

Report to the Health Quality & Safety Commission and the Ministry of Health

# Assessment of the implementation of the Productive Ward and Productive Operating Theatre programmes in New Zealand

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## Executive summary

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We visited ten DHBs. Nine have some experience with implementing the Productive Ward: Releasing Time to Care (RTC) programme and eight have experience with implementing the Productive Operating Theatre (TPOT). We provide our summary comments below.

### **Implementation is patchy**

There is considerable enthusiasm for the programmes but implementation is patchy. Changes to streamline the physical environment – as suggested in the foundation modules – are more straightforward. DHBs have not dealt with the process modules well, other than in the most organised cases. Even if the DHBs have attempted to address these modules, they may or may not have used the process. For instance, when medicines administration was being addressed, the medicines module may not always have been properly worked through.

The common theme in all DHBs is the dependence on ward and theatre staff to continue to drive the programme. There was tangible benefit to these staff if there was Board and CEO visibility and support for the programme and some resourcing support, in terms of time being made available to release staff to work through the modules.

Two other areas that appeared highly variable, to the detriment of the programmes, were the measurement and feedback of performance indicators to staff, and the involvement of quality improvement teams responsible for other competing or supporting initiatives.

### **Wholesale support for the programme**

Everyone that we met felt that both programmes are well worth doing. Even at one DHB where the Productive Ward programme was started and then stopped, the ward staff felt that the programme had been worth doing and were able to identify continuing benefits arising from partial implementation.

Anyone who implements the programmes will immediately talk about the change in staff behaviour and the increased flexibility, better morale and more proactive stance of nursing and theatre staff. The degree to which this is sustained, however, has been variable among the DHBs – often because of restructuring and staff departures.

### **A lack of programme support has not helped**

The nature of the roll out of the Productive Ward programme has not helped. The project was started relatively organically and the DHBs were, therefore, generally underprepared. TPOT suffered similarly by an under-estimation of the work required (realistically a three to five year implementation period) even though there was more structure and some critical seeding money. Systematic programme issues such as the involvement of medical staff were not addressed at a programme level but, rather, left as issues at DHB level.

### **Organisation-wide support often an issue**

The programmes are extremely popular with the staffs who participate. All of the interviewed staff talked positively about the programmes. But all have expressed frustration with getting buy-in other departments within their organisation, such as facilities, information technology, pharmacy and, most importantly, medical staff.

With TPOT, even if there is a strong clinical champion, securing real teamwork between surgeons, anaesthetists and theatre nurses, and managers, appears difficult. Scheduling is the module that DHBs have struggled with most because of the interactions between departments and with medical staff; most felt that they would not have the support to break through existing blockages in attitudes. This is where we need performance data at theatre and clinician level, along with strong medical champions to succeed.

### **Training is variable among boards**

Some boards provide Six Sigma training. Some provide Accelerate training. Other than Auckland, boards do not appear to be trying to bring these disparate programmes together.

Further, some of the charge nurses participating in the Productive Ward were not aware of the “house” of modules – a product of a self-management approach to implementation. Although the programmes are designed to be self-directed, putting in some programme support in (e.g. leading a module to learn process mapping, cost benefit analysis, gap analysis and how to close the gap) assists with module progress and leads to better measurement.

Another observation was that middle managers need some targeted support to understand and accept the programme, as much as the executives and the clinical leads.

### **Common success factors**

Those DHBs experiencing success with the programmes have some vital common features:

- stronger leadership, from the board, the executive and front-line management;
- a more structured programme roll-out plan, with clear accountability and reporting;
- being able to use training budgets laterally to release staff to work through modules.

Organisations that have unified quality and change approaches seem to have made the combination of projects more relevant to staff and to have reinforced each aspect of the otherwise competing programmes. They typically exhibit greater structure around their change management programmes. They are also more easily able to identify the resources needed to support these programmes. We were likely to see a structured plan, regular milestone check-ups, and a sense of pace to roll out the modules in a timely manner.

### **Measurable benefits**

Available performance information from DHBs suggests there are likely to be real benefits in the quality and efficiency of care and in staff satisfaction arising from participation in the Productive Ward. Although conclusive attribution is not possible, there is a strong enough association with those wards implementing the programme well to conclude the following:

- responses in satisfaction surveys, suggesting staff find their environment is better organised, with more time to spend with patients, and a clear vision for the ward team;
- improved ward documentation and standardised processes to reduce the risk of medication errors and patient falls – with measurable results in some wards; and
- a gain of almost one-fifth of nursing time is possible. Wards at Waikato Hospital experienced an average gain in direct care time of 19 percentage points, off an average baseline of 33%. This gain is comparable with an NHS study (18 percentage points).

Impacts of the Productive Operating Theatre are generally harder to pin down. A number of boards showed signs of higher theatre utilisation, although the data appears volatile and improvements are not always fully sustained. Caution is required, as the time periods available are mostly barely longer than a year and it is unclear if seasonable factors are at play

Direct cost savings, albeit modest, are visible and attributable to TPOT. Many DHBs provide some estimate of cost savings from better management of clinical supplies, from improved segregation of medical waste, and from time savings due to the use of electronic patient status boards. Estimate of these savings typically ranged up to \$70,000 per site with one outlier of \$300,000 in savings. Clearly, to breakeven with the implementation costs – which we estimate to be \$400,000 over three years for a medium size hospital with seven theatres – greater savings need to be sourced from increased productivity.

Our top-down look at year on year throughput gains suggests TPOT participants have done relatively well. DHBs increased elective surgery nationally by 10.6% (equivalent to 14,600 discharges) between 2009/10 and 2011/12, whereas the initial tranche of eight DHBs starting the Productive Operating Theatre in 2009 had combined growth of 14.5% (DHB domicile perspective) and 15.9% (DHB provider perspective).

Clearly, there are issues of attribution. Other factors, such as electives targets, other change initiatives, and scheduling challenges are likely to have impacted on hospitals in different ways. But a positive effect from TPOT cannot be ruled out, given findings from the interviews that the programme encourages new approaches to managing scheduling and to find ways to improve patient attendance.

## **Weighing up costs and benefits**

We model implementation costs for the Productive Ward and conservatively estimated financial benefits for a medium size hospital with 14 wards and 20 beds. Our conclusion is that the financial benefits – largely the value of increased nurse time for direct care, supported by savings in stock management – are likely to outweigh implementation costs by a ratio of approximately 8 : 1. The net present value of the investment over ten years is estimated at approximately \$1 million per ward, or nearly \$14 million for the hospital.

As for TPOT, a definitive answer about the value for money of the initial contribution from the Ministry of Health is not possible because the visible benefits are not straightforward to quantify or to attribute to the programme. However, the funding of programme licences was often cited as an attraction for participating DHBs, along with TPOT's structured approach.

The seed funding also tended to be used to fund programme facilitators, who often proved critical in helping staff to work through modules and in driving changes to the physical environment. Without that contribution, it is unclear if DHBs would have funded the role or taken on the programme. In some cases, that role was disestablished when the funding ran out, even though DHBs generally found the timeframe for implementation was too short. We would also note that clear benefits from the programme include improvements in staff morale, better organised workplaces, and a mindset shift in terms of staff feeling more empowered to look at issues around on-time starts, scheduling and theatre utilisation, patient attendance, and internal coordination among teams within the perioperative environment.

As the benefits of the Productive Operating Theatre are less straightforward to model, we therefore estimate implementation costs over three years at a medium size hospital with seven theatres. We then calculate the number of 'lost' or cancelled surgical sessions to be

avoided if the programme is to at least financially breakeven. The intuition is that, based on interviewee comments, TPOT can help change mindsets around session scheduling and improve systems for ensuring patient attendance. Our conclusion is that it is feasible that TPOT would easily pay for itself – if reductions in cancelled sessions number between 8 and 16 per year over a three-year implementation in a medium size theatre suite.

## **Revitalise?**

Despite the best efforts of many within DHBs, there is little depth and insufficient breadth in the current programmes. Therefore, as the current champions leave or move into other roles, or as senior management is disrupted by restructurings, the programmes falter significantly. If the programmes are to be revitalised:

- A decision is needed as to whether there is a commitment to the programme at a national level or just at a local level;
- If there is commitment at a national level, then a stronger programme management framework is required. This framework could include staff forums, conference calls, and a clear comparison of how DHBs are doing against expectations – in terms of module roll-out and in terms of impacts on the quality and efficiency of care;
- A set of standardised key performance indicators across both programmes is needed, covering impacts on the quality and efficiency of care. These would need to have common definitions to improve comparability, and be regularly reported on;
- Chairs and CEOs would need to be on board to ensure whole-of-DHB support.

Everybody has talked about the need to celebrate the success and to build the inter-DHB learning environment. This could be an easy win. DHBs need to learn to recognise, and celebrate, and to connect staff together. This would help theatre and ward staff to connect and share common issues, and help improve the interface between their work places.

A range of DHBs have elements that make them suitable for demonstration sites, or at least suitable for sharing specific innovations more widely. For the Productive Ward, we were generally impressed by Waikato and Bay of Plenty. Both have a strong programme management function, monitoring of widespread roll-out against plan, and systematic processes for capturing and reflecting back performance data in an accessible form.

In terms of the Productive Operating Theatre, Southland Hospital in Invercargill is innovating by providing comparable feedback directly to surgeons, in terms of the performance of their sessions against key indicators. Waitemata and Auckland are two boards that have made progress with their systems for session scheduling. Hutt is innovating with an electronic status board that is available across the perioperative environment.

Above all, the programmes should be seen as a long-run investment. While it is possible to set targets to deliver higher volumes, there need to be ways of empowering staff to rework their environments and care processes beyond just working harder and faster. This is the strength of the programmes – they have the potential to give front-line staff the skills to systematically think through what quality and efficiency improvements are required and how those changes should be enacted and their gains embedded.

# 1. Introduction and our approach

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## 1.1 Background to this assessment

The Productive Series was developed by the NHS Institute for Innovation and Improvement in the United Kingdom to support health providers to redesign and streamline the way in which they work. In 2009, the Ministry of Health supported the introduction of two Productive Series programmes into District Health Boards: the Productive Ward and the Productive Operating Theatre.

The Health Quality & Safety Commission commissioned Sapere Research Group to carry out an independent assessment of the implementation of these programmes to inform their future direction in New Zealand. Two directors of nursing from Nottingham University Hospitals NHS Trust with expertise in the implementation of the Productive Series, Jenny Leggott and Kerry Bloodworth, were also invited to join the assessment team.

The Commission outlined the key deliverable as being a report that covers:

- (a) a description of the scope and depth of implementation;
- (b) the costs of implementation, including licence fees and training;
- (c) the evaluation framework used by DHBs and ways it could be strengthened;
- (d) the benefits, including staff time released, patient safety, and productivity gains;
- (e) the main barriers to successful implementation;
- (f) lessons learned through implementation (including clinical governance models) and ways that this could be shared more broadly;
- (g) identifying potential demonstration sites; and
- (h) DHB plans for expansion and options for how this can be supported.

The National Health Board contributed funding to the assessment and identified issues for consideration, with the focus being on the Productive Operating Theatre programme.

- (a) What direct cost savings have been identified?
- (b) What productivity gains have been identified in terms of resources utilisation and output, or other relevant factors?
- (c) Have any costs savings and productivity gains been reflect in the DHB's financial performance? If not, why not?
- (d) Have any costs savings and productivity gains led to operational changes to capture the gains on a sustainable basis? If not, why not?
- (e) Does the DHB have adequate means of analysing such cost savings and productivity gains, and if not, what are the recommended steps to be taken to acquire such means?

## 1.2 Our approach

We have used a ‘mixed method’ approach, making use of published material, site visits with qualitative interview-based research, and quantitative analysis. More specifically, our approach includes the following elements:

- a review of existing literature and evaluation reports of the Productive Series in the National Health Service in the United Kingdom and elsewhere;
- a review of available programme reports completed by DHBs;
- a series of site visits to ten public hospitals to interview clinical and managerial staff and to observe changes to clinical environments;
- analysis of existing performance indicators collected by DHBs; and
- weighing up information about costs and potential financial benefits.

The site visits involved a series of meetings and semi-structured interviews with those leading the implementation of each programme. Interviews were typically with the director of nursing, quality improvement manager, service managers and programme facilitators.

Where the implementation of the Productive Ward was being assessed, the site visit usually included a tour of two or three wards with discussions with clinical nurse managers. Points of interest on a tour often included the boards displaying the ward’s vision and performance, as well as the equipment room, medication room, sluice room and staff office.

In the case of the Productive Operating Theatre, the site visit included a tour to one or two theatre suites, and included interviews with the theatre manager, service manager, and a clinical lead for the programme – typically an anaesthetist.

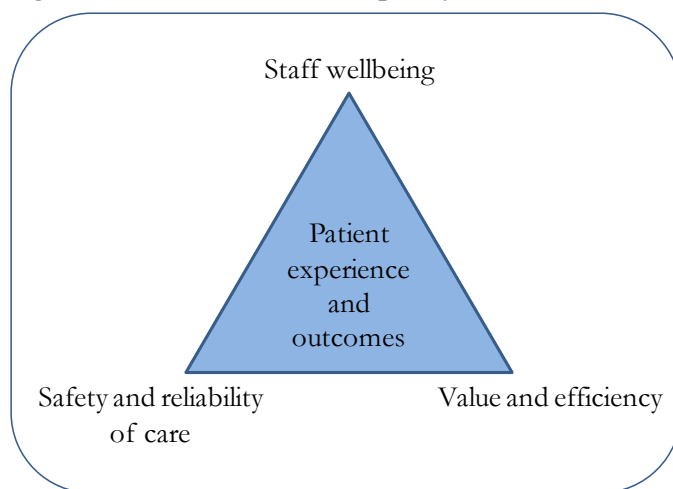
Two supplementary visits were arranged after the initial series of visits (Southland Hospital and Gisborne Hospital) to complete the set of the initial eight DHBs implementing the Productive Operating Theatre programme. These supplementary visits were conducted by David Moore and tended to be somewhat shorter in duration than the initial series.

