The King's Fund

Ideas that change health care

Developing accountable care systems

Lessons from Canterbury, New Zealand

Anna Charles

August 2017

Key messages

- One of the biggest challenges currently facing the NHS is how to slow increasing demand for acute hospital care. In New Zealand, the transformation of the Canterbury health system provides an example of how this has been done, and indicates that expanding hospital capacity is not inevitable if investment is made in alternative models of provision and community-based services.
- Three key approaches were central to delivering the transformation in Canterbury: the development of a clear, unifying vision behind the 'one system, one budget' message; sustained investment in giving staff skills to support them to innovate and giving them permission to do so; and developing new models of integrated working and new forms of contracting to support this. The changes in Canterbury have been the result of collaborative working, relying on system leadership, and strong relationships and staff engagement across the health and care system.
- The overall transformation has not been the result of one 'big bang' change, but an aggregation of many simultaneous changes to the way in which care is organised and delivered. A number of new programmes and delivery models were developed as part of the transformation. Common themes running through these were integrating care across organisational and service boundaries; increasing investment in community-based services; and strengthening primary care. The networked organisation of general practice has been key to many of the developments.
- As a result of the transformations, the health system is supporting more people in their homes and communities and has moderated demand for hospital care, particularly among older people. Compared with the rest of New Zealand, Canterbury has lower acute medical admission rates; lower acute readmission rates; shorter average length of stay; lower emergency department attendances; higher spending on community-based services; and lower spending on emergency hospital care.
- Although the Canterbury system has moderated demand for acute care, it has not cut beds or taken resources from hospitals in absolute terms, and its finances remain challenging. This casts doubt over expectations that new models of care will enable disinvestment in acute hospitals in the NHS. A more realistic goal would be to bend the demand curve, slowing – but not reversing – growth.
- The changes in Canterbury required investment – for example, in implementing new technologies, training staff and developing new models of provision – and took several years. These are also prerequisites for transformation in the NHS.

Introduction

Four years ago, we told the story of the quest for integrated health and social care in Canterbury, New Zealand (Timmins and Ham 2013). In this report, we revisit the experience in Canterbury and consider the lessons that the NHS can learn as it embarks on its own journey of transformation. Canterbury's progress in moderating demand for acute hospital services is particularly worthy of closer study, as this has recently been set as a key focus and marker of success for sustainability and transformation partnerships and new models of care (NHS England 2017).

Canterbury District Health Board (DHB) is responsible for planning, organising, purchasing and providing health and care services for the largest and most highly populated region of New Zealand's South Island. Like other health systems around the world, Canterbury has been struggling with growing demand for hospital care in the context of an ageing population.

A decade ago, the region's health system was facing a number of significant challenges. Christchurch Hospital (the region's main hospital and the only one with an emergency department) was performing poorly against a number of key measures, including average lengths of stay and elective waiting times that were among the longest in New Zealand (Gullery and Hamilton 2015; Timmins and Ham 2013). The hospital frequently experienced high bed-occupancy levels, meaning people often faced long waits in the emergency department before being admitted (Millar 2013; Timmins and Ham 2013). Financial performance was also poor, culminating in a NZ$16.9 million (£9.6 million) deficit in 2006/7 (Gullery and Hamilton 2015).

It was projected, that to meet rising demand, Canterbury would need an extra 450 acute hospital beds, 2,000 more care home beds, 20 per cent more GPs and an additional 8,000 people in the overall health care workforce by 2020 (Gullery and Hamilton 2015; State Services Commission 2013). This was not affordable or possible given the available workforce. Instead, Canterbury DHB set out to transform the health system, fundamentally redesigning ways of working to address the clinical and resource pressures it was facing.

Before examining Canterbury's experience, it is worth noting some of the key differences between its health system and the NHS. In New Zealand, as in the UK, care is funded from general taxation. However, people make co-payments for GP appointments and these co-payments account for around half of general

practice income. While GPs are usually independent contractors (as in the UK) there are strong local networks of practices: in Canterbury there is a primary care network, Pegasus Health, which involves 109 practices delivering care to more than 365,000 patients. Pegasus Health supports general practices and contracts with the Canterbury DHB to provide a range of primary and community services (acting as a primary health organisation). Unlike in the UK, most social care is paid for by district health boards, and provision of state-funded social care is relatively generous compared with UK standards, meaning that entitlements to health and social care are more closely aligned. The New Zealand health system has had no formal purchaser/provider split since 2001, has undergone no significant organisational restructures in recent years and has a far less complex regulatory environment than the NHS.

But while the context may be different, there are clear parallels between the pressures facing the Canterbury health system and pressures on the NHS – including financial deficits, rising demand and declining performance in emergency and elective care (**Murray *et al* 2017**). The initiatives taken in response to these pressures – and the impact of those initiatives – offer useful learning for NHS leaders facing similar challenges. Understanding how Canterbury DHB implemented new ways of working is relevant to any system looking to work in a more integrated way, including those developing accountable care systems.

The start of the journey

When it began in 2007, Canterbury's programme of transformation focused on keeping people (particularly older people) well and healthy in their homes and communities. Three key approaches were central to delivering the transformation:

- developing a clear, unifying vision
- ensuring sustained investment in giving staff the skills to innovate and supporting them to do so
- developing new forms of contracting to support more integrated ways of working.

