute inpatient service) was 95% in November 2018 and 89% in December 2018. The average number of consumers under care in this 64 bed facility was 73 in November 2018 and 71 in December 2018. There were 10 sleepovers during November 2018 and 48 sleepovers during December 2018. Additional patients are 'sleeping over' in other inpatient services or in NGO crisis respite.

Condition, Age & Design of Existing Building

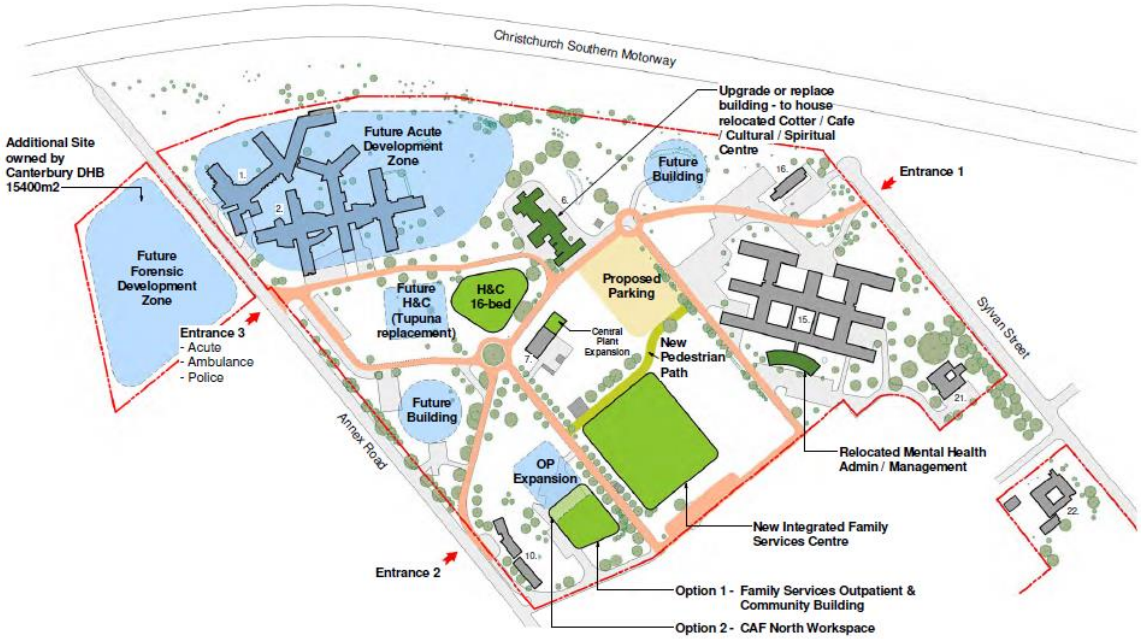
The existing facility was constructed in the 1950s and extensively renovated in the 1990s. Keeping the original footprint has meant the building has long narrow corridors and very poor lines of sight. The windows are domestic grade aluminium and the door hardware is mainly wooden and has proven to be insecure and create risk. The 2018 condition assessment reported about 35% of the overall building and more than 37% of the exterior ranges from moderate to very poor. The design of the existing building does not provide flexibility to change, resulting in limited options for either facility or model of care solutions. Continued investment into a 70 year old building is not a prudent approach.

In our submission for Health capital consideration, CDHB has indicated an indicative commissioning requirement of 2026.

SMHS AT&R and PSAID Facility

This is a secure facility for individuals with an intellectual disability. It provides dual service for people with severe behavioural disturbance and individuals receiving compulsory care under the Intellectual Disability (Compulsory Care and Rehabilitation) Act 2003. The current facility was not designed to meet the secure standards required to meet the clinical needs of the current consumer population. The prevalence of multiple functional impairments, challenging behaviours and mild to moderate intellectual disability in this complex consumer group poses considerable challenges, with assaults against staff and patients. This aged and not fit for purpose AT&R and PSAID facility requires replacement by 2031 indicatively.

Figure 67- Proposed Hillmorton Hospital Site Zoning – covered by current business case



7.4.3 LABORATORY SERVICES FACILITY

This proposed investment is for a new laboratory facility and/or refurbished facility to replace or repair and upgrade the existing earthquake damaged building which is aged and of design that is no longer fit for purpose to house medical laboratories services currently or into the future.

Post 2011 earthquakes, the molecular pathology laboratory had to relocate from the leased space in the Christchurch School of Medicine building to the Canterbury Health Laboratory building. The inclusion of more services within an already space constrained building is resulting in significant risk and compliance issues.

Following the earthquakes, we took the opportunity created by the destruction of both private laboratories to undertake a comprehensive review of laboratory services with the private laboratory providers, clinicians and consumers, which looked at current and future models of laboratory services. The agreed strategy developed from that piece of work was to create a two laboratory model , one hospital facility with a focus on urgent, complex and point of care activity and one community facility with a focus on community generated routine work . An RFP process was undertaken and an alliance structure between the two laboratories was put in place with a focus on reducing any duplication of activity.

The existing building was built in 1988 and designed in an era when manual laboratory processes was the standard method of test delivery. Since then, laboratory science has seen significant advancements in technology and the evolution of the role that laboratory testing plays in clinical decision making. This building was not built following the 'Long Life Loose Fit' philosophy or the Australasian Health Facility Guidelines. The design and configuration of the existing building cannot be 'practically or economically' retrofitted or refurbished to house the required range of automated tracking and processing systems.

This investment is considered a priority given the current facility has resulted in a repeated accreditation risk for the Canterbury Health Laboratories service. To date, the short term action plan to address the immediate risks are being implemented but this has resulted in trading off the efficiency of other areas. Planning of medium term action plan for interim solutions is underway, to mitigate the risks of non-compliance, while pending the long term solution.

In line with Treasury's 'Better Business Case' process, CDHB has completed an initial strategic assessment, including a risk profile, in regards to investment in a facility for Canterbury's tertiary laboratory and pathology services. This has been submitted to the Capital Investment Committee.

The Christchurch Hospital site master planning which has been completed, included the Laboratory facility on St Asaph street campus. The Christchurch Campus Programme business case due to be completed in September 2019 includes the Laboratory facility and the Cancer Centre. In the submission for Health Capital consideration for 2019 and 2020 budget, CDHB has indicated a requirement for 2025 commissioning of a new Laboratory facility of approximately 11,900m^2.

7.4.4 CANCER CENTRE

Canterbury DHB is one of the four Cancer Centres in New Zealand. Christchurch Hospital currently operates four Linear Accelerators (Linacs) available at Christchurch Hospital. Due to population growth, increasing inter-district referrals, the increasing burden of long term conditions and the Government Faster Cancer Treatment target, a fifth Linac is needed by 2021. In addition, three of the existing machines need to be replaced over the next three years and replacement involves a stand down period of six months. The service would run most efficiently if there were a fifth bunker available to enable smoother replacement of existing Linacs and to eventually house the new machine. The lower ground floor where the existing four Linacs are is below the flood line. Furthermore, the existing facility does not allow for expansion meaning services are constrained at current levels but an increase in demand is expected.

The Christchurch Hospital facility master plan completed in 2009/10 showed the next stage of redevelopment with the extension of Hagley as the potential space for the Cancer Centre, replacing the existing Oncology Building. This plan is now superseded by the Ministry of Health managed Christchurch Hospital campus site master planning. The Christchurch campus programme business case which included a new Cancer Centre on the St Asaph street campus, is due to be completed in September 2019. In the submission for Health Capital consideration for 2019 and 2020 budget, we have indicated a requirement for 2025/26 commissioning of the new, approximately 8,350m^2 Cancer Centre on the St Asaph site.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

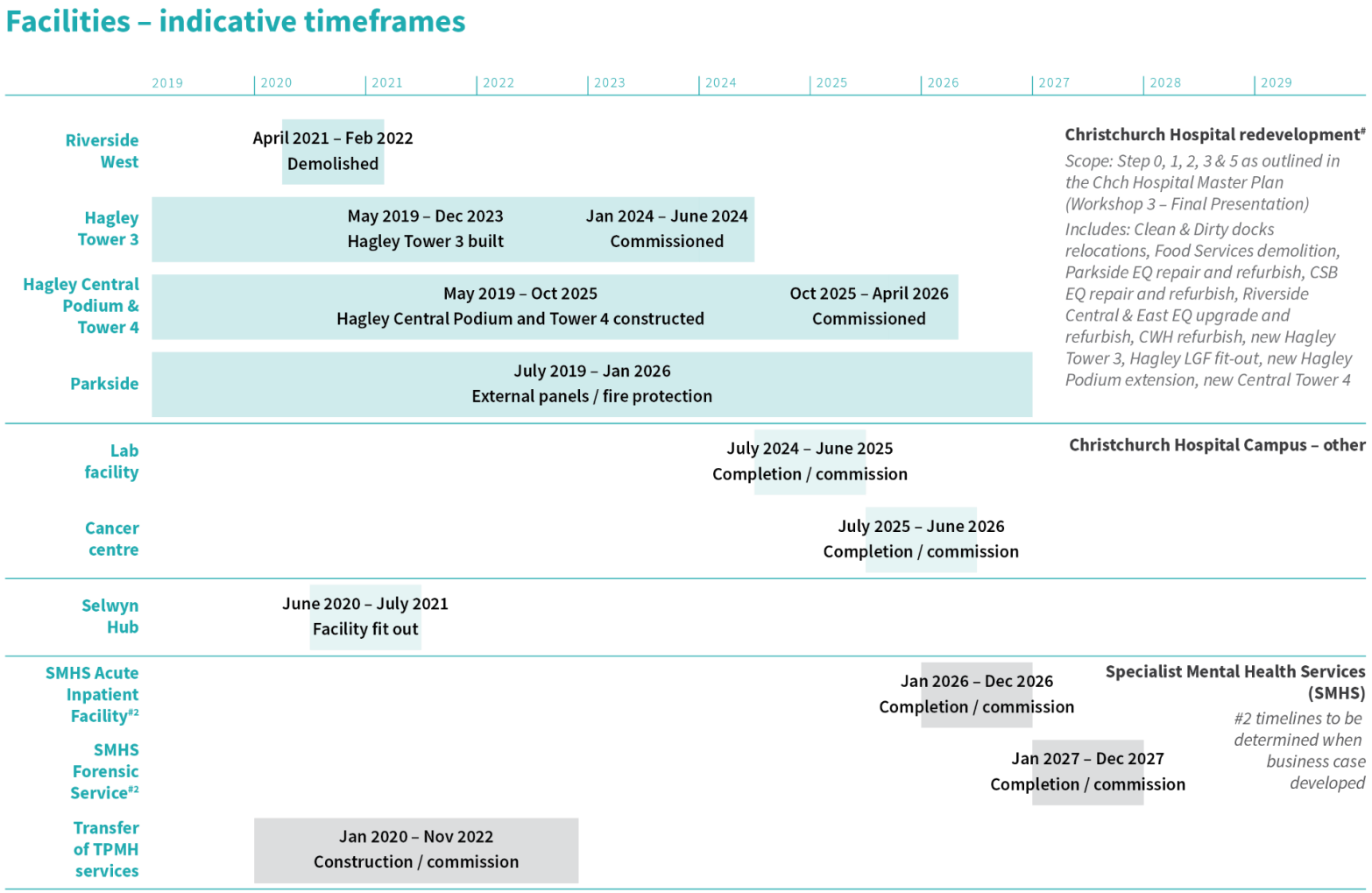
7.4.6 SUMMARY OF PROPOSED FACILITIES INVESTMENT

The proposed facilities investments are summarised in the tables and figures below.