## 2. Background to the programmes

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The Productive Ward and Productive Operating Theatre are part of the Productive Series, designed and piloted by the NHS Institute. Both programmes are built around a series of modules designed to give frontline staff – in wards and operating theatres – the knowledge and practical tools to transform their workplaces and processes. The aim is to deliver long-term cultural change within organisation, built around four common objectives shown in Figure 1.

**Figure 1: Four dimensions of quality**



**Source:** NHS Institute

### 2.1 Productive wards came first

The Productive Ward programme, also known as *The Productive Ward: Releasing Time to Care*, uses a lean approach to maximise the efficiency of care. Lean thinking, which has its origins in the Toyota Production System, involves systematically examining and redesigning processes to improve quality, and efficiency. Applying a lean approach to health care involves identifying and reducing waste and streamlining clinical environments and processes to release time to meet patient needs.<sup>1</sup> The Productive Ward draws on this approach by giving ward teams a structured approach to examining current practices and identifying improvements and to:

- increase the proportion of time nurses spend in direct patient care;
- improve patient safety and quality of care;
- improve staff morale; and
- change the use of ward spaces to improve efficiency in terms of time and effort.

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<sup>1</sup> Jones and Mitchell (2006); Fairbanks (2007); Crump (2008)

These changes are also intended to result in financial savings by eliminating waste and making processes more efficient (NHS Institute (2010; and 2012).

A ward team begins the Productive Ward by attending a launch day, where the approach and structure of the programme is discussed and staff develop their vision for their ward to be –often a useful team-building exercise. Staff then volunteer to attend workshops to work through each module, one at a time, and to generate and implement improvements. Each ward progressively works through the modules, with support from a central programme team.

The programme contains a number of modules, depicted in Figure 2 as the Productive Ward “house”. As well as providing guidance for ward leaders, programme facilitators, and executive management, there are three foundation modules for ward teams to begin with.

- *Knowing How We Are Doing* – establishes measurement systems that provide timely, accurate and useful to ward staff. The aim is help staff understand and benchmark ward performance and to make decisions on what to do to improve performance.
- *Well Organised Ward* – aims to increase the proportion of time spent delivering care and to improve patient and staff experience. Provides guidance for simplifying the workplace and reducing waste by having everything in the right place, at the right time, ready to go.
- *Patient Status at a Glance* – focuses on the use of visual management to display important patient information so that it can be updated regularly, seen at a glance and used more effectively. This covers information relating to shift handovers; patient journey from admission to discharge; and optimising the use of patient boards.

The foundation modules tend to lead to immediate and visual gains that are tangible and so tend to be popular with staff. After implementing the foundation modules, wards move on to modules that deal with processes, such as admission and discharge procedure, shift handovers and meals. Summary descriptions of these modules are outlined in Table 13 in Appendix 1

**Figure 2: The modules of the Productive Ward programme**



Source: NHS Institute



## 2.2 TPOT to address a multi-disciplinary environment

The Productive Operating Programme, also known as *The Productive Operating Theatre: Building Teams for Safer Care* and often just referred to as “TPOT”, came after the Productive Ward programme and was launched in the NHS in September 2009. TPOT is aimed at helping surgical theatre teams to work more effectively together to improve:

- the quality of patient experience;
- the safety and outcomes of surgical services; and
- the effective use of theatre time and staff experience.

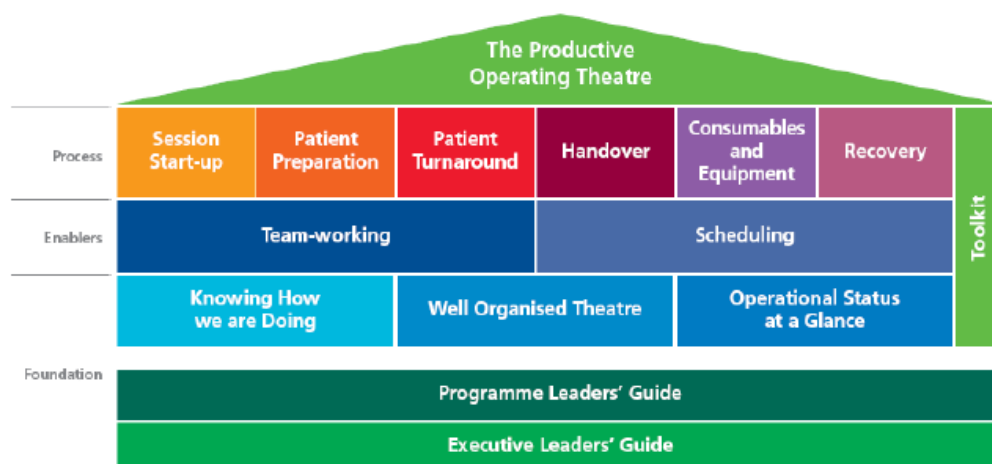
The NHS Institute points out that the benefits of the programme arise from the fact that theatre teams themselves – including surgeons, anaesthetists, and nursing staff – identify the problems and implement solutions that are more likely to be relevant and sustained. The focus on quality and safety is also intended to help theatres to be run more productively and efficiently, thereby leading to financial savings.

TPOT begins with the multidisciplinary theatre team participating in a ‘visionary workshop’ to identify obstacles to running the ideal operating list. As with the Productive Ward, staff then work through a series of modules. Figure 3 shows the TPOT “house” has three layers, which are worked through in sequence:

- Foundation modules – modules on Knowing How We Are Doing, Well Organised Theatre, and Operational Status at a Glance;
- Enabler modules – two modules on Team-working, and Scheduling;
- Process modules – six modules Session Start-up, Patient Preparation, Patient Turnaround, Handover, Consumables and Equipment, and Recovery.

Summary descriptions of these modules are outlined in Table 14 in Appendix 1

**Figure 3: The modules of the Productive Operating Theatre programme**



Source: NHS Institute

## 2.3 An emerging evidence base

The emerging body of evidence from the NHS and elsewhere suggests that the Productive Ward and Productive Operating Theatre programmes can deliver significant benefits for staff, for patient care, and for organisation resource use, if implemented as intended

### 2.3.1 Evidence on Productive Wards

The NHS Institute conducted a survey of NHS Trusts in 2009 as part of an initial review into the impact of the Productive Ward programme. The majority of respondents reported measurable improvements as a result of their participation, with the general themes being that it had led to better teamwork and a better organised and calmer work environment. The most tangible outcomes for staff were time savings from more efficient work practices and a corresponding increase in direct care time.

A rapid impact assessment conducted by NHS Institute in 2011 provides further evidence. The assessment looked at nine NHS Trusts implementing Releasing Time to Care between 2007/08 and 2009/10 and found that the programme was associated with improvements in staff satisfaction, improvements in patient care, reduced harm events and reduced same-diagnosis readmissions. Productivity and financial benefits arose from reductions in bed days, reductions in unplanned staff absences and reductions in stock held. The proportion of nursing time available for direct patient care time increased, on average, from a baseline of 42.5% to 60.2%. Infection rates for MRSA and C-diff infections declined, on average, by 30% and 18%, respectively.

The limited number of other studies, from within the NHS and elsewhere, show results that are consistent, or at least partially consistent, with these findings. Nottingham University Hospitals Trust has been rolling out Releasing Time to Care across 92 wards across two hospital sites. The Trust has reported positive impacts across the indicators of patient safety and the reliability of care that were collected for display in wards, as part of the Knowing How We Are Doing module (Bloodworth, 2011). Participating wards reported downward trends in patient falls, in the prevalence of pressure ulcers, and in infections associated with cares. Direct care time increased from the average baseline of 26% of a nurse's shift to an average of 52%.

The Centre for Healthcare Quality Improvement conducted a pilot of Releasing Time to Care at four acute care organisations in Ontario Canada, between November 2009 and August 2010. Significant improvement was recorded in the reliability of charting patient observations and in incidence of MRSA and C-diff infections and pressure ulcers. Promising results were also observed with respect to patient satisfaction and unplanned staff absence rates. No improvement was recorded in direct care time or length of stay, although the relatively brief pilot period may have been a limiting factor.

Regular collection and reporting of impact measures can be a challenge at times. Healthcare Improvement Scotland (2012) conducted a stocktake of the programme within NHS Scotland, where it has been voluntarily adopted by all boards since 2009. The stocktake found wide variation around the information that is collected and in how teams use it to make changes. It recommended that hospital leaders ensure that data is made available, so that staff can see the immediate and direct impact of making changes in their working practices and use the data to drive further improvements.

## 2.3.2 Evidence on Productive Operating Theatres

Published evidence on the impacts of TPOT appears slightly less developed, at this point, than that on the Productive Ward programme. As the programme continues to be implemented across the NHS, work continues to be done on measuring the impact. The NHS Institute outlines the key impacts emerging from NHS development sites as being:

- improved team working and communication between theatre staff,
- contributing to safer and more efficient working practices and reduced errors;
- improved start time and turnaround, session uptake and utilisation and staff wellbeing;
- improved patient experience and outcomes; and
- financial savings with waste elimination and more efficient processes.

Case studies from NHS Trusts provide more specific examples of these impacts. Central Manchester NHS Foundation Trust was able to demonstrate a statistically significant improvement in staff attitudes regarding team work climate, safety climate and job satisfaction. This was associated with implementing team briefings and debriefings in theatres. Similarly, Gateshead NHS Foundation Trust found that staff absence rates halved, from 6.6% to 3.2% since implementation of the programme. The reduction is attributed to increased morale in theatres and to improved awareness of staff absence rates gained from displaying the rates on the Knowing How We Are Doing board. The Heart of England Foundation Trust reported a range of efficiency improvements, such as a 63% reduction in average turnaround times, a 25 minute reduction in average start times; and session utilisation improving from 90% to 99%.

Financial evidence involves direct savings as well as efficiency gains. The NHS Institute (2009) guide for financial teams refers to a “compelling financial argument” and suggests that the average NHS Trust (i.e. with 16 operating theatres) could expect an efficiency saving opportunity of more than £7 million, based on savings examples from trusts:

- one-off savings on from a reduction in consumable stock of £320,000, with annual recurrent savings £40,000 per year;
- improved session utilisation – the greatest opportunity for efficiency gains, given the high running costs for an operating theatre (cited at approximately £1,200 per hour, on average). Appointing a dedicated orthopaedic scheduler improved session utilisation at one Trust from 87% to 97%. For an average trust a 10% improvement generates the following of £330,000 per month, £3,960,000 per year

Other examples related to increasing total contact time by ensuring sessions for operating lists start and finish on time and reducing the rejection or glitch rate for sterilised equipment.

The NHS Institute also cites benefits that are less easy to quantify financially, in particular, reducing errors or complications can lead to reduced length of stay, reduced drug expenditure, reduced admissions to intensive care units.

### 3. New Zealand implementation

The Ministry of Health purchased licences for the Productive Ward programme and issued licences to 14 DHBs that volunteered to implement the programme. Similarly, 12 licences were issued to the 12 DHBs volunteering to implement the Productive Operating Theatre programme. Table 1 shows the DHBs volunteering for each programme.

**Table 1: Productive Series programme licenses issued to District Health Boards**

District Health Board	The Productive Ward – Releasing Time to Care	The Productive Operating Theatre
Auckland	Yes	Yes*
Bay of Plenty	Yes	Yes*
Canterbury		
Capital & Coast	Yes	
Counties Manukau		
Hawke's Bay	Yes	Yes*
Hutt Valley	Yes	Yes*
Lakes		
MidCentral	Yes	
Nelson Marlborough	Yes	Yes
Northland		Yes
South Canterbury	Yes	Yes
Southern		Yes*
Tairāwhiti	Yes	Yes*
Taranaki	Yes	Yes
Waikato	Yes	
Wairarapa	Yes	
Waitemata	stopped	Yes*
West Coast		
Whanganui	Yes	Yes*

**Source:** Ministry of Health

\* Denotes the DHB was part of the initial tranche of TPOT licenses issued.

### 3.1 Ten DHBs were visited

Table 2 shows the hospitals visited and the programmes assessed. The sites were determined by two factors: a desire to focus on the initial tranche of eight DHBs implementing the Productive Operating Theatre programme; and logistical considerations, given that the UK members of the assessment team were visiting New Zealand for two weeks.

**Table 2: District Health Board sites visited by the assessment team**

Date (2012)	Site visited	Programme assessed
23 October	Auckland Hospital, Auckland DHB,	RTC, TPOT
24 October	North Shore Hospital, Waitemata DHB	TPOT
25 October	Tauranga Hospital, Bay of Plenty DHB	RTC, TPOT
26 October	Waikato Hospital, Waikato DHB	RTC
29 October	Wanganui Hospital, Whanganui DHB	RTC, TPOT
30 October	Hutt Hospital, Hutt Valley DHB	RTC, TPOT
31 October	Hawke's Bay Hospital, Hawke's Bay DHB	RTC, TPOT
1 November	Wellington Hospital, Capital & Coast DHB	RTC
<b>Supplementary visits</b>		
5 December	Southland Hospital, Southern DHB	TPOT
20 December	Gisborne Hospital, Tairāwhiti DHB	RTC, TPOT

### 3.2 Variable progress by DHBs

Table 3 and Table 4 show the commencement of modules in the Productive Ward and Productive Operating Theatre, as reported by DHBs to the Ministry of Health. Following the site visits, our impression is that these summaries tend to suggest the extent of role out is greater than the reality. These tables show where a module has been commenced by a ward or theatre within a hospital.

