Building Teams for Safer Care
The Productive Operating Theatre

June 2012 Progress Report
Hawke’s Bay DHB

To: Tony Crane
Senior Project Manager
National Health Board

June 2012

Provider Number: - 436487
Contract Number: - 336064/00

Prepared by
Alan Spinks - Programme Leader
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1. Background

The Productive Operating Theatre model / philosophy offers a credible structure that engages front line clinical staff to take control and improve the clinical environment for the betterment of patient care (who remain the focus of this approach) and for themselves. The TPOT offers a systemic way of delivering high quality, safe, reliable care to patients across the organisation. The programme is designed to help staff understand the value of measurement, and how this can be a real motivator for improvement. It is designed to empower staff to identify and resolve day to day frustrations, which put together a shared vision, contributes towards “the perfect operating list”

In Hawke’s Bay DHB, Elective and Surgical Services we are continuing our focused programme of change to position the service to achieve improvements in theatre productivity.

Progress continues to achieve the following improvements: -
- Development of reporting – theatre dashboard daily reporting/weekly reporting against health targets/monthly consolidated progress results
- Theatre patient information flow process mapping, data entry, coding, data quality improvements
- Improvement in late starts
- Improvement in early finishes
- End to end process mapping of pre-admission process
- six week annual leave notification in Surgical Services
- Improved theatre utilisation of sessions
- Reduction of DNA’s on the day of surgery
- Day Surgery Unit utilisation– trial of use of chairs instead of beds / review of day surgery unit model, linen supply costs, change of patient and staff expectations. Surgical short stay unit – feasibility and potential utilisation
- Theatre leadership and structure changes - major piece of work implementation underway.
- Changes in nursing recruitment work hour contracts and rostering of nursing staff to enable optimal theatre session management - includes flexible nursing hours (5,8,10 hr shifts)
- Acute theatre prioritisation and process review. Electronic whiteboard in development.
- New Graduate Theatre Orientation programme

We received funding through the MOH to:

- Undertake the TPOT programme to gain the benefits of this model to improvement performance and productivity in the theatre environment.
- Complete the Pre-admissions project
2. Programme Team

The programme has been established with the following:

- **Executive Leader:** Warrick Frater, COO
- **Project Sponsor:** Katherine Johnson
- **Programme Leaders:** Alan Spinks, Joan Plowman
- **Programme Facilitator:** Wendy Lorentz
- **Clinical Leads:** Andrew Husband – ENT Surgeon
  Hugh Rorison - Anaesthetist
- **Information Analyst:** Pieter Albertyn

The Programme continues to be supported by the following structure
Project Inclusions
- Delivery as per MoH contract for TPOT implementation within 2 showcase theatres
- Create natural roll out of capability for all theatres

Exclusions
- Endoscopy will be managed as a separate project, which is implementing changes in service including development of stand alone endoscopy suite.

Project Interdependencies
- Elective Pre-admissions Project
- CapPlan
- Optimise Procurement in Theatre
- Productive Wards - Releasing Time to Care
- Productive Community Services
- Endoscopy project
- Hospital Flows (ED 6 hr target)

3. Achievements within each module to date:

Summary Comment

For our showcase theatre we chose Theatre 3 the ENT theatre as this is a speciality that is very receptive to change as they have lead the way in our early days of general theatre improvement programmes. Theatre 6, orthopaedics was picked as the next theatre to embrace the improvements, and this has proved more challenging.

With the success of TPOT in theatre 3 staff are keen to see those successes and initiatives translated through into the other theatres.

Endoscopy, although not formally included in this project, has been very proactive with implementing the team briefing, and is now going to be key in assisting other areas to utilise the tool and see the benefits.

All 11 modules are now underway across all theatres. Good progress is being made in some modules and some are near completion. We are also seeing clear links across other modules as we progress with the current modules e.g. handover and patient preparation are being linked to team working. This will shorten our completion time for the whole programme.

It was initially thought that this programme could be fully implemented within two years, however due to the complexity of surgical services and the absolute necessity to maintain and improve our productivity it is envisaged for this programme to be truly sustainable and get the greatest improvements possible it will take up to three years to fully implement and realise its true benefits.