Table P - Summary of Proposed Facilities Investments

Stage	Facility (re)build activity	Completion/Commission
1	Build Hagley Tower 3 levels 3-8 (160 beds) and demolish Riverside West, Food services building and Central Services building	2024/25
2	Build new IL4 Central Building, Tower 4 (160-233 beds & four operating theatres) and suspended link bridge between Hagley and Riverside (level 1 only)	2026/27
3	Build Hagley Annex (includes theatres, Nuclear Medicine, clean dock)	2024/25
4	Build New Canterbury Health Laboratory facilities, decant into these and vacate existing. Potential refurbishment of current buildings.	2024/25
5	Build new Cancer Centre, decant into this and vacate existing. Demolish existing Cancer Centre and potentially Oncology	2025/26
6	Specialist Mental Health Services – Acute Inpatient Service Facility	2026
7	Specialist Mental Health Services – Forensic Service Facility	2027

Figure 68 - Indicative Timeframes for Construction & Commissioning[52]



[52] For the purposes of this LTIP, we have aligned this section with the June version of the Christchurch Master Plan

Figure 69 - Map showing Proposed New Buildings

7.5 What this 10 Year Investment Plan will Deliver

In summary, this 10 year investment plan is aimed to provide the following outputs to enable the DHB in meeting our service priorities and the health targets within a safe and efficient environment:

Investment	Facility (re)build activity/Clinical Equipment/ICT investment
Facilities	Build Hagley Tower 3 levels 3-8 (160 beds) and demolish Riverside West, Food Services building and Central Services building
Facilities	Build new IL4 Central Building, Tower 4 (160 - 233 beds & four operating theatres) and suspended link bridge between Hagley and Riverside (level 1 only)
Facilities	Build Hagley Annex (includes theatres, Nuclear Medicine, clean dock)
Facilities	Build New Laboratory facilities, decant into these and vacate existing. Potential refurbishment of current buildings.
Facilities	Build new Cancer Centre, decant into this and vacate existing. Demolish existing Cancer Centre and potentially Oncology
Facilities	Specialist Mental Health Services – Acute Inpatient Service Facility
Facilities	Specialist Mental Health Services – Forensic Service Facility

Investment	Facility (re)build activity/Clinical Equipment/ICT investment
Clinical Equipment	CT scanners (diagnostic and planning) fleet replacement over 2021 to 2028
Clinical Equipment	MRI scanners fleet replacement over 2025 to 2029
Clinical Equipment	Spec CT scanners fleet replacement in 2022 and 2030
Clinical Equipment	Digital subtraction Angiography equipment replacement over 2027 and 2028
Clinical Equipment	Linear Accelerators fleet replacement in 2020, 2021, 2023 & 2026
Clinical Equipment	Cath Lab equipment replacement in 2020 and2027
Clinical Equipment	Anaesthetic machines fleet replacement over 2021 to 2024
Clinical Equipment	Core Lab High Volume Automation system replacement in 2020
Clinical Equipment	Bowel Screening equipment
Clinical Equipment	Additional linear accelerator
Information systems	interRAI Consolidation
Information systems	Electronic Medications Refresh
Information systems	HRIS, HR File, HR Record
Information systems	Information systems Virtual Desktop Refresh
Information systems	On-premise File Server Refresh
Information systems	Laboratory E-ordering (Hospital & Community)
Information systems	Anaesthetic Electronic Record
Information systems	Health One and Health Connect South
Information systems	Nursing E-Observation (Phase 2)
Information systems	Advanced Analytics Data Labs
Information systems	Patient Portal
Information systems	Patient Self Care

The following figure shows how Māia and Agnes' journeys through the system would look in the preferred scenario.

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Figure 70 - Māia and Agnes' Journey through the System Post-Investment

7.6 Risks of Not Investing

This section describes the risks of not investing as per the preferred scenario.

Christchurch Hospital campus risks of not investing

Not investing in the preferred scenario leaves CDHB open to risks in a number of areas in addition to a lack of bed and theatre capacity.

If the existing buildings are not repaired or renovated to meet various regulatory standards then the Board may be found liable for continuing to knowingly operate non-compliant buildings, and be subject to a fine or conviction. Regulatory or compliance issues include (but are not limited to):

- Failure to remediate earthquake prone buildings (now also incorporating earthquake prone parts of buildings) within the prescribed timeframe is a breach of the Building (Earthquake Prone Buildings) Amendment Act and the owner of that building is liable to a conviction and fine. There may also be insurance implications.
- Failure to have compliant fire protection puts a BWOF at risk. Council can issue a notice to fix within a prescribed time period that we may not be able to comply with. Council may also refuse to issue the BWOF. Either would be a breach of the Building Act. Failure to obtain a BWOF could also have insurance implications.
- There are also overarching obligations under the Health and Safety at Work Act. Failure to comply with Health and Safety obligations is an offence punishable by conviction, fine and/or imprisonment.

A lack of investment in new buildings would also mean that minimum clinical standards are not able to be met, impacting our ability to provide quality of care for patients due to a lack of adequate facilities:

- Additional staffing to enable safe care due to the inappropriate facilities, to ensure nursing line of sight to patients and increased requirements for hospital aides to act as patient 'sitters'.
- Insufficient power or data available at bed spaces limits the use of treatment or monitoring machines.
- Increased infection control issues due to a lack of single rooms, and likely increase in outbreaks of contagious illness and other hospital acquired conditions.
- Risk of increased falls due inappropriate facilities and lack of space especially around the bedside.
- Toilet and bathroom provision falls below acceptable standards, with nurses not able to access patients in these areas, lack of facilities leading to reduced quality of care for patients, e.g. more use of bedpans/commodes.
- Loss of dignity and privacy for patients due aspects of current facilities including continued use of mixed gender rooms due to lack of suitable capacity, and inadequate shower and toilet facilities.

Maintaining training accreditation becomes more difficult as we meet fewer of the requirements to offer a safe and effective environment for staff and their development:

- There are requirements and expectations from colleges for opportunities to be provided, including sufficient clinical capacity to undertake workload, e.g. theatre opportunities for surgical registrars.
- The casemix for effective training is impacted by moving patient cohorts to outsourced providers due to a lack of capacity, especially for elective surgery cases.
- Compliance with MECA requirements for training and RMO spaces becomes difficult to maintain.
- Loss of the ability to have onsite close to clinical training space to continue professional development. It becomes less efficient to have to rostering offsite and providing cover.
- Chance of training not being provided due lack of facilities and or coverage if has to occur offsite.

Financial implications in addition to the already significant expenditure required to repair and maintain facilities in a delayed case or do minimum scenario begin to mount:

- The financial implications of outsourcing electives work to relieve capacity issues is significant.
- The capacity in the private sector that could be used to outsource is becoming increasingly limited due to their own business demands. Many patients are also not suitable for external providers due to co-morbidities or the complexity of surgery.
- Staff costs for work placed in external providers includes significant additional payments, as well as the need to resource on-call and overnight medical cover in private facilities.
- Inefficient use of staff time due to travel times between facilities. At times some surgical teams are working from up to four different sites within Christchurch.
- Impact on DHB recruitment, as currently outsourced and outplaced work supports staff establishment in private hospitals. Transfer of this work back to DHB requires recruitment of staff to meet the demand internally. The longer that external providers are seen as a viable option the more difficult it becomes to be able to recruit to the internal DHB workforce.

Laboratory Facilities – risks of not investing

Consequences of not investing in new facilities include:

- Delay in introduction of automation technology due to existing spatial constraints (therefore delay in gaining service efficiency)
- Constrained in replacement - increase in repairs of existing equipment as option limitation in availability of old technology
- May require investing in overseas testing
- Wasted investment in buildings or parts of building with no future long term role, for EQ repairs, plant replacement and PFP rectification due to the increased risk because of the prolonged period
- Continued IANZ non-compliant risk & further investment on interim mitigation plan
- Delay in providing conducive building that supports the wellbeing of staff.

Cancer Centre – risks of not investing:

The existing Oncology building on the Christchurch campus is already operating above capacity. Its situation on the site means that there is no possibility for expansion of the building; it is landlocked on all sides with a new link structure enclosing the space, and the structure is not able have upper floors added.

Should we be unable to invest in a new Oncology Centre, the department would have to remain in their current accommodation, with severe repercussions for capacity. As well as being unable to meet demand for appointment and treatment spaces, staying onsite would mean that Linac capacity would not be able to keep up with demand. This would result in lack of timely care and poorer cancer outcomes for our population.

The replacement/refurbishment required for the existing four Linac machines would mean reducing capacity further, increasing the pressure on other cancer centres and presenting CDHB with additional operating costs.

Lack of investment in bowel screening equipment to support the national screening programme would result in failure to meet demand generated by population based screening. This initial screen has a high false positive rate which would mean increased stress and concern while waiting for colonoscopy, ultimately impacting on the wellbeing of people who are otherwise well. In addition, Canterbury would currently not be compliant to commence the screening programme, disadvantaging our population who have relatively high rates of bowel cancer.

Information Systems – risks of not investing

Information Systems are key enablers for providing services. While attribution of benefit for Information Systems is difficult as they enable complex systems to function efficiently and effectively, their absence can have profound measurable effects. Failure to invest in information systems may result in the following:

- Inability to work as 'one care team' with lack of knowledge of other clinicians assessments and interventions – creating risk for patients, patients being asked to unnecessarily repeat their stories, duplication of processes, diagnostics and pharmaceutical prescribing
- Reduced ability to integrate service provision with system partners to achieve the best outcomes for the individual and whānau and best outcomes for the system as a whole
- Inability to future proof the system optimising outcomes for the population, wasting clinicians' time and inability to support a 'paperlite' approach
- Lack of data capture to assess effectiveness or services and interventions resulting in ineffective operational decision making and service investment. This includes continuous improvement processes and feedback loops that drive clinical decision making ultimately resulting in poorer health outcomes for our population.

8 Financial Assessment of Preferred Scenario

This chapter sets out the financial aspects of the Preferred Scenario 10-year capital investment programme, including the key assumptions and funding sources underpinning the investment plan. Also included in this chapter are the summary forecast financial statements (which outline the financial impact of the investments and support the affordability of investment programme) and the list of major facility, clinical equipment and ICT capital projects and/or investments.

8.1 Overview

The environment post the earthquakes provides the platform and opportunity for the DHB to reassess its infrastructure planning to consider the best option for each building, e.g. to repair, rebuild and/or reconfigure the damaged facility. Within each of these decisions is the need to realign compliance to the new building code, where required.