Developing the vision

To develop a vision of how the health system should change, Canterbury DHB undertook a significant staff engagement process.

Initially, 80 senior staff took part in the Xceler8 programme, which involved training in change processes and management techniques, including Lean and Six Sigma, and visits to other industries where these approaches had been used. They then took part in Vision 2020, an exercise to consider how the health care system should change and how it should look by 2020. At the end of the exercise they were handed a small card signed by the chief executive giving them 'permission' to change the system (**Timmins and Ham 2013**).

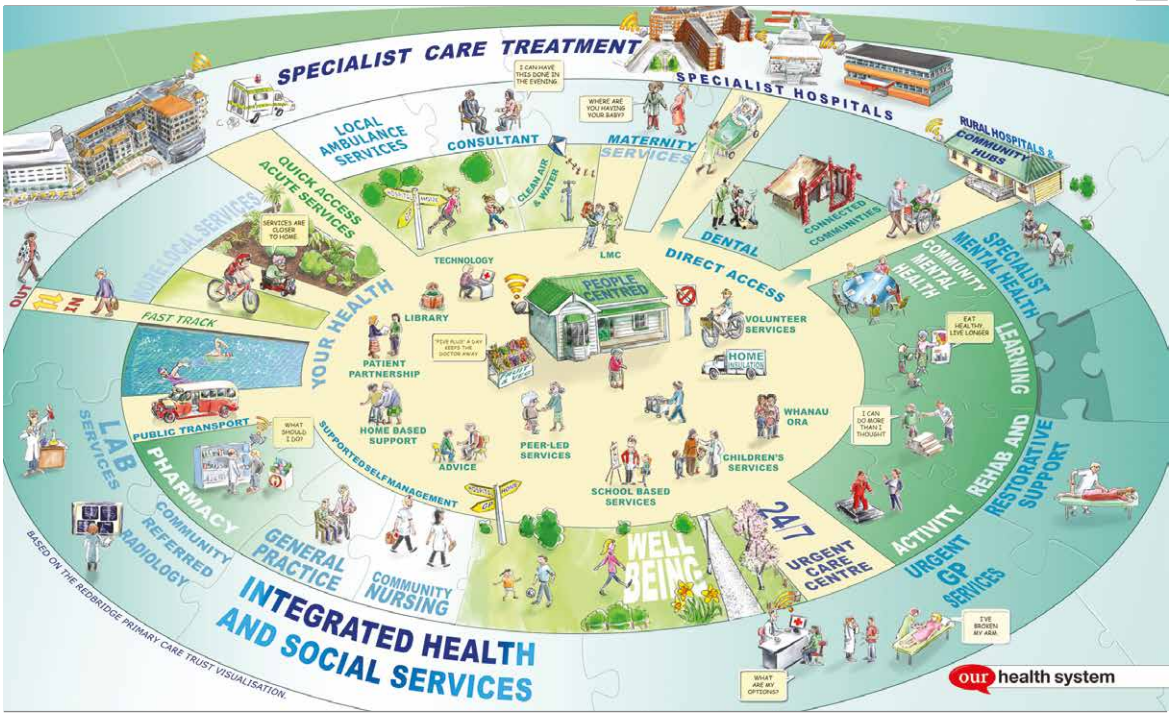
To broaden engagement, Canterbury DHB developed an event called Showcase. Mock-ups of various health care settings were set up in a warehouse and groups of staff were walked through them, presented with challenges facing the health system and asked to consider solutions to the challenges presented. Showcase was advertised through word of mouth and was open to employees of Canterbury DHB and other partner organisations. The event was originally planned to last less than 2 weeks and involve around 400 participants, but it actually ran for 6 weeks and more than 2,000 people attended. It was key to developing a shared vision for the future of the health system, and, crucially, it enabled clinicians and other staff to see themselves as active participants in the transformation process (**State Services Commission 2013**; **Timmins and Ham 2013**).

Through this engagement process, the DHB developed its strategic goals for the health system (Timmins and Ham 2013).

- **Goal 1:** Services should enable people to take more responsibility for their own health and wellbeing.
- **Goal 2:** People should stay well in their own homes and communities as far as possible.
- **Goal 3:** When complex care is required it should be timely and appropriate.

The overarching vision was a single, integrated health and social care system where services would work together around the needs of patients and reduce the time people 'wasted' waiting for access to services. The central and unifying concept was to act as 'one system, one budget', even though the reality was far more complex than this. This vision was summarised in an illustration showing the patient and their home at the heart of the system (*see* Figure 1) (Gullery and Hamilton 2015; Ham 2013; Timmins and Ham 2013).

Figure 1: Pictogram of health care system in Canterbury



Investing in staff

Staff engagement was not only central to developing the strategic vision, but has also been key to its implementation. Canterbury DHB has invested in developing its staff's capability and skills in innovation and change management and now has a business development unit comprising 12 service designers, including a small number of process engineers, who provide specific service-design expertise.