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<th>Progress / Comment</th>
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<td>1</td>
<td>Knowing How we are doing</td>
<td>Metrics have been developed overtime to make the data useful not only for management but also for staff to see visually how well they are working and to show how their efforts in making changes to</td>
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<tr>
<td>1</td>
<td>established</td>
<td>their systems has benefited them and their patients. We have in place a monthly ongoing system set up to record and share with staff data that is pertinent to this programme. The SPC statistical programme for presentation of data will be continued as it is a very simple way of visualising trends, variability and sustainability. This analysis tool is yet to be handed over from the initial programme leader to the current team for future use.</td>
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<td>2</td>
<td>Well Organised Theatre Module</td>
<td>All theatres have gone through a process of improvement. The biggest changes have been made to the way storage of equipment is located within each theatre and also each workstation within each theatre. This programme has also used the benefits realised from the “Optimising patient’s journey” programme. This has helped greatly in the adoption the improvement programme. The greatest benefits will be made with theatre 7 coming on line, and within the month of August this module will see an enormous amount of activity, and completion.</td>
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<td>3</td>
<td>Operational status at a glance module</td>
<td>Through this module we have developed a staff allocation board, which directs all staff to the theatre they have been assigned to work. The staff allocation board also helps manage the day-to-day running of the theatre making it easy to locate staff as and when required. This has allowed greater visibility of staff changes and movements that just was not visible prior to TPOT. Due to the constraints of the CRISP programme we were unable to use any new information technology to proceed further. To combat this we are in the process of adapting our ECA system to develop a real time electronic visibility system of patients as they progress through theatre. Monitors will be strategically placed within theatre and day surgery to give staff in theatre and the wards the ability to locate patients in theatre. This information will help prepare the flow of patients to make sure we achieve maximum utilisation in theatre and reduce the time patients have to wait for surgery. Due to IT constraints this work will be completed in September 2012.</td>
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<td>4</td>
<td>Team-working</td>
<td>ENT Theatre was the first theatre to use the new briefing concept. Through the use of PDSA cycles we are at version nine of the documents. The biggest benefit of briefings is improved communication within the surgical team. A number of potential delays in utilisation have been avoided by using briefings. Briefings are being initiated in all remaining theatres and feedback is positive. The briefing document has been reduced to a page document for both pre and post briefings. Theatres using this for some time now do not document, unless there is a significant issue arising from the briefing. Medical staff are certainly very positive about the value of briefing to them, and the general team cohesiveness that this brings to the team. We have also introduced the use of ISBAR as a further communication tool for use in theatre to communicate patient issues, handover etc. to PACU and the ward. We are linking with the Productive Ward programme as a</td>
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<td>5</td>
<td>Scheduling</td>
<td>The DHB has introduced Cap Plan theatre module. This is a multifaceted management tool linked to CapPlan inpatient module to develop the best use of theatre by creating the best use of inpatient beds available. This module will link with the booking process via the booking clerks and ACN’s to formulate theatre lists which will give the best case and patient fit with the theatre space available. The current benefit is the real time understanding of acute demand and its effect on elective waits. Further improvements will be seen when Cap Plan is rolled out to all specialties. The overall benefit from Cap Plan will be to reduce and predict the time elective patients will wait for their surgery.</td>
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<td>6</td>
<td>Consumables &amp; Equipment</td>
<td>This module has produced the greatest physical and visible change in theatre. Process mapping events have been carried out across all specialties to understand problems with consumables in terms of ordering processes and storage issues and to identify potential improvements. The initial results of this work have shown that approximately 129 lines of consumables, which equates to approximately 40,000 items, will be moved to the automatic imprest system. The supply chain will take on this work releasing a .5FTE RN. The result of this will reduce the time clinical staff order consumables, so more time can be spent on clinical duties, and will also free up about 25% of the storage space in the theatre department. This will help with the introduction of theatre 7 when it comes on line in August. On the equipment side of this module the issue of storage and use of loan equipment has produced improvements. With the participation of TSU, a plan to rearrange storage of equipment to stream-line the flow and processing of loan equipment is evolving. With these changes the model for purchase, distribution and ordering of supplies will demand a much closer liaison between procurement and theatre, with the benefits of rationalised stock levels, more accurate and timely ordering resulting in less waste, more space and best use of staff time.</td>
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<td>7</td>
<td>Session Start Up</td>
<td>Data has been collected to highlight the problem of start times within each theatre. The biggest benefit is all staff are now using the same definitions for start times and that alone will achieve the greatest benefit at present. This module continues to be implemented, and remains challenging, particularly in orthopaedics where the pressure of pre theatre ward rounds and specialty meetings do demand that theatre time is not always recognised as top priority. We continue to work with ways to achieve the best results here. Discussion is underway with the orthopaedic surgeons to ensure that the acute lists start on time.</td>
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| 8  | Patient                   | Staff awareness of the synchronisation of clocks in theatres has
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<td>8</td>
<td>Module</td>
<td>Turnaround provided improvement to turnaround times. Data collection is improving due to staff seeing the importance of collecting good clean and reliable data. Links to other process modules below has also shown improvements to turnaround times in terms of patient preparation and improvements to the handover process. This module continues to be implemented. The slowly increasing use of bed/chair procedures and more patients being treated without sedation in endoscopy proves very effective with patient turnaround and quicker discharge from the unit. This is modelling the change of practice required across all specialities. There are other initiatives that can be introduced to theatre yet that will assist with patient turnaround.</td>
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<td>9</td>
<td>Patient Preparation</td>
<td>As part of the overall general improvement programmes occurring in theatre is the acute demand management system. This is an electronic system that the team can access to plan and prepare patients for surgery. Recent changes to the computer software have enabled a lot more patient information to be recorded, so that all staff are able to see this, meaning less phone calls, more accurate information requirements for surgery and less chance of oversights re the patient status occurring. This module continues to be improved and implemented.</td>
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<td>10</td>
<td>Handover</td>
<td>Work is being established jointly with the productive ward programme. Work has commenced to introduce the concept of ISBAR as the primary communication tool. Training has been provided and is currently in trial.</td>
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<td>11</td>
<td>Recovery</td>
<td>The handover of patient to recovery nurse in theatre has been trialled and currently being evaluated. Nurses now receive their allocated patient in theatre rather than wait for their patients to arrive in PACU. This allows the nurse to be there when the patient awakes therefore improving assessment for recovery and facilitates more in depth interaction with theatre staff.</td>
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We are making good progress up to this point. It is important to note the pace of change/improvement is largely governed by the department’s ability to work through the modules and the ability of staff to be released from their day job to implement the necessary changes required. An important factor we have taken into account when implementing this programme has been to maintain our productivity levels as our primary goal is to provide safe and efficient access to surgical services to patients in the Hawke’s Bay region. Below you will see the data that supports our implementation pace.

