

# Exploring the Links between Quality Improvement Strategies and Organisational Outcomes in Four New Zealand District Health Boards

Final Report

March 2016

*A project between the Ministry of Health, the Treasury, and the Health Quality & Safety Commission, with collaboration from Auckland, Bay of Plenty, Canterbury and Whanganui District Health Boards.*

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# Executive Summary

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A number of New Zealand District Health Boards (DHBs) are using quality frameworks and concepts as core elements of their organisational strategies to improve patient outcomes and manage healthcare costs. The successes and challenges of these strategies can provide useful insights for other DHBs and the broader health system.

During 2015, the Ministry of Health (Ministry), the Treasury (Treasury) and the Health Quality & Safety Commission (the Commission) undertook a collaborative project with Auckland, Bay of Plenty, Canterbury and Whanganui DHBs to explore the links between quality improvement (QI) strategies and organisational outcomes.

The four participating DHBs were retrospectively evaluated using two frameworks. Their organisational strategy and overall approach to quality were summarised using a framework based on the Institute for Healthcare Improvement's (IHI) Seven Leadership Leverage Points for Organization-Level Improvement in Health Care<sup>1</sup> and the New Zealand Quality Guide<sup>2</sup>. Concurrently, their performance was measured against the dimensions of the Triple Aim. This approach provides a comprehensive overview of each DHB, both from the qualitative and quantitative perspectives.

Analysis carried out for the project found that all four case study DHBs showed clear improvements in some measures, and for some measures the improvement was greater than for non-case study DHBs. There is no evidence that a focus on specific outcomes had a negative impact on outcomes elsewhere. Rather, the general direction of QI in the studied DHBs in areas not covered by specific local initiatives was similar or better than the country as a whole.

QI programmes undertaken by the four DHBs were all significantly different in nature, approach and scale. However, there were common success factors across most or all of the case study DHBs including alignment to strategic goals, executive and clinical leadership, culture and capability, measurement and results, and consumer engagement and patient experience.

In addition to providing an overview of each DHB and their approach to QI, the case studies offered a number of useful lessons for DHBs seeking to include QI elements in their organisational strategy. The case studies also offer a number of valuable insights for the centre.

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<sup>1</sup> Reinertsen JL, Bisognano M, Pugh MD. Seven Leadership Leverage Points for Organization-Level Improvement in Health Care (Second Edition). IHI Innovation Series white paper. Cambridge, MA: Institute for Healthcare Improvement; 2008. (Available at <http://www.ihl.org/resources/pages/ihlwhitepapers/sevenleadershipleveragepointswitepaper.aspx>)

<sup>2</sup> <http://www.hqsc.govt.nz/assets/Health-Quality-Evaluation/PR/quality-safety-guide-July-2013.pdf>

# 1 Introduction

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The New Zealand health system is facing increasing challenges in delivering healthcare within the context of growing demographic (such as population aging) and non-demographic pressures (such as the rising incidence of chronic disease). These pressures are not unique to New Zealand, with other developed countries facing similar circumstances now and in the foreseeable future.

A number of New Zealand District Health Boards (DHBs) are using quality frameworks and concepts as core elements of their organisational strategies to improve patient outcomes and manage healthcare costs. The successes and challenges of these strategies can provide useful insights for other DHBs and the broader health system.

To explore the links between quality improvement (QI) strategies and organisational outcomes, the Ministry of Health (Ministry), the Treasury (Treasury) and the Health Quality & Safety Commission (the Commission) undertook a collaborative project with Auckland, Bay of Plenty, Canterbury and Whanganui DHBs.

The project had three key objectives:

- 1 Determine whether the QI initiatives have led to:
  - } improved patient experience and outcomes
  - } improved operational efficiency and/or produced fiscal savings
- 2 Identify the lessons learned from QI initiatives that could help other DHBs undertake similar initiatives.
- 3 Identify actions that the Ministry and the Commission could take to support:
  - } Other DHBs to introduce QI initiatives, and
  - } The development of the integrated performance and incentive framework.

The four participating DHBs were retrospectively evaluated using two frameworks. Their organisational strategy and overall approach to quality were summarised using a framework based on the Institute for Healthcare Improvement (IHI) Seven Leadership Leverage Points for Organization-Level Improvement in Health Care (7 points of leverage) and the NZ Quality Guide (developed post NHS Mid-Staffordshire hospital inquiry). Concurrently, their performance was measured against the dimensions of the New Zealand Triple Aim. This approach provides a comprehensive overview of each DHB, both from the qualitative and quantitative perspectives.

The project has three primary audiences:

- } Insights from the four participating DHBs could be useful for other DHBs who may be planning to introduce or further develop QI elements in their organisational strategies.
- } The case studies provide an opportunity for central agencies to gain a better appreciation of how DHBs plan, implement and evaluate QI programmes. These studies could also provide useful lessons on how these QI programmes are reflected in formal accountability documents.
- } Finally, the project aims to give Ministers of Finance and Health an overview of how QI programmes contribute to the overall performance of the health sector.

## 2 Why focus on quality?

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The international literature suggests that there are a number of advantages in systematically improving the quality of healthcare. Better quality care is less expensive care. It is more efficient and less wasteful. It is the right care at the right time. It should also lead to fewer patients being harmed or injured.<sup>3</sup>

Poor quality care can contribute to poor patient outcomes. International research suggests that between a third and a half of patient harm is potentially avoidable.<sup>4</sup> Although the annual New Zealand Health Survey indicates that our health system performs relatively well by international standards in respect to quality and safety of services,<sup>5</sup> in 2009 it was estimated that as much as \$800 million was spent annually in response to potentially preventable patient harm.<sup>6</sup>

QI strategies and practices are not always fully reflected in official accountability documents. As a result, central agencies (such as the Ministry and the Treasury) may not have complete visibility and understanding of the initiatives DHBs are undertaking to improve the quality of their care. This may limit the extent best practices are distributed across other DHBs or modelled by the centre.

Further, there is limited domestic evidence on links between QI initiatives in healthcare and their contributions to financial sustainability. Are DHBs motivated by potential savings or efficiencies when planning their QI initiatives? Do DHBs monitor financial savings generated by their quality initiatives, even if savings were not part of the primary motivation to pursue quality?

Finally, quality frameworks can serve as a way of shifting the focus of the health system from managing and delivering outputs to improving patient experience and outcomes. DHBs with experience in QI could provide useful insights into how to best facilitate this shift.

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<sup>3</sup> Charles Andel, Stephen L. Davidow, Mark Hollander, and David A. Moreno (2012) *The Economics of Health Care Quality and Medical Errors*, Journal of Health Care Finance.

<sup>4</sup> The Health Foundation (2011), *Research Scan: Levels of Harm*.

<sup>5</sup> Ministry of Health. 2014. Annual Update of Key Results 2013/14: New Zealand Health Survey. Wellington: Ministry of Health.

<sup>6</sup> Ministerial Review Group (2009), Meeting the Challenge: Enhancing Sustainability and the Patient and Consumer Experience within the Current Legislative Framework for Health and Disability Services in New Zealand.

## 3 Project methodology

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Four DHBs (Auckland, Bay of Plenty, Canterbury and Whanganui) were invited to participate in the collaborative project because they explicitly referenced a QI strategy in their 2009/2010 DHB annual plans. This time period was chosen to establish a common starting point across the participating DHB. It was also envisaged that choosing this period would provide DHBs with sufficient time to realise and evaluate the benefits from some of the initial QI initiatives.

Project methodology was designed by the Ministry, the Treasury and the Commission with active input from the four participating DHBs. There are two main parts to the project: (i) case studies of each DHB using a framework based on the IHI 7 points of leverage and the NZ Quality Guide and (ii) a retrospective evaluation of DHBs' performance against the dimensions of the Triple Aim.

### 3.1 DHB case studies

The primary aim of the project was to describe the organisational approaches to QI within each DHB. A number of elements of QI strategies cannot be effectively captured using quantitative measures, such as organisational culture, or the relationship between the DHB and non-Government organisation (NGO) healthcare providers. These elements can have a substantive effect on the success of QI initiatives, serving either as key enablers, or impediments.

Using IHI's 7 points of leverage as the starting point, the project team developed an evaluation framework to capture and describe the follow elements of organisational strategy and QI:

- } strategic context and environment
- } approach, methodology and framework
- } information and monitoring systems
- } leadership
- } culture
- } capability
- } consumer engagement
- } results, outcomes and outputs, and
- } programme management

Initially, DHBs were interviewed to understand the strategic context that led to the decision to pursue QI as part of their overall organisational strategy. These interviews were also used to get a high-level overview of the main QI initiatives. Information collected during these interviews helped guide the project team during the in-depth discussions as part of the site visits to the DHBs.

One-day site visits were used to explore the impact of QI projects across the entire DHB. Each visit included a discussion with the executive team, quality programme leads as well as clinical staff.



These discussions were summarised in individual case studies, emphasising the unique as well as common features of each approach.

These case studies were refined over time with the help from the participating DHBs, supported by examples of specific QI initiatives and data on the observed effects.

## 3.2 Analysis against the Triple Aim

There is no single, internationally accepted definition of quality in healthcare, and there is a wide range of frameworks and concepts that emphasise various elements of performance and quality. This can lead to fundamental differences in the way healthcare organisations view quality and undertake QI initiatives. In the context of this project, significant differences in scope and aim were recognised in the QI strategies of the participating DHBs.

To complement the insights offered by the case studies, the New Zealand Triple Aim was chosen as an objective framework for quantifying the impact of QI strategies on organisational outcomes. Developed by the Institute for Healthcare Improvement (IHI) in 2007, it has since been adapted to New Zealand and accepted across the health sector, including by the Ministry, the Commission and some DHBs.

The Triple Aim has three elements:

- } improved quality, safety and experience of care
- } improved health and equity for all populations
- } best value for public health system resources

The Triple Aim stresses that in order to affect meaningful and lasting change at an organisational or systemic level the three elements should be addressed simultaneously. It also emphasises the need to understand relevant populations, appropriately manage services and establish a system for ongoing learning.<sup>7</sup>

A range of existing quality measures were chosen based on the Triple Aim and analysed over the period from 2009 to 2014 (Table 1). These measures test two contradictory hypotheses:

- 1 Did the focused improvement efforts displace other priorities and lead to deterioration in quality elsewhere, or
- 2 Did the concentration on specifics have wider benefits through the building of capacity and capability?