Of the DHBs visited during this assessment, the DHBs that have made the most progress in implementing the Productive Ward modules across their hospital wards would be Waikato and Bay of Plenty. Generally, the foundation modules were simpler to implement, as they tend to produce visible, tangible results relatively quickly, where as the process modules take more time to determine, agree and embed new ways of working.

For the Productive Operating Theatre, the picture is less clear, but our sense is that the boards that have made notable progress in working through the modules would be Waitemata, Bay of Plenty, Hutt, and Southern (Southland Hospital).

**Table 3: RTC module commencement within District Health Boards**

DHB	Foundation modules			Process modules							
	KHWD	WOW	PSAG	Shift handovers	Admission & discharge	Meals	Medicines	Ward round	Patient hygiene	Patient observation	Nursing procedures
Bay of Plenty	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Waikato	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Auckland	Y	Y	Y	Y	Y	Y	Y	Y	Y		
Hawkes Bay	Y	Y	Y	Y	Y						
Capital and Coast	Y	Y	Y		Y						
MidCentral	Y	Y	Y	Y							
Taranaki	Y	Y	Y			Y					
Whanganui	Y	Y	Y	Y							
South Canterbury				Y		Y	Y				
Tairāwhiti	Y	Y	Y								
Wairarapa	Y	Y									

**Source:** Ministry of Health

Information supplied to the Ministry of Health by District Health Boards. Not all wards within a hospital would have commenced or completed modules recorded as having been commenced at that Board.

**Table 4: TPOT module commencement within District Health Boards**

DHB	Foundation modules			Enabler modules		Process modules				
	KHWD	WOT	OSAG	Team Working	Scheduling	Session Startup	Patient Preparation	Handover	Consumables & Equipment	Recovery
Bay of Plenty	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Hawkes Bay	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Hutt	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Southern	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Tairāwhiti	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Waitemata	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Whanganui	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Auckland	Y	Y	Y	Y	Y	Y	Y		Y	
Northland	Y	Y	Y	Y						
Taranaki	Y	Y	Y	Y						
Nelson Marlborough	Y	Y	Y							
South Canterbury	Y	Y	Y							

**Source:** Ministry of Health

Information supplied to the Ministry of Health by District Health Boards. Not all operating theatres within a hospital would have commenced or completed modules recorded as having been commenced at that Board.

## 4. A site level view of implementation and benefit

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We make a number of observations and comments on the programmes as they were implemented in New Zealand. Real gains are certainly being obtained, in terms of improved staff well-being, patient satisfaction, quality of care and efficiency of care. At a high level, the more that a DHB has been able to put into these working through the modules – including of leadership, resourcing, and time and effort – the more that DHB has reaped a reward, in terms of an improved physical environment and more orderly, streamlined care processes.

### 4.1 Productive wards: a powerful underpinning for organisation change and leadership

We observed that the productive ward programme is a nurse oriented programme that has significant appeal to nursing workforces and which is a major enabler for hospital service providers. The programme can be implemented around medical staff, with the support of the executive team, and has significant appeal to nurse leaders, other senior nurses and to nursing and other ward staff. This significant appeal is based on the programme’s ability to apply lean tools, together with teambuilding tools, and to express those tools in the context of fundamental nursing processes (medication administration, bed rounding, etc).

The appeal is based on three aspects of the programme:

- a general improvement in the ward environment leading to improved performance in terms of direct patient time and other quality of care indicators;
- cost reductions and time savings;
- the ability to gain quick wins and, vitally, to empower nurses “on the shop floor” to take charge of their involvement and lead and support a change agenda.

#### 4.1.1 Observed benefits of the programme

By the end of the visits, the assessment team was readily able to discern a ward where the programme had been significantly implemented – and one where it had not. The immediate impression in the former case is of greater calmness reinforced by a high level of organisation and tidiness, and well-attended patients. Specifically, we observed the following:

- staff satisfaction, in terms of feeling genuinely empowered to suggest improvements to the environment and systems in their workplace;
- improved workflow, from tidier workplaces and reworked processes (e.g. patient status boards, standardised handovers) with consequent reduction in stress and in time wasted;
- the quality of services received by patients, such as reduced waiting times for surgery (including fasting times), reductions in patient falls, infections, and medication errors; and
- direct financial savings, through better management of clinical supplies and equipment.

The net effect of these specific factors was, at least in one DHB, borne out in increased acuity being managed, with a decreasing average length of stay, with the same number of staff, but with fewer registered nurses and more health care assistants.

There was another equally important but less measurable benefit. We observed in several DHBs that senior management was able to connect far more closely with the “shop floor” and could get a much better view of nurse leadership and accountability, as well as any system roadblocks that need to be attended to.

We also observed other significant gains, for example:

- an increase in direct care, arising from streamlined processes, reductions in time spent looking and from fewer interruptions. The scale of the improvement in nursing time spent with patients was often from a baseline of around 20-30% to around 50-60%; and
- easier and better implementation of safety programmes around falls reduction, safe medication administration and infection reduction, with associated improvements in quality of care indicators.

#### 4.1.2 Success factors

The site visits also revealed a number of factors common to boards making progress with the programme. The executive role in supporting the programme appears to be crucial. Boards that had most the most progress, had a leadership that displayed commitment in the form of articulating the direction and following through with resources (often in response to a business case), required accountability in the form of regular reporting to a steering group with executive representation, and displayed visibility by regular visits to wards.

A summary list of other common success actors is outlined in the box below.

##### **Some success factors for Releasing Time to Care**

- Full support from the DHB executive team
- Active involvement of the executive team in walk arounds and development of nurse leadership
- Dedicated programme support
- A structured programme of module roll-outs and reporting
- Lateral use of training budgets
- Strong expectations of improvement particularly quality improvement, and
- Strong nurse leadership in the ward.



Figure 4: Ward vision statements, Wards 8 and 14, Waikato Hospital

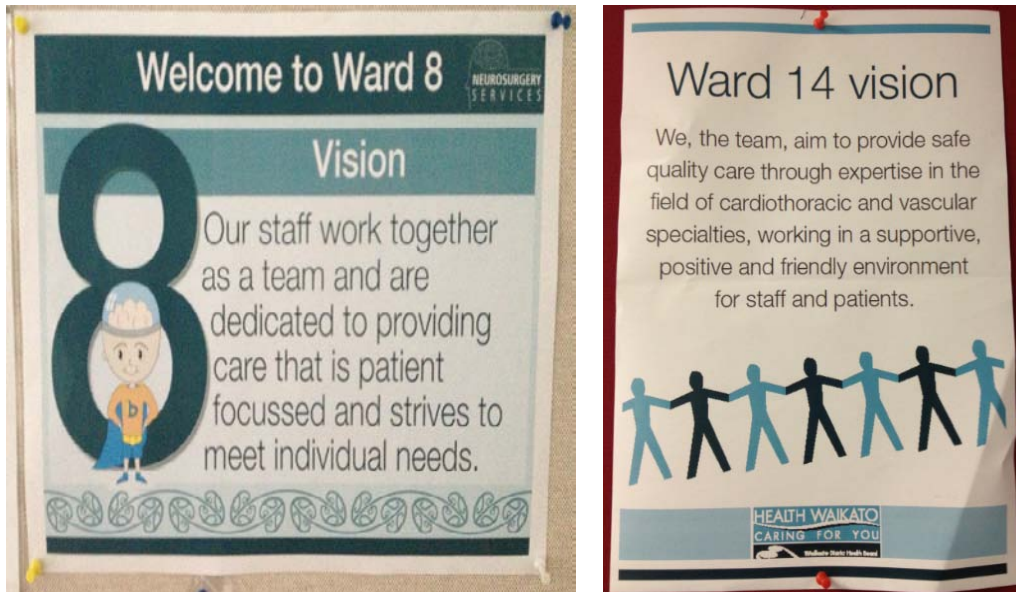


Figure 5: Knowing How We Are Doing, Ward B2, Hawke's Bay Hospital



## 4.2 Operating theatres are more difficult to make productive but the effort is worth it

Many interviewees indicated that they had entered TPOT after success with RTC. However, they found the going more difficult. Whereas the Productive Ward can largely be implemented by the nursing staff; the Productive Operating Theatre requires teamwork between theatre nurses, scheduling staff, anaesthetists and surgeons.

This coordination challenge can make implementation more difficult. There is clear participation in the programme from theatre nurses and notable involvement with anaesthetists. But there is distinctly less involvement with surgeons. Even if there is a strong clinical champion, genuine teamwork between surgeons, anaesthetists and theatre nurses, and managers, is difficult and appears to be the exception rather than the rule.

Scheduling is the module that DHBs have struggled with most because of the interactions required between departments and with medical staff; most felt that they would not have the support to break through these difficulties.

### 4.2.1 TPOT seen as an enabler of increased volumes

Nevertheless, many of the staff interviewed definitely felt TPOT had definitely contributed to a mindset shift that enabled service improvements and increased elective volumes. This includes new approaches to managing scheduling and a focus on finding ways to improve patient attendance. However, we note that several management interviewees were more focused on improving service flow and could not fully understand the close focus on operating theatres.

Attributing sector productivity gains to TPOT is more difficult because of the high level of other activity going on at the same time. External goals are also important. Both productive programmes were clearly intersecting with external goals being set by different parties in the sector. The push to increase volumes to meet elective targets was an important driver of change, for example, a board direction at Waitemata to in-source elective volumes. There was also considerable knowledge spill-over from, for instance, a sector-wide push to improve scheduling.

### 4.2.2 National roll-out was structured but too short

DHBs found the roll-out of TPOT by the Ministry of Health to be better structured than that of RTC. The interviewees liked that there was a contract and an expected deliverable – a final report. Boards used the funding for a programme facilitator in the short term but, after the funding ran out, the position often disappears. This generally led to difficulties in continuing TPOT beyond the end of the contract. Boards found the contractual period to be too short to complete TPOT and some ended up cutting corners to try to meet the needs of the contract. The visiting UK experts agreed the implementation period was too short, particularly as the process-based modules take time. Implementation should realistically be seen as three to five years.

Deployment appears patchy. All DHBs running one of the programmes had a group of motivated staff; but only a small subset of those DHBs appears to have sufficient executive leadership and support for the programme. A small number of DHBs do not appear to be deploying their programme in a systematic way, with no real depth or breadth of implementation. As the champions leave or as senior management is disrupted by restructurings, the programme falters.

### **4.2.3 Measurement appears incomplete, non-standardised**

We did not find the range of readily available indicators that we would have expected. The Ministry of Health contract specified three efficiency-focused indicators: percentage of on-time surgical operation starts, operating theatre utilisation, and patient turnaround times. It was not clear that these follow any national definition. These were sometimes displayed in wards and were found in almost all of the DHB programme reports to the Ministry. But we would also have expected to see other performance measures being more commonly collected and reported to staff – relating to other core programme objectives of improving patient experience and outcomes, safety and reliability of care, and team working and staff wellbeing.

### **4.2.4 Common challenges raised**

The most common challenges cited by staff we interviewed included:

- a lack of dedicated facilitation resource;
- a lack of resource to enable time away from front-line services to work on modules;
- a lack of leadership from management and executive team; and
- a lack of clinical involvement .

These issues were not always the case in each DHB. A small number of DHBs do not appear to be deploying their programme in a systematic way.

### **4.2.5 A variable relationship with medical staff**

Another issue is the relatively permissive approach to allowing surgeons to work in public and private practice. This can impede productivity and can lead to more weight on surgeon priorities less priority on patient needs. One DHB reported that it fed session performance data directly to medical staff, suggesting that this step is possible, although most other DHBs appear to have shied away from doing so.

We are clearly finding our way with theatres. The most expensive resource in a theatre (including the capital cost of the theatre itself) is the cost of the surgeon. A close focus on how best to use surgeon time will continue to yield productivity benefits in the foreseeable future.

### **4.2.6 Value for money of seed funding**

A definitive answer about the value for money of the initial contribution from the Ministry of Health is not possible because the visible benefits are not straightforward to quantify or attribute to TPOT. However, we would note that the funding of programme licences was often cited as an attraction to DHBs that chose to participate, along with TPOT's structured approach and tools.

The seed funding also tended to be used to fund programme facilitators, who often proved critical in helping staff to work through modules and in driving changes to the physical environment. Without that funding contribution, it is unclear if DHBs would have funded the role or taken on the programme. In some cases, that role was disestablished when the funding ran out, even though DHBs generally found the timeframe for implementation was too short.

We would also note that clear benefits from the programme include improvements in staff morale, better organised workplaces, and a mindset shift in terms of staff feeling more empowered to look at issues around on-time starts, scheduling and theatre utilisation, patient attendance, and internal coordination among teams within the perioperative environment. If this approach becomes embedded in theatres, the productivity benefits will accrue over time.

#### **Some success factors for the Productive Operating Theatre**

- A performance expectation from the executive management team
- Nurses working with at least one active, clinical champion in a leadership role
- A structured programme of activity
- Support from the theatre management with some dedicated resource allocated within the theatre suite, and
- Some resource to fund time to work through modules and minor capital improvements.