Our planned capital investment is driven by a number of factors as outlined in earlier sections of the document. Meeting current demand projections will require significant investment to increase capacity, and capability. For presentation purpose, the primary influences of the investments are summarised and classified as follows:

- **Condition/Renewal** - capital expenditure to renew existing assets as they age and come to the end of their useful life. This may be due to both physical degradation and/or technological obsolescence.
- **Growth and/or Transformation** - capital expenditure on new or upgraded assets to support increases in demand for, and transformation of, healthcare services and/or model of care. Demand is primarily impacted by demographic change while transformation includes the opportunity to apply innovation to do this differently to improve services and/or address demand issues. This driver includes capital expenditure on new or upgraded assets to support the provision of new healthcare services.
- **Service Quality and Efficiency** - capital expenditure on new or upgraded assets to improve the quality and/or efficiency of healthcare services, e.g. new clinical equipment and/or information technology.

The majority of the DHB's strategic and/or significant capital projects straddle over a number of the classifications above i.e. it is impractical to assign a single influence or driver for these projects.

In parallel with the primary influences, our 10-year capital investment plan is underpinned by four key investment categories:

- **Baseline** – primarily for 'business as usual' equipment renewal of existing asset stock to enable continuity of service delivery from existing services
- **Strategic Approved DBCs** – Crown approved capital projects associated with the Facilities Redevelopment DBC (e.g. Hagley building at Christchurch Hospital) and the Mental Health Relocation DBC (for inpatient facilities currently 'stranded' at TPMH)
- **Earthquake Programme of Works (POW**) – building and infrastructure capital related spend as a consequence of the earthquakes
- **Planned Strategic Investments** – primarily for transformation of our healthy system locally and regionally as well as ensuring adequate future capability and capacity to meet demographic and demand growth

8.2 Key Assumptions

Integral to the financial assessment and affordability are a number of detailed assumptions (as set out in Appendix 10.9) with the key ones being:

- Appropriate population based funding (PBF) increases aligning to demand and demographic change
- Appropriate deficit funding from the Crown aligning to planned operating deficits, where being forecast
- New equity funding for key facilities associated with the Christchurch hospital campus masterplan, (e.g. Parkside, Towers 3 and 4, Labs and Cancer facilities), and Hillmorton hospital redevelopment (e.g. Forensic and Adult Inpatient Services (AIS) replacement facilities).
- Transformation and earthquake recovery strategies will not be delayed due to sector or legislative changes

8.2.1 KEY FINANCIAL ASSUMPTION RISKS

The key financial risks are associated with the assumptions outlined above not holding true. This is particular so around the assumption of full deficit funding. Whilst this assumption presents an elevated risk, it is moderated by a number of outstanding funding related matters still in discussion between the MOH and CDHB. In addition, the forecasts exclude funding for capital charge for new capital equity (per the recently announced change in capital charge regulations), which will reduce the deficits and the size of deficit funding required.

[redacted]

As an integral part of our annual and longer term planning process, CDHB monitors and manages the risks and will continue to review and reprioritise its planned investments, where appropriate, to align to any change in the health service needs (regional, national and local) and financial landscape.

We are also cognisant of the national capital funding envelope and will continue to engage with relevant Crown agencies (MOH, Treasury, HRPG, Capital Investment Committee) in a timely manner to ensure alignment with national funding and timeframes as part of our ongoing review and prioritisation process.

8.3 Robustness of Financial Assumptions

The Ministry of Health (MOH) engaged Price Waterhouse Coopers to review Canterbury DHB's financial assumptions and outputs in 2017 and one of the key findings is that the assumptions applied by the DHB are reasonable[53] and have been appropriately incorporated into the forecast model. Similar assumptions have been applied for the Long Term Investment Plan together with updated information at hand (e.g. Multi Employment Collective Agreement settlements, population based funding).

In 2019 MOH engaged Ernst & Young (EY) to undertake an operation plan and sustainable review of CDHB. Relevant outcomes of that review to date have also been incorporated in the financial forecasts. These include the development of five taskforces to address continuous improvement, resource optimisation, workforce absenteeism, funder arm discretionary contracts and revenue optimisation. These initiatives create a four year pathway to financial stability, excluding interest, depreciation and capital charge.

[53]Except the assumption that full deficit funding aligning exactly to prior year's deficit. Historically the amount may vary, subject to CANTERBURY DHB's cashflow. For consistency and to avoid distorting the timing and quantum of deficit funding, the same assumption, as previously, has been applied.

8.4 Major Sources of Funding of Preferred Scenario

The primary funding sources for the capital investment plan are:

- Internal cash or funds (including deficit funding)
- Earthquake settlement proceeds draw down for earthquake related programme of works
- Approved equity for approved detailed business cases (DBCs) e.g. Hagley facility and Mental Health inpatient facilities for services currently 'stranded' at TPMH
- Assumed, but yet to be approved, new equity for specific 'planned strategic investment' projects (subject to approved detailed business cases)

The table below sets out the estimated value of each of those funding sources.

Table Q - Major Sources of Funding

Asset Category	CDHB Cash	Pre-Approved Crown Equity	EQ Settlement Proceeds	New Crown Equity (Assumed)	Indicative Total Funding	
Major Investment Category	**$M**	**$M**	**$M**	**$M**	**$M**	**%**
Baseline	[redacted]					
Strategic Approved DBCs						
EQ Programme of Works (POW)						
Planned Strategic Investments						
Total 10-Year Capital Investment						

EQ POW investments are funded by a mix of EQ settlement proceeds and internal cash and the actual split between these two sources is indicative only and may vary, subject to draw downs for other EQ POW repairs and projects at the time

8.5 Capital Investments of Preferred Scenario

The indicative total capital investments over the next 10 years is [redacted] and the summary profile by major investment category and primary campus is in the following table (the summary spend by year is set out in Appendix 10.4):

Table R - Major Investment Category

Asset Category	Building & Infrastructure Plant	Clinical & Other Equipment	Information & Communication Technology	Motor Vehicles	Indicative 10-Year Total	
Major Investment Category	**$M**	**$M**	**$M**	**$M**	**$M**	**%**
Baseline	[redacted]					
Strategic Approved DBCs						
EQ Programme of Works (POW)						
Planned Strategic Investments						
Total 10-Year Capital Investment						
Primary Campus	**$M**	**$M**	**$M**	**$M**	**$M**	**%**
Christchurch Campus	[redacted]					
Burwood Campus						
Hillmorton Campus						
Rural, TPMH & Community						
Organisation - wide						
Total 10-Year Capital Investment						

Some of the key features of the plan include:

- Baseline spend totalled [redacted]
- Strategic approved projects i.e. primarily Hagley and Hillmorton Inpatients (for services to be relocated from TPMH) account for [redacted]
- Earthquake capital (exclude operating repairs) related projects totalled [redacted]
- Planned Strategic Investments amount to [redacted] with the major spend associated with the Christchurch hospital masterplan and Hillmorton hospital campus projects
- In terms of asset type, building and infrastructure is by far the largest component at [redacted] while clinical and other equipment is the next highest at [redacted]
- The majority of investment is on the Christchurch hospital campus, which account for [redacted], whilst [redacted] is being planned for Hillmorton hospital campus.

Other features and note:

- The ICT capital investment of [redacted] recognises the move towards the cloud environment and "SaaS" services, both of which will help contain and/or reduce ICT capital spend. Whilst the ICT capital spend may fluctuate from year to year (depending on actual needs), the overall investment represents a rational and optimal investment based on information at hand. As an integral part of CDHB's prioritisation and review process, CDHB will respond to shift in technology and allocate applicable funds to meet this shift where appropriate

- IAAS and SAAS are well embedded in CDHB's investment structure and assessments. This is evidenced by the many cloud risk assessments for clinical and non-clinical applications hosted in public cloud submitted to the GCDIO and CDHB has a significant hybrid cloud transformation plan underway which has been regularly reported to the MoH. CDHB is one of the early adopters of cloud environment and has been on IAAS for a decade. The [redacted] (including the [redacted] significant projects) have been appropriately included in CDHB's baseline and major capital funding sources and accessible over the LTIP period.
- The indicative investment cost for new buildings include the normal costs of technology (including ICT services that will operate in the facilities) to ensure that the facilities can provide the services that they are being developed. Each estimate will be refined during each business case development process and if it exceeds the scope, such ICT costs will be refreshed and accommodated in future LTIPs, as appropriate.
- Integral part of the [redacted] 'Building & Infrastructure' investment over the next 10 years are ICT and FF&E (clinical and other equipment) components associated with significant projects (e.g. Christchurch Campus Masterplan). The values of these components will only be determined as part of the detailed business cases of the respective projects. Hence, for simplicity and to avoid distorting the LTIP, their amounts have not been segregated out in the above table, i.e. investment in ICT and Clinical & Other Equipment would be higher than the [redacted] shown above respectively.

8.5.1 MAJOR CAPITAL INVESTMENTSOF THE PREFERRED WAY FORWARD

The major facilities, equipment and ICT investments over the next 10 years are outlined below together with indicative funding sources (note: the lists and totals below are a subset of total capital investment for the respective asset group and investment category outlined above). The detailed commentary of the specific major investments is set out in chapter 7, whilst the indicative spend by year is outlined in Appendix 10.4.