The two hypotheses are recognised in the international literature and aim to explore and capture the effects of QI projects outside their immediate aims. These hypotheses can be tested in two ways:

- i has the overall DHB performance across a range of quality measures improved over time?
- ii how does the current performance and change in performance compare to other DHBs?

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<sup>7</sup> John W. Whittington, Kevin Nolan, Ninon Lewis, and Trissa Torres, *Pursuing the Triple Aim: The First 7 Years*, The Milbank Quarterly, Vol 93, No.2, 2015 (pp.263-300).

Table 1: Quality and safety measures based on the Triple Aim

Aim	Measure
Aim 1: Individual – quality, safety and experience of care	In-hospital falls with fractured neck of femur
	Staphylococcus aureus bacteraemia
	Post-operative deep vein thrombosis (DVT)/pulmonary embolism (PE) and sepsis
	Patient experience
Aim 2: Population – improved health and equity	Opening up space to increase elective care – hips and knees
	Hospital Standardised Mortality Ratio (HSMR)
Aim 3: System – best value for public health resources	Ambulatory sensitive hospitalisations
	Occupied bed days associated with people aged 75 and over admitted more than once as an acute admission to hospital ('frequent users')
	Cancelled operations
	Estimates of costs associated with harm
	Estimates of costs associated with 'frequent users'

While the selected measures will inevitably be insufficient to capture all changes that occurred after the introduction of the QI strategies, testing the two hypotheses using well-established measures of quality provides an opportunity to evaluate some of the potential unintended consequences. This analysis also allows the performance of the case study DHBs to be compared with that of their peers.

## 4 Results

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### 4.1 Lessons from case studies

QI initiatives undertaken by the four DHBs were all significantly different in nature, approach and scale. However, analysis of case studies against the project framework identified common success factors across most or all of the DHBs, including:

- } alignment to strategic goals
- } executive and clinical leadership
- } culture and capability
- } measurement and results, and
- } consumer engagement and patient experience.

These factors are discussed briefly below.

#### 4.1.1 Alignment to strategic goals

All four DHBs had clear strategic goals that they aimed to achieve through their investment in quality. Clear alignment between QI and organisational strategy is important, since QI takes time and can require considerable investment in staff skills, clinical processes and data and analytical capability.

The case studies highlighted a number of differences and similarities in the motivation of DHBs to invest in quality. Both Whanganui DHB and Auckland DHB cited, amongst other reasons, their financial performance as a motivator to improve quality, recognising the link between cost pressures and quality in the healthcare they provide. In addition to financial issues, Whanganui DHB had also experienced safety issues, prompting them to address these at a strategic level.

Canterbury DHB identified a number of challenges in its strategic planning which required a quality response, including their working relationship with PHOs, a rapidly aging population, and insufficient facilities to cope with demand with services structured as they were.

Bay of Plenty DHB was not motivated by a specific event or situation, instead seeking to improve patient experience and outcomes and reduce inequality.

In each case, the alignment with organisational outcomes created an impetus to prioritise QI initiatives and maintain focus on continuous improvement.

#### 4.1.2 Executive leadership

Across three of the four DHB case studies the executive team played a key role in introducing QI frameworks into organisation strategy. The executive team were responsible for creating a shared vision for the future, changing organisational culture and/or structure and investing in necessary analytical capability. The only exception was Auckland DHB, where the focus on quality was channelled through a consistent organisational strategy and a robust QI framework.

### 4.1.3 Clinical leadership

Clinical leadership and leadership at all levels of staff were recognised as important elements of embedding QI across each organisation.

Clinical involvement and leadership can be achieved in a range of different ways. Auckland DHB restructured into directorates in 2013, placing greater responsibility for traditionally non-clinical areas onto clinical leaders, including financial management, human resources and patient outcomes. Both Bay of Plenty and Whanganui DHB's distribute clinical leadership across a triumvirate of medical, nursing and management personnel, creating joint responsibility for QI from the groups responsible for delivering healthcare services.

Across all participating DHBs (Whanganui and Canterbury in particular), staff were empowered to develop QI ideas and projects. This approach builds capability and commitment at a team level and creates a shared vision of QI across the organisation.

### 4.1.4 Culture and capability

All of the case studies highlighted the importance of staff embracing both the principles of QI, and also the specific initiatives enacted.

Canterbury DHB's '8 programmes – Xceler8, Particip8 and Collabor8 – are designed to introduce staff to the theories and techniques of quality improvement and encourage them to actively participate in developing ideas for change. This approach embeds the idea of constant improvement and innovation into the culture of the organisation, and gives staff a specific role in driving change.

Whanganui DHB had arguably the most difficult starting point of the four case studies, and addressing low staff morale was a vital part of QI. Changing the culture began at the top, and the leadership team made increasing joy and pride in work one of their aims.

This attitude has successfully spread through the organisation and the culture change has been pronounced. Better use of information and data, enabling teams to monitor and improve their performance, has been key to their success. Performance measures for each team are displayed on visual boards in their areas. The measures are selected, developed, recorded and analysed by the teams, ensuring they are meaningful for them.

In Auckland, the DHB was able to make important changes to the way clinical staff carried out blood transfusions by working with the staff, undertaking a benchmarking exercise and researching best practice in Australia and the United States. This led to the development of new best practices across the DHB, including new protocols and medical algorithms to support medical practice and transfusion prescription based on medical evidence.

Through clear communication and helping staff understand the clinical reasons for making a change the DHB was able to ensure the change was adopted. Staff understood that the change was about the best outcomes for patients rather than just saving money, because they were involved in designing the change.

#### 4.1.5 Measurement and results

All participating DHBs referred to the importance of identifying and monitoring the outcomes the organisation aims to improve, and having the right metrics to track the progress of these improvements over time. Good understanding of clinical processes was seen as a key element in successfully identifying areas of improvement, particularly where these processes span multiple parts of the organisation.

Effective integration between clinical processes and data and analytical capability was also viewed as a key element of success. It creates a feedback loop that allows frontline teams to make timely adjustments to the way they deliver care and improves visibility of organisational performance for the executive teams.

Tracking performance over time is useful in disseminating best practices and identifying new leaders by raising the profile of smaller projects. This transparency in performance allows benchmarking both within the DHB and more widely, contributing to the reduction in information asymmetry that may exist across different teams.

The case studies suggest analytical capability can be built up over time, with tangible benefits arising even from simple tools for recording and analysing data.

Most DHBs used visual boards that allow teams and patients to track performance over time. Some of the metrics on these boards were updated daily to give teams instant visibility of their performance, while other metrics were designed to show progress across months or years. Location-based indicators were also used to keep track of any potential issues with the physical environment. In the case of Whanganui DHB, these boards are maintained by the teams themselves, using simple tools (like Microsoft Excel) to record and analyse their performance.

Bay of Plenty DHB used its IT and analytical capability to develop, implement and maintain the Care Capacity and Demand Management (CCDM) system, which combines up-to-date data to improve workforce management, leading to better patient experience and outcomes.

Auckland and Canterbury DHBs demonstrated very sophisticated approaches to data and analytics. Auckland took a staged approach to building analytical capability, initially contracting capability for specific projects. The success of these early projects highlighted a need for permanent capability, eventually culminating in the creation of the Management Operating System (MOS). MOS provides integrated processes and tools to convert strategic priorities into actionable tasks, with measures to monitor and improve both.

Canterbury DHB invested heavily in building their analytical team, creating the necessary data infrastructure and incorporating process and outcome measures into clinical pathways. The use of signalsfromnoise® statistical software is particularly notable, because it allows the DHB to monitor variation of performance on a given day and determine whether changes in pathways are impacting on defined outcomes.

#### 4.1.6 Consumer engagement and patient experience

Improving consumer engagement and patient experience was consistently identified as a central motivation to invest in quality. Bay of Plenty DHB puts considerable effort in engaging with patients during the development and testing of new services through a dedicated patient liaison. The DHB invites patients to share their experiences of care with the board and the executive team. The DHB also actively engages with 18 local iwi, working through any issues and barriers to the delivery of better healthcare.

Whanganui DHB had to rebuild the trust of its community after a number of women and their families were negatively impacted by an incompetent surgeon. The introduction of root cause analysis of all complaints and deaths, combined with improved communication between the DHB and the community, contributed to greater trust in health care services and substantially improved patient experience.

The introduction of HealthPathways and HealthInfo by Canterbury DHB led to a number of improvements including: care that is closer to home, more appropriate treatment from their provider, shorter waiting times, less variation in outcomes from inconsistent referrals for diagnostics or treatment, and better support for patients through quality information about their conditions, treatments and medication.

## 4.2 Performance against the Triple Aim

Analysis of DHB performance found that all four case study DHBs showed clear improvements in some measures, and for some measures the improvement was greater than for non-case study DHBs. None of the case study DHBs performed significantly worse or improved significantly less than the national average.

Radar charts were chosen to show a number of different measures on the same scale (Figure 1). The red line represents the national average, with the outer ring indicating performance that is significantly better than the average, and the inner ring significantly worse. The coloured lines represent DHB performance. The further out the coloured lines are in relation to the red line, the better the DHB's performance is relative to the rest of the country.

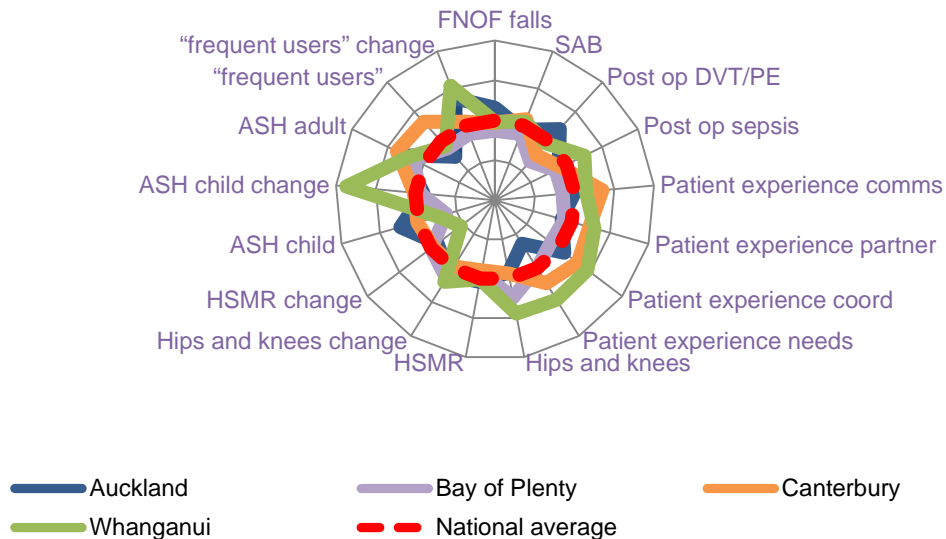
In relation to DHB-specific results, the analysis showed that:

- } Auckland DHB had a large reduction in 'frequent users' (bed days occupied by older people admitting more than once as an emergency in a year), although this was from a low base. Both adult and child ambulatory sensitive hospitalisation measures are better than average.
- } For Bay of Plenty, elective activity rates (represented by hips and knees) are both high and increased by more than average. Improvement in safety measures is lower than the national average, but in most instances this represents starting from an already low base.
- } Canterbury performs well on frequent user and adult ASH measures (intuitively this is linked to an emphasis on care integration) and on patient reported experience measures.
- } Whanganui performs well on patient reported experience, reduction in frequent users and child ASH.