## **4.3 Overall comments on both programmes**

### **4.3.1 These programmes should not be seen as “islands”**

Both TPOT and RTC fit well with other ‘lean’ focused productivity improvement programmes. Also, RTC in particular acts as a foundation for DHBs to implement other management programmes. Unlike other programmes, TPOT and RTC tend to empower staff to such an extent that staff can become much more proactive in addressing organisation-wide challenges.

### **4.3.2 Internal cohesion often appears as an issue**

We typically witnessed strong enthusiasm among nursing staff and ward managers, as well as among executive members that we encountered, such as directors or nursing and chief operating officers. We sometimes observed a disconnection, with middle management not always fully understanding of buying into the programme; this may be as a result of staff turnover in these roles and/or competing budgetary pressures.

Another side of the cohesion issue was that quality improvement teams at DHBs often appeared disconnected from the programmes. This was not always the case, for example Hawke’s Bay had relocated a quality improvement lead onto an office beside the ward floor. We speculate that part of the problem may be more of a TPOT/theatre disconnect from office-based quality teams.

There was often a disconnection between organisation collection of data and feedback to wards, and sometimes vice versa, meaning that DHBs did not always have a full picture of their own ward-level performance against programme indicators.

Furthermore, we observed that the programmes were only rarely connected in with whole of organisation change agendas. This matters for staff to see how it all fits together and not feel inundated with new initiatives with different languages around goals and processes.

### **4.3.3 Training is variable among boards**

Some boards provide Six Sigma training. Some provide Accelerate training. Other than Auckland, boards do not appear to be trying to bring these disparate programmes together.

Further, some of the charge nurses participating in the Productive Ward were not aware of the “house” of modules – a product of a self-management approach to implementation. Although the programmes are designed to be self-directed, putting in some programme support assists with module progress and leads to better measurement (e.g. leading a module to learn process mapping, cost benefit analysis, gap analysis and how to close the gap).

Another observation was that middle managers need some targeted support to understand and accept the programme, as much as the executives and the clinical leads.

### **4.3.4 Celebrating successes**

Everybody has talked about the need to celebrate their successes more and to build the inter-DHB learning environment. This would be an easy, quick win. DHBs need to learn to recognise, and celebrate, and to connect staff together. This would, for instance, help to get theatre staff out of their environment and enable a connection between the theatre and the wards, so that any interface issues can be more easily agreed on and worked through.

## 5. Measuring the impacts

This section looks at quantifiable impacts, drawn from DHB programme reports, examples obtained during site visits, and performance data obtained from DHBs. Our approach is consistent with that recommended in the NHS Institute’s guide to rapid impact assessments, which is to report the full range of benefits before attempt to quantify the financial impacts.

### 5.1 Productive Ward impacts

The core objectives of the Productive Ward, of improving staff wellbeing, patient experience, patient safety and reliability of care, and the efficiency of care, are a useful framework for considering the impacts. Table 5 shows common performance indicators against this framework. Progress against these indicators is often displayed on boards within wards as part of the Knowing How We Are Doing module. We use this framework to examine performance information obtained from Waikato, Hawke’s Bay and Bay of Plenty.

**Table 5: A framework for Productive Ward impacts**

Dimension	Indicators and rationale
Staff wellbeing	<ul style="list-style-type: none"> <li>Unplanned staff absences - happier, more satisfied staff tend to have fewer unplanned absences.</li> </ul>
Patient experience	<ul style="list-style-type: none"> <li>Patient satisfaction survey – a reflection on the quality, safety and dignity of the care being delivered.</li> </ul>
Patient safety <i>and</i> reliability of care – wards choose the indicators of most relevance	<ul style="list-style-type: none"> <li>Patient observations – correctly, on time and actioned patient observations tend to improve responses to clinical deterioration.</li> <li>MRSA and C-diff infection rates – infection control is a key indicator of patient safety.<sup>2</sup></li> <li>Pressure sores – a measure of patient and staff safety risk.</li> <li>Patient falls – a measure of patient and staff safety risk.</li> </ul>
Efficiency of care	<ul style="list-style-type: none"> <li>Direct care time – increases the chances that the quality of care will improve or remain at a high standard.</li> <li>Patients discharged on agreed date – indicates better planning and gives patient and carers more certainty.</li> <li>Length of stay – reflects patient flow and impacts on ward costs.</li> <li>Ward cost per patient stay – longer-term efficiency measure.</li> </ul>

**Source:** adapted from *Releasing Time to Care: The Productive Ward – Knowing How We Are Doing*

<sup>2</sup> MRSA is methicillin-resistant staphylococcus aureus, commonly referred to as a ‘staph germ’; C-diff refers to clostridium difficile infections, typically affecting older adults in hospitals after use of antibiotic medications

### 5.1.1 Staff wellbeing

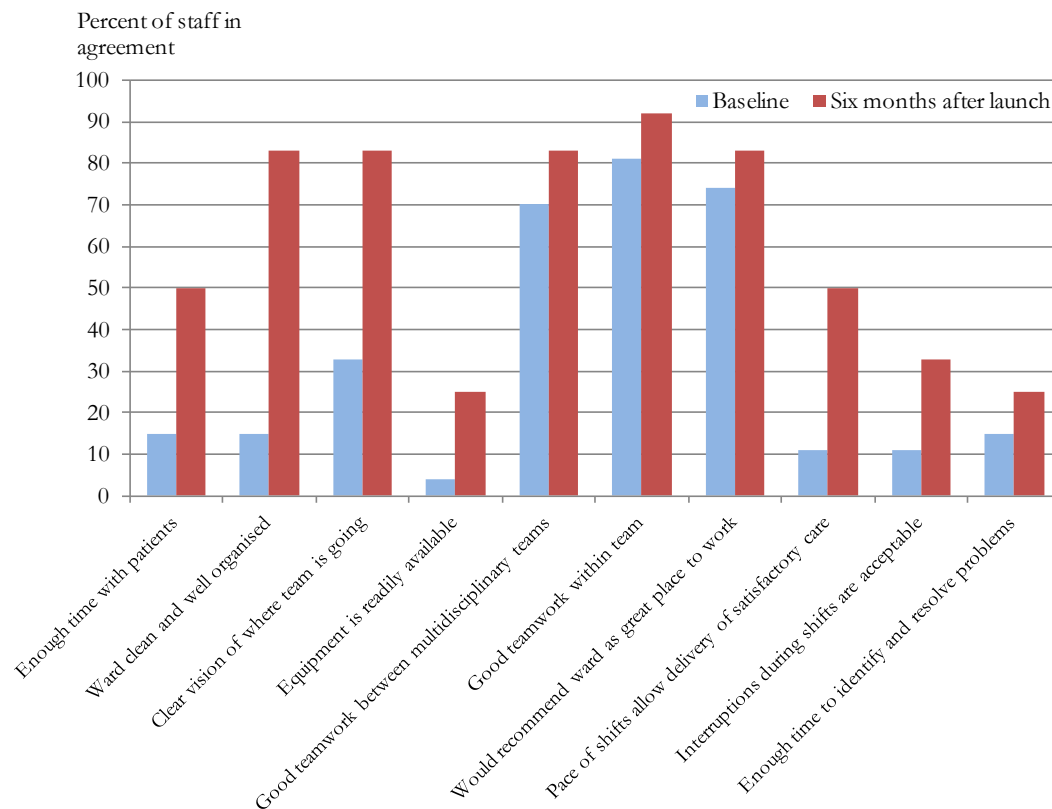
Evidence suggests that participation in the programme improves staff job satisfaction. Staff at Waikato Hospital completed a survey before and after starting on the programme. The DHB reported that staff felt more involved in the organisation of the ward and felt that equipment was more readily available when needed. Bay of Plenty DHB reported improvements in the level of trust and commitment among staff in the showcase ward at Tauranga Hospital during their first year of participation. However, reported reductions in staff turnover appear more difficult to distinguish from changes in the economic climate.

Programme dashboards from Hawke’s Bay DHB also show an improvement in overall staff satisfaction for the two showcase wards. Results from two surveys from one showcase ward, an acute medical ward at Hawke’s Bay Hospital, provide more detail. Figure 6 shows increases in the proportion of staff in agreement with each statement, in particular to:

- “I spend enough time with my patients” – an increase from 15% to 50%;
- “Our ward is clean and well organised” – an increase from 15% to 83%; and
- “Our team has a clear vision of where it is going and how it is going to get there” – an increase from 33% to 83%.

These findings are consistent with those reported by the NHS Institute, which found improved job satisfaction to be a key impact that was emphasised by most interviewees.

**Figure 6: Staff survey results – selected ward at Hawke’s Bay Hospital**



Source: Hawke’s Bay DHB (2011)

### 5.1.2 Patient satisfaction

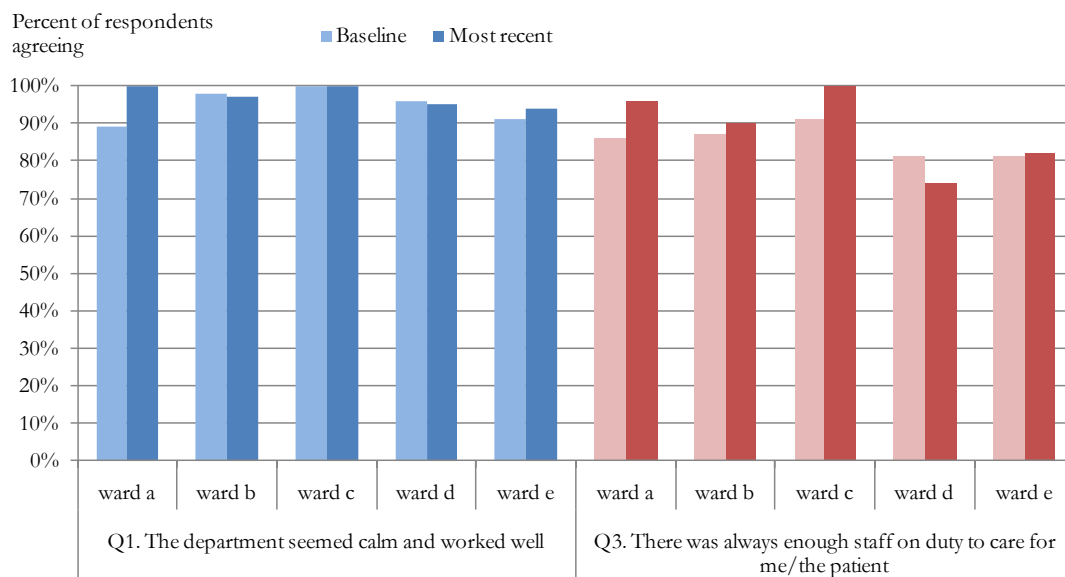
It might be expected that patient satisfaction will improve if staff are more engaged in their workplace. In practice, the programme impacts on patient satisfaction are not always clear. As noted by one programme facilitator, results from patient surveys were often positive before implementing the programme, with patients being grateful for receiving care. Furthermore, where the sample of responding patients is small, care needs to be taken to not read too much into percentage-based gains, which may represent a shift in views from one or two patients. Nevertheless, we report some key points from the information available.

Bay of Plenty’s programme dashboard from October 2012 showed five out of ten wards were able to maintain their baseline position of 100% of respondents rating their overall satisfaction as being good or excellent. Three other wards were able to improve from a baseline of between 75% and 83% to a rating of 95-100%. Two boards that began with a baseline of 100% reported follow-up results of 88% and 95%, respectively.

Waikato DHB reported the general observation that patients were noticing that wards feel calmer and that staff are more available and accessible. Figure 7 shows selected results for a sample of five wards at Waikato Hospital that were judged by the programme coordinators to have done well in implementing the programme. The results generally show a stable or improving proportion of respondents agreeing (totally or partially) to two statements:

- “The department seemed calm and worked well” – one ward showed an improvement of greater than five percentage points, with the others reported results within the range of plus or minus five percent;
- “There was always enough staff on duty to care for me / the patient” – two wards showed an improvement of greater than five percentage points.

**Figure 7: Patient survey results – selected wards at Waikato Hospital**



**Source:** data provided by Waikato District Health Board  
Ward names are not actual names.



### 5.1.3 Patient safety and reliability of care

There is evidence that the Productive Ward can lead to improvements in the safety and quality of care experienced by patients. Waikato DHB has reported that safety cross data collection has led to heightened awareness among staff, resulting in a decrease in patient falls, medication events and phlebitis. Waikato captures data against four quality and safety dimensions of the safety and reliability of care.