Table S - Major Facility Investments

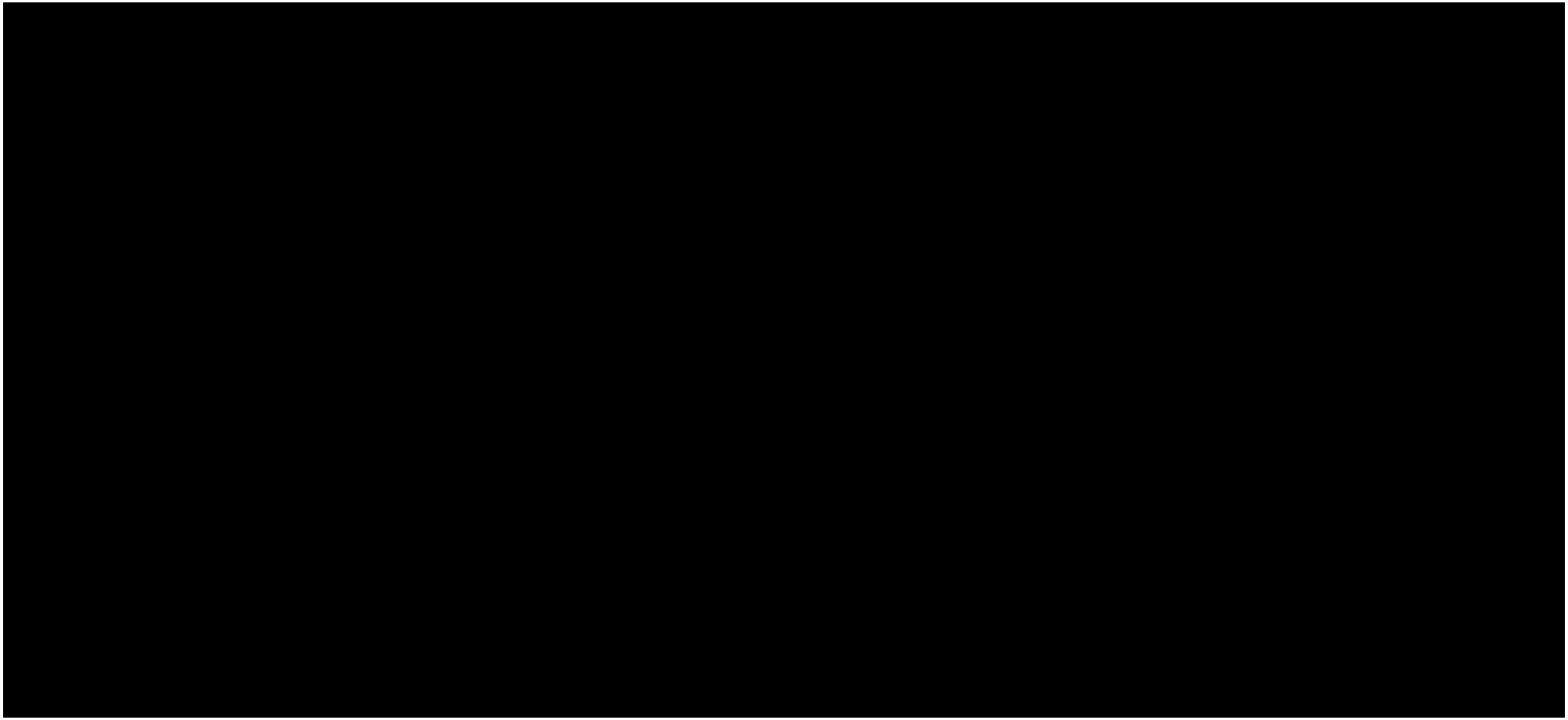

Table T - Major Information and Communication Technology (ICT) Investments

Table U - Major Clinical Equipment Investments

8.5.2 ASSET CAPITAL EFFICIENCY & DISPOSAL OF SURPLUS LAND

Under the New Zealand Public Health and Disability Act, no DHB may dispose of land without approval of the Minister of Health. Ministerial approval will only be given where the DHB has complied with its statutory clearance and public consultation obligations under the Act. Canterbury DHB will ensure due process is undertaken with regard to the sale of any of its surplus land.

As set out in Section 3.7.2 , as an integral part of the capital efficiency focus, CDHB has an ongoing process to review and assess its asset base and assets such as land that are surplus to health service requirement in the foreseeable will be earmarked for disposal. The DHB, and its predecessor organisations, have a demonstrable prudent record in disposing of surplus assets and reinvesting the proceeds for health services and/or repaying the proceeds to the Crown. Examples of this capital efficiency focus include previous disposals of surplus parcels of land and property at Hillmorton, Burwood, Templeton and Hanmer and more recently the sale of surplus land on Maddisons Road and on Lincoln Road.

Future surplus asset earmarked for disposal include the Princess Margaret Hospital site with the proceeds from this sale being repaid as equity to the Crown. This is in line with the 2012 approved Facilities Redevelopment DBC. Other anticipated activities over the next 10 years include the potential disposal of a parcel of land on St Asaph Street and two parcels of land on Tuam Street as part of a land swap with Ōtākaro and Land Information New Zealand (LINZ) within the Health Precinct.

We are yet to determine the future of the former Christchurch Women's Hospital site in the central city and we are also considering the future use of all of our rural hospitals in line with our rural sustainability project. It is unlikely that all of the rural hospitals will continue to operate in their current form. Whilst some may yield a positive net return others such as the former Christchurch Women's Hospital site may yield a net negative return due to the significant asbestos contamination concern of the site.

In terms of other assets such as clinical equipment, ICT and motor vehicles, CDHB has an effective maintenance programme to ensure the economic useful life of these assets are optimised and extended, without compromising service efficiency and patient outcome, past the manufacturers' indicative useful life. This capital efficiency gain (circa 15%-20% useful life) enabled the DHB to reduce and/or defer its replacement capital spend considerably. For example the extended useful life of a Linac equipment means that CDHB is able save and/or defer the significant spend which enables it to optimise its prioritisation programme and/or contain its baseline capital budget at a relatively constant level. The indicative saving and/or deferment on our baseline capital spend amounts to circa $5M-$6M per annum or $50M-$60M over the 10-year LTIP period.

Also as part of the capital efficiency focus, CDHB has an ongoing process to work with suppliers on potential viable long term and sustainable asset based funding solution that will improve the efficiency of operations, whilst ensuring the ongoing operating cost does not significantly outweigh the capital cost. This procurement option, such as leasing, in particular for high cost clinical equipment is an integral part of CDHB's capital investment and capital efficiency decision-making processes. An example is the successful reagent rental model used by Canterbury Health Laboratories. CDHB is mindful of the operating versus financial lease criteria and will continue to ensure adherence to due process when entering into leases.

The proactive capital efficiency gains, such as disposal of surplus land and effective maintenance programme outlined above has enabled CDHB to accumulate significant funds over a number of years. This is evident in CDHB's ability to contribute $180M to the Crown to partially fund the cost of the 2012 approved Facilities Redevelopment DBC.

Capital efficiency gains, in terms of sale proceeds, capital savings and operating efficiencies, including the five taskforce initiatives outlined in Section 8.3 have been included in our investment plan and financial forecasts where appropriate.

8.6 Financial Summary of Preferred Scenario

The summary financial forecasts of the preferred scenario for the 10-year planning period ending 2029, are outlined below, whilst the pro-forma financial statements and forecast by year are set out in Appendix 10.8.

Whilst the DHB will continue to actively to review and reprioritise where appropriate and explore other funding options such as Public Private Partnership models, no adjustments have been made for these potential interventions as detailed planning has yet to occur.

The 'Planned Strategic Investments' information is segregated for clarity purpose and is notional only as these investments are subject to formal business case and approval process.

Table V - Summary Cumulative Cashflow for 10-Year Period Ending 2029

Summary Cashflow	Total 10 Years $M
Net Operating Cashflow (excl Capital Charge)	[redacted]
Net Operating Cashflow - Capital charge	
Net Investing Cashflow (Note 1)	
Net Financing Cashflow (Note 1)	
NET Cashflow Movement Before Planned Strategic Investments	
Add: Opening Balance Before Planned Strategic Investments	
Indicative Cash Before Planned Strategic Investments	
Add/(Less): Cumulative Planned Strategic Investments Cash Movement:	
Planned Strategic Investments	
New Equity - Assumed Crown Funded Planned Strategic Investments (Note 2)	
Indicative Capital Charge on assumed New Equity	
Indicative Closing Cash After Planned Strategic Investments (Note 3)	

Note 1: Some Crown funded/ MOH managed projects are transacted as 'non-cash' transfers e.g. Hagley
Note 2: Christchurch Hospital Masterplan (include Passive Fire Protection Compliance) and Hillmorton Masterplan (Forensic and AIS). The balance of Planned Strategic Investments is financed by internal cash.
Note 3: To avoid potential circular references, deficit funding for deficit arising from IDCC impact of Crown funded Planned Strategic Investments have not been included in the forecast i.e. the forecast closing cash position is conservative.

Capital charge on assumed new equity, for specific Planned Strategic Investments, is included for completeness as the mechanics of the imminent change to the capital charge regulations for Crown funding for new facilities have not been finalised. We understand the new regulations would result in funding for such capital charges, which will likely improve the indicative cash position.

Table W - Summary Cumulative Financial Performance for 10-Year Period Ending 2029

Summary Financial Performance	Total 10 Years $M
Revenue	[redacted]
Expenditure (excl Depreciation & Capital Charge)	
Indicative Cumulative Net Surplus/(Deficit) - before Depreciation & Capital Charge	
Depreciation and Capital Charge (Note 1)	
Indicative Cumulative Net Surplus/(Deficit) - before IDCC on Crown Funded Planned Strategic Investments	
Other Comprehensive Income	
Indicative Total Comprehensive Income	
Add/(Less): Notional Depreciation & Capital Charge (IDCC) on Assumed Crown Funded 'Planned Strategic Investments'	
Depreciation on Assumed Crown Funded Planned Strategic Investments	
Capital Charge on assumed New Equity	
Indicative Net Surplus/(Deficit) - After Notional IDCC for Planned Strategic Investments	

Note 1: Excludes notional depreciation and capital charge for assumed Crown funded 'Planned Strategic Investments' which is shown separately. For 'practicality' and to avoid distortion, other operating efficiencies and/or costs, if any, have not been assessed as the respective business cases have not progressed or finalised.

In addition to the capital charge regulations imminent change highlighted above, there are a number of outstanding historical funding matters currently under discussion with the Ministry of Health, which continue to have significant adverse impact on the DHB financial performance. No adjustments have been made for these matters i.e. if the outcomes were favourable, the financial result will improve.

Table X -Summary Financial Position and Crown Equity as at 2029

Summary Financial Position	As At End of Yr 10 $M
Total Assets (before Planned Strategic Investments)	[redacted]
Total Liabilities (before Planned Strategic Investments)	
Estimated NET Assets (before Planned Strategic Investments)	
Add/(Less): Cumulative Planned Strategic Investments Movement	
Total Planned Strategic Investments	
Indicative Internal Cash for Planned Strategic Investments	
Indicative Accumulated Depreciation	
Indicative Capital Charge on assumed New Equity	
Indicative Planned Strategic Investments Net Movement	
Indicative Net Assets After Planned Strategic Investments	

Summary Crown Equity	As At End of Yr 10 $M
General Funds	[redacted]
Revaluation Reserve	
Retained Earnings	
Estimated Crown Equity - before Planned Strategic Investments	
Add/(Less): Cumulative Planned Strategic Investments Movement	
General funds - assumed New Equity for Planned Strategic Investments	
Retained Earnings - Depreciation & Capital Charged on assumed New Equity	
Indicative Crown Equity After Planned Strategic Investments	

The net assets and Crown equity are indicative only and subject to a number of assumptions as outlined earlier. In addition, over the course of the 10-year period, facility related assets are subject to revaluation process at three yearly intervals which will impact on the indicative values shown above.

8.7 Affordability of the Preferred Scenario 10-Year Capital Investment Programme

Inherent in determining the affordability are a number of key assumptions outlined earlier, in particular deficit funding and new equity being provided to the DHB for key projects, where assumed. In addition robust reprioritisation will be required to ensure projects are affordable within the forecast cash envelope and for those years in which overdraft is forecasted, that CDHB does not breach the Operational Policy Framework (OPF) guidelines on bank overdraft limit.

Subject to the assumptions holding true, the financial forecasts indicate that the 10-year investment plan is affordable as evidenced by:

- positive 10-year cumulative cashflow (and without breaching the DHB OPF overdraft limit for CDHB for the 10 respective years)
- positive 10-year cumulative operating result before depreciation and capital charge

The position will be further improved when the impending capital charge regulations changes are formally introduced by the Crown as this will help offset some of the capital charge expense included in the forecast.

To provide some context to CDHB's forecasts above, it is important to emphasis the imposing impact of incremental depreciation and capital charge generated by the approved DBCs, earthquake capital and the 10-year capital investment programme. These combined costs, which have been included in the indicative forecast operating results, are set out below.

Table Y - 10-Year Cumulative Incremental Depreciation and Capital Charge

(Approved DBCs, Earthquake Capital and Assumed Crown Funded Planned Strategic Investments Only)

YEAR ENDED 30 JUNE	Total 10 Years (2019/20-2028/29)
Depreciation - Approved DBCs	[redacted]
Capital Charge - Approved DBCs	
Depreciation - EQ POW Capital	
Capital Charge - EQ Proceeds Equity Drawdown	
Total IDCC before Planned Strategic Investments	
Depreciation on assumed Crown Funded Planned Strategic Investments	
Capital Charge - on assumed New Equity for Planned Strategic Investments	
Total IDCC including Planned Strategic Investments (Note 1)	

Note 1: Figures represent a subset of total forecast depreciation and capital charge. Approved DBCs relate to the approved 2012 Facilities Redevelopment DBC and 2018 Mental Health Relocation DBC

The cumulative depreciation and capital charge cost (subject to impending new capital charge regulations yet to be formally implemented) highlighted above, is a significant component of CDHB's operating finances.