Table 2: Measures used in Figure 1

Measure	Description
FNOF falls	Change in falls with fractured neck of femur per 1000 admissions aged 65+ between baseline (2010/11 and 2011/12 combined) and first 9 months of 2014/15
SAB	Change in S. aureus bacteremia per 1000 bed days between 2012 and 2014/15
Post op DVT/PE	Change in DVT/PE per 1000 at risk admissions between 2012 and 2014/15
Post op sepsis	Change in sepsis per 1000 at risk admissions between 2012 and 2014/15
Patient experience comms	Average of last four quarters summary score for communication domain
Patient experience partner	Average of last four quarters summary score for partnership domain
Patient experience coord	Average of last four quarters summary score for coordination domain
Patient experience needs	Average of last four quarters summary score for physical and emotional needs domain
Hips and knees	Elective (WN) hip and knee replacements per 1000 population aged 55+ Q4 2014
HSMR	MoH/HQSC Hospital Standardised Mortality Ratio (HSMR) 2013
Hips and knees change	Change between quarterly average elective (WN) hip and knee replacements per 1000 population aged 55+ in 2010/11 and Q4 2014
HSMR change	Change in HSMR between 2007 and 2013
ASH child	HQSC Ambulatory hospitalisation rates for children 2011/12
ASH child change	Change in HQSC Ambulatory hospitalisation rates for children between 2009/10 and 2011/12
ASH adult	HQSC Ambulatory hospitalisation rates for adults 15-64 2011/12
'frequent users'	Occupied bed days associated with patients who admit more than twice acutely in a year 2013/14
'frequent users' change	Change in occupied bed days associated with patients who admit more than twice acutely in a year between 2008/09 and 2013/14

Figure 1: DHB performance against selected measures



The analysis of the selected measures shows no indication that the ‘distraction’ hypothesis holds. There is no evidence that a focus on specific outcomes had a negative impact on outcomes elsewhere in the DHB. Rather, the general direction of QI in the studied DHBs in areas not covered by specific local initiatives was similar or better than the country as a whole. In some instances there are links between these higher level measures and the local goals, (eg, frequent use of hospital by older people in Christchurch and elective activity increase in Auckland) and in these cases the improvement in the related measure is notable.

It is probably too early to find evidence to support the ‘incidental improvement through capability building’ hypothesis. Reviewing this in another three years would be a useful exercise.

### 4.3 Messages for other DHBs

The four DHBs identified lessons from their own experience which might be useful for other DHBs planning on introducing and implementing QI programmes as part of their organisational strategy:

- } Do not underestimate the amount of time it takes for changes to bed in, and for benefits to be realised. In most of the case studies, it took around three to four years before organisation-wide changes could be fully observed. However, small-scale, specific projects can show results much sooner, providing tangible examples to reinforce the commitment to QI.
- } The term ‘quality’ means different things to different people, even within a single organisation. To create a unified vision there must be a shared understanding of what quality looks like.
- } Well-established quality frameworks and methodologies such as Baldrige Criteria for Performance Excellence, Lean and Six Sigma, root cause analysis, and ‘Plan, Do, Study, Act cycles’ can serve as stepping stones for DHBs looking at introducing QI elements into their organisational strategy. These frameworks contain useful guidelines for developing systems, processes and capability to identify, develop and implement QI initiatives at multiple levels of the organisation.



- } It is important to make these frameworks your own. All four DHBs took time to transform the language and concepts of QI frameworks in a way that would engage their staff and tap into their intrinsic motivation to do what's best for their patients. The importance of using deliberate language in communicating organisational strategy (including QI elements) was emphasised by all participating DHBs.
- } Regardless of which QI methodology is chosen, the organisation should consider monitoring all three dimensions of the Triple Aim. Fiscal savings and efficiency were often de-emphasised by the participating DHBs, with the view that concentrating on money would lead to lower engagement from staff.
- } However, the inclusion of financial and efficiency metrics can allow staff to view their performance from a range of perspectives and encourage greater ownership of financial performance and efficiency as part of the overall strategy to improve the quality of care.
- } DHBs should consider investing in building QI skills across the organisation, from senior and middle management to teams who deliver frontline services. Providing staff with skills to identify, develop and implement QI initiatives promotes local ownership and leadership. In order to fully leverage these skills, staff should be allowed sufficient time to undertake QI projects.
- } Investment in analytical capability and data systems was often identified as a key enabler for QI projects. Integrating data analytics with clinical processes allows individual teams to monitor their performance, enabling them to make more rapid improvements. Even simple analytical tools can be used to drive QI and DHBs can take a staged approach to building this capability over time.
- } DHBs should establish an evaluation methodology and start collecting baseline data before the start of any QI initiative. Ex-post evaluation can be challenging if outcomes and performance metrics are not routinely collected and analysed. Attribution of benefits to specific initiatives can also be difficult if multiple similar QI initiatives are introduced either concurrently, or within a short period of each other.
- } Coordinating QI initiatives can be a major challenge. One solution that really stood out was Whanganui DHB's approach of managing QI, complaints and risks from the same team, using the same system. This approach can reduce duplication of effort and harness the synergies that exist between QI, and complaint and risk management.
- } Focusing on QI does not necessarily mean having a lot of different QI initiatives. Too many separate QI initiatives can create confusion and limit the effectiveness of each initiative. The Chief Executive at Bay of Plenty DHB recognised this as a problem and reduced the number of initiatives from over 300 to around 50.

## 4.4 Messages for the centre

Case study DHBs were asked how government agencies could better support them in their efforts to improve the quality and safety of their services. The main message from DHBs was the need for an integrated health system. In such a system, DHBs would be responsible for achieving a common goal shared between all service providers, in primary care, the community and hospital care.

More detailed suggestions to enable greater integration across the health system include:

- } ensure that patient well-being is the focus of the health system
- } remove disincentives for moving services from hospital to primary care
- } facilitate cross-agency programmes aimed at improving health outcomes better; simplify their implementation
- } use an outcome-based approach to demonstrate the impact of services and programmes
- } reflect the integrated health system approach through the Ministry's DHB accountability planning documents.

Other suggestions were:

- } make Māori health improvement a priority
- } improve mutual trust between DHB and the Ministry
- } direct specific improvements in DHB Information Technology and Information Services.

## 4.5 Discussion

### 4.5.1 Project objectives

The collaborative nature of the report, combined with its ambitious scope, presented a unique opportunity for the Treasury, the Ministry and the Commission to work directly with four DHBs to explore the links between quality and organisation outcomes. The project yielded a number of insights that could be useful for other DHBs seeking to undertake or expand quality improvement programmes of their own. DHBs also made a number of suggestions on how the centre could play a more active role in supporting the sector.

The four case study DHBs serve as practical examples of how patient-centric health systems can lead to better population outcomes and improved patient experience. All DHBs showed clear improvement in a range of patient outcomes, with some outcomes noticeably improving more than in other DHBs. Key elements that contributed to the success of these DHBs are not unique to the health sector and could provide a blueprint for achieving better outcomes from other government-run services.

The studies show that quality improvement programmes can vary in their financial impact, either at the organisational or programme-specific levels. In some cases, QI programmes can lead to quantifiable savings and/or efficiency gains. In other cases, no obvious savings or organisational efficiencies can be observed through routinely collected data, but the programmes achieve better outcomes for patients. It is also possible that QI programmes can lead to increased overall costs by identifying previously unmet need. This effect can occur even if programmes produce per unit/outcome efficiencies.

Unintended financial and non-financial consequences are possible, as patients, clinical staff and external providers react and adjust to the changes under the QI programmes. These consequences can enhance or partially mitigate the positive effects from QI programmes.

These findings are well aligned with the original objectives of the report, but should be considered alongside a couple of caveats. Attribution of savings, efficiencies or improved outcomes to specific programmes can be problematic in cases where multiple QI initiatives are introduced within one area or service. In addition, this project only partially analysed the performance of other DHBs over the same time period. Some of the DHBs may have introduced QI programmes of their own, while others may have improved without any specific actions by the DHB.

It should also be noted that a number of QI initiatives that were originally developed by the four case study DHBs have been adopted by other DHBs. The best example is Canterbury's HealthPathways, which has been implemented across all but four DHBs. And while this spread of best practices can be seen as a gain for the sector, it creates a real challenge in the comparative analysis of DHBs.

#### 4.5.2 Role for the centre

The project highlighted a number of specific areas where central agencies could play a more active role, namely: develop a sector-wide outcomes framework, provide analytical support, and develop leadership capability across the sector.

All DHBs recognised the value of an organising framework for their quality improvement programmes. Such frameworks provide DHBs with a way to develop their QI initiatives and allow DHBs to determine how to evaluate the relative success of the programmes before they are implemented. Well established QI frameworks, such as Lean, Six Sigma, or Baldrige, appear to be particularly useful, but all differ slightly in their scope and focus. This can have an impact on how outcomes from QI initiatives are captured in centrally collected data and accountability documents.

Quality improvement programmes and their outcomes have limited visibility at the centre. Consideration is currently being given to developing a comprehensive sector-wide outcomes framework, complemented by a more nuanced set of accountability documents. This would provide the centre with greater visibility of intended outcomes, without limiting DHBs' freedom to test local approaches suited to their communities.

Analytical capability differs greatly across DHBs, partially as the result of the relative size of the DHB. Maintaining analytical capability and investing in new systems were seen as real challenges for smaller DHBs. These DHBs demonstrated innovative ways of leveraging value out of their existing systems and capability. However, there may be a role for the centre in providing analytical support, facilitating the introduction of new systems and encouraging the dissemination of best practices across the DHB.