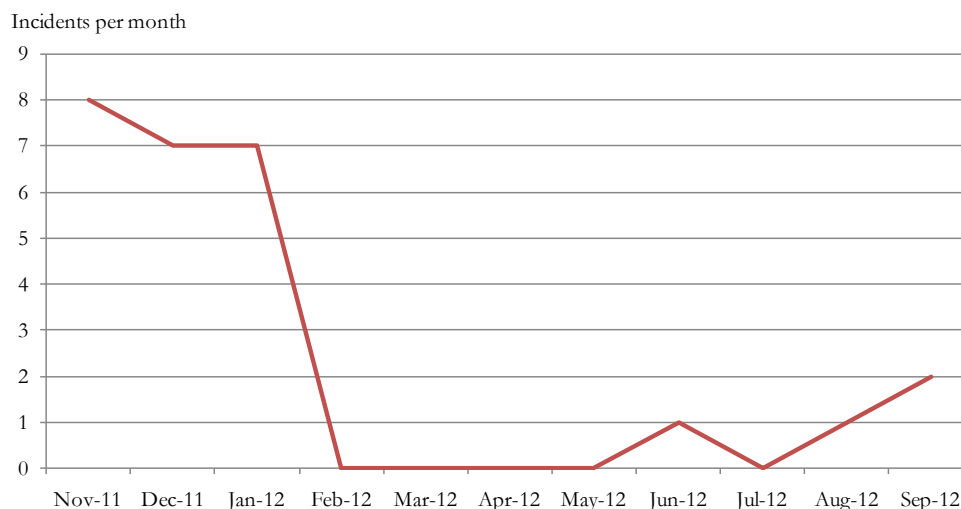
- Documentation – cases of incomplete patient documentation, such as patient care plans, admission documentation, or fluid balance documentation, among other options.
- Falls risk – completion of a falls risk assessment, which enables mitigation measures where the risk is high. Patient falls may also be captured on incident forms.
- Medication events – cases where medication is not recorded or dispensed correctly.
- Phlebitis – cases of vein inflammation that can lead to infection, often caused by insertion of a cannula to deliver fluid or medicine. Nurses have a role in recognition and response.

Wards choose what they will measure within these categories. Data is displayed within the wards, enabling trends and issues to be identified and corrective action initiated.

In each case, there are examples of wards making progress, suggesting that gains are possible. The magnitude of change differs, as wards experience different challenges due to the nature of their care and patient mix. In some cases, no impact is apparent; this may be because modules have not yet been worked through or because an indicator can initially worsen due to increased focus leading to improved information capture.

Results from a providing assessment, treatment and rehabilitation ward at Waikato Hospital show what is possible, in terms of medication and patient falls. The 28 bed unit has been implementing the Productive Ward since late 2011, with results after one year show improved safety around the dispensing and recording of patient medications. Figure 8 shows a reduction in incidents per month where patient labels were missing from a page in their drug chart.

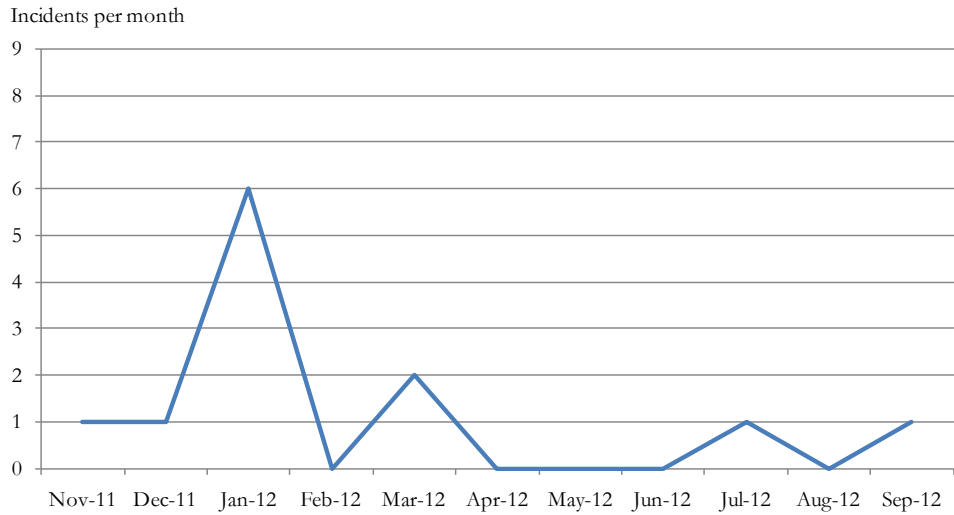
**Figure 8: Patient labels missing from drug charts – selected ward at Waikato Hospital**



**Source:** Waikato District Health Board

Figure 9 shows the same ward has also made progress with an improvement in fall risk assessments, with a reduction in incidents of incomplete documentation being visible.

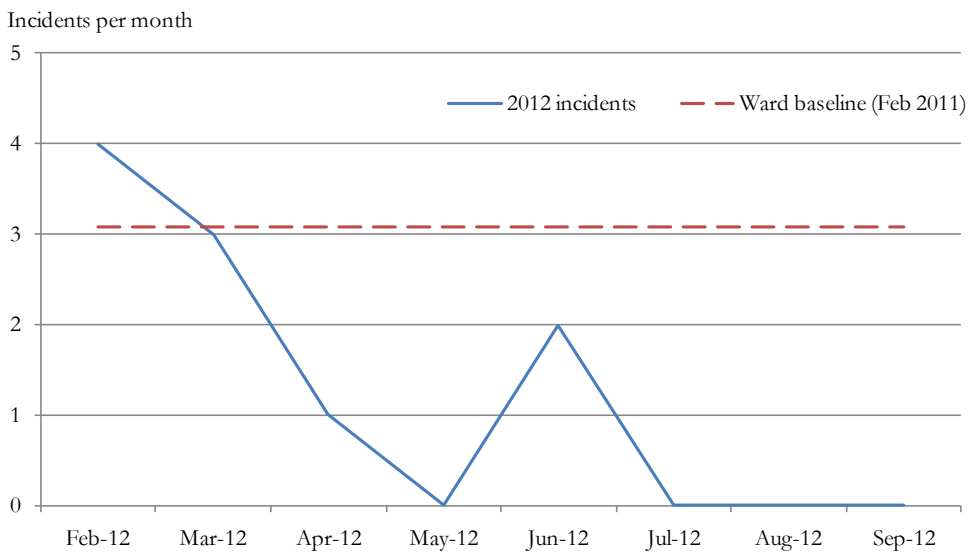
**Figure 9: Incomplete fall risk documentation – selected ward at Waikato Hospital**



**Source:** Waikato District Health Board

Hawke’s Bay provides an example of a reduction in actual patient falls, with both showcase wards making progress on this measure during 2012. Figure 10 shows points to a reduction patient falls in an orthopaedic ward, where a fall is defined as an event which results in a person coming to rest inadvertently on the ground or floor or other lower level. Although some volatility is present for each ward, the trend is heading in the right direction. Caution is required in attributing these improvements solely to the Productive Ward, as the hospital is likely to have multiple initiatives aimed at reducing these incidents.

**Figure 10: Patient falls – selected ward at Hawke’s Bay Hospital**



**Source:** Hawke’s Bay District Health Board

## 5.1.4 Efficiency of care

We were able to obtain the most extensive data from Waikato DHB, which is rolling the programme out across Waikato and Thames Hospitals, and had readily available ward-level data for direct care time and average length of stay.

### Time savings and increases in direct care

Direct care time is based on ‘activity follows’, where a nurse is followed for a shift and every minute is classified into categories that can highlight areas of time being wasted unnecessarily, such as looking for equipment or setting up for procedures. Increases in direct care time are thought to support the delivery of safer and timelier care with the increased visibility of staff reducing the likelihood of patient falls and the use of call bells.

There is evidence of a positive relationship between implementation of the programme and the proportion of direct care time. Available data from Waikato Hospital shows that wards that implemented the programme well experienced an increase in direct care time. Table 6 summarises these measurements into three groups.

Sample 1 covers five wards that were judged by the programme coordinators to have done well in implementing the programme. These wards experienced an average increase in direct care time of 19 percentage points, with the most recent measurement being an average of 51% compared with a baseline of 33%. Each ward experienced an increase of between 5 and 34 percentage points, as shown in Figure 11. This result is comparable with the findings in a study of nine NHS Trusts by the NHS Institute (2011), which found an average increase of 18 percentage points – a similar gain of almost one-fifth of nursing time.

Sample 2 covers three wards that have had some struggles in implementing the programme, for example due to staff turnover. These wards generally experienced little or no change from their baseline measurements.

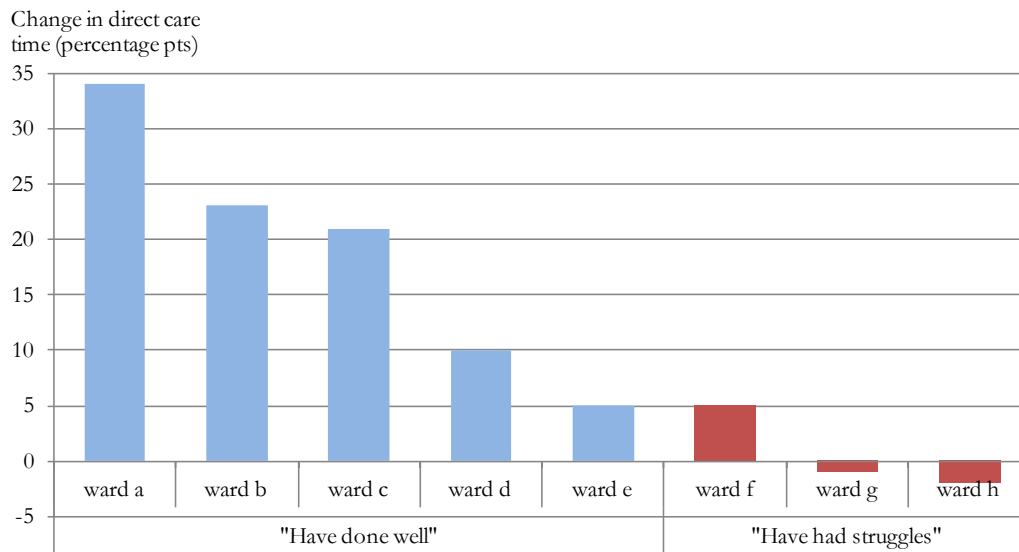
Sample 3 presents the full set of 15 wards that had completed at least three measurements of direct care time. The average increase across these participating wards was 9 percentage points, with 11 out of the 15 wards experiencing an increase.

**Table 6: Direct care time – samples from Waikato Hospital and the NHS**

Measure of direct care time	Sample 1: wards that have done well [5]	Sample 2: wards that have had struggles [3]	Sample 3: full sample of wards [15]	NHS Institute study (2011)	Nottingham Hospital study (2011)
Average at baseline (%)	33	37	36	43	26
Average at most recent measure (%)	51	38	45	60	52
Average change (percentage pts)	+19	+1	+9	+18	+26

**Source:** Waikato District Health Board; NHS Institute (2011); Bloodworth (2011)

**Figure 11: Changes in direct care time – selected wards at Waikato Hospital**



**Source:** data provided by Waikato District Health Board

Ward names are not actual names.

Measured increases in direct care time are attributable to efforts to streamline work flows and improve access to equipment. Wards used spaghetti diagrams to enable processes to be timed, to inform the planning of improvements, and to quantify resulting time savings. Examples reported by Waikato DHB include:

- A neurosurgery ward saved an average of 19.9 minutes per day by reviewing the location of equipment used to record patient blood pressure, height and weight. This aggregates to 126 hours per year being released for patient care; and
- the emergency department changed the location for storing clinical notes to reduce searching time. Previously, the team of staff spent 16.7 hours per day, on average, looking for clinical notes. The new system for handling clinical notes has reduced this time by 70%, with 11.7 hours per day being released for patient care.

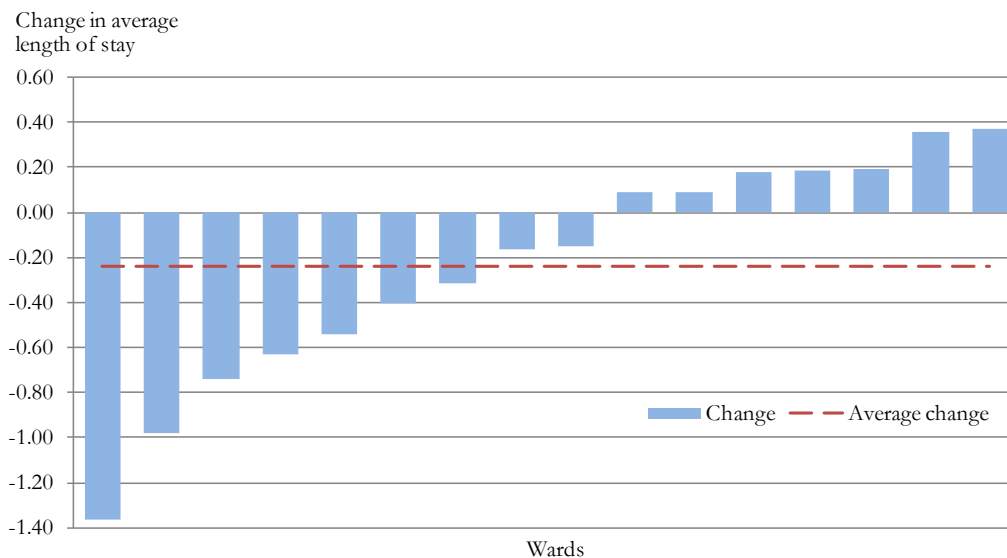
### Changes in average length of stay

It is plausible that improvements in direct care time and the quality of care – such as reducing the risk of patient harm events – would lead to some patients spending less time in hospital, thereby reducing the average length of stay. However, identifying the effect of the Productive Ward is not straightforward due to changes in patient acuity and other change programmes.

For instance, many of the participating wards at Waikato Hospital had a shorter length of stay in the year to September 2012, compared with the twelve months prior to their participation in the programme. Figure 12 shows that nine out of 16 wards experienced a reduction in length of stay, with the average reduction being 0.59 days and the overall change being -0.24 days.

No relationship between these changes in length of stay and the increases in direct care time is visible. Only two out of the sample of five wards at Waikato Hospital viewed as having done well with the programme experienced a reduction in length of stay, and one of the wards that had struggled with implementing the programme experienced a reduction in length of stay.