Canterbury DHB has also developed a number of programmes to build capability and skills in innovation and service improvement among its staff. The Particip8 programme focuses on change management techniques, while the Xceler8 programme gives staff the tools and skills to think and act differently. At the end of Xceler8, participants develop their ideas to improve the system; these ideas are presented to the chief executive, and each is then allocated to a senior leader and those considered to have potential are taken forward. Hundreds of staff have taken part in these programmes, leading to many small changes, which together have contributed to the transformation that has taken place (**Ham 2013**; **Timmins and Ham 2013; State Services Commission 2013**).

Developing new forms of contracting

Previously, hospitals in the region were paid per episode or procedure they undertook using a price/volume schedule similar to the NHS tariff. This payment method was scrapped and hospital budgets are no longer determined by the level of activity hospitals undertake. This has created more aligned incentives across the system and has encouraged greater efficiency, as reduced activity does not lead to reduced organisational revenue.

The other major contractual change has been the development of alliance contracting for health services in Canterbury. In keeping with the vision of 'one system, one budget', alliance contracting involves organisations working together to manage care collectively and share risks and gains that may result. Canterbury DHB provides annual block grants to its providers and makes collective decisions with alliance partners on how to allocate savings from improvement initiatives. Similarly, the alliance makes collective decisions on how to address overspends within individual services, with a recognition that it needs to ensure the viability of services. Canterbury DHB does not rely on financial incentives such as additional payments or penalties for good or poor performance.

The contracting alliance includes Canterbury DHB, Pegasus Health, pharmacy, public and private nursing organisations, and laboratory providers. These organisations have formally agreed to work together to balance the best interests

of the local population with what is best for the sustainability of the Canterbury health system (Gullery and Hamilton 2015; Timmins and Ham 2013). There is a clinically led alliance leadership team (which includes a representative from Canterbury DHB) supported by a dedicated alliance support team, and a number of service-level alliances and work groups with responsibility for driving service improvements and transformation in their respective areas. This alliance structure (Canterbury Clinical Network 2017) means leadership responsibilities and capabilities are spread across the system, reducing reliance on a few senior leaders and placing system improvement on a more sustainable footing (personal correspondence).

The alliance is not a legal entity in its own right, and Canterbury DHB is ultimately legally accountable for the alliance's actions. The success of the alliance relies on the contribution of participating organisations and having confidence that Canterbury DHB will enact the decisions it makes (Gullery and Hamilton 2015).

Key interventions

Canterbury DHB developed a number of new programmes and ways of working as part of its system transformation. There are common themes running through these programmes (Ham 2013):

- integrating across organisational boundaries
- increasing investment in community-based services
- strengthening primary care.

HealthPathways

Before 2007, the interface between hospitals and primary care was a key issue within the health system. The HealthPathways programme addressed this by bringing together GPs and hospital specialists to agree management and referral pathways for particular conditions. The programme was initiated by clinicians: a small group of hospital doctors and GPs who were reviewing a backlog of referrals identified common issues with these, and felt that many could have been prevented by improved communication between hospitals and primary care. They then engaged with larger groups of hospital doctors and GPs – and later with nurses, allied health professionals and funders – to look at what the issues were and how they could do things better.

New pathways are developed using a collaborative, iterative process in which hospital doctors and GPs discuss problems and identify solutions that are tailored to their local system. According to clinicians who use the pathways, the process by which they are agreed is just as important as the final output: bringing together hospital doctors and GPs builds trust and supports implementation by increasing clinical buy-in (McGeoch *et al* 2015; Ham 2013; Timmins and Ham 2013).

Pathways are available on the HealthPathways website and are designed to be easy to use as part of a patient consultation. They are subject to regular review and audit and are frequently updated. Some pathways have changed the way services are provided, for example, some diagnostics and procedures are now undertaken in a primary care setting (Timmins and Ham 2013).

Referrals are made via the electronic request management system (described below). If hospital doctors have questions about referrals, they can discuss these directly with the referring GP and GPs receive feedback on their referrals (Timmins and Ham 2013). The associated website, HealthInfo, provides health information for patients consistent with the clinical pathways (McGeoch *et al* 2015).

Both the number of pathways and the number of visits to the HealthInfo site have increased steadily since the programme began in 2008. There are currently more than 900 pathways and supporting resources (Canterbury District Health Board 2016) and the website is accessed more than 1.3 million times per year (Gullery and Hamilton 2015).

Acute demand management system

The acute demand management system was introduced in 2000. Under this system, people with acute health needs can receive urgent care in their homes or communities, avoiding hospital admission or enabling early discharge from the emergency department or medical or surgical assessment unit.

Patients are managed by GPs supported by rapid-response community nursing, community observation beds, hospital-based specialist advice and rapid diagnostic tests. This means that people who are unwell can be observed and followed up, illnesses can be investigated, and treatments (such as intravenous antibiotics) can be given without the need for a hospital stay. Patients are usually cared for within the system for a short period, typically three to five days (Canterbury District Health Board 2016; Schluter *et al* 2016; Gullery and Hamilton 2015; Timmins and Ham 2013). The system differs from many 'hospital at home' schemes as it is managed by primary care professionals rather than being a hospital outreach programme (Blick and Love 2017).