8.8 Financial Tradeoffs compared with other Scenarios

The major financial tradeoffs are associated with the significant risks set out in Section 7.7 "Risks of Not Investing". Whilst we have presented, in section 6.3.1, an indicative financial impact of outsourcing arising from bed deficits for each scenario, CDHB is mindful that there are other major tradeoff risks (highlighted in Section 7.6) which are inherently impractical and difficult to quantify with an acceptable degree of robustness due to many counterfactual elements.

Hence to avoid presenting theoretical and/or misrepresented sets of comparative financial summaries, we believe it is more constructive to highlight the major financial tradeoff implications which cumulatively is highly substantial and/or immeasurable compared against the cost of capital of each scenario. These financial tradeoffs, in addition to the significant outsourcing cost outlined in section 6.3.1, include but not limited to:

- breach of Building Act for knowingly operate non-compliant buildings, subject to fine or conviction
- significant insurance cost implications and potential risk of non-coverage in certain circumstances
- failure to comply with Health and Safety obligations liable for fine and/or imprisonment
- minimum clinical standards not met, impacting on quality of care due of adequate facilities
- additional staffing to enable safe care, increased infection control issues and risk of increased falls due inappropriate inappropriate facilities
- difficulty in maintaining training accreditation and MECA requirements for training and RMO spaces
- insufficient clinical capacity to undertake workload e.g. theatre opportunities for surgical registrars
- deferred maintenance and wasted investment in buildings with no future long term role
- delayed introduction of laboratory automation technology impacting on service efficiency
- inability to invest in a new Oncology Centre has severe repercussions for treatment and LINAC capacity and would result in lack of timely care and poorer cancer outcomes for our population, increasing pressure on other cancer centres and presenting CDHB with additional operating costs
- lack of investment in mental health facilities will impact on the ability to meet demand, both local and regional (e.g. forensics), creates inefficiencies and necessitate more investment in the community (if appropriate) and/or outflow to other DHBs
- Information systems are key enablers for providing services and failure to invest in information systems result in inefficiencies such as reduced ability to work as 'one-care team' creating risk for patients, duplication of processes, diagnostics and pharmaceutical prescribing, inability to integrate service provision with system partners, future-proof the system optimising outcomes for the population and support a 'paperlite' approach

9 Improvement Plan and Future Direction

Delivering healthcare services in the context of population ageing and growth, increasing public expectations of care and a constrained financial environment will continue to be challenging. To meet these challenges will require us to do what we do currently more efficiently but also develop stronger inter-sectoral partnerships that will enable us to make more progress in our goal of supporting people/whānau to stay well and take increased responsibility for their own health and wellbeing.

9.1 Strategic direction

The Canterbury health system vision for 2020 was designed in 2008 and is epitomised by the 'Integrated Health and Social Services' graphic. As we approach 2020 the development of a new Investment Logic Map highlights our future will be reliant on further integration, not just within health but with other social service agencies as we need to address ongoing inequities, work in preventive models and provide facilities, workforce and other enablers that are fit for the challenges we face.

The World Health Organization has been clear and consistent, through sentinel documents such as the Alma Ata declaration, the Ottawa Charter and Now More Than Ever, that health service delivery needs to be embedded in community care and need to impact on determinants beyond health care.

9.2 Improvement Plan

We have a number of strategic initiatives underway to improve our performance over the next 3-5 years. These include:

- A 5 year Improvement Plan for how we manage our assets as part of our Asset Management Plan. This will enhance the level and accuracy of data as well as optimisation of data attributes (especially performance and condition) as part of our continuous improvement model.

- Improving environmental performance with excellence awarded for the large organisation climate change in the 2019 Enviro-Mark Solutions Awards. We will continue to monitor our energy use and greenhouse gas emissions and seek to reduce these under the CEMARS scheme.
- New project management software has been implemented that will help to standardise project office functions for significant initiatives across the organisation.

Financial sustainability is a major focus for the Canterbury health system. This challenge is currently at a peak with burden of affording new facilities that were planned for as replacements as well as repairing and replacing earthquake damaged facilities. There are five key focus areas:

- **Addressing Absenteeism -** the rates of sick leave have rapidly increased over recent years as the long term impacts of the earthquakes. This work is focusing on discretionary leave /managed SMO, work-related ACC injury, non-work ACC injury, paid sick leave, annual leave for sick and unpaid sick leave with the aim of building working environments to support people in their work.
- **Continuous Improvement -** the initial work will be focused on radiology, pharmaceuticals and hospital acquired conditions which engages clinical teams in optimising the use of clinical diagnostics and interventions. Identifying opportunities when outcomes are affected by the care we provide through hospital acquired conditions addresses consistency in good clinical practices.
- **Resource Optimisation -** addresses the key organisational operating systems including resetting current establishment staffing, realigning and integrating new systems, building robust demand and production planning systems and optimising supply and demand.
- **Planning and Funding Contracts -** the continued review of current 'discretionary contracts', identification of alternative pathways for outcome with allow maximum benefit across all contracts.
- **Revenue Optimisation -** this includes the refreshing of costing systems, coding review and automation, review of IDF and overseas chargeable processes and a commercial revenue strategy will be explored.

9.3 Future Directions/Opportunities in Healthcare

The following directions are key to sustainable delivery of health services over next 10-20 years:

- Earlier intervention, especially in mental health, improving health literacy, working in schools and other social sector agencies and services – we need to work together to change the trajectory of demand for health services by keeping our population well and healthy, address the determinants of health and intervene early.
- Cross sector collaboration is key to future investments – we have experience transforming the way we work with initiatives such as Mana Ake, the Integrated Safety Response (wraparound for most at risk families) and Step Up. Collaboration and learning to work across each other's paradigms underpins success and will extend the skill set required by our workforce.
- Increasingly, our population accesses care outside of office hours and there are increasing expectations and capability around using digital tools. These will enable people to talk to their health professional remotely, integrate self-monitoring data from mobile and personal devices and be supported to manage long term conditions.
- New wraparound services will become more important tools for addressing the needs of the most vulnerable people. Māori whanau ora-based models provide a way forward that needs to be extended especially in the first 1,000 days.
- Addressing the inequity of outcomes for Māori using Te Tiriti o Waitangi as a guiding framework is key to success.
- Development of new strategies to support people to manage their health and be treated as partners in their care.
- Continuing to work in a collaborative alliance across the South Island to ensure our collective assets provide the right services, in the right place, at the right time.
- Continuing to develop and connect health (and other social service) information platforms will allow our collective efforts to create value to our people without waste and duplication.

- We currently have strengths in the capture and analysis of health data, however our electronic systems will generate burgeoning amounts of data that we will need to organise and analyse to create insights that can improve our systems and models of care. New solutions will be driven the age of 'big data' (see Digital Transformation below).
- Rationalisation of highly specialist services will be driven by workforce shortages and the need to ensure equitable outcome regardless of equity of postal code, deprivation and ethnicity. Our work in the South Island Alliance means we are well prepared for these conversations as the provider of last resort. The same decision making processes will be required to optimise our collective investments; information systems including telehealth hub and spoke models that are common across the South Island enable access to services regardless of geography and will allow streamlining of facilities investments.

Digital Transformation

There are opportunities to improve health outcomes by using improved data analytics built around big data, machine learning and artificial intelligence technology. We have developed world leading examples such as out chest pain pathway and we intend to continue to improve our internal capability to contribute to and use these technologies to lead the improvement of health outcomes for our community. We plan to continue to identify and implement emerging technologies using low cost proof of concept implementations with the intent to fully deploy successful proof of concept technologies within the scope of the Advanced Analytics Data Labs investment in the 2021-2023 timeframe.

Our digital transformation will continue both in the community and hospital settings, paper forms are replaced with digital equivalents, processes are standardised, and we are continuously optimising our processes to improve efficiency and quality of our health delivery.

The South Island wide electronic health record will continue to expand so that all health care providers able to contribute and access information about patients in their care. The record will be easily available to other New Zealand health care providers to allow improved care of patients wherever they are in New Zealand. Patients will have access to their community and hospital health records to allow improved self-management of their care.

Technology supporting roaming, mobility and communication for staff will be ubiquitously available within CDHB hospital facilities. We anticipate that improved communication will significantly reduce time lost to currently with inefficient approaches and allow more time to be spent with patients.

We are already exploring the use of robotic Automation Processing and Artificial Intelligence and as these technologies grow in maturity and meet clinical and business needs we will adopt them – it is likely we will have augmented systems within clinical services that will support at risk roles such as Anatomical Pathology and other diagnostic services.

In order to maintain our social and cultural licences for the capture, security and use of the data we capture we will continue to focus on the policies, business processes and technologies that we need to have to ensure security and privacy are maintained.

Known Challenges

Although there will be new, as-yet unknown challenges and solutions, some of the known issues confronting us during the span of this document include:

- Increased public expectations of what the health system can provide
- There will be increasing constraints on vote health allocation for publicly-funded healthcare; the issue of affordability of growing healthcare budgets is common across the world
- An increasing array of treatment options and new technologies, some of which have diminishing health benefits for the investment required
- Climate change (impact on the health of the population and the resulting service demand)
- Fluoridation; this leads to inequities in oral health both compared with other regions of New Zealand and within our population based on ethnicity and deprivation

- Workforce issues remain a challenge with lack of clarity in our recruitment pipelines
- The impact of disruptive technologies – new virtual and episodic models of general practice, potential 'Uberisation' of healthcare, point of care diagnostics, genomics, CRISPR gene editing
- Mental Health and Addictions Inquiry – the need to reorient health system responses to keep people well and intervene early
- Health and Disability System Review impacts.

This LTIP outlines the vision for our health system over the next 10 year period. There are a number of challenges identified that require investments which are summarised in this document. These investment propositions have been designed to mitigate potential risks, capitalise on the strengths of the Canterbury health system and be fiscally responsible. The investments are designed to provide flexibility to address future challenges and ensure the Canterbury health system is sustainable and high performing.