**Figure 12: Changes in average length of stay – wards at Waikato Hospital**



**Source:** data provided by Waikato District Health Board

Discussion with programme facilitators highlights the need for care in interpreting these changes, as the Productive Ward programme is only one of many change programmes occurring within the hospital. For example, one ward had started to accept trauma patients, which increased its overall patient acuity and length of stay. Another group of wards moved to a new building, which led to changes in how care is delivered and the patient mix.

Despite these difficulties with attribution, we would conclude that a positive impact from the Productive Ward programme cannot be discounted. The 2011 NHS Institute study of nine NHS Trusts found reductions in average length of stay over three years of 0.48 days for general medical discharges and 0.39 days for general surgical discharges. The NHS Institute (2012) has also reported that the consensus emerging from interviews with nursing staff and management is that the Productive Ward had about a 50% impact on improvements to the length of stay. Most interviewees stated that the value of the Productive Ward should not be discounted as it generally acts as an enabler for other initiatives to realise their potential.

## 5.2 Productive Operating Theatre impacts

The Productive Operating Theatre contains a useful framework as part of the Knowing How We are Doing module. Table 7 shows that it groups potential performance measures into four ‘domains’ similar to those of the Productive Ward: patient experience and outcomes; safety and reliability of care; value and efficiency; and effective /team working and staff wellbeing.

This section focuses on evidence that we have been able to obtain, which largely relates to the value and efficiency domain of that framework. We have been able to secure little quantifiable evidence that relates to the other domains. The evidence we have obtained can be grouped into:

- the three key performance indicators specified in the contract with the Ministry of Health – percentage of on-time surgical operation starts, operating theatre utilisation, and patient turnaround times. This indicators provide insights into theatre efficiency;
- tangible examples of efficiency gains, such as time savings from reconfigured processes and or cost savings from improved stock management; and
- hospital surgical throughput, comparing those DHBs participating in TPOT with those that have not participated.

**Table 7: A framework for Productive Operating Theatre impacts**

Domain	Example indicators
Patient experience and outcomes	<ul style="list-style-type: none"> <li>• Patient satisfaction survey</li> <li>• Percent of patients being complication free in recovery</li> <li>• Patient pain score</li> <li>• Average patient fasting time</li> </ul>
Safety and reliability of care	<ul style="list-style-type: none"> <li>• Clinical incidents</li> <li>• Readmissions</li> <li>• Exceptions from ‘time out’ checklist</li> <li>• Percent of correct equipment to hand</li> </ul>
Value and efficiency	<ul style="list-style-type: none"> <li>• Turnaround time</li> <li>• Percent theatre utilisation</li> <li>• Cancellations</li> <li>• Delays (late starts/ finishes)</li> </ul>
Effective team working and staff wellbeing	<ul style="list-style-type: none"> <li>• Staff survey</li> <li>• Training and development</li> <li>• Staff turnover</li> <li>• Staff absence</li> </ul>

**Source:** adapted from *The Productive Operating Theatre – Knowing How We Are Doing*

Our approach has been to identify examples of direct costs savings and to look at DHB performance indicators as proxies for productivity and to connect this with the qualitative story were heard from participants. We also conduct some top-down analysis of theatre output and consider the findings in relation to DHB interviewee perceptions.

### 5.2.1 Cost savings

Direct cost savings, albeit modest, are attributable to the Productive Operating Theatre. Many DHBs provide some estimate of cost savings due to TPOT, either in their programme reports or interviews. Most of the examples relate to the rationalisation of stock levels of theatre clinical supplies or equipment – usually as a result of working through the Well Organised Theatre and Consumables and Equipment modules. There is considerable variation in the figures cited.

- Tairawhiti DHB secured approximately \$300,000 in savings between 2011 and 2012, with the cost of theatre clinical supplies being reduced from \$1.8 million to \$1.5 million. Much of these savings were obtained from reduced treatment disposables, which had been identified as an area of concern following an initial measurement of costs, although there was also some reduction in instruments and equipment. These figures were the outcome of a formal audit completed by the DHB.
- Southern DHB (Southland Hospital) reviewed stock levels and removed \$70,000 of redundant stock and \$30,000 of out-of-date stock from the shelves. Revised stock levels are monitored weekly by the Stores department, which now manages the ordering process instead of the previous manual ordering by surgical staff.
- Whanganui DHB reduced clinical stock levels in the sterile store room by \$5,000.
- Hawke's Bay found that 129 lines of consumables, or approximately 40,000 items, could be moved to the automatic supply system and thereby free up 25% of storage space.
- Bay of Plenty DHB found that sorting the sterile equipment room to improve access to items returned \$35,000 worth of equipment being unnecessarily held.

Hutt DHB cited reductions in theatre waste disposal costs, which saved of approximately \$4,000 per month through improved segregation of medical and non-medical waste. The DHB projected the savings to amount to \$52,000 per year.

Staff time savings were another form of cost savings cited by DHBs. Some boards estimated and reported time savings arising from improvements to specific processes, for example:

- Hawke's Bay DHB cited work on automating the supply chain for clinical supplies, via greater use of an imprest system, as reducing clinical staff time spent ordering items, thereby freeing up 0.5 of a registered nurse FTE;
- Hutt DHB identified time savings from the introduction of an electronic 'operational status at a glance' board into the theatre suite in October 2011. The aim was to improve overall planning and management of acute patients, but the DHB estimates the value of time savings at \$23,900 per year. Real-time information has eliminated the need for staff to visit a whiteboard to get updates and reduced telephone calls to the Patient Flow Coordinator;
- Hutt also identified time savings from moving to a colour coding system for surgical equipment, to make sure items are in the right place when needed, and to reduced staff time spent looking – conservatively estimated the cost of the time saved per year at \$2,200.

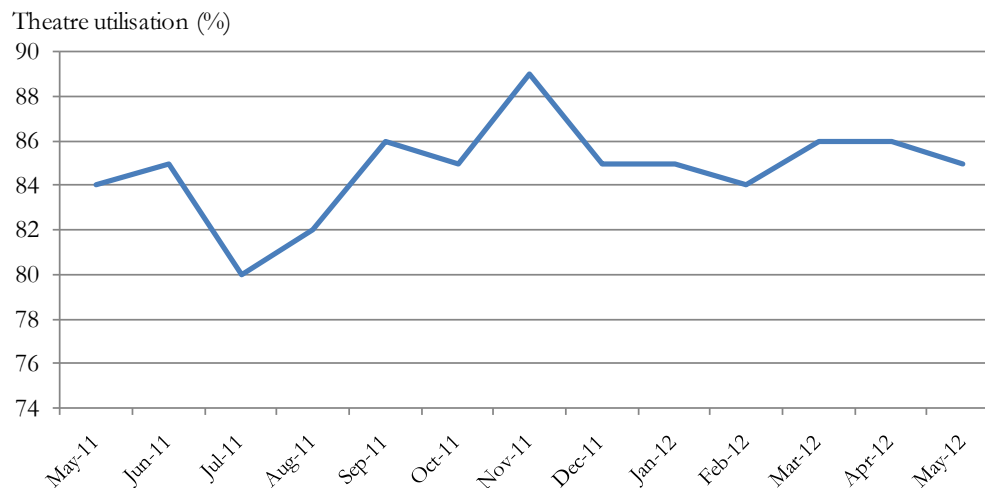
## 5.2.2 Productivity gains

In the absence of a full productivity model for operating theatres, we look at performance indicators that provide glimpses at dimensions of theatre suite productivity. Even then, the question of attribution arises as to whether performance improvements are due to the TPOT or other initiatives, or whether changes in resourcing or elective targets are the primary drivers.

### Theatre utilisation

A number of boards showed signs of higher theatre utilisation, although the data appears volatile and improvements are not always fully sustained. Figure 13, showing results for Southland Hospital from May 2011 to May 2012, provides a representative example of these emerging gains. Caution is required, as the time periods available are mostly barely longer than a year and it is unclear if seasonable factors are at play. Boards that appeared to have some success in rolling out the TPOT modules, such as Waitemata and Bay of Plenty also report volatile pictures of theatre utilisation, with the data available not showing a clear picture of sustained improvement.

**Figure 13: Theatre utilisation – Southland Hospital**



**Source:** Southern District Health Board

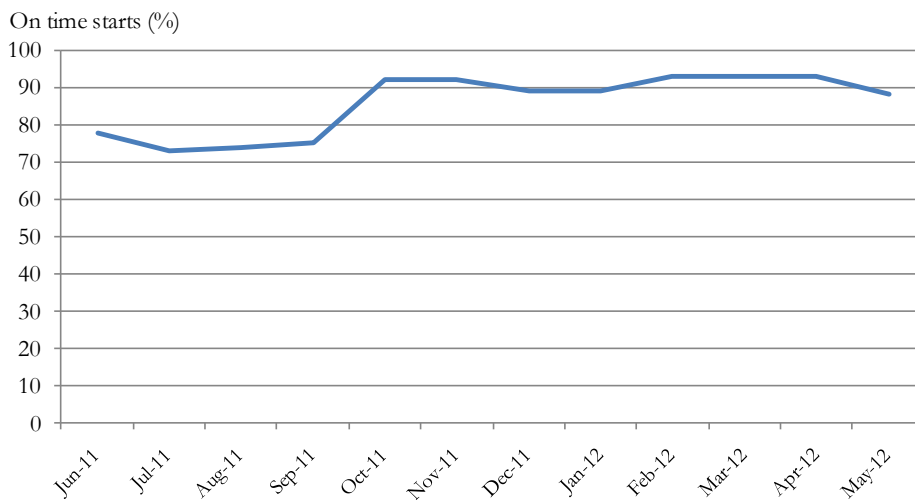
### On-time starts and turnaround times

Most DHBs reported a reduction in the proportion of late starts. Two DHBs reported periodic statistics showing increases in their average percent of on-time starts per month, for example Whanganui reported an increase from 70% to 77% per cent between late 2010 and mid 2012. Figure 14 shows a trend improvement for Hutt Hospital, with on-time starts for elective surgery increasing from 78% in June 2011 to between 88-93% for the first five months of 2012. DHBs also tended to report a reduction in theatre turnaround times, or at least reduced variation in theatre turnaround times.

Some hospitals have improved the quality of the data collected and its analysis. Bay of Plenty DHB introduced real time electronic data reporting, substantially affecting its baseline data – the number of reported late starts increased 100 per cent, and turnaround time increased 50 per cent. Others are adopting statistical process control methods to develop a more sophisticated understanding of variation and the means to measure improvements over time.



**Figure 14: Proportion of on-time surgical starts for electives – Hutt Hospital**

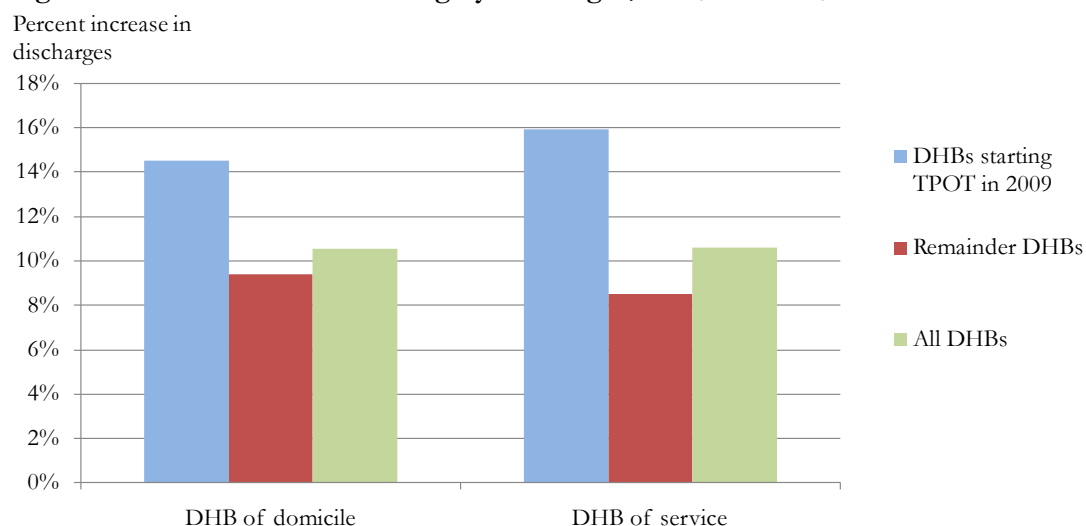


Source: Hutt Valley District Health Board

### 5.2.3 A top-down look at the impact of TPOT

We also look at throughput among DHBs, in terms of elective surgery discharges and case-weighted surgical discharges. The group of DHBs starting the Productive Operating Theatre in 2009 had higher percentage growth in elective surgery discharges between 2009/10 and 2011/12 than other DHBs – for DHB of domicile (funder arm) and DHB of service (provider arm) perspectives. Figure 15 shows that DHBs increased elective surgery nationally by 10.6% (equivalent to 14,600 discharges) between 2009/10 and 2011/12, whereas the initial tranche of eight DHBs starting TPOT in 2009 had combined growth of 14.5% (DHB domicile perspective) and 15.9% (DHB provider perspective).