GPs, paramedics, and emergency department doctors and nurses can refer people into the acute demand management system. More than 30,000 people were supported by the system in 2015/16 (Canterbury District Health Board 2016).

Analysis from Canterbury DHB shows that, among GP practices that refer more people to the acute demand management system, fewer people from the practice present at the emergency department. The average cost of managing a patient within the acute demand management service is NZ$140 (£80) per episode of care, compared with an average cost of NZ$340 (£194) for each person presenting at the emergency department and NZ$1,180 (£670) per bed day for each person admitted to an acute medical bed. If one in three acute demand management system episodes prevents a person presenting at the emergency department, or one in 10 prevents a patient occupying an acute medical bed for a day, there will be an overall cost saving to the system (Blick and Love 2017).

Community rehabilitation enablement and support team

The community rehabilitation enablement and support team offers community-based rehabilitation to older people. The team supports people to return home from hospital and to avoid care home admission (Schluter *et al* 2016; Gullery and Hamilton 2015; Timmins and Ham 2013). The service is based around a model from the Waikato district in New Zealand that is similar to many intermediate care programmes in the United Kingdom and elsewhere (Timmins and Ham 2013). It began as a supported discharge service but has since been extended to take referrals directly from GPs, helping to avoid hospital admissions (Canterbury District Health Board 2016).

The team can provide intensive, community-based support, with a focus on rehabilitation and helping people to rebuild their social networks (Timmins and Ham 2013). Multidisciplinary support is provided for up to six weeks (up to four visits a day, seven days a week), and offers nursing services; occupational therapy and physiotherapy; support with activities of daily living; home-based rehabilitation; continuing clinical assessment to recognise any deterioration; personalised care plans; education for patients, their carers and families; and liaison with general practice (Canterbury District Health Board 2012). In 2015/16, more than 1,700 people were supported by the team (Canterbury District Health Board 2016).

Canterbury DHB is currently considering whether the acute demand management system and the community rehabilitation enablement and support team services should be brought together given the strong overlaps in their work; any changes will be designed in partnership with patients and staff.

Enhanced out-of-hours general practice

Canterbury has always had a strong primary care system, but it has been further strengthened during the transformation programme. There is now a centralised nurse-led triage system, a number of centres offer extended opening hours and there is a 24-hour GP surgery. The 24-hour GP surgery has observation beds and access to diagnostic tests such as blood tests and x-rays. GPs can see patients who would otherwise need hospital treatment, and ambulances, where appropriate, can take patients to the surgery rather than the emergency department (Timmins and Ham 2013).

The introduction of an electronic shared care record view (described below) has been central to the success of out-of-hours general practice: GPs seeing a patient out of hours can access their full medical history, and other health professionals can see the results and notes of out-of-hours investigations when the patient is followed up.

Technology

Improving and developing new IT systems has been a key part of Canterbury's move towards working as an integrated system. Progress has required both innovation and investment, and the local IT industry has collaborated with the health system to pioneer new approaches and facilitate progress (Millar 2013). Three key developments are described below.

Electronic shared care record view

The electronic shared care record view is a secure online summary care record, combining an individual's GP records, hospital records, community pharmacy records, and laboratory and imaging results. It is not a central database or a replacement for existing systems, but a central portal that brings together information from different e-health systems. Patients can choose to opt out of all or part of it (Millar 2013; Timmins and Ham 2013; State Services Commission 2012).

Because it draws on existing systems rather than replacing them, it has been possible to implement the record without the disruption that moving multiple organisations to a single IT system would have caused. The way that it builds on existing systems also means that its scope can be extended over time (Timmins and Ham 2013; State Services Commission 2012).

The electronic shared care record view was developed by Canterbury DHB, Pegasus Health, the Canterbury Community Pharmacy Group, Nurse Maude (a charitable organisation contracted to provide community nursing and support)

and Orion Health (a health care software development company). The initial development cost was around NZ$1 million (£570,000) (within the context of an NZ$1.4 billion annual operating budget for Canterbury DHB). A project team representing key clinical groups in the health system oversaw the development (State Services Commission 2012).

Clinicians across hospital, community and primary care services can view the record, improving information-sharing between different parts of the system. Access to a shared record has been key to the success of some of the new ways of working implemented in Canterbury; Canterbury DHB's chief medical officer has described it as 'mission critical' to out-of-hours GP services (Millar 2013).

Electronic request management system

The electronic request management system is an electronic referral system between general practice and other parts of the system, replacing fax and letter referrals. It does not only cover health board services – it also covers private referrals, for example – so can operate across the system. Referrals go to a central repository and can be rerouted if appropriate.

GPs can use the system to request diagnostic tests, specialist assessments, outpatient appointments or specialist advice. It is installed on GPs' computers and forms are pre-populated with relevant patient information from their clinical systems. GPs and hospital doctors were closely involved in designing the system, and so it is well-suited to users' needs (Timmins and Ham 2013).