10 Appendices

10.1 Asset Stocktake

Beds	Christchurch Hospital (incl CWH)	Burwood Hospital	Hillmorton Hospital	The Princess Margaret Hospital	Ashburton Hospital	Chatham Island Health Centre	Darfield Hospital	Ellesmere Hospital	Kaikoura Health	Lincoln Hospital	Oxford Hospital	Rangiora Health Hub	Waikari Hospital	Community Dental Facilities	Community Other Facilities	Total
Adult Medical Inpatient Beds	243	22			21	3	5	4	6 (flexibeds)		7	4	6			315
Adult Surgical Inpatient Beds	288	56														344
Medical Paediatric Beds	35															35
Surgical Paediatric Beds	26															26
Adult Intensive Care: ICU Support critically ill/injured patients.	23															23
Adult Intensive Care: CCU Support critically ill/injured patients.	9															9
Acute Assessment Unit	26					1			2							29
Medical Assessment Unit Overnight Capacity	36															36
Assessment Treatment & Rehab Beds		154			22											176
DHB owned Aged Residential Care							4	6	14		8		4		37	73
Antenatal/Postnatal Beds	45															45
Neonatal ICU Beds	41															41
Number of Delivery Suites	31				7		2		1	8		8				57
Number of Physical Operating Theatres	18	4			1											23

Beds	Christchurch Hospital (incl CWH)	Burwood Hospital	Hillmorton Hospital	The Princess Margaret Hospital	Ashburton Hospital	Chatham Island Health Centre	Darfield Hospital	Ellesmere Hospital	Kaikoura Health	Lincoln Hospital	Oxford Hospital	Rangiora Health Hub	Waikari Hospital	Community Dental Facilities	Community Other Facilities	Total
Procedure Rooms	6	4			1											11
Day Surgery Unit Beds/ Chairs	36	20														56
Emergency Department Beds and Trolleys etc	52				8											60
Diagnostic and Treatment Rooms (outpaitent)	83	5			5											93
Adult Mental Health Beds			71													71
Child and Adolescent Mental Health Beds				16												16
Forensic Mental Health Beds			35													35
Other Mental Health Beds		48	36	37												121
Cancer																
Chemotherapy Day Beds and Chairs	7				1											8
Brachytherapy units	1															1
Linear Accelerators (Linacs)	4															4
Other Units																
Mortuary units	48				6				2							56
Total Dentistry (chairs and beds)	13													62		75
Clinical Equipment																
Magnetic Resonance Imaging (MRI) units	2	2														4
CT Scanners	4	1			1											6

Beds	Christchurch Hospital (incl CWH)	Burwood Hospital	Hillmorton Hospital	The Princess Margaret Hospital	Ashburton Hospital	Chatham Island Health Centre	Darfield Hospital	Ellesmere Hospital	Kaikoura Health	Lincoln Hospital	Oxford Hospital	Rangiora Health Hub	Waikari Hospital	Community Dental Facilities	Community Other Facilities	Total
Cardiovascular Interventional Labs (Cathlabs) Units	2															2
Dialysis Units	77				1											78
Shelled Units																
Shelled Wards		1														1
Time to make shelled ward operational (days)		TBC														0
Shelled Beds		24														24
Time to make shelled beds operational (days)		TBC														0

10.2 Asset Condition Assessment

10.2.1 ASSET CONDITION

Building condition rating categories:

ELEMENT	CONDITION GRADE				
	1	2	3	4	5
	Very Good Condition	Good Condition	Moderate Condition	Poor Condition	Very Poor Condition
Estimated Proportion of life consumed	Up to 45%	Between 45% to 90%			Up to 90%
Structure	Sound structure.	Functionally sound structure.	Adequate structure, some evidence of foundation movement, minor cracking.	Structure functioning but with problems due foundation movement, some significant cracking.	Structure has serious problems and concern is held for the integrity of the structure.
External	Fabric constructed with sound materials, true to line and level. No evidence of deterioration or discolouration.	Showing minor wear and tear and minor deterioration of surfaces.	Appearance affected by minor cracking, staining, or minor leakage. Indications of breaches of weatherproofing. Minor damage to coatings.	Fabric damaged, weakened or displaced. Appearance affected by cracking, staining, overflows, or breakages. Breaches of weatherproofing evident. Coatings in need of heavy maintenance or renewal.	Fabric is badly damaged or weakened. Appearance affected by cracking, staining, overflows, leakage, or damage, breaches of waterproofing. Coatings badly damaged or non-existent.
Internal			Appearance affected by minor cracking, staining, or minor leakage, some dampness or mildew. Minor damage to wall / ceiling finishes.	Fabric damaged, weakened or displaced. Appearance affected by cracking, staining, dampness, leakage, or breakages. Breaches of waterproofing evident. Finishes of poor quality and in need of replacement.	Fabric badly damaged or weakened. Appearance affected by cracking, staining, leakage, or wilful damage. Breaches of waterproofing. Finishes badly damaged, marked and in need of replacement.
Services	All components operable and well maintained.	All components operable.	Occasional outages, breakdowns or blockages. Increased maintenance required.	Failures of plumbing electrical and mechanical components common place.	Plumbing electrical and mechanical components are unsafe or inoperable.
Fittings	Well secured and operational, sound of function and appearance.	Operational and functional, minor wear and tear.	Generally operational. Minor breakage.	Fittings of poor quality and appearance, often inoperable and damaged.	Most are inoperable or damaged.
Maintenance	Well maintained and clean.	Increased maintenance inspection required.	Regular and programmed maintenance inspections essential.	Frequent maintenance inspections essential. Short term element replacement / rehabilitation.	Minimum life expectancy, requiring urgent rehabilitation or replacement.
Customers	No customer concerns.	Deterioration causes minimal influence on occupational uses. Occasional customer concerns.	Some deterioration beginning to be reflected in minor restrictions on operational uses. Customer concerns.	Regular customer complaints.	Generally not suitable for use by customers.

Buildings that are 33% or less at the required Importance Level (IL):

#	Campus	Name of Buildings	IL	Planning Status
1	Christchurch	Parkside (including link bridges)	IL4	Services migrating to ASB. Planning underway but pending commissioning of ASB
2		Avon Generator	IL4	Service migrating to ASB & other areas
3		Boiler House	IL4	New boiler house design underway. Demolition, pending commission of the new boiler house
4		Clinical Services Block	IL3	Upgrade being planned.
5		Riverside central	IL3	Planning underway, pending commissioning of ASB
6		Food Services	IL3	Pending outcome of Christchurch stage 2 master plan, as demolition is one of the options being considered
7		Diabetes building	IL2	Demo being planned. Pending services migrating to new Outpatient and other facilities
8	Burwood	Spinal Hostel / Orthopaedic Outpatient	IL2	
9	Hillmorton	Main Kitchen	IL2	Upgrade being planned
10		Avon Administration	IL2	
11		Recreation Centre	IL2	
12	Rural	Darfield Hospital	IL2	Pending model of care planning
13		Rangiora Hospital	IL3	Last phase of Rangiora Health Hub built underway. Remaining services migrating to Health Hub.
14		Waikari Hospital	IL2	Pending model of care planning

Asset functionality rating categories:

1	2	3	4	5
Full	**Good**	**Moderate**	**Partial**	**Unfit**
Asset fully fit for intended purpose	Asset fit for intended purpose in all material respects	Asset largely fit for intended purpose	Asset not fit for intended purpose in some material respects	Asset generally not fit for intended purpose

Condition grading information for Clinical Equipment:

ELEMENT	CONDITION GRADE				
	1	2	3	4	5
	Very Good Condition	**Good Condition**	**Moderate Condition**	**Poor Condition**	**Very Poor Condition**
Estimated Proportion of life consumed	Up to 45%	Between 45% to 90%			Above 90%
Equipment	All components operable and well maintained.	All components operable.	Occasional unplanned breakdowns	Frequent unplanned breakdowns . No replacement parts for some components.	Unsafe to use. Most parts are inoperable or no replacement parts
Maintenance	Well maintained	Increased maintenance inspection required.	Regular and programmed maintenance inspections essential.	Frequent maintenance inspections essential. High cost repairs	Minimum life expectancy, requiring urgent replacement. Repairs no longer economical or not possible.
Service Delivery	No unplanned disruption	Minor distruption	May have some minor restrictions on operational uses.	Moderate restrictions on operational uses. Prolonged interruption to service	Major or significant restrictions on operational uses. No longer working

Functionality rating for Clinical Equipment:

ELEMENT	Functionality Grade				
	1	2	3	4	5
	Full	Good	Moderate	Partial	Unfit
Interpretation	Asset fully fit for intended purpose	Asset fit for intended purpose in all material respects	Asset largely fit for intended purpose	Asset not fit for intended purpose in some material respects	Asset generally not fit for intended purpose

10.2.2 ASSET PERFORMANCE

PROPERTY PORTFOLIO

Asset Performance Indicators	Indicator Class	Measure description
Percentage of critical property portfolio that has a National Building Standard (NBS) at or greater than 34%	Condition	Assessment of each (clinically related) building's seismic status. This is to ensure that buildings have acceptable seismic strengthening to mitigate damage during an earthquake event. Status is monitored periodically by experienced assessors.
Theatre Utilisation	Utilisation	Elective Clinical Occupancy - Anaesthetic Minutes (within session) Used Plus Turnaround Time / Total Session Minutes Available.
Energy consumption per m^2 (kWh/m^2)	Functionality (Fitness for Purpose)	Energy consumption measure is based on Code of Practice NZS4220:1982 Energy Conservation standard which applies to non-residential Buildings and specifies targets for existing buildings. This is an indicator of the functionality of assets implemented to help reduce energy consumption. Actuals are measured and reported annually in the Energy Management Manual which is required to obtain the Energy Mark "Gold" Standard (ISO 50001).
Percentage of buildings within the DHB's property portfolio with a current Building WoF	Condition	Requires that each occupied building can evidence holding a BWoF, issued by an independent assessor, for the current year. This is to ensure safety of both the public and staff. There is annual certification.
Number of elective surgical discharges delivered	Other	All DHBs are expected to deliver on the national Electives Health Target by delivering an increasing number of elective surgeries. The indicator provides a measure of the performance (capacity & utilisation) of the DHB's facilities.

INFORMATION COMMUNICATION AND TECHNOLOGY (ICT) PORTFOLIO

Asset Performance Indicators	Indicator Class	Measure description
Condition of servers to mitigate against cyber-attacks- Percentage of servers patched with critical and security updates	Condition	This measure highlights the importance of ensuring the DHB has mitigated against cyber-attacks. Measure is the proportion of servers with up to date operating system patches, so as to mitigate against cyber attacks. This is an indicator that servers are in a sufficiently current state for withstanding such attacks. The result is reported on a monthly basis and the result shown is for June.
HealthOne Page Views	Utilisation	HealthOne is a system which provides clinicians access to a single electronic patient record across the South Island. This record details a patient's treatment and prescriptions to enable better and more timely decision making. The measure is the average monthly HealthOne page views by Christchurch Hospital staff.
Network Security External Penetration Test (external facing websites)	Functionality (Fitness for Purpose)	Penetration test reports results to 5 risk levels (5-Critical, 4-High, 3-Medium, 2-Low and 1-Informational). A penetration test is carried out annually by an independent, external contractor. This measurement is designed to show that the security-related assets in use are fit for that purpose.
Percentage uptime for critical applications (HealthConnectSouth, Rhapsody, Éclair, MedChart)	Other	Critical clinical applications are essential to support the delivery of health services to the right patient and at the right time. The uptime of mission critical applications reflects the condition of these applications. The uptime is recorded each month and then averaged across the year. We used this indicator as a condition indicator.