Importance of good leadership was recognised across all case study DHBs, both at the executive and clinical levels. Development of leadership capability across the organisation should be a priority for each DHB. The centre could play a facilitating role in developing greater capability by creating collaborative networks on specific elements of quality and performance, and identifying skills and practices that would benefit the sector as a whole.

## DHB Case Studies

# Auckland District Health Board

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## Overview

### Population

Auckland DHB is New Zealand's largest DHB, providing services to a large domestic population, as well as a wide range of secondary and tertiary services for the rest of New Zealand. Auckland DHB's domestic population is around 480,000, and:

- } is younger than rest of New Zealand, with one of the lowest proportions of individuals over the age of 75 among all DHBs
- } has fewer individuals who identify as Māori or Pasifika
- } has fewer individuals who live in most deprived neighbourhoods. However, pockets of deprivation are present, with Māori and Pasifika experiencing comparatively poorer outcomes than the rest of the population
- } has one of the fastest growing populations, increasing by around 7% between Census 2006 and 2013.

Auckland DHB recognises that it has one of the younger, healthier populations. However, it also notes that it provides a large number of services for the rest of the country, including, among others, specialist paediatrics (Starship Children's Hospital) and regional cancer services.

### Financial performance

Auckland DHB consistently reported breakeven positions from 2008/9 to 2013/14, demonstrating a strong focus on delivering services within tight funding constraints. The DHB receives around 50% of its provider arm revenue through inter-district flows for providing secondary and tertiary services for other DHBs.

## Motivation to invest in quality

In 2009, the DHB identified a number of challenges, including:

- } Substantial cost pressures. Most of the 'low-hanging fruit' had been picked, such as efficiencies in the back office, stationery and learning expenditure. Long-term financial sustainability would not be possible without major changes to the system.
- } The impact of the Global Financial Crisis on the New Zealand economy, with low increases to DHB funding signalled at the time. Funding increases Auckland DHB would have received were unlikely to keep up with increases in the projected DHB costs.
- } Government introduced Health Targets, which Auckland DHB would have struggled to achieve without changing the way it delivers its services.

These challenges served as a starting point for Auckland DHB's strategic planning, leading to the development of the Healthcare Excellence framework, a key component of which was the Management Operating System; described in greater detail below.

## Leadership

### Executive team

Unlike other DHBs in this study, Auckland DHB experienced substantial turnover in its executive leadership team and Board since 2009. Despite this, Auckland DHB maintained a strong focus on QI through the Healthcare Excellence framework.

At a high level, the framework covers five key result areas:

- } Patient Safety – eliminating avoidable harm
- } Better Quality Care – effective, accessible, integrated and patient-centred care
- } Improved Health Status – helping people self-manage their care and providing better prevention advice and support
- } Economic Sustainability – finding innovative ways to improve efficiency
- } Engaged Workforce – ensuring that staff have the right skills and can effectively contribute to achieving Healthcare Excellence.

The executive team oversees these key results, aided by Auckland DHB's Management Operating System (MOS). MOS provides integrated processes and tools to convert the Healthcare Excellence framework priorities into actionable tasks, with measures to monitor and improve both.

At this stage, MOS only covers hospital-based services. This is partially because hospital-based services comprise a larger proportion of Auckland DHB's activities than in any other DHB. However, the executive team and the board also mentioned that extending their QI strategy into primary and community care has proven to be challenging, because Auckland DHB does not have direct control over these providers.

### Clinical leadership

One of the more recent changes in the way Auckland DHB is organised was the decision to restructure its provider arm into directorates in 2013. Directorates place responsibility for financial management, human resources, patient outcomes and service delivery on clinical leaders. This puts greater expectations on clinical leaders, but provides them with the opportunity to observe the performance of their directorate from a range of perspectives.

MOS assists clinicians in undertaking these responsibilities by supporting strategy development, implementation and effective operational management. Greater responsibility for delivering services, combined with better visibility of key projects and operational statistics, allowed new (and sometimes unexpected) leaders to emerge across the organisation.

## Culture and QI methodology

Auckland DHB's Healthcare Excellence framework has matured over the past seven years to become an integrated approach to delivering sustained QI. It is largely based on the Baldrige Excellence Framework (see Bay of Plenty DHB case study below for a short description of Baldrige).

QI methods are predominantly based on concepts such as 'lean' and 'Six Sigma', with increasing use of co-design and Plan, Do, Study, Act (PDSA) concepts. These methods allow staff to lead and engage in QI initiatives, and use appropriate methodology and tools depending on the nature of the change required.

In some cases, improvement initiatives may be slow in driving change or have limited success where a process involves multiple parts of the organisation. To stimulate a step change in performance, Auckland DHB undertakes rapid improvement events. These events bring together relevant decision makers and representatives from every team involved in a particular process.

The event starts with the group walking through the process to determine what works well and what elements need improving. Consequently, the group identifies main issues, determines solutions and assigns necessary resources to enable the change to occur. Progress is assessed against a set of agreed targets to see if changes are having the desired effect.

The overall approach adopted by Auckland DHB rests on individuals and teams taking ownership of their work to actively identify, develop and monitor QI initiatives. It encourages local leadership and gives teams the tools to measure their performance in a way that is useful for them.

### Key enablers

Investment in QI and analytical capability was consistently identified as one of the key enablers for Healthcare Excellence. Auckland DHB took a staged approach to building improvement capability and integrating it with clinical processes. At first, Auckland DHB brought capability in on a temporary basis by contracting for specific improvement projects. These projects had a strong focus on demonstrating value to Auckland DHB, with particular emphasis on tangible efficiencies and savings.

Success of these projects demonstrated the need for permanent improvement capability and increased investment in data infrastructure. As a result, many of the contractors who delivered the projects were hired permanently by Auckland DHB. The team remained very stable over the years, contributing to continuous momentum behind Healthcare Excellence.

Auckland DHB invested in developing their staff and providing them with skills to drive change. In particular, Auckland DHB has trained over 400 staff in 'lean' and 'Six Sigma' methodologies, with a number of them receiving training in more advanced tools and techniques.

Auckland DHB also runs two different workshops to introduce the Management Operating System (MOS) to staff, explain what it is trying to achieve and how it works at various levels. These workshops also provide staff with the necessary skills and a plan to successfully implement, customise and improve any relevant elements of MOS. Auckland DHB mentioned that these workshops were well received by staff. Staff had a good understanding of what was required and how that contributes to their work.



Unfortunately, 'lean' training has not yet achieved all of its intended results. Staff who received training and ran some of the early QI projects were often not given sufficient time following the initial project to develop and implement further projects, preventing them from fully developing their improvement skills. Auckland DHB also mentioned that it could have been more selective about who receives improvement training to better target the skills to the areas that would benefit the most.

## Management Operating System (MOS)

Auckland DHB's Management Operating System (MOS) combines a number of distinct elements to provide an integrated platform for managing daily operational performance and delivering longer term change. MOS is a Lean Management System that has been developed for Auckland DHB based on best practice from international health organisations and leaders in other industries. MOS can be roughly split into three components: strategy deployment, implementation and business as usual, and monitoring and evaluation.

### Strategy deployment

Strategy deployment involves identification of high-level outcomes that Auckland DHB wants to change, which are then summarised into an A3 plan and a scorecard of tangible measures. A 180-day plan accompanies each A3 plan, setting out key actions and milestones necessary to deliver the desired change. These targets, actions and milestones are cascaded down to appropriate teams, who are responsible for implementing the QI initiatives.

### Implementation/business-as-usual

Individual teams select a small set of around five indicators they monitor on a daily basis using visual boards. These indicators include a mix of targets relevant to current QI initiatives, team-selected measures and Government's Health Targets. Each visual board also include the team's summary of current concerns, likely causes and agreed countermeasures.

This approach to implementing change and managing team performance borrows heavily from 'lean' methodology. It provides teams with a visible measure of their performance, disseminates relevant information across the team (removing the need to 'catch up' on some information, particularly when staff rotate at the end of the shift), and stimulates timely and collaborative approaches to solving common problems.

### Monitoring and evaluation

MOS includes tailored performance measures across different levels of Auckland DHB. Services and departments use team-level indicators to monitor performance across their teams, while the directorate teams, executive team and the board use system-level measures to monitor performance across the entire DHB. This information is used to compare outcomes against expectations, make adjustments to existing programmes and identify areas of focus in the future.

## QI in practice

Auckland DHB has a number of QI projects underway, ranging from small initiatives that affect the use of a particular resource to bigger initiatives that affect multiple parts of the organisation. Auckland DHB's approach to changing the way blood transfusions are performed demonstrates how an initiative based on robust analytics, national and international benchmarking and clear communication can have a positive impact on patient outcomes, lead to more efficient use of hospital resources and contribute to better financial performance.

### Blood transfusions

#### *Overview*

Due to historical practice, patients were routinely being transfused unnecessarily (when haemoglobin was above 100) and once the decision to transfuse was made, two units of blood (red blood cells and fresh frozen plasma) were transfused rather than one. Shifts in the evidence base highlighted that transfusions can have an adverse effect on patients as the risk of infection and that of rejection increases with every transfusion. In addition, the evidence found that it was only necessary to transfuse when haemoglobin dropped to 80, and then to transfuse only one and monitor for improvement before deciding to transfuse further units.

Historical and projected information was analysed in combination with a two-week prospective audit in order to establish the extent of this practice within Auckland DHB. The results showed that a third of all transfusions used two or more units by default.

Subsequently, Auckland DHB undertook a benchmarking exercise and research into best practices in Australia and the United States. This led to the development of new best practices across the DHB, including new protocols and medical algorithms to support medical practice and transfusion prescription based on the medical evidence.

Changes in process and practice required a substantial change in clinical behaviour. "An education and awareness campaign known as 'Why use two when one will do' was introduced alongside the new practices to support the change management. In addition, strong clinical leadership was key to persuading clinicians to change their behaviour. Auckland DHB noted that the 'Why use two when one will do' campaign was an important early push and is one of 12 projects that were subsequently run as the Blood Programme – aimed at better blood utilisation.

#### *Benefits*

From October 2010 to May 2012 more than 5,000 units of blood and 2,000 units of plasma were saved. This resulted in financial savings of \$3.6 million over that period. These savings have been sustained and are now estimated at over \$10 million since the beginning of the project. More importantly, these changes led to safer practices and better outcomes for patients.

Auckland DHB indicated that further improvements to blood utilisation were possible, but that the cost/benefit of pursuing each of these improvements was not as high as many other improvement initiatives that had priority at this stage.