Hospital capacity planning

Canterbury DHB also worked with a health IT company to analyse hospital activity and bed-occupancy levels, and has developed a capacity-planning programme called CapPlan. The programme predicts activity on a continual basis, and can predict acute demand up to three days in advance with around 99 per cent accuracy. Peaks in demand or spare capacity can be foreseen, supporting operational decision-making, for example, around workforce allocation (Millar 2013; Timmins and Ham 2013).

Other interventions

Medications management service: community pharmacists work with people taking multiple medications to actively review their medicines and prevent admissions due to medication-related problems. This service directly links into the acute demand management system and the community rehabilitation enablement and support team (Gullery and Hamilton 2015; Timmins and Ham 2013).

Community falls prevention programme: brings together GPs, physiotherapists, pharmacists and 'falls champions' to support older people to avoid falls in the community and reduce associated harm. The programme involves individual assessments and personalised prevention strategies developed with patients and their families (Canterbury District Health Board 2016).

An unexpected twist in the road

On 22 February 2011, four years into Canterbury's transformation journey, a 6.3-magnitude earthquake struck Christchurch causing widespread damage. More than 6,600 people were injured and 185 lost their lives (**Ardagh *et al* 2012**). Many buildings were destroyed and there was significant damage to core infrastructure. The health system lost 106 acute hospital beds, 5 GP surgeries, 19 community pharmacies and 635 care home beds (**Schluter *et al* 2016**; **Gullery and Hamilton 2015**).

Far from slowing or stalling the changes being made to the health system, the damage caused by the earthquake acted as a catalyst. After the earthquake, changes that were already under way were implemented more quickly, and several new initiatives were introduced (*see* below). The health system was able to change and respond quickly to the crisis as a result of its previous work on innovation and transformation and rapidly transform the way it delivered care.

The acute demand management system, which had been introduced in 2000, was significantly expanded after the earthquake. This was part of a strategy to relieve the immediate strain on the health service by reducing the number of people attending the emergency department and the number of people being admitted to hospital.

Both the community rehabilitation enablement and support team and the falls management programme were introduced soon after the earthquake, again with the aim of reducing pressure on hospitals. The community rehabilitation enablement and support team, which had been planned but not implemented before the earthquake, was rolled out based on a model from the Waikato district of New Zealand and was up and running within three weeks of the earthquake (**Timmins and Ham 2013**).

The HealthInfo website (which provides clinical information to patients) was also established immediately after the earthquake and was used to disseminate public health information (**Gullery and Hamilton 2015**; **McGeoch *et al* 2015**; **Millar 2013**; **Timmins and Ham 2013**).

The electronic shared care record view was also rapidly introduced. The record was in the planning stages prior to the earthquake, and, although providers generally agreed that it would be beneficial, differing opinions around how it could be achieved and concerns over affordability and governance issues had prevented progress. Following the earthquake, Canterbury DHB's chief medical officer invited hospital doctors, GPs, pharmacists, allied health professionals and community health service providers to participate in a series of workshops to progress the shared care record. The group drew up a matrix of stakeholders and the type of information each held and shared, and reached a consensus on the need for improved information-sharing.

By working together, and by working closely with the software developers (Orion Health), the group was able to work through and address issues that had previously prevented progress, and a number of safeguards were built into the design. This close working relationship (along with a pilot phase involving key professional groups) resulted in a design tailored to meet users' needs. Using existing examples of successful electronic health tools to inspire and guide development also facilitated the development process. The record was operational within six months – in contrast to the slow progress of many similar shared record systems elsewhere (**Timmins and Ham 2013**; **State Services Commission 2012**).

What has been the impact of the transformation?

More care is available in the community

As a result of these transformations, the Canterbury health system is supporting more people to stay well in their homes and communities, and has moderated demand for acute hospital services. In 2015/16, compared with the national average, Canterbury spent more on community-based services such as district nursing (spending 9 per cent more) and primary care (spending 3 per cent more), and less on hospital care, including emergency department attendances and acute medical admissions (spending 18 per cent less on each) (Blick and Love 2017).

There are closer links between primary and secondary care

The HealthPathways programme, and the relationships that have developed as a result of the programme, mean that there is now a smoother interface between hospitals and primary care. A greater proportion of referrals for specialist care are accepted – for example, the proportion of gynaecology referrals accepted rose from 65 per cent in 2007 to 80 per cent in 2011 (McGeoch *et al* 2015). More diagnostic tests and procedures – such as gynaecological biopsies and skin cancer removals – are performed in community settings, and there have been dramatic reductions in waiting times for some tests and procedures as a result (McGeoch *et al* 2015; Timmins and Ham 2013).

Spending on diagnostic services has fallen

Spending on pharmacy, radiology and laboratory services has fallen in recent years: compared with average national spending, in 2015/16 Canterbury spent 12 per cent less on pathology, 18 per cent less on radiology and 1 per cent less on pharmacy (Blick and Love 2017). Canterbury DHB's spend on community pharmacy in 2015/16 was NZ$15 million (£8.5 million) lower than would have been expected from previous rates.

These changes have largely been attributed to the HealthPathways programme, which has led to primary care professionals requesting fewer unnecessary or inappropriate investigations (personal correspondence).