**Figure 15: Increases in elective surgery discharges, 2009/10 – 2011/12**



Source: data provided by Ministry of Health

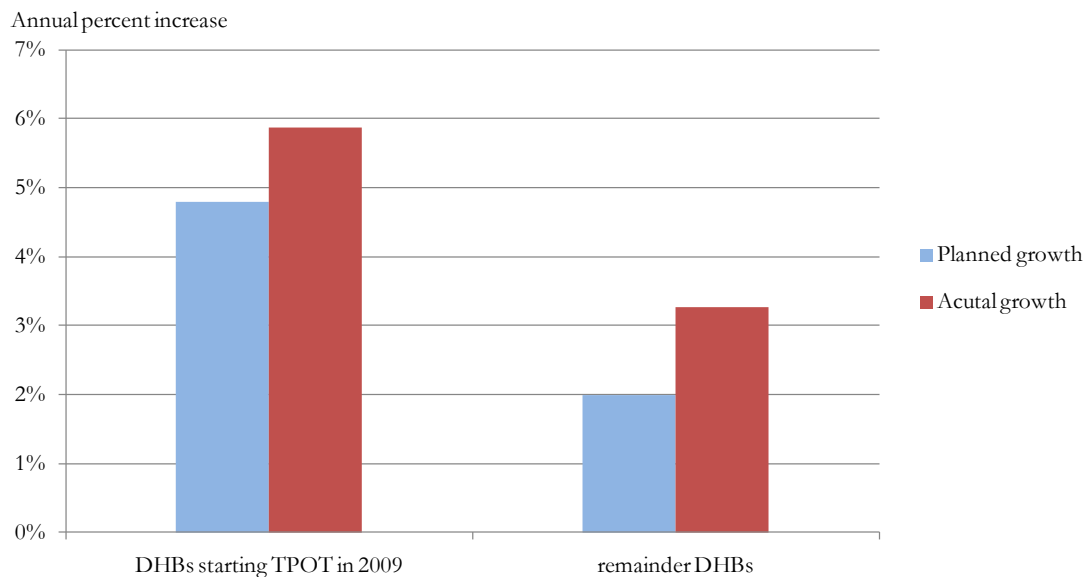
Southern DHB has been excluded from this analysis of the initial TPOT participants, as two-thirds of its elective discharges are delivered at Dunedin Hospital, which was not initially implementing TPOT. Other boards with multiple provider arm sites, such as Bay of Plenty are included, as the main site was an initial TPOT participant.

Similarly, Figure 16 shows that the DHBs starting TPOT in 2009 also had higher growth in case-weighted surgical discharges overall, between 2010/11 and 2011/12, relative to other DHBs (5.9% versus 3.3%). These TPOT boards also had higher planned growth in surgical case weights – 4.8% versus 2.0% – which may have been a response to higher electives targets. Nevertheless, seven out of eight TPOT boards were able to achieve an increase in surgical case weights between 2010/11 and 2011/12, whereas the equivalent ratio for the other boards was seven out of 12. Some of the largest increases in surgical case weights were among TPOT participants such as Auckland, Waitemata and Bay of Plenty.

Clearly, there are issues of attribution. Not all DHBs participating in the first tranche of TPOT had higher growth in throughput than other boards. Some non-TPOT boards also had large increases. This suggests that other factors, such as electives targets, other change initiatives, and scheduling challenges may have impacted on theatres in different ways. There is no easy way to determine how much of improved theatre performance among TPOT boards can be attributed to the programme, if at all. But a positive effect cannot be ruled out, given findings from the interviews that the TPOT approach encourages new approaches to managing scheduling and a focus on finding ways to improve patient attendance.

**Figure 16: Planned versus actual increases in surgical case-weights, 2010/11 – 2011/12**

DHB of service (provider arm) perspective



Excludes Southern DHB, as Southland Hospital participated in the TPOT roll-out whereas Dunedin Hospital did not

Source: Caseload monitoring reports (Ministry of Health)

## 6. Weighing up costs and benefits

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This section considers the potential financial benefits of the programmes and weighs them up against the likely costs associated with implementation, using a medium sized public hospital as a base case. The information used to model costs and benefits has been drawn from New Zealand experience where possible, and supplemented with data from the NHS.

### 6.1 Productive Ward costs and benefits

#### 6.1.1 Costs

The financial costs comprise programme licences, capital improvements to wards, staff time to attend module workshops and staff backfilling, and programme facilitation. The purchase of licences, met by the Ministry of Health, cost \$48 per bed. Capital costs, such as changes to shelving or storage areas, are highly variable, but our observations suggest an average of \$10,000 per ward is not unreasonable. Staff time to attend module workshops and form a working group, based on Waikato's experience, is around 10.5 full-time equivalent days for the foundation modules and 1.3 days for process modules. Using an average hourly rate of \$27.50, taken from the collective agreement, and factoring in backfill costs, this time can be costed at \$4,600 per foundation module and \$600 per process module. Resourcing the programme management and facilitation is estimated at \$130,000 for a medium size hospital.

#### 6.1.2 Financial benefits

Evidence of direct financial benefits is less straightforward. The most visible and measureable benefits relate to stocks of medical supplies, with amounts of redundant or unnecessary stock being returned from ward stores, as well as examples of small but ongoing changes to the ordering system that can result in reduced waste. Those examples include:

- Auckland – estimating average one-off savings of \$3,000 to \$5,000 per stock room;
- Waikato – an average saving of \$5,000 to \$6,000 per ward from centralising stock;
- Hutt – cited a one-off saving of \$2,000 from ward drug-room refunds; and
- Hawke's Bay – reported ongoing savings of \$1,600 per year from switching from 30ml to 20ml syringes, which are sufficient in most cases, but at a fraction of the cost.

These examples – which suggest one-off savings of around \$5,000 and ongoing savings of \$1,600 per ward – are comparable with those reported by the NHS Institute in 2011. That assessment reported average one-off savings equivalent to approximately \$3,500 per ward and ongoing savings of approximately \$2,200 per ward, albeit with a wide range of results.

Time savings are cited in studies and interviews as a key benefit and are typically measured as an increase in direct care time. An average gain of 15% is a plausible estimate for wards that implement the programme well, given the gains measured at Waikato Hospital (+19%) and reported in NHS studies (+18% and +26%). Using an average hourly rate of \$27.50 for a registered nurse, we estimate the value of this released time for care at \$8,600 per nurse per year. This excludes the value of any quality of care benefits.

A reduction in the average length of stay is a plausible financial benefit, if gains in the quality and safety of care associated with the programme result in fewer bed days per patient. The attribution issues are difficult to resolve, but nevertheless, a conservative assumption can provide insights into the scale of potential benefit. A reduction of 0.20 days is low, relative to the assumptions used in the NHS Institute study (0.39 days and 0.48 days). This would mean 185 fewer patient bed days for a 20-bed ward per year, with a baseline average length of stay of 7.9 days. Using an average cost of \$468 per bed day, as cited by Waikato DHB, suggests an annual financial benefit of around \$86,000 per ward.

There are other potential savings that we place less weight upon. The NHS Institute has referred to financial benefits arising from reductions in unplanned staff absences and reduced turnover, although we could find no clear evidence of this in New Zealand setting. District health boards provided other examples of savings, such as a reduction in unneeded patient meals or streamlining linen management. Consistent with our approach of being conservative in determining financial benefits, these have not been included within the cost benefit analysis below, as they are either minor in scale or appear to be hospital-specific. Similarly, although quality improvements are likely to lead to productivity gains, we have not attempted to model the monetary value because of a lack of sufficiently robust data across an adequate sample of wards.

### **6.1.3 Modelling costs and benefits over ten years**

We model the implementation costs and financial benefits of the Productive Ward for an “average” ward comprising 20 beds with six nurses per morning and afternoon shift (and three at night). The results are aggregated to a medium size hospital of 14 wards and 280 beds. The modelling timeframe is 10 years, which is sufficient for the programme to be rolled out and its approach to be embedded. The model assumes half of the wards begin implementation in Year 1 and work through the modules over a two-year period. The remaining wards begin implementation in Year 2, so that all wards have completed the modules by the end of Year 3. From Year 4 to Year 10, the programme moves to sustaining mode, during which, wards conduct audits and refresh their workplace and processes.

The costs comprise programme licences, minor capital improvements to wards, staff time to attend a visioning workshop and work through programme modules, the full backfilling of released staff, and programme facilitation. Staff time commitments to the programme are generally held constant through the implementation and sustaining phases of the programme, except for programme management costs, which are reduced by one half.

Financial benefits comprise savings from one-off reductions in the stock of medical supplies as well as ongoing gains from changes to ordering, and the financial value of increases in direct care time. We also model the benefit from a reduction in average length of stay. We model this separately from the gains in direct care time, so as to avoid double counting any benefits that increased direct care time may have on patient stay in hospital. This alternative scenario is included to provide an additional perspective on the scale of plausible benefits.

The cumulative costs over ten years, shown in Table 8 are \$123,000 for a 20 bed ward and \$1.776 million for a 280 bed hospital with 14 wards – discounted to present value. The largest cost is staff time – releasing nurses to work through implementation of the modules and to keep sustaining the improvements, as well as the cost of backfilling with additional staff.

Table 9 summarises the financial benefits at the level of ward and hospital. The cumulative benefits over ten years, discounted to present value, from the combination of stock changes and gains in direct care time are \$1.042 million for a 20 bed ward and \$13.631 million for a 280 bed hospital with 14 wards.

The alternative scenario, using a combination of stock changes and a reduction in average length of stay, has cumulative benefits over ten years, discounted to present value, of \$631,000 for a 20 bed ward and \$8.262 million for the hospital.

**Table 8: Summary of Productive Ward costs**

Cost component	Ward level (20 beds)	Hospital level (14 wards and 280 beds)
Programme licences (one-off)	\$1,000	\$13,500
Capital improvements (one-off)	\$10,100	\$141,300
Nurse time per year – during implementation and sustaining	\$8,900	\$83,400
Programme facilitation per year – during implementation phase	\$8,700	\$130,700
Programme facilitation per year – during implementation phase	\$4,400	\$65,300
Cumulative costs over ten years (discounted)	\$123,000	\$1,776,000

**Table 9: Summary of Productive Ward financial benefits**

Benefit component	Ward level (20 beds)	Hospital level (14 wards and 280 beds)
Return of stock (one-off)	\$5,000	\$70,000
Changes to stock ordering – annual benefit	\$1,600	\$22,400
Increased direct care time (+15%) – annual benefit	\$144,500	\$2,023,600
Reduced average length of stay (-0.2 days) – annual benefit	\$86,500	\$1,210,900
Cumulative benefits over ten years – <i>stock and direct care</i> (discounted)	\$1,042,000	\$13,631,000
Cumulative benefits over ten years – <i>stock and length of stay</i> (discounted)	\$631,000	\$8,262,000

## 6.1.4 Results

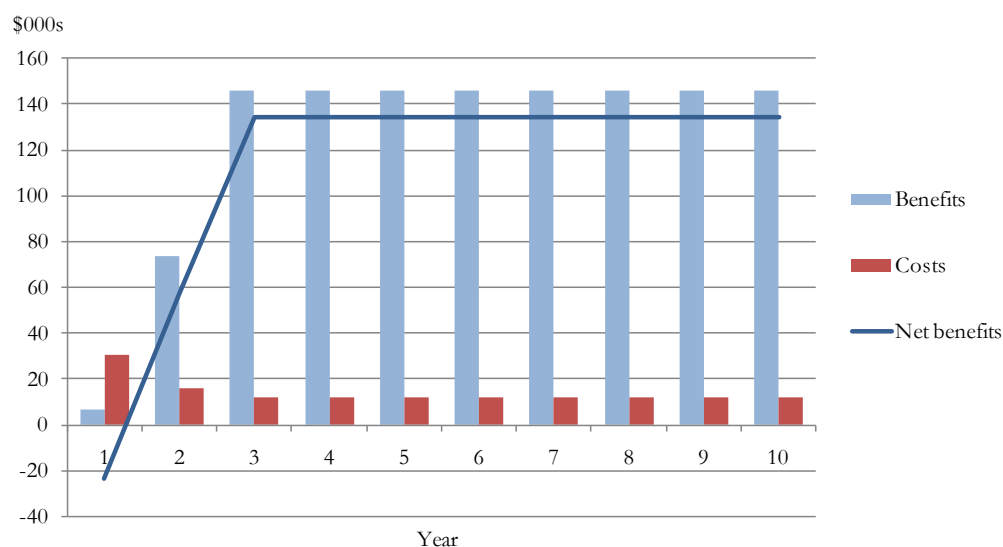
The value of the modelled benefits of the Productive Ward programme outweighs the financial costs, regardless of whether gains in direct care time or average length of stay are being modelled. Table 10 shows a net present value of \$919,000 for a ward and \$11.855 million for a hospital. The benefit to cost ratio of 8.5 to 1 for a ward and 7.7 to 1 for the hospital represents the return on investment in the programme, in terms of gains in stock management and increased nursing time for patient care. The slightly lower ratio for the hospital reflects the staggered roll-out across the wards. Under the alternative scenario, based on length of stay gains, the net present value is \$508,000 for a ward and \$6.486 million for a hospital. This scenario has a benefit to cost ratio of 5.1 to 1 for a ward and 4.7 to 1 for the hospital.

Figure 17 presents the modelled costs, benefits and net benefits for a 20 bed ward across ten years, where the benefits are gains in stock management and direct care time. The steady state annual net benefit of \$134,400 is modelled as fully accruing from Year 3 onwards.