The success of Auckland DHB's approach demonstrated the advantages of using data and international best practice to change how certain procedures are delivered. It is important to note that even with good data and evidence, changes in clinical behaviour require strong clinical leadership. The programme's success also led to domestic and international recognition, with other DHBs and Australian health organisations adopting the approach developed by Auckland DHB. In fact, New Zealand's national red blood cell use has dropped by about 13.7% since 2010 and is now trending sideways, despite an increase in health care utilisation.

The Bloods Programme was a catalyst in the DHB, a measurable success to demonstrate that change was possible.

### *Unintended consequences*

Reduction in Auckland DHB's demand for blood and plasma had a negative financial impact on the supplier of these products, New Zealand Blood Service (NZBS). NZBS intended to increase the price per unit, but were limited in their attempt to raise the cost of blood much above the Consumer Price Index by the Treasury. As a result, NZBS went into deficit and had to change its operating model, leading to a reduction in FTEs and more intense inventory management. NZBS is now projected to move to surplus again with leaner systems and at lower cost to the system as a whole.

This unexpected consequence shows that some of the financial benefits from quality initiatives can have knock-on effects on organisations outside the DHB's direct control, such as suppliers of external services, clinical equipment or supplies.

# Bay of Plenty District Health Board

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## Overview

### Population

Bay of Plenty DHB (BoP DHB) is a medium-sized DHB that is responsible for delivering health services to around 215,000 people. On average, their population:

- } is older than the rest of New Zealand. BoP DHB mentioned that it is facing a 'grey tsunami', which creates pressures on primary and secondary health care, as well as on aged residential care
- } has more people who identify as Māori – BoP DHB has 18 different iwi within its geographical boundary. A number of indicators point towards a high degree of health inequality, with Māori experiencing outcomes that are substantially worse than other ethnic groups
- } has more people living in rural areas than the rest of New Zealand. BoP DHB operates across two hospital sites (Tauranga and Whakatane) in order to provide services to a population that is spread over a relatively large territory.

### Financial performance

Apart from reporting a small deficit in 2009/10 of around 0.2% of revenue, BoP DHB reported breakeven results over the past 6 years.

### Capital stock

BoP DHB undertook a refurbishment and build programme that transformed both Tauranga hospital (2011) and Whakatane hospital (2014). These relatively new facilities should be fit for the purpose of delivering the latest models of hospital-based care.

## Motivation to invest in quality

Unlike other DHBs, BoP DHB did not mention their financial performance as one of the main reasons for undertaking their QI programme. Instead, BoP DHB stated the desire to improve patient experience and outcomes, and to reduce outcome inequality as the main reasons to invest.

## Leadership

### DHB executive and board leadership

BoP has enjoyed a high degree of stability in senior leadership. The CEO (who only recently left the DHB) joined the DHB around 2006 and most of the executive leadership team has been with the DHB for at least 5 years.

This stability appears to be one of the key enablers for the DHB's QI programme. BoP DHB had over 300 QI initiatives at the time the CEO took over. These initiatives were not well coordinated and did not have an overarching strategy driving them. The CEO led the consolidation of these initiatives (down to

around 50), introduced the Baldrige Excellence Framework as the overarching QI methodology, and ensured that the organisation maintained the focus on QI over the subsequent years.

BoP DHB also has a very experienced and active Board. The Board monitors the progress of QI initiatives. They invite patients to tell their stories during Board meetings, irrespective of whether their experience was good or bad. The Board also conducts quarterly visits to specific service areas to engage with clinical staff. These actions allow the Board to observe the link between QI initiatives and patient outcomes and reinforce the organisational focus on QI.

## Clinical leadership

Clinical leadership was also mentioned as one of the elements necessary for the successful implementation of QI initiatives. Within BoP DHB, clinical leadership is distributed across the triumvirate of medical, nursing and management personnel. This creates joint responsibility for QI from personnel groups responsible for delivering healthcare services.

## QI methodology

BoP DHB used the Baldrige Excellence Framework (Baldrige) as the starting point for the development of their overall QI approach. Baldrige is a well-known and widely used performance improvement framework that covers the following elements:

- } Leadership – how senior leadership guides and sustains the organisation
- } Strategy – the development and implementation of strategic objectives and action plans
- } Customers – how the organisation listens to the voice of patients
- } Measurement, analysis and knowledge management – how the organisation selects, gathers, analyses, manages, and improves its data and information
- } Workforce – how the organisation assesses workforce capability and capacity
- } Operations – how the organisation changes its service delivery models to deliver better value to patients and improve operational efficiency, and
- } Results – results across key areas.

Baldrige also notes that integration between all these elements is central to driving improvements within the system.

After undertaking an internal stock-take of Baldrige capability, BoP DHB summarised the framework into four core principles. These would guide the organisation's QI work and would serve as a way to communicate the QI message to patients and staff. BoP DHB felt that patients and staff would not engage with Baldrige unless it was translated into the language that they could understand. The four guiding principles that form the C.A.R.E philosophy are **C**ompassion, **A**ccountability, **R**esponsiveness and **E**xcellence. The philosophy permeates the organisation and forms the cornerstone of the DHB's organisational culture. Other elements of Baldrige, such as workforce management and measurement of results, were also implemented across BoP DHB (described in later sections).

Baldrige also offers organisations an opportunity to be assessed against their Performance Excellence criteria. This provides organisations with independent feedback on their QI journey, highlights areas of success as well as areas where further progress can be achieved.

The DHB submitted its QI programme for Baldrige accreditation and received a Bronze Medal (2013) for its dedication to best practice achievement. Although the assessment report noted that BoP DHB had made good progress against the criteria, it also noted that they could increase the integration between their individual QI initiatives.

## QI in practice

BoP DHB has around 50 current QI initiatives such as the development of clinical pathways using the Map of Medicine, the Bay Navigator portal for GP and patient information, and advanced care planning information and guidelines. The Care Capacity Demand Management system (CCDM) is one QI initiative that stood out during our visit to the DHB and demonstrates a number of elements that are necessary to develop, implement and evaluate QI initiatives.

### Care capacity and demand management system

#### *Overview*

In 2010 BoP DHB was one of the demonstrator sites under the national Safe Staffing Health Workplaces initiative that became the Care Capacity and Demand Management programme (CCDM). CCDM has the following features:

- } matching the workforce availability and skill mix to patient acuity in each ward on the day
- } providing a suite of indicators that enable a 'real time' view of the patient, the ward and the hospital in relation to workforce availability and patient acuity, in order to identify any gap between demand and capacity
- } providing tools that enable variance in the predicted workforce availability, skill mix and patient acuity to be managed safely and efficiently on the day.

BoP DHB combined CCDM with the Releasing Time to Care programme that provides guidelines on how to maximise the amount of time nurses spend with their patients.

In addition, CCDM now includes a set of core data (Table 1) that contains a comprehensive set of output and outcome measures. It is used to provide clinical staff, patients and management with a transparent picture of the impact of the programme.

Table 1: CCDM core data set

Measure	Purpose
Clinical hours required versus clinical hours provided	Are patients receiving all the care they need?
Health and Quality Standard markers	Are adverse events occurring?
Productivity	Is the budget being maintained?
Flow	Are flows and volumes being achieved?
Staff satisfaction	Are staff satisfied with what they are able to achieve?
Work effort	Is the work effort to maintain service levels reasonable?

The core dataset is a relatively recent addition and can be used to benchmark DHB performance against other DHBs with CCDM. However, it is not fully embedded in other DHBs, which currently makes this process impractical.

### *Key enablers*

Close collaboration with clinical staff as well as advanced understanding of data and statistical processes was required from the development team in order to implement the programme at the start. Close collaboration with clinical staff meant the team understood the clinical processes and realities faced by staff on the ward. In turn, this allowed them to provide richer insights and make better suggestions on changes and improvements. BoP DHB already had the necessary analytical and information technology capability and estimates that it took around \$300,000 (or 1.5 FTE) to develop and roll out the system. Once embedded, the system requires little ongoing investment to maintain (one day a week).

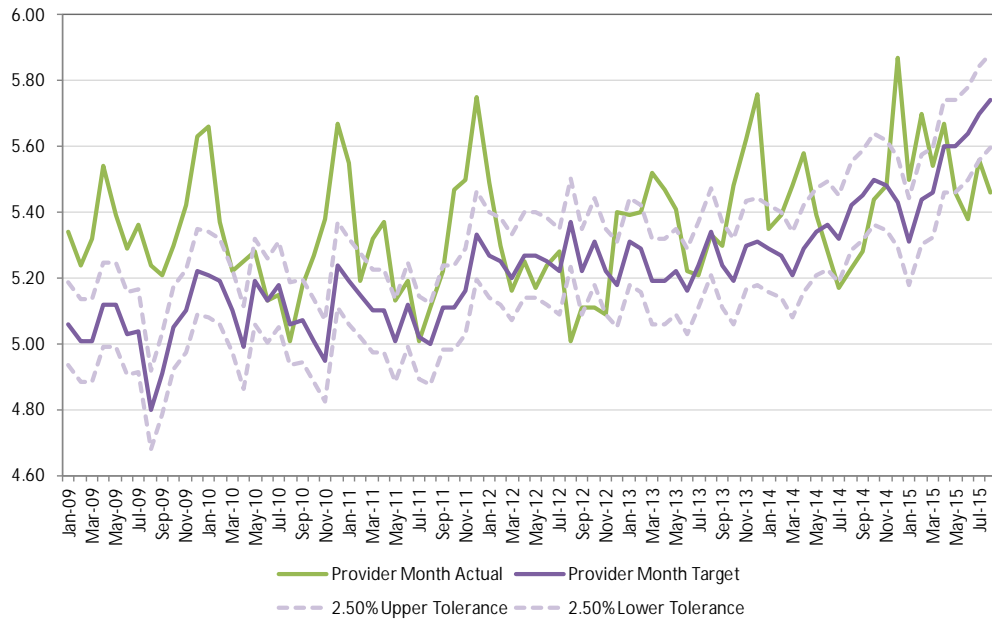
A strong and trusting relationship between the DHB and the NZ Nurses Organisation (NZNO) was identified as one of the reasons BoP DHB was able to implement changes to workforce management through the CCDM. The DHB ensured that the NZNO understood what information was collected through the CCDM and how it would be used. Once the NZNO understood the purpose of the programme and the potential benefits, it worked collaboratively with the DHB to communicate the benefits to their members. This created a two-way reciprocal relationship between the DHB and the union.