Pressure on acute hospital services has reduced

There have also been notable changes in demand for acute hospital services. The rate of growth has been significantly slower in Canterbury than in the rest of New Zealand: between 2003 and 2013, the rate of growth in acute medical admissions fell by 13 per cent (Millar 2013). Gullery and Hamilton (2015) estimated that if these changes had not been made, and Canterbury had been admitting patients in line with national rates, it would have needed 100 more acute hospital beds in 2015 than it had (assuming 85 per cent bed occupancy). Compared with many other health boards in New Zealand, Canterbury has lower acute medical admissions rates; shorter average length of stay for medical admissions; and lower acute readmission rates (Blick and Love 2017; Timmins and Ham 2013).

Analysis also points to a step-change in people's use of acute hospital services in the immediate aftermath of the earthquake. A recent study detected a significant change in emergency department attendance rates at the time of the earthquake (the monthly attendance rate fell from 14.7 to 12.7 per 1,000 people). The attendance rate subsequently continued to grow at the same rate as before but from a lower baseline (Schluter *et al* 2016).

There was also a significant change in hospital admission rates at the time of the earthquake (monthly hospital admission rates fell from 6.59 to 5.83 per 1,000 people). Not only did admission rates fall, they then increased more slowly than before (prior to the earthquake, admissions were increasing at a rate of 0.026 per 1,000 people per month, but post-earthquake this fell to 0.014 per 1,000 people per month). These changes have significant resource implications: comparing the number of admissions in December 2014 to the number projected from pre-earthquake growth rates, there were 676 fewer admissions for that month (more than 16 per cent of total admissions).

The transformations to Canterbury's health system focused particularly on services for older adults and the most dramatic reduction in admissions growth was seen among people aged over 65. This suggests that these targeted interventions were successful in moderating demand for acute hospital care among older people (Schluter *et al* 2016).

While the results provide interesting insight into changes in use of acute hospital services, they do not give a comprehensive picture of how the performance of the health system changed following the earthquake, because they focus on a very limited range of outcome measures. It is also difficult to confidently attribute cause and effect; there are many variables and confounding factors, and it is feasible that the changes

in the level of hospital utilisation may be due to changes to the health system, the earthquake itself (including people avoiding large hospital buildings due to fears about their structural safety, or changes in people's thresholds for seeking emergency care following experience of major trauma) or other drivers (Schluter *et al* 2016; Timmins and Ham 2013).

However, it is clear that the changes are at least partly a consequence of the health system transformation. This conclusion is supported by the finding that the biggest reduction in hospital admissions was seen among older people – the group most likely to benefit from targeted interventions such as the acute demand management system and the community rehabilitation enablement and support team – and data showing that GP referrals to emergency departments also declined (Schluter *et al* 2016; Timmins and Ham 2013). The fact that the rapidly accelerated integration and transformation of the health system led to a significant reduction in the number of people attending the emergency department and lowered the level and the growth rate of acute admissions strongly supports the idea that greater integration and improved community-based care may go some way to addressing the issue of rising demand for acute hospital care.

Recent figures from Canterbury DHB suggest that progress has continued: its acute admissions rate remains one of the lowest in the country (at 5,341 per 100,000 people, compared with a national rate of 7,644 per 100,000 people) and its avoidable admission rate is also lower than average (2,637 per 100,000 people, compared with 3,717 per 100,000 people nationally) (Canterbury District Health Board 2016).

Hospitals have more capacity for elective work

The changes have not been limited to acute care. As a result of reduced strain on hospital capacity and fewer peaks in bed-occupancy levels, there has been an increase in elective surgery, there are fewer cancelled elective admissions and waiting times have fallen (McGeoch *et al* 2015; Timmins and Ham 2013).

Canterbury DHB previously outsourced more elective surgery than other large DHBs. The easing of acute hospital demand has allowed it to bring some of this outsourced activity back in-house, reducing costs and increasing income (personal correspondence).

Demand for long-term residential care has fallen

There has also been a change in demand for residential care. In Canterbury, the proportion of people aged over 75 living in care homes fell from around 16 per cent in 2006 to 12 per cent in 2013, and this trend has continued.

Almost 90 per cent of the population aged over 75 were living in their own homes in 2015/16 (Canterbury District Health Board 2016). Canterbury has historically had a relatively high level of spending on residential care; however, this has gradually fallen, with spending per capita dropping from 120 per cent of the national average in 2009/10 to 107 per cent in 2015/16. This equates to a saving of NZ$25.4 million (£14.5 million) per year. The length of time people stay in care homes has also fallen, reflecting the fact that people are going into residential care at a later stage (Blick and Love 2017).

Financial performance has remained challenging

In our previous analysis, we noted that these improvements had been accompanied by improved financial performance. In 2013, New Zealand's Auditor General rated Canterbury as the only DHB with 'very good' service performance information, and one of only two with 'very good' management control. Its financial information systems were described as 'good' (Timmins and Ham 2013). However, the position deteriorated significantly in 2014/15, with Canterbury accruing a NZ$17.9 million (£10.2 million) deficit. This was much higher than the budgeted deficit and was the second highest across all health boards in New Zealand that year. The Auditor General subsequently downgraded both its 'very good' ratings to 'good' (Controller and Auditor General 2016).