**Table 10: Summary of Productive Ward net benefits over ten years**

Component	Ward level (20 beds)	Hospital level (14 wards and 280 beds)
Cumulative net benefit – <i>with stock and direct care time benefits</i>	\$919,000	\$11,855,000
Cumulative net benefit – <i>with stock and length of stay benefits</i>	\$508,000	\$6,486,000
Benefit to cost ratio – <i>with stock and direct care time benefits</i>	8.5 : 1	7.7 : 1
Benefit to cost ratio – <i>with stock and length of stay benefits</i>	5.1 : 1	4.7 : 1

**Figure 17: Costs and benefits for an average ward – direct time care scenario**



## 6.2 Productive Operating Theatres

Weighing up the financial costs and benefits of the Productive Operating Theatre programme is more difficult than the Productive Ward. Most DHBs implementing TPOT reported benefits that were indicative and qualitative in nature. Some DHBs stated that it is too early to quantify overall value for money of the programme as implementation of modules is ongoing, or effectively just commencing. This means that any anticipated benefits are less clear relative to the short-term opportunity cost of releasing staff to participate in the programme.

### 6.2.1 Implementation costs

We estimate implementation costs for a medium size hospital with seven operating theatres. We assume that all of the TPOT modules are rolled out across the theatre suite over a three year period. Apart from the programme licences, we include capital improvements, programme facilitation, staff time released to attend a launch workshop, plus time for a working group to work through the modules. We estimate that this implementation would cost \$400,000 over a three year period – a minimum period for implementation. The details of this estimate are laid out in Table 11.

**Table 11: TPOT cost assumptions – implementation across 7 theatres over 3 years**

Component	Description	Amount
Programme licences	Purchased from the NHS by the Ministry of Health	\$1,700 per theatre \$11,900 for the theatre suite
Capital improvement costs	Changes to the theatre suite environment to improve workflow, such as the addition/removal of shelving, doors, cupboards, sinks etc	\$10,000 per theatre \$70,000 for the theatre suite
TPOT programme facilitation	Programme manager to oversee module roll out and facilitate workshops and reporting	\$80,000 per annum
TPOT launch and “visioning workshop” – staff attend a half day launch, also covering their vision for the theatre suite.	Theatres close for a session, with costs being staff ‘down time’ and theatre running costs.	\$9,000 per theatre team \$63,000 for the theatre suite
TPOT working group formed to hold workshops, comprising: - Clinical Director - Theatre nurses (x 2) - Theatre manager Assisted by the programme facilitator.	Foundation modules (3) 1 x 4hr workshop – for each of the 3 modules = 12 hours for each working group member Also 9 nine days to implement “Well Organised Theatre”.	\$5,400 in theatre staff time
	Process modules (8) 2 x 1hr workshops for each of the 8 modules = 16 hours for each working group member	\$4,400 in theatre staff time
Total cost	Cost of implementing modules in 7 theatres over 3 years.	At least \$400,000

## 6.2.2 Break-even point

To break even during the implementation phase, the programme would need to return financial benefits equivalent to \$400,000 over three years. In terms of evidence from DHBs, it is apparent that direct costs savings from improved management of clinical supplies are unlikely to be sufficient. These savings typically ranged up to \$70,000 with one outlier of \$300,000 in savings. Clearly, to breakeven with the implementation costs, greater financial gains would be required from increased productivity.

The biggest gain is likely to be from improved theatre utilisation – from reducing cancelled or lost sessions due to the unexpected unavailability of staff or patients. To give a sense of the scale of improvement required to at least cover the cost of TPOT implementation, we estimate the number of avoided cancellations required balance our estimate of implementation costs of \$400,000 over three years.

We use assumptions about the average cost-per minute of theatre time for a four-hour session, based on estimates obtained during DHB site visits. There is likely to be variation among theatres and among DHBs, according to different specialities and local cost structures. To address this variation, we use a range of estimates provided by two different DHBs: a ‘low’ assumption of \$34 per minute of theatre time and a ‘high’ assumption of \$66 per theatre minute.

Table 12 shows what would be required from a medium size hospital with seven theatres to breakeven with our estimate of TPOT implementation costs of \$400,000 over three years:

- under the ‘low’ assumption of \$34 per minute of theatre time, that hospital would need to avoid 48 sessions or 16 sessions per year for three years; and
- under the ‘high’ assumption of \$66 per minute of theatre time, that hospital would need to avoid 25 sessions or 8-9 sessions per year for three years.

DHBs may have differing views about whether TPOT can assist with improved theatre utilisation. In at least a couple of cases there was a sense that TPOT partly contributed to a change in mindset around session scheduling and systems for ensuring patient attendance. These results show that, in such cases, it appears feasible that utilisation gains lead to TPOT easily paying for itself – if reductions in cancelled sessions number between 8 and 16 per year for three years in a medium size theatre suite.

This calculation does not include other likely benefits, such as better stock management and improved staff satisfaction and wellbeing, as reported by DHBs and in the NHS.

**Table 12: TPOT breakeven scenarios – implementation across 7 theatres over 3 years**

Average ‘cost per theatre minute’ assumption	Estimated cost of a four-hour session	Number of avoided cancelled sessions to balance TPOT implementation costs	Annual number of avoided cancelled sessions required for three years
\$34	\$8,200	48 sessions	16 sessions per year
\$66	\$15,800	25 sessions	8-9 sessions per year



## 7. Reflections and next steps

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Despite the best efforts of many people within DHBs, there is too little depth and insufficient breadth in the current programmes. Therefore, as the current champions leave or move into other roles, or as senior management is disrupted by restructurings, the programmes falter significantly. If the programmes are to be revitalised, the following issues need to be worked through:

- A decision is need as to whether there is a commitment to the programme at a national level or just at a local level;
- If there is commitment at a national level, then a stronger programme management framework is required. This framework could include staff forums to share idea, conference calls, national training workshops and a clear comparison of how DHBs are doing against expectations in terms of module roll-out;
- A set of standardised key performance indicators across both programmes is needed, covering impacts on the quality and efficiency of care. These would need to have common definitions to improve comparability, and be regularly reported to boards and the centre;
- Chairs and CEOs would need to be familiarised with the programme to ensure whole-of-DHB support.

The success factors common to both programmes, summarised in the box below, provide a useful set of touchstones for the above considerations.

### **Success factors common to both programmes**

- Support from the DHB executive team, including a clear expectation of performance improvement and active involvement in on the floor ‘walk arounds’.
- A structured programme of module roll-outs and reporting to a steering group.
- Dedicated support for programme management and facilitation.
- Some resource to fund time for staff to work through modules (e.g. lateral use of training budgets) and for minor capital improvements.
- Strong leadership in the ward and within theatre management.
- Nurses being able to work with an active clinical champion in a leadership role.

Everybody has talked about the need to celebrate the success and to build the inter-DHB learning environment. This could be a quick win. DHBs need to learn to recognise, and celebrate, and to connect staff together. This would, for instance, help to get theatre and ward staff connected, sharing common issues, and help improve the interface between their work places.

A range of DHBs have elements that make them suitable for demonstration sites, or at least suitable for sharing specific innovations more widely. For the Productive Ward, we were generally impressed by Waikato and Bay of Plenty. Both have a strong programme management function, monitoring of module roll-out against plan, and systematic processes for capturing and reflecting back performance data in an accessible form.

In terms of the Productive Operating Theatre, Southland Hospital in Invercargill is innovating by providing comparable feedback directly to surgeons, in terms of the performance of their sessions against key indicators. Waitemata and Auckland are two boards that have made progress with their systems for session scheduling. Hutt Hospital is innovating with an electronic status board that is available across the perioperative environment.

Above all, the programmes should be seen as a long-run investment. While it is possible to set targets to deliver higher volumes, there need to be ways of empowering staff to rework their environments and care processes – beyond just working harder and faster. This is the strength of the programmes – they have the potential to give front-line staff the skills to systematically think through what quality and efficiency improvements are required and how those changes should be enacted and their gains embedded.

## 8. References

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- Bay of Plenty District Health Board (2010) *Releasing Time to Care – Productive Ward Review March 2010*. Document provided by the board.
- Bloodworth, Kerry (2011) “The productive ward and the productive operating theatre” in *Journal of Perioperative Practice* volume 21, issue 3 pp.97-103
- Centre for Healthcare Quality Improvement (2011) *Releasing Time to Care: Ontario Pilot Phase. Final Report*. March 2011.
- Crump, B. (2008). “How can we make improvement happen?” *Clinical Governance: An International Journal*, 13 (1), 45-50.
- Fairbanks, C. (2007). “Using six sigma and lean methodologies to improve throughput” *AORN Journal*, vol 86, no 1, 73-82.
- Hawke’s Bay District Health Board (2011) *Releasing Time to Care 2011: Showcase Ward Report*. November 2011.
- Healthcare Improvement Scotland (2012) *Releasing Time to Care Stocktake Report*. Healthcare Improvement Scotland, May 2012.
- Jones, D. and Mitchell, A. (2006). *Lean Thinking for the NHS*. London: Lean Enterprise Academy
- NHS Institute for Innovation and Improvement.(2009) *Improving quality and efficiency in the operating theatre. A lifeline for financial leaders*. London: NHS Institute.
- NHS Institute for Innovation and Improvement. (2010). *The Productive Ward: Releasing Time to Care learning and impact review*. London: NHS Institute.
- NHS Institute for Innovation and Improvement. (2011). *Rapid Impact Assessment of The Productive Ward: Releasing time to care*. London: NHS Institute
- NHS Institute for Innovation and Improvement. (2012). *Calculating the financial benefit of The Productive Ward: Releasing time to care*. A ‘How to guide’ to support the Rapid Impact Assessment. London: NHS Institute
- NHS Institute for Innovation and Improvement. (2012). *Releasing Time to Care: The Productive Ward - the story so far...* Retrieved November 1, 2012, from NHS Institute site.
- Waikato District Health Board (2012) *Productive Series Status Report*. 15 October 2012

## Appendix 1 : Programme modules

**Table 13: Modules of the Productive Ward programme**

Module	Summary description
Knowing How we are Doing	Introduce measurement systems that help ward staff to understand and benchmark ward performance, and to inform decisions on what to do to improve performance.
Well Organised Ward	Gives guidance for simplifying the ward and reducing waste by having things in the right place, at the right time, ready to go.
Patient Status at a Glance	Visual management by displaying important patient information so that it can be updated regularly, seen at a glance and used more effectively.
Meals	Guidance on how to ensure the best experience for patients while making the delivery quick and easy for staff. Results in less wasted time in meal delivery and staff having time to feed patients who require support.
Medicines	Documents how the scheduled administration of medicines can be improved. Resulting in fewer errors, increased patient safety, less wasted time and an improved patient experience.
Admission and Planned Discharge	Guides ward leaders, lead nurses, matrons, nursing directors and directors with responsibility for improvement through the steps necessary to: gain a thorough understanding of how well wards are doing with ward rounds and to identify the opportunities for improvement; and to implement, monitor and evaluate changes.
Shift Handovers	Explores the approach to handovers; making the process more patient focused; building on patients' values and cultural beliefs; using handover to drive safety and quality for patients and staff.
Patient Hygiene	Highlights opportunities to make patients safe and comfortable; safeguard dignity; promote confidence and independence. Helps nursing staff to ask fundamental questions about processes.
Nursing Procedures	An approach to improving how nursing procedures are carried out on wards, which results in consistent processes being undertaken by nursing staff, a better patient experience and the possibility of reduced infection rates and delivery of safer, reliable care.
Patient Observations	Increase patient safety through increasing the reliability of patient observations.
Ward Rounds	Guides ward leaders and nursing directors through the steps necessary to: gain a thorough understanding of how well a ward is doing with its ward rounds; identify the opportunities for improvement; generate ideas to make this happen and take action to implement, monitor and evaluate changes.
Toolkit	A set of tools designed to complement the other modules.

**Source:** NHS Institute for Innovation and Improvement

**Table 14: Modules of the Productive Operating Theatre programme**

Module	Summary description
Knowing How We Are Doing	Develops measures to help theatre teams understand how they are doing against the overall objectives of the programme.
Well Organised Theatre	Helps teams organise their workplace better to support the processes being carried out in theatres, simplifying the workplace and reducing waste by having everything in the right place, at the right time, ready to go.
Operational Status at a Glance	Helps teams create a visual management tool that will support individual theatres and the whole theatre suite to demonstrate 'real time' performance enabling staff to pro-actively manage and mitigate any quality, safety or operational risks as they arise.
Team-working	Focuses on enhancing multidisciplinary team-working within operating theatres. Helps teams understand the importance of, and introduce techniques to, improve communication using tools such as brief, debrief and time out.
Scheduling	Looking at the essentials of the scheduling process and improve the flow of information, ensuring each process is performed in a timely manner, reducing errors and delays, eliminating unnecessary duplication.
Session start-up	Helps teams to identify what is required to standardise the processes for effective session start-up and making that standard repeatable, thereby, eliminating duplication and delays by ensuring each task has been actioned at the right time.
Patient Preparation	Manage the preparation of patients for surgery, by focussing on the information and activities required in the theatre suite to 'pull' patients for surgery, efficiently and without delay.
Patient Turnaround	Look at improving the process of managing the transition between patients in theatres.
Handover	Help teams focus on the safe and efficient transferral of patients from one function to another
Consumables and equipment	Focuses on planning levels and timing of top-ups, including stock usage requirements, stock levels, storage and replenishment systems for surgical kit and consumables
Recovery	Focuses on information flows, tasks and activities required to transfer your patients into recovery and out of the theatre suite, efficiently without delay
Toolkit	The toolkit is a reference manual for all the tools referred to in The Productive Operating Theatre modules

**Source:** NHS Institute for Innovation and Improvement