## Benefits

Evaluation of CCDM and Releasing Time to Care highlighted a number of benefits, including:

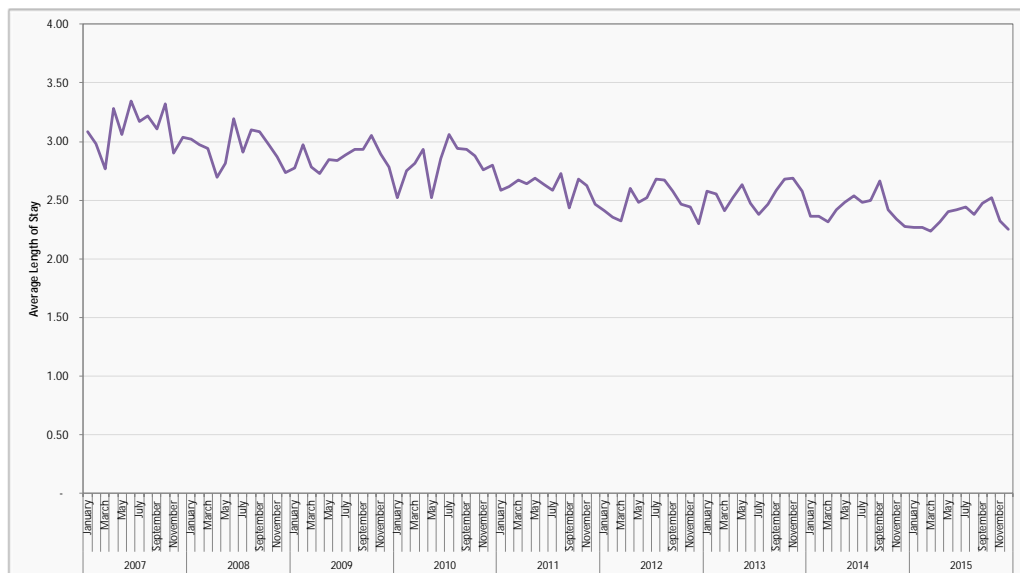
- } A better match between hours required and hours provided (Figure 2), which led to a more consistent workload during the week and a reduction in staff stress.

Figure 2: Hours provided per patient – monthly target compared to monthly actuals



- } The combination of CCDM and Releasing Time to Care increased the number of hours nurses spend delivering care to their patients (as shown by the increase in the number hours required and provided in Figure 2). This subsequently led to a reduction in the average length of stay across both hospital sites (Figure 3).

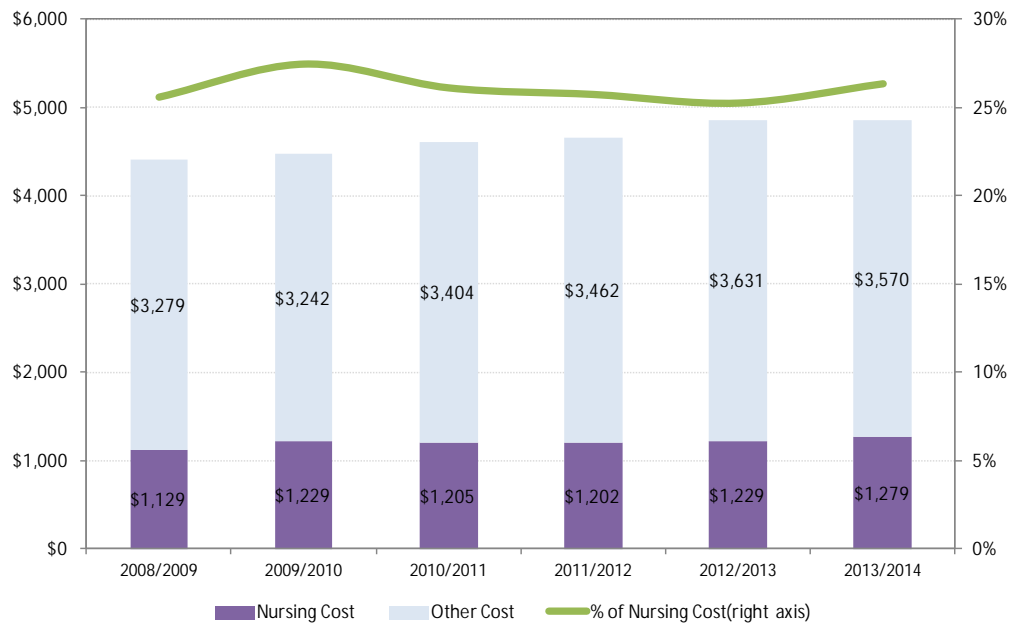
Figure 3: Average Length of Stay Tauranga & Whakatane Hospitals (CWD funded inpatient events excluding maternity)





- } These improvements have been achieved while keeping the average cost of nursing per Case Weighted Discharge relatively stable across time (Figure 4). All of which points to tangible improvements in nursing staff efficiency, while delivering better quality of care.

**Figure 4:** Nursing cost per Case Weighted Discharge (left axis). Nursing as % of total cost per Case Weighted Discharge (right axis)



Perhaps most importantly, BoP DHB mentioned that the introduction of CCDM provided them with a transparent, rules-based approach to managing demand and staff capacity. This led to greater staff collegiality and better relationship between the DHB and the nursing union.

Initially, CCDM met some resistance from areas with excess capacity. These areas were reluctant to transfer their nurses to other wards out of concern that nurses would not be able to operate safely and efficiently. This led to some delays in data being supplied during the day, which prevented the central team from making adjustment to the staffing mix in the wards. Over time, these issues have been largely resolved as staff became more familiar with, and trusted the system.

### *Lessons learned*

Based on their experience, BoP DHB made some suggestions for other DHBs planning on starting a QI programme:

- } set up a core data set from the start to demonstrate the progress of the programme to patients and staff. Use the core data to evaluate the impact of the programme
- } prioritise investment in systems, people and processes
- } find a clinical champion to show how it benefits patients
- } have patience – change takes around 6 to 12 months to bed-in, with full benefits being realised 3 to 4 years in the future

- } no system is perfect at all times. Even with the assistance of CCDM, there are days where demand substantially exceeds care capacity. These days should be put into perspective of the overall benefits offered by a systematic approach to managing care.

### *Patient experience*

It is difficult to determine the impact of CCDM on patient experience. Formal evaluation could not isolate any specific impact, partially because it is difficult to assign changes in reported patient experience to changes in workforce management and patient care under CCDM. The DHB does not currently incorporate patient experience into CCDM but it is their plan to do so in future.

BoP DHB puts considerable effort in engaging with patients during the development and testing of new services through a dedicated patient liaison champion. Patient groups also actively contribute to the development of communication material that accompanies new services.

Engagement with iwi is particularly notable. The DHB engages with 18 local iwi through the Rūnanga governance and strategic board. The board is responsible for working with Māori providers, working through any issues or barriers they may have. It also facilitates the translation of publications into local Māori dialects.

# Canterbury District Health Board

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## Overview

### Population

Canterbury DHB (CDHB) is one of the largest DHBs in the country and provides health services for around 480,000 people (Census 2013). On average, the Canterbury DHB population:

- } is considerably older than the rest of New Zealand
- } has fewer individuals who identify themselves as Māori or Pasifika
- } has fewer individuals who live in highly deprived areas, with only around 9% of the population living in most deprived neighbourhoods (deciles 9 and 10 under NZ deprivation index).

These characteristics should, on average, translate to lower levels of health inequality compared to the rest of New Zealand. CDHB has the largest populations for over 65 years and over 75 years in New Zealand, like the rest of New Zealand, it is facing a rapidly aging population.

CDHB also delivers a number of secondary and tertiary services for the rest of South Island as well as some services for the lower North Island.

### Christchurch Earthquakes

In September 2010 and again in February 2011, Christchurch was struck by major earthquakes. CDHB facilities on all sites experienced damage and disruption to services. Patients and staff were displaced, further increasing the challenge of delivering services. These earthquakes also had a number of negative effects on population health, particularly in the area of mental health. In addition, the DHB's aged residential care (ARC) bed capacity was reduced by 635 beds and acute hospital beds were reduced by 106, increasing the need to shift more services into primary/community care.

### Financial performance

CDHB received a substantial earthquake insurance payment in 2012/13 (which was transferred to the centre in the subsequent year) as well as financial support in the form of additional revenue to help deal with the impact of the earthquakes over the past 5 years. These payments, combined with the overall complexity of the post-earthquake repair and recovery programme, make it difficult to assess the DHB's recent financial performance.

## Motivation to invest in quality

There were a number of pressing reasons for CDHB to invest in quality. In 2007, when the DHB started its long-term strategic planning, the DHB identified the following challenges:

- } CDHB health system was often in gridlock, with demand for hospital services exceeding capacity, leading to some patients being turned back to primary and community health care without receiving necessary care. The DHB would have needed to build another hospital to meet growing demand over the medium term, which would have been financially unsustainable.
- } CDHB did not have a good working relationship with Primary Health Organisations (PHOs), which limited its ability to integrate services with primary/community care.
- } Similarly to other DHBs, CDHB is facing an ageing population, leading to increases in emergency department attendances and greater demand for aged residential care.
- } CDHB was also mindful of their aging workforce. CDHB would need to transform the way it delivers healthcare services in order to deliver better care with a proportionally smaller workforce.

CDHB does not view the impact of the earthquakes as a one of the main reasons to invest in quality. CDHB recognises that the damage caused by the earthquakes created greater impetus to ensure people have greater access to services closer to their homes in the community and reduce demand through investment in quality. However, CDHB sees the earthquakes as disruptions to their system transformation journey. CDHB indicated that the earthquakes may have delayed the progress of the overall QI strategy by up to two years.

## Leadership

### Executive leadership team

Similarly to Bay of Plenty, Canterbury DHB enjoys a high level of stability in the executive leadership team. Most of the team have been with the DHB for at least 5 years, with the current CEO joining in 2009.

The executive team is responsible for transforming Canterbury's health system in a number of ways. The team views Canterbury as one health system that encompasses primary, community and secondary care providers. This approach means that CDHB actively seeks opportunities to improve outcomes through its Alliance, the Canterbury Clinical Network, by ensuring care is provided as close to peoples' homes and communities as possible. It also means that CDHB is prepared to transfer funding between parts of the system in order to enable this change to occur. The executive team summarised this approach as 'one system, one budget'.

The executive team invests considerable effort in building leadership and change capability across the Canterbury health system. At a system level, CDHB established the alliance framework with their PHOs and community care providers, which encourages collaborative decision making based on the principle of 'best for the patient, best for the system'. CDHB also invested in developing a culture that promotes innovative changes to service delivery through the '8' programmes – Xceler8, Particip8 and Collabor8.