These financial issues are not unexpected; ongoing expenditure on repairs following the earthquake and a significant hospital redevelopment programme (the largest single investment in health facilities in New Zealand's history) have been identified as key drivers of the financial deterioration (Controller and Auditor General 2016; PwC 2015). Canterbury DHB reported a much smaller deficit of NZ$473,000 (£270,000) in 2015/16 (Canterbury District Health Board 2016), but the position is forecast to deteriorate again in 2016/17. Canterbury DHB is having ongoing conversations with central government regarding the impact of its high levels of capital investment (both on earthquake repairs and the new hospital) and subsequent effect on its financial position (personal correspondence).

Canterbury faces other ongoing challenges, including workforce shortages, rising treatment costs and pressures due to the changing demographics of the population. There are also specific challenges resulting from the impact of the earthquake, including a significant increase in demand for mental health services over the past five years. The changes described above have not been a panacea, and improvements are being made on a continual basis.

Learning from the experience in Canterbury

Health systems looking to make similar transformations – the NHS included – can learn from Canterbury's journey. It is difficult to measure the impact of specific changes made in Canterbury, as multiple changes occurred simultaneously. However, there is strong evidence that their combined impact has significantly modified demand for health care and reduced pressure on acute hospitals. Accelerated progress following the 2011 earthquake appears to have had a rapid and lasting impact. Although hospital capacity has not been reduced, without the changes that were made it is likely that more hospital capacity and greater capital investment would have been required to meet demand both now and in the future.

One of the biggest challenges currently facing the NHS is how to stem a rapid increase in demand for hospital care (**Maguire *et al* 2016**). Some commentators have questioned whether this is possible, given the growing population and changing demographics. But the experience in Canterbury suggests that, by investing in alternative models of provision and strengthening community-based services, expanding hospital capacity need not be inevitable.

This is not to say that the transformation is complete; ongoing expansion, improvements and refinements are continually being undertaken. Canterbury still faces challenges, including demographic pressures, workforce shortages and financial challenges. The experience in Canterbury clearly demonstrates that transformation of this kind takes time, with progress still under way a decade into the journey. This highlights the challenge of the extremely tight timescales attached to the transformation agenda in the NHS (**Ham *et al* 2017**).

Health systems can also learn from Canterbury's approach to staff engagement and continuous quality improvement. Strong engagement with stakeholders is a common thread across the work Canterbury has undertaken, and it has made a considerable investment in developing capability and skills in innovation and service improvement across the system (**State Services Commission 2013**).

Technology has been key to Canterbury's success, and local investment and innovation have been central to this. Developing solutions in partnership with clinical users and technology companies has been key to their successful design and uptake.

Other enablers include the development of a clear and shared strategic vision, continuity of senior leadership, and the development of innovative forms of commissioning (State Services Commission 2013; Timmins and Ham 2013).

Some features of the New Zealand health system have made transformation easier than it might have been in a context more similar to the NHS. Strongly networked general practice has been key to many of the developments, and the NHS is some way behind in this regard. Other enabling features include: most of the social care budget being the responsibility of district health boards; entitlements to health and social care being more closely aligned; the absence of a formal purchaser/provider spilt; and a much simpler system architecture than the complex and fragmented structures we have seen in the NHS since the Health and Social Care Act 2012. There are parallels between these enabling features and the changes that some systems in England are looking to make as they develop into accountable care systems.

However, many of the changes in Canterbury required significant investment, and although the changes have successfully moderated demand for acute care, they have not cut beds or taken resources from hospitals. This raises questions over the feasibility of ambitions around NHS transformation. Vanguards and sustainability and transformation partnerships are being asked to make significant service changes with little or no additional funding, and services are already under immense financial strain; it is hard to see how the kind of progress made in Canterbury can be achieved in this austere context. Canterbury's experience also casts doubt over expectations that new models of care will enable disinvestment in acute hospitals. A more realistic expectation would be to bend the demand curve, slowing – but not reversing – growth.

Canterbury's transformation journey occurred in the context of a 'burning platform' and additional catalyst for change, triggered by the realisation that maintaining the status quo was unsustainable, and accelerated by additional pressures after the 2011 earthquake. It is a powerful illustration of what can be achieved when all parts of a health system come together with a common purpose and vision to improve the health of the population they serve.

References

Ardagh MW, Richardson SK, Robinson V, Comp N, Than M, Gee P, Henderson S, Khodaverdi L, McKie J, Robertson G, Schroeder P, Deely JM (2012). 'The initial health-system response to the earthquake in Christchurch, New Zealand, in February 2011'. *The Lancet*, vol 379, no 9831, pp 2109–15. Available at **www.thelancet.com/journals/lancet/article/PIIS0140-6736(12)60313-4abstract** (accessed on 13 April 2017).

Blick G, Love T (2017). *Benchmarking the resource allocation of Canterbury District Health Board: report prepared for the Canterbury District Health Board*. Sapere Research Group: Wellington, New Zealand.

Canterbury Clinical Network (2017). 'Canterbury Clinical Network structure'. Canterbury Clinical Network website. Available at: **http://ccn.health.nz/WhoWeAreOurStructure.aspx** (accessed on 27 July 2017).