CLINICAL EQUIPMENT PORTFOLIO

Asset Performance Indicators	Indicator Class	Measure description
Percentage of Linacs compliant with the requirements of the Radiation Protection Act	Condition	All Linacs have to be in compliance with the Radiation Safety Act. Each scanner is serviced, tested and monitored on a regular basis. The measure is assessed by reviewing annual QA tests (by Medical Physics).
Percentage of patients (referred with a high suspicion of cancer and a need to be seen within two weeks) receiving their first cancer treatment within 62 days of referral	Utilisation	All DHBs are expected to deliver on the national faster cancer treatment health target by delivering an increasing number of cancer treatments within shorter timeframes. This indicator has been updated to reflect the current health target and provides a measure of the performance (capacity and utilisation) of the DHB's clinical equipment as the DHB seeks to meet increasing expectations. The Ministry of Health sets the standards nationally.
Percentage of diagnostic monitors meeting RANZCR QA requirements for primary monitors	Functionality (Fitness for Purpose)	RANZCR requirements cover many indicators including max luminance of 350Cd/m^2 from 2014, which is our standard with a target of 90% compliance.
Percentage of CTs compliant with the requirements of the Radiation Protection Act	Condition	All CTs have to be in compliance with the Radiation Safety Act. Each scanner is serviced, tested and monitored on a regular basis. The measure is assessed by reviewing annual QA tests (by Medical Physics).
Average CT uptime vs operational hours	Other	The uptime of CT scanners reflects the condition of the scanners. This measures the total time that the scanner is available for use and/or able to produce diagnostic images during the agreed operational hours of the service. Uptime is based on total operational usage hours less unplanned downtime. Planned outages such as regular maintenance and/or upgrades, are not considered downtime for this measurement. Unplanned downtime is recorded and reported monthly to management. The CT uptime vs. operational hours measure has been calculated as the average result across all six of the DHBs diagnostic CT machines. Only diagnostic CT scanners are included in the calculation.
Average Linac uptime vs operational hours	Other	The uptime of Linacs reflects the condition of the Linacs. This measures the total time that the Linac is available for use and/or able to provide treatment during the agreed operational hours of the service. Uptime is based on total operational usage hours less unplanned downtime. Planned outages such as regular maintenance and/or upgrades, are not considered downtime for this measurement. Unplanned downtime is recorded and reported monthly to management. The uptime vs. operational hours measure has been calculated as the average result. (This measure is in the Annual Report)

10.3 Bed Demand Scenario Modelling

10.3.1 INTRODUCTION TO SCENARIOS

We have developed a number of scenarios to describe the potential cost impacts of a range of options for investment in Christchurch hospital facilities, workforce or community programmes.

(Refer to section 6.2 in main document)

The scenarios test the impacts of changing various inputs in our bed demand projection model, including:

- Available capacity, both the total number of beds and timing of availability
- Inpatient admission volumes
- Event durations

Where possible the scenarios use a range of benchmark rates to demonstrate the impact on demand and capacity when compared to our base model being used in programme and detailed business cases.

Each scenarios uses the projected demand for beds and the expected available capacity under their stated conditions to demonstrate whether there is a spare capacity or a shortfall of beds in each year.

10.3.2 ASSUMPTIONS USED

Changes to capacity availability

Programme timescales for our current investment plans suggest that Tower 3 on the Christchurch campus should provide a net additional 72 beds from the start of the 2025/26 financial year. The Central building and Tower 4 are expected to follow the next financial year providing a net 126 beds, while allowing us to exist from substandard facilities in Parkside building.

Scenarios anticipating delays in these buildings coming on stream assume that Tower 3 is to be delayed by one year, becoming available in 2025/26, while Tower 4 will not be available until four years later than planned, in 2029/30.

These scenario inputs affect the available capacity of adult inpatient beds only, they do not by themselves alter the projected demand for beds.

10.3.3 CHANGES TO ADMISSION RATES

A number of the scenarios consider the impact of changing the current medical inpatient admission rates.

Where the scenario envisions increased investment in community programmes to prevent hospital admissions we have reduced the bed demand for medical specialties by 5%.

We have used the Ministry of Health's national inpatient data collection (NMDS) to calculate age-standardised acute admission rates for several years. Using these rates we can compare Canterbury rates with the national rate and other DHBs. Where a scenario uses another DHB to demonstrate the impact on inpatient events if Canterbury was to admit medical patients at the same rate, we have used the difference in the age standardised rates to find the potential bed demand. For example, Waitematā DHB are found to have an age-standardised medical admission rate 46% higher than Canterbury.

10.3.4 CHANGES TO LENGTH OF STAY

A number of the scenarios consider the impact of increasing lengths of stay. We have used NMDS to calculate average length of stay (ALOS) measures for medical, surgical acute and surgical elective events. This is based on the Ministry's OS3 – average length of stay measure used in the DHB reporting programme.

Where a scenario uses the impact of another DHB's length of stay on our projected bed demand, we have used the difference in the ALOS rates to find the potential bed demand. For example, Waitematā DHB are found to have a medical ALOS 14% higher than Canterbury, while surgical acute ALOS is 11% higher and surgical elective 6% higher.

10.3.5 CASE WEIGHTED DISCHARGES

The New Zealand health system uses a weighted casemix model to measure resources used or needed to provide hospital inpatient services, and are the default mechanism for calculating payments between funders and providers.

The Ministry of Health have published "The New Zealand Casemix System – An Overview" as an introductory guide to the system: (https://www.health.govt.nz/system/files/documents/publications/new-zealand-casemix-system-an-overview-dec15_0.pdf)

An event considered to require the average cost of resources in a particular year is said to have a case weight, or CWD, of 1. The weighting captures the variation in production, while a unit price is calculated for each year and is constant across all events. For the 2018/19 year the unit price was $5,068.12.

The casemix model is built around the distribution of lengths of stay for similar events, to reflect the required resource levels typically expected for an event. Should length of stay increase there will obviously be an increased resource requirement for the additional time spent as an inpatient. However this change in resource required is likely to be at a lower rate than any ALOS increase as the most resourse intensive elements of an inpatient stay are on admission and at discharge. So it is reasonable to assume that for an expected 5% increase in ALOS the case weighted resource requirement would increase by 2.5%.

10.3.6 COMBINATIONS

Where a scenario uses changes in admission rates and length of stay then the differences are simply multiplied to calculate their effects.

10.3.7 IMPACTS ON DEMAND

Once the inputs for each scenario have been added to the calculations we can then see the projected bed demand and capacity through to 2030/31, and the difference between the number of beds needed and the number available. We have stated this gap as a simple difference, and taking into account a level of 'freeboard', or a margin of free beds.

10.3.8 FREEBOARD, OR MARGIN OF SAFETY

"Freeboard" is a term usually used in shipbuilding or in flood management, as a level considered to be safe above the waterline; it is a **factor of safety**. Freeboard in this contexts is also used as a margin of safety.

A certain margin is needed when matching available bed numbers to demand to recognise that increased numbers of 'hospital full' days add risk to patient safety, outcomes and experience. A number of 'free' beds above projected demand are required to ensure that any hospital facility is able to respond to resourcing requirements; too few and the hospital becomes gridlocked.

A factor of safety provides greater operational efficiencies reducing length of stay and retaining clinical and staff safety. There is significant upside risk of demand being higher than projected, while the downside risk of having some spare capacity can actually allow more efficient hospital operations, with more patients on home wards getting more focused care, and reducing length of stay.

A factor of safety of 64 beds (two wards) has been recommended by EY in its IBC review in 2018.

10.3.9 CASE WEIGHTED DISCHARGES MODEL OUTCOMES

For each scenario we have considered the base number of case weighted discharges that can be accommodated in the capacity available each year. Where the demand projection shows that more CWD are required than are available, we can show the shortfall in costs in 2018/19 terms by multiplying the shortfall by the current price. This cost represents the default price that Canterbury would be charged by other DHBs to provide these volumes on our behalf, or the price that would need to be negotiated with an external provider within the region.

This shortfall has been calculated for the difference between the demand and total capacity, and also taking into account the freeboard margin of safety.

10.3.10 SHORTFALL COSTS

The scenarios allow us to compare the potential impacts of different investment outcomes. It is important to note that shortfall costs would not be avoided in a case where available capacity at Christchurch were enough to meet the demand – much of these costs would be incurred in any event. However, they do give an indication of the additional expense associated with any of the scenarios presented. Should we be faced with an investment scenario that results in additional inpatient events because we have to retreat from community based programmes, or experience an increase in length of stay due to staffing restrictions, then an increase in costs will inevitably occur.

In practice elective surgical events would be displaced in any shortfall scenario. In addition to the case weighted cost of these events, Canterbury would be liable for any travel and accommodation costs incurred for events transferred to other DHBs, and faced with a premium cost for outsourcing any significant volume of events to external providers within the region.

BED CAPACITY	F2020	F2021	F2022	F2023	F2024	F2025	F2026	F2027	F2028	F2029	F2030	F2031
Delivered on time	[redacted]											
Delayed	[redacted]											

PROJECTED BED DEMAND	F2020	F2021	F2022	F2023	F2024	F2025	F2026	F2027	F2028	F2029	F2030	F2031
Ideal	[redacted]											
Preferred	[redacted]											
Delayed	[redacted]											
Reduced Community Investment	[redacted]											
Clinical Workforce Capped	[redacted]											
Do Minimum	[redacted]											

BED DEMAND VS TOTAL CAPACITY	F2020	F2021	F2022	F2023	F2024	F2025	F2026	F2027	F2028	F2029	F2030	F2031
Ideal	[redacted]											
Preferred	[redacted]											
Delayed	[redacted]											
Reduced Community Investment	[redacted]											
Clinical Workforce Capped	[redacted]											
Do Minimum	[redacted]											

BED DEMAND VS SAFE CAPACITY	F2020	F2021	F2022	F2023	F2024	F2025	F2026	F2027	F2028	F2029	F2030	F2031
Ideal	[redacted]											
Preferred	[redacted]											
Delayed	[redacted]											
Reduced Community Investment	[redacted]											
Clinical Workforce Capped	[redacted]											
Do Minimum	[redacted]											

CASEWEIGHTED DISCHARGE SHORTFALL (2018/19 PRICES) VS TOTAL CAPACITY	F2020	F2021	F2022	F2023	F2024	F2025	F2026	F2027	F2028	F2029	F2030	F2031	TOTAL
Ideal	[redacted]												
Delayed													
Reduced Community Investment													
Clinical Workforce Capped													
Do Minimum													

CASEWEIGHTED DISCHARGE SHORTFALL (2018/19 PRICES) VS SAFE CAPACITY	F2020	F2021	F2022	F2023	F2024	F2025	F2026	F2027	F2028	F2029	F2030	F2031	TOTAL
Ideal	[redacted]												
Preferred													
Delayed													
Reduced Community Investment													
Clinical Workforce Capped													
Do Minimum													

10.4 Investment Summary by Year - Preferred Scenario

The indicative total capital investments by year by major asset category and major investment category is as follows:

Financial Year Ending 30 June	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	Total 10 Years
Asset Category	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**
Building & Infrastructure Plant	[redacted]										
Clinical & Other Equipment											
Information & Communication Technology											
Motor Vehicles											
Total 10-Year Capital Investment											

Note: The timing of spend is indicative and as an integral part of Canterbury DHB's prioritisation and review process, Canterbury DHB will respond to shifts in service needs and technology accordingly and allocate applicable funds to meet these shifts where appropriate

Financial Year Ending 30 June	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	Total 10 Years
Major Investment Category	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**	**$M**
Baseline	[redacted]										
Strategic Approved DBCs											
EQ Programme of Works (POW)											
Planned Strategic Investments											
Total 10-Year Capital Investment											

Note: For assumed Crown funded Planned Strategic Investments, the amounts are recorded as lump sum in the year which the asset is expected to be transferred by the Crown to Canterbury DHB. Timings are indicative only e.g. subject to formal business case process.