## PHO alliance framework

The alliance framework enables clinicians from across the system to design collaborative solutions to common problems. Alliance contracts have the following features:

- } Members have transparency of each other's performance to allow joint problem solving to improve performance. This allows them to benchmark their performance against each other.
- } Members jointly agree on gains and losses based on the overall performance of all parties.
- } Gains are invested back into the system in a mutually agreed way.
- } Disagreements are brought to the alliance members first to encourage consensus-led decision making.

This approach reduces competition between healthcare providers and incentivises better coordination of care. It creates greater transparency in individual performance, facilitating greater trust between parties. It also encourages local ownership of quality and performance improvement programmes; performance becomes the responsibility of all partners rather than being exclusively controlled by the DHB. Finally, it reinforces the overall message that both CDHB and primary/community care providers are all part of "one system with one budget".

## Culture change and QI methodology

### 8's programmes: Xceler8, Particip8 and Collabor8

CDHB invested considerable effort in developing a culture that promotes better quality care and dispersed leadership of change through the '8' programmes: Xceler8, Particip8 and Collabor8.

Xceler8 is the first of the three programmes and was originally introduced to a small group of staff, but has since been rolled out across the DHB and through system partners who also have access to the training. As part of the programme, staff (particularly middle management) are exposed to the health system's strategic direction and a range of QI and change management techniques, including 'lean' and 'Six Sigma'. The first couple of groups were also asked to come up with a shared vision for the health system and identify elements that would need to change to achieve this vision.

At the end of the programme, staff receive a personal card from the Chief Executive giving them permission to change the system. By giving permission for change to staff who have completed the Xceler8 programme, CDHB ensures that change happens based on a common foundation of skills and a shared vision. This programme also spreads the responsibility for change throughout the health system.

Particip8 and Collabor8 are two programmes that encourage staff to generate, develop and refine ideas to improve efficiency and/or patient outcomes. Particip8 is a 14 hour programme spread over 3 days that provides change management support to work up ideas that participants have identified to improve services they provide. Collabor8 involves workshops on two separate days three months apart. The programme encourages staff to develop a change project between the two workshops using input from the DHB's planning, finance and business development units. At the end of the programmes, ideas of sufficient quality are supported by the DHB and progressed to implementation.

Particip8 and Collabor8 programmes provide staff with QI skills to develop their ideas and opportunities to test these skills in practice. Perhaps more importantly, these programmes allow staff to view QI ideas through a number of perspectives, including clinical outcomes, financial sustainability and patient experience.

## QI in practice

CDHB has a number of hospital and community-based QI initiatives that are either in the process of being implemented or have been in place for some time. HealthPathways and HealthInfo demonstrate how a systematic approach to reducing variation in patient experience can lead to better identification of demand as well as better coordinated and more appropriate care.

### HealthPathways and HealthInfo

#### *Overview*

HealthPathways is a secure website available to GPs, community providers, NGOs and DHB service providers. It contains clinical pathways and information on referrals, specialist advice, diagnostics, GP procedure subsidies and patient handouts. Clinical information is presented in a condensed form to allow clinicians to refer to it during their patient consultations. Steps along the clinical pathway (such as specialist referrals or diagnostics) are outlined and supported by clear information on what is required before patients progress to the next step. There are currently over 800 clinical pathways and resources available through HealthPathways.

HealthInfo is a complementary site to HealthPathways, designed to provide patients with trusted, high quality information. It contains information on health conditions, local health services and support, medication and general health and wellbeing. Information is written and approved by local doctors, nurses, pharmacists and health alliance professionals and provides links to other trusted sites. It is presented in plain language, avoiding clinical jargon and explaining key concepts in greater detail. HealthInfo aims to empower and support patients to understand their conditions and keep themselves well.

Neither HealthPathways nor HealthInfo are novel ideas in themselves. However, the way they are developed, monitored and maintained contains a number of valuable lessons.

#### *Key enablers*

Clinical leadership is critical in the development of clinical pathways. Doctors from CDHB, PHOs and community providers were responsible for the initial audits of patients who were removed from waiting lists for hospital procedures. The audit demonstrated that:

- } a third of all patients were referred back for hospital treatment
- } a third could receive appropriate care from their primary care providers.

This highlighted a large degree of variability in patient pathways leading to increased pressure on hospitals and longer waiting times for patients that required hospital-based treatment. Subsequently, clinicians, nurses, allied health professionals and funders used international evidence to reach local agreements on best practice, leading to the development of clinical pathways. Health professionals across the Canterbury health system continue to actively contribute to updating and auditing clinical pathways, and developing material for patients through HealthInfo.

Investment in data and analytical capacity was also identified as one of the key enablers for HealthPathways. Over the years, CDHB invested in building the analytical capability of their system, creating the necessary data infrastructure and incorporating outcome and process measures into clinical pathways. The use of signalsfromnoise® statistical software is particularly notable, because it allows CDHB to determine variation of performance on a given day and if changes in pathways are impacting on defined outcomes.

By investing in data and analytical capability CDHB is able to:

- } track performance of each pathway in real time
- } identify statistically significant improvements due to changes in service delivery models
- } highlight potential issues along the pathway leading to faster resolution
- } identify, celebrate and showcase successful programmes.

Access to real time performance data eliminated the information asymmetry between DHB funders and providers, leading to more constructive engagement on addressing current issues. It also allows service providers and clinicians to benchmark their performance based on historical implementation. This eliminates common misconceptions about relative performance of individual services and stimulates cross-disciplinary approaches to QI.

### *Benefits*

Evaluation of multiple pathways highlighted a number of benefits for patients, general practice and community providers. There were also a number of benefits for the DHB, both from the clinical and financial perspectives.

For patients, introduction of HealthPathways and HealthInfo resulted in:

- } care closer to home. Patients can receive appropriate treatment from their GP or community care provider
- } shorter waiting times for treatment
- } greater certainty about the services required for care
- } fewer non-discriminatory diagnostic tests with less variation in outcomes from inconsistent referrals for diagnostics or treatment
- } better support through quality information about their conditions, treatments and medication.

General practice and community care providers:

- } receive high quality information on what is required to refer patients for further care and diagnostics. 80% of GPs use HealthPathways more than 6 times per week
- } have greater certainty that referrals will be accepted and acted upon in shorter timeframes
- } are able to deliver certain procedures that were not available in the primary care setting before. This allows GPs to work at a higher scope of practice, leading to better development opportunities.

For the DHB the introduction of HealthPathways and HealthInfo resulted in:

- } a reduction in demand for a number of hospital-based services
- } faster processing of patients in hospitals. Patients arrive with necessary information already filled in by their GP
- } lower costs of delivering certain procedures by moving them from the hospital into primary and community care
- } ability to offer more services by reinvesting efficiency gains back into the system.

In some cases, improvements in system performance have resulted in increased demand for certain diagnostics and treatments. This highlights the fact that improvements in quality of care can simultaneously lead to a reduction in the average cost and an increase in the total cost of certain treatments due to higher demand, unless the demand is managed appropriately.

### *Cost*

Developing HealthPathways and HealthInfo and establishing the supporting data and analytical capability involved considerable investment from the DHB. Currently, Health Pathways cost approximately \$1 million per annum; however, this amount is projected to decrease as fewer pathways need to be developed and updated. The business intelligence tools (including signalsfromnoise® statistical software) cost around \$500,000 per annum for enterprise-wide licences.

### *Domestic and international success*

HealthPathways and HealthInfo received a high level of recognition, both by other DHBs and by healthcare providers in other countries. Fifteen out of twenty DHB have licensed HealthPathways from CDHB, with the exception of five Midland Region DHBs who have their own pathways based on the Map of Medicine. HealthPathways are also licensed by a number of international healthcare providers, particularly in Australia. This generates around \$2 million in royalties each year, which have been re-invested in building new content including Hospital HealthPathways.



# Whanganui District Health Board

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## Overview

### Population

Whanganui DHB is one of the smallest DHBs, providing services for a population of around 60,000. On average, Whanganui DHB's population:

- } is older than the rest of New Zealand, with one of the highest proportions of individuals over the age of 75
- } has around 25% of the population who identify as Māori
- } has more individuals who live in most deprived areas, with around 36% of the population living in such areas
- } is declining; Whanganui DHB population decreased by around 5% between 2006 and 2013 Census.

These characteristics present a challenging population, with poorer than average health outcomes and higher levels of inequality than the rest of New Zealand.

### Financial performance

Whanganui DHB faced a grim financial situation at the start of their QI journey. In 2008/09, the DHB reported a \$9.8 million deficit, which translated to around 5% of revenue at the time (third worst financial performance among 20 DHBs). Since then, the DHB reported sustained improvements in financial performance, reducing the deficit to less than 0.5% of revenue in 2013/14. This improvement is particularly noteworthy, given that Whanganui DHB achieved this result while receiving minimum increases to its funding.

## Motivation to invest in quality

In 2008, Whanganui DHB was facing a number of challenges to delivering hospital-based care, including:

- } 32 women and their families were negatively impacted by an incompetent surgeon, generating a strong community backlash and loss of trust. These cases were symptomatic of wider quality issues that the DHB was facing at the time
- } recommendations from reviews and incident analysis were not followed up and acted upon, with over 300 recommendations outstanding
- } disempowered clinical leadership and low staff morale created a workplace culture that made it difficult to recruit quality staff.

These challenges, combined with limited scale due to the DHB's small size, poor financial performance and population outcomes, created what could be considered the most difficult starting position out of the four DHBs covered by this report.

## Leadership

### Executive team

Whanganui DHB's QI journey started with changes to the executive team and the management structure. Due to Whanganui DHB's poor performance at the time, Government replaced the chair of the board and appointed two Crown Monitors in 2008.

A new chief executive (CE) was appointed in 2008 to bring a stronger focus on safety and quality. In turn, the new CE recruited a director of patient safety and quality with direct reporting to the CE who would oversee QI and patient safety across the DHB. The leadership team set themselves a challenge to safely reduce DHB expenditure, while strengthening leadership and clinical governance, increasing joy and pride in work, and enhancing measurement and monitoring.

These priorities are supported by six focus areas, including:

- } management of access to services
- } improvement in patient experience
- } reduction in patient harm and improvement in incident management
- } improvement in efficiency and quality of care environment
- } increase in workforce productivity, and
- } improvement in efficiency of non-clinical systems and process.