Canterbury District Health Board (2016). *Canterbury DHB annual report 2015/16* [online]. Canterbury District Health Board website. Available at: **www.cdhb.health.nz/About-CDHB/corporate-publications/PagesAnnual-Report.aspx** (accessed on 13 April 2017).

Canterbury District Health Board (2012). *Programme profile: community rehabilitation enablement and support team (CREST)* [online]. Canterbury District Health Board website. Available at: **www cdhb.health.nz/What-We-Do/Projects-Initiatives/Community-Rehabilitation-Enablement-Support-Team/Pagesdefault.aspx** (accessed on 7 June 2017).

Controller and Auditor General (2016). *Health sector: results of the 2014/15 audits* [online]. Controller and Auditor General website. Available at: **www.oag.govt.nz/2016/health-audits/docs/summary.pdfview** (accessed on 20 April 2017).

Gullery C, Hamilton G (2015). 'Towards integrated person-centred healthcare – the Canterbury journey'. *Future Healthcare Journal*, vol 2, no 2, pp 111–6. Available at: **www.futurehospital.rcpjournal.org/content/2/2111.full** (accessed on 13 April 2017).

Ham C (2013). 'Canterbury tale: making a success of integrated care'. *HSJ* website, 12 September. Available at: **www.hsj.co.uk/comment/canterbury-tale-making-a-success-of-integrated-care/5063073.article** (accessed on 13 April 2017).

Ham C, Alderwick H, Dunn P, McKenna H (2017). *Delivering sustainability and transformation plans: from ambitious proposals to credible plans*. London: The King's Fund. Available at: **www.kingsfund.org.uk/publicationsdelivering-sustainability-and-transformation-plans** (accessed on 21 April 2017).

Maguire D, Dunn P, McKenna H (2016). 'How hospital activity in the NHS in England has changed over time'. The King's Fund website. Available at: **www.kingsfund.org.uk/publications/hospital-activity-funding-changes** (accessed on 7 August 2017).

McGeoch G, Anderson I, Gibson J, Gullery C, Kerr D, Shand B (2015). 'The evolution of HealthPathways'. *New Zealand Medical Journal*, vol 128, no 1408, pp 86–96. Available at: www.nzma.org.nz/journal/read-the-journal/all-issues/2010-2019/2015/vol-128-no-14086418 (accessed on 13 April 2017).

Millar N (2013). 'How an earthquake sped up care reform'. *HSJ* website, 14 March. Available at: www.hsj.co.uk/topics/technology-and-innovation/how-an-earthquake-sped-up-care-reform5055925.article (accessed on 13 April 2017).

Murray R, Jabbal J, Thompson J (2017). 'How is the NHS performing? March 2017: quarterly monitoring report'. The King's Fund website. Available at: www.kingsfund.org.uk/publications/articleshow-nhs-performing-march-2017 (accessed on 20 April 2017).

NHS England (2017). *Next steps on the NHS five year forward view* [online]. NHS England website. Available at: www.england.nhs.ukfive-year-forward-view (accessed on 21 April 2017).

PwC (2015). *Canterbury District Health Board: stage two financial review* [online]. Ministry of Health website. Available at: www.health.govt.nz/publicationcanterbury-district-health-board-stage-two-financial-review (accessed on 20 April 2017).

Schluter PJ, Hamilton GJ, Deely JM, Ardagh MW (2016). 'Impact of integrated health system changes, accelerated due to an earthquake, on emergency department attendances and acute admissions: a Bayesian change-point analysis'. *BMJ Open*, 6:e010709. doi: 10.1136. Available at: http://bmjopen.bmj.com/content/6/5/e010709.info (accessed on 13 April 2017).

State Services Commission (2013). *Designing and growing innovation capability: a case study.* Wellington, New Zealand: New Zealand Government. Available at: www.ssc.govt.nz/sites/all/filescase-study-growing-innovation-capability.pdf (accessed on 20 April 2017).

State Services Commission (2012). *Christchurch innovation – shared care record view case study* [online]. State Services Commission website. Available at: www.ssc.govt.nzci-shared-care (accessed on 7 June 2017).

Timmins N, Ham C (2013). *The quest for integrated health and social care: a case study in Canterbury, New Zealand.* London: The King's Fund. Available at: www.kingsfund.org.uk/publications/quest-integrated-health-and-social-care (accessed on 13 April 2017).

About the author

Anna Charles is senior policy adviser to Chris Ham. She joined The King's Fund in 2015 and has published work on financial pressures in the NHS, social care for older people, quality in community health services, demand and activity in general practice, mental health and new models of care.

Before joining the Fund, Anna worked as a doctor at Imperial College Healthcare NHS Trust. She holds a medical degree and a degree in health care ethics and law from the University of Birmingham.

Acknowledgements

I would like to thank Carolyn Gullery, Nicholas Timmins and Ravi Baghirathan for their helpful comments on earlier drafts of this paper. I would also like to thank colleagues at The King's Fund – including Chris Ham, Nicholas Timmins, Siva Anandaciva, Ben Collins and Lisa Oxlade – for their valuable ideas and input.