10.5 Major Facilities

Estimated Timing of Spend (Year Ending 30 June)	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	Total 10 Years
Major Facility Related Investments	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M
Hagley	[redacted]										
Hagley – Canterbury DHB funded scope											
Energy Centre											
Tunnel (capex portion)											
Chch Campus Masterplan DBC -(STEPS 0-2)											
Chch Campus Masterplan - STEP 3 (CHH Podium Extn)											
Laboratory - Chch Campus Masterplan (STEP 4)											
Cancer Centre - Chch Campus Masterplan (STEP 4)											
Chch Campus Masterplan - Readiness (STEP 5)											
Parkside External Panels											
Hillmorton - Forensic replacement											
Hillmorton - AIS replacement (Te Awakura)											
Passive Fire Compliance											
Mental Health ex TPMH - Inpatients											
Mental Health ex TPMH - CAF Outpatients											
Total Indicative Major Facility Projects											

Note: The amounts represent a subset of total Building and Infrastructure Plant investment, the balance being 'business as usual' or baseline spend. Hagley facility amount is indicative as at June 2019 and final transfer amount may differ. Steps 0-4 amounts of the Christchurch Campus Masterplan are indicative per draft QS estimates based on preliminary options analysis and may differ from final business cases. All timings and amounts are indicative only e.g subject to formal business case process

10.6 Major Information Communication Technology

Estimated Timing of Spend (Year Ending 30 June) Major ICT	2019/20 $M	2020/21 $M	2021/22 $M	2022/23 $M	2023/24 $M	2024/25 $M	2025/26 $M	2026/27 $M	2027/28 $M	2028/29 $M	Total 10 Years $M
eObservations Phase 2 (PatientTrack upgrades)	[redacted]										
Nurse Resource Capacity Planning											
Anaesthetic Electronic Record - Anaesthesia/ISG											
eOrders (Hospital & Community)/Lab System Integration											
Electronic Medication Supply Chain – ICT, Robotic dispensing etc.											
Total Indicative Key ICT											

Note: The amounts represent a subset of total investment in ICT, the balance being 'business as usual' or baseline spend. Timings are indicative only e.g. subject to formal business case process. The above represents ICT investment projects circa $1M or higher. The ICT strategy also includes a number of specific investments that are <$1M (within the LTIP period) and hence are not separately listed e.g. Clinical Cockpit/Digital End of Bed Chart, whilst others are part way through implementation and the balance of spend may be <$1M, e.g. ERMS. Canterbury DHB has an ongoing review and prioritisation process to accommodate spend on strategic ICT investments as appropriate.

10.7 Major Clinical Equipment

Estimated Timing of Spend (Year Ending 30 June) Major Clinical Equipment	2019/20 $M	2020/21 $M	2021/22 $M	2022/23 $M	2023/24 $M	2024/25 $M	2025/26 $M	2026/27 $M	2027/28 $M	2028/29 $M	Total 10 Years $M
Linear accelerators (additional bunker & T5)	[redacted]										
Bowel Cancer Screening Equipment											
CT scanners											
DSA Equipment #1 (Mono plane)											
MRI Scanners											
Spec CT (Nuclear Med)											
O-Arms											
Linear Accelerator replacements											
Brachy therapy suite /theatre											
Cath Lab replacements											
Cath Lab #3 (new)											
Core Lab High Vol Automation											
Bacteriology Processing											
CHL Lab Information System replacement											
Anaesthetic machines											
Theatre Instrument - additional for Hagley											
Total Indicative Major Clinical Equipment											

Note: The amounts represent a subset of total investment in Clinical Equipment, the balance being 'business as usual' or baseline spend. Timings are indicative only e.g. subject to formal business case process

10.8 Pro forma Financial Statements by Year

Pro-forma Cashflow by year

Summary Cashflow	2019/20 $M	2020/21 $M	2021/22 $M	2022/23 $M	2023/24 $M	2024/25 $M	2025/26 $M	2026/27 $M	2027/28 $M	2028/29 $M	Cumulative Total 10 Years $M
Net Operating Cashflow (excl Capital Charge)	[redacted]										
Net Operating Cashflow - Capital charge											
Net Investing Cashflow (Note 1)											
Net Financing Cashflow (Note 1)											
NET Cashflow Movement Before Planned Strategic Investments											
Add: Opening Balance Before Planned Strategic Investments											
Indicative Cash Before Planned Strategic Investments											
Add/(Less): Cumulative Planned Strategic Investments Cash Movement:											
Investing - Planned Strategic Investments											
Financing - New Equity - Assumed Crown Funded Planned Strategic Investments (Note 2)											
Operating - Indicative Capital Charge on assumed New Equity											
Indicative Closing Cash After Planned Strategic Investments (Note 3)											

Note 1: Some Crown funded/ MOH managed projects are transacted as 'non-cash' transfers e.g. Hagley

Note 2: For Christchurch Hospital Masterplan (include Passive Fire Protection Compliance) and Hillmorton Masterplan (Forensic and AIS). Balance of financing cashflow for Planned Strategic Investments is internal cash

Note 3: To avoid potential circular references, deficit funding for deficit arising from impact of Crown funded Planned Strategic Investments is excluded in the forecast i.e. forecast closing cash position is conservative.

Pro-forma Financial Performance by year

Year ending 30 June Summary Financial Performance	2019/20 $M	2020/21 $M	2021/22 $M	2022/23 $M	2023/24 $M	2024/25 $M	2025/26 $M	2026/27 $M	2027/28 $M	2028/29 $M	Cumulative Total 10 Years $M
Ministry of Health Revenue (incl IDFs)											
Other Government Revenue											
Earthquake repair revenue redrawn											
Other Revenue											
Gain/(Loss) on Sale - (e.g. TPMH)											
Total Revenue											
Personnel (incl Outsourced Personnel)											
Clinical Supplies											
Earthquake building repair opex											
Infrastructure & Non Clinical											
Payments to External Providers											
Total Expenditure excl Depreciation & Capital Charge											
Net Surplus/(Deficit) - before Depreciation & Capital Charge											
Depreciation and Capital Charge (Note 1)											
Net Surplus/(Deficit) - before IDCC on Crown Funded Planned Strategic Investments											
Add/(Less): Notional IDCC on Assumed Cro											
Depreciation on Assumed Crown Funded Planned Strategic Investments											
Capital Charge on assumed New Equity											
Indicative Net Surplus/(Deficit) - after IDCC for Planned Strategic Investments											

Note 1: Excludes notional depreciation and capital charge for assumed Crown funded 'Planned Strategic Investments' which is shown separately. For 'practicality' and to avoid distortion, other operating efficiencies and/or costs, if any, have not been assessed as the respective business cases have not progressed or finalised. .

Pro-forma Financial Position and Crown Equity by year

Balance as at 30 June Summary Financial Position	2019/20 $M	2020/21 $M	2021/22 $M	2022/23 $M	2023/24 $M	2024/25 $M	2025/26 $M	2026/27 $M	2027/28 $M	2028/29 $M	As At End of Year 10 $M
Cash (Notes 1 & 2)	[redacted]										
Other Current Assets											
Fixed Assets (Note 2)											
Depreciation Provision (Note 2)											
Other Non-Current Assets											
Estimated Total Assets											
Bank Overdraft (Note 1 & 2)											
Other Current Liabilities											
Other Non-current Liabilities											
Estimated Total Liabilities											
Estimated NET Assets (before Planned Strategic Investments)											
[redacted]											
Total Planned Strategic Investments											
Indicative Internal Cash for Planned Strategic Investments											
Indicative Accumulated Depreciation											
Indicative Capital Charge on assumed New Equity											
Indicative Planned Strategic Investments Net Movement											
Indicative Net Assets After Planned Strategic Investments											

Summary Crown Equity	2019/20 $M	2020/21 $M	2021/22 $M	2022/23 $M	2023/24 $M	2024/25 $M	2025/26 $M	2026/27 $M	2027/28 $M	2028/29 $M	As At End of Year 10 $M
General Funds	[redacted]										
Revaluation Reserve											
Retained Earnings											
Estimated Crown Equity - before Planned Strategic Investments											
Add/(Less): Cumulative Planned Strategic Investments Movement											
General funds - assumed New Equity for Planned Strategic Investments											
Retained Earnings - Depreciation & Capital Charged on Assumed New Equity											
Indicative Crown Equity After Planned Strategic Investments											

10.9 Representative Detailed Key Financial Assumptions

Description / Year Financial Performance	2019/20 % / $M	2020/21 % / $M	2021/22 % / $M	2022/23 % / $M	2023/24 % / $M	2024/25 % / $M	2025/26 % / $M	2026/27 % / $M	2027/28 % / $M	2028/29 % / $M
CPI	[redacted]									
Revenue										
Population Based Funding (MoH)										
MOH - Subcontracts (price/vol)										
IDF Inflow, Inter Provider DHBs, Other Govt & Patient Related - price/vol										
Other income enhancement										
Expenditure										
Personnel/Employee Costs	Per workforce Model which includes, amongst other parameters, the impact of settled MECAs and efficiency initiatives associated with the taskforces to address continuous improvement, resource optimisation and workforce absenteeism. These efficiency initiatives are an integral part of Canterbury DHB's pathway to financial stability, excluding interest, depreciation and capital charge.									
Outsourced Personnel Efficiencies	[redacted]									
Clinical Supplies - Activity & Marginal Growth										
Clinical Supplies - Electives Back In-House										
Clinical Supplies Costs – Net Efficiencies										
Non Clinical - Activity & Marginal Growth										
Non Clinical - Electives Back In-House										
Rental (CAF Outpatients ex TPMH)										
ICT Systems – Specific (ie.g. IAAS)										
Non Clinical Net Efficiencies										
External Service Providers - indicative net										

Note: The relevant key assumptions represented above is a subset of detailed financial modelling assumptions. Figures are indicative.

Description / Year	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
Average Depreciation Rates p.a. - NEW assets										
Clinical Equipment	[redacted]									
Other Equipment & Motor Vehicles										
ICT - Software & Hardware										
New Facilities (Structure 70Yrs & Mix of Plant, ICT & FFE)										
Financial Position										
Equity - Deficit support funding										
Equity - Hagley (ASB) transfer										
Equity- residue Parkside DBC portion										
Equity- approved MH Relocation DBC										
Equity Repayment- TPMH est Net sale proceeds										
Equity – assumed new equity for planned strategic investments										
Equity - FRS 3 Repayment										
Cashflow										
Operating Cashflow										
Investing Cashflow										
Financing Cashflow (equity for approved DBCs, eg MH relocation and Hagley))										
Equity Repayment (TPMH sale proceeds & FRS3 repayment)										
Financing Cashflow (assumed new equity for planned strategic investments)										
Surplus Asset Disposal (Capital Efficiency)										
Est Net Sale Proceeds (TPMH) per valuer										
Est book value (Land) at disposal date										
Est 'Gain/(Loss) on Sale' (TPMH)										