Actions across these areas led to a considerable change in the way the DHB delivers services and addresses complaints, hires new staff and communicates with the community. A suite of performance measures and key performance indicators (KPIs) sits behind each focus area, providing the leadership team with a comprehensive overview of the DHB's progress.

### Clinical leadership

The changes to the management structure placed senior clinicians in roles of accountability not only for professional standards, but also operational management. The structure required these clinical managers to work in partnership across disciplines supported by a business manager.

Whanganui DHB distributes clinical leadership across a triumvirate of medical, nursing and management personnel, with the aim of assigning equal responsibility for QI across the three professional groups.

## Culture and QI methodology

Whanganui DHB invested considerable effort in changing organisation-wide attitudes to quality and to building QI capability. At the service/team level, Whanganui DHB promotes better use of information and data for teams to monitor and improve their performance.

At the system level, Whanganui DHB utilises Root Cause Analysis methodology and Critical System Analysis (a human factors approach) to analyse clinical incidents. There are audit processes in place to follow up the recommendations formed to ensure they are implemented and effective.

The DHB also conducts a formal review of every death that occurs under its care whether the death is expected or not. The purpose of the review is to identify areas for improvement and to recognise when the care that has been provided is as planned. More importantly, these reviews help the DHB to communicate with its community by providing feedback to families and offering them the opportunity to ask questions about the care of their loved ones. This approach is contributing to the process of rebuilding trust in DHB-delivered services.

Finally, the DHB ensured it has good coordination and oversight of complaints, risks and QI initiatives through the RiskMan incident management and quality system.

### Team/ward/service level

Similarly to BoP DHB, Whanganui DHB uses the Care Capacity Demand Management (CCDM) programme in conjunction with Releasing Time to Care (RTTC) to improve staff efficiency and patient outcomes, while creating a safe and healthy work environment (see BoP DHB section for more detail). The combination of both programmes has proven very successful in engaging staff and providing them with the mechanisms to make and sustain improvements.

One of the RTTC modules is 'Knowing How We are Doing', where the staff set and evaluate KPIs that are relevant to track their progress across time using visual boards. These boards contain patient outcome measures, process indicators and, in some cases, a visual map recording any incidences that have occurred, their severity and location. In wards where the CCDM work analysis has occurred objectives and measures will be based upon findings from the report.

Some measures are updated on a daily or weekly basis to provide teams with an up-to-date picture of their performance. Other indicators may only be updated annually to allow teams to track their progress across a longer time horizon and reflect on any changes they may have implemented during the year. The use of location-based incident indicators is particularly noteworthy, since it can highlight issues associated with the physical environment.

Performance measures are selected, developed, recorded and analysed by teams. This ensures that measures are closely aligned with clinical processes and are updated at the rate that is useful for each team. The process of recording and analysing data is relatively low-tech and utilises standard tools, such as Excel.

Most boards are also visible to patients, with the exception of boards that contain sensitive patient-specific information. This encourages the DHB to tell its performance story using simple terms and concepts, while increasing transparency and encouraging better engagement on quality both from staff and their patients. This approach rests on teams taking active leadership in managing their performance and would not be successful if it did not deliver tangible value for the team.

Other well established RTTC modules are Well Organised Ward (WOW) and Patient at a Glance. WOW assists frontline staff in designing environmental efficiency improvements to ensure that the environment is consistently well organised to support care delivery. Patient Status at a Glance gives clinical staff the most relevant information they need in a three-second glance. This is particularly useful for multidisciplinary teams and provides instant up-to-date information that may otherwise have had to be gleaned by interrupting a nurse.

All of the RTTC improvements reduce duplication, interruption and wastage and allow frontline staff to spend more time providing direct patient care. It is an empowering framework that situates authority with frontline staff to design real system improvement.

## Root cause analysis

Whanganui DHB undertakes Root Cause Analysis (RCA) reviews utilising a mixture of methodologies including critical systems analysis and tracer methodology to investigate and address any complaints it receives from staff or patients. RCA is a well-established tool for understanding why an event happened. More importantly, the DHB uses RCA to identify what changes need to occur to prevent the event from happening again, which serves as a catalyst for future QI initiatives.

The main aim of RCA is to identify the root causes within the problem-cause sequence, removal of which will prevent undesirable outcomes from occurring in the future. This process involves:

- } establishing a timeline, including timing and location of the patient harm event
- } collecting relevant data on the factors that led to or contributed to the patient harm. This includes a wide spectrum of information, such as management practices, staff capability, environmental factors and clinical processes
- } determining what behaviours, actions, inactions or conditions need to be changed to prevent similar outcomes from occurring in the future
- } developing and implementing an action plan based on the recommendations raised by the RCA teams with the aim of preventing or reducing the likelihood that the clinical event would happen again. Once implemented, all recommendations are audited for their effectiveness. Changes that have not delivered the desired effect are adjusted or adapted with CE approval.

Initially, application of incident management processes, triaging and managing the outstanding recommendations required considerable effort from the DHB. However, systematic and persistent use of information to drive change allowed the DHB to reduce the number of outstanding recommendations from over 300 to only 9. It also led to Whanganui DHB developing greater capability, increasing the efficiency with which the DHB can conduct incident management and resolve complaints.

## Death audits

In a step to rebuilding community confidence in DHB-delivered services, Whanganui DHB made a commitment to review each death that occurs under its care regardless of whether the death was expected or not, and share any findings of the review with the family. A letter of condolence is sent

out to families whose family member has died in hospital. The letter explains that the DHB reviews all deaths and seeks feedback on the care from the family. There is a commitment given to share the findings of the review with the goal to improve care into the future. This allows the DHB to test its internal processes and identify any lessons for the future.

More importantly, the DHB communicates the finding of each review to the family/relatives of the deceased. If care has been provided below the standard expected, Whanganui DHB is open and transparent with the family, makes an apology and explains changes it is planning to undertake as the result of the review. While going through such a process may require a considerable commitment of time and resources, it signals a strong commitment by the DHB to improving patient safety and increasing community engagement.

## Key enabler

### Patient safety unit and RiskMan (incident management electronic tool)

Coordinating QI initiatives, audits and complaints is a challenging task that Whanganui DHB has addressed through a dedicated patient safety unit and the use of the RiskMan system. RiskMan is a risk management system specifically designed for health organisations. It allows Whanganui DHB to effectively manage:

- } incidents – by providing a simple way of reporting and managing clinical and occupational health and safety incidents
- } risks – includes a register of all organisational risks and supporting documentation. It allows the DHB to rate each risk and develop appropriate action plans
- } complaints – by recording details of each complaint, its seriousness and outcomes. The system also includes features to record what actions the DHB is planning to undertake and how these will be implemented
- } QI initiatives – the system provides tools to track QI activities across the DHB, monitor their progress and assign actions to staff.

This system supports the patient safety team in delivering a number of functions. The team uses RiskMan to coordinate QI initiatives across the DHB. In cases where similar QI initiatives are already underway in different parts of the DHB, the team combines the two initiatives together.

This leads to better use of DHB resources by eliminating parallel development of similar QI initiatives, which is important given the DHB's small size and resources. It also enables faster development of QI initiatives by allowing teams to share their findings with each other. This stood out as a particular strength of Whanganui DHB's approach to QI.

The team also supports DHB staff through the complaint process. They collect the necessary information from patients and staff and provide guidance to assist staff in creating an effective response. The support is especially useful when medical staff have to provide evidence during sensitive enquiries. Better management of complaints was well received by DHB staff. It also contributed to better patient engagement, with noticeable and sustained improvements in patient experience survey results over time.

All complaint response letters are sent out via the CE office and the DHB believes that such a high-level response shows respect to the complainant and the importance the DHB takes to learning from complaints.

## QI in practice

Whanganui DHB has a number of QI initiatives across a range of services. Changes to mental health services stood out as an example of comprehensive changes to a service delivery model led by quality and patient experience.

### Mental health services

#### *Overview*

Whanganui DHB provides acute mental health services (Te Awhina) for its population as well as adult male forensic rehabilitation mental health services (Stanford House) for the Central Region (Capital and Coast, Hutt Valley, Wairarapa and Whanganui DHBs). In 2010, following a number of sentinel events and complaints, a critical Ministry of Health review was undertaken with a number of recommendations.

As the result, the DHB undertook a number of changes to its mental health services, including:

- } increasing the number of regulated staff, improving standards of practices and strengthening clinical leadership
- } introducing visual boards to help teams track their performance over time. These boards are also available to patients and families, to increase transparency and accountability
- } undertaking a project to develop and implement strategies to reduce restraint and seclusion incidents
- } introducing Sensory Modulation as a clinical intervention to assist people to regulate their emotional arousal. This was supported with an education campaign for all mental health staff
- } designing a “step-up” flat to give great autonomy to people in their last stages of rehabilitation back to the community.

In 2012, the DHB undertook a partial rebuild of mental health facilities in order to complement and enable the new models of care. Changes to the physical environment helped to create a more tranquil environment and eliminate elements that have been known to agitate patients in the past, such as the rattling noise of the keys that were used to open and lock doors in the old facilities.

#### *Benefits*

Whanganui DHB reported a number of improvements to patient outcomes and staff safety, with reductions in seclusion events, restraint incidents, self harm and instances where patients leave the premises without leave.

Stanford House has had no seclusion events since August 2013 and Te Awhina seclusion hours have decreased by 54% from 2010 to 2014. Incidents of violence and aggression in Te Awhina have increased by over 30% since 2013. Demographic data shows that this correlates with the

increase of admission of service users under the influence of synthetic cannabis and alcohol. Despite this significant increase, seclusion hours have continued to decrease.

Current trends indicate that restraint incidents will decrease by 20% in 2015 following an increase in 2014. Data analysis showed that just 14% of the service users were responsible for more than 50% of incidents of restraint, which prompted Whanganui DHB to review and adjust the way it interacts with these users.

Incidents of service users leaving Te Awhina without leave have reduced by more than 60% for the 2013-2014 year. Self-harm incidents reduced by 86% from July 2012 to June 2014.

Finally, it should be noted that these improvements in patient outcomes coincided with a dramatic increase in staff satisfaction. In 2012, around 62% of staff reported overall satisfaction with their work. This has increased to 100% in 2015.

### *Cost*

The main cost of changes to mental health services was associated with the partial rebuild of the facilities. The total cost of the rebuild was 3.4 million. The rebuild was completed on time and under budget. Mental health services were continued to be provided within the building as the work was undertaken. Strong contingency planning saw no incidents or complaints during the year-long rebuild which took place around the service users and staff.