**Post June 2012 Continuation of Project.**
The end of June 2012 sees the end of the programme from a Ministry of Health perspective. I Hawke’s Bay is committed to continuing this programme of work. As we continue to see the benefits realised we have put together an implementation plan up to the end of December 2012.
Due to the programme being in a stable implementation phase across the remaining theatres we intend to hand over the leadership of this programme to the theatre manager who will oversee the already agreed deliverables to provide leadership to meet the full benefits of the programme. The theatre manager will be supported by a programme facilitator, who will work with the theatre team to monitor progress and will continue to progress the agreed changes to fully implement the programme. As an added process to this intention we will continue to have support from Information Services and data measurements will be provided at an agreed time and pace.

4. Processes Used to Implement TPOT Programme

Improvement methodology

In the last report we presented the following KPI baseline report

The above table shows an increase in the number of patients over time whilst maintaining a constant utilisation rate.

The above table shows our baseline data aggregated at a monthly level. This form of data presentation does not give us a sense of how we are doing on an ongoing basis. It does not also show how the system is functioning over time and does not give us any statistical analysis to judge whether a) any changes have taken place, b) whether any change that is made is desirable, c) there is any stability in the variation to show sustainability on any improvements throughout the system of focus.
Statistical Process Control Methodology

In light of the above we adopted the use of statistical process control (SPC) methodology. We believe this methodology gives us the ability to show improvements to meet the quality dimensions for the TPOT programme. We believe it is of the upmost importance to understand how our system is functioning in order to make a judgement of the amount of effort required to meet the benefits from the TPOT programme. Aligned with this is the absolute need to understand the type and amount of variation that exists within our systems therefore giving us the means to measure our improvements over time. At the same time it will give us the confidence that sustainability of the improvement gains exist within our improvement efforts and the changes we make.

We have been and will continue to work on a four step approach to show improvements required as the KPI's for this programme; - Utilisation rates, Turnaround times and reducing the number of late starts.

Step 1. We are looking at the data to establish if there are any special cause variation within the system, if there are then the system is said to be unpredictable and out of control - Improvement number 1

Step 2. We will carry out investigations to understand why there is special cause variation, we will eliminate them and this will bring the system under control and will therefore be predictable – Improvement number 2

Step 3. Once we have eliminated any special cause variation we are then in the position to look at the level of variation over time, also the system is then said to be stable and predictable – Improvement number 3

Step 4. We will now look at the level of variation within the system and seek sustainable perfection to allow us to develop a continuously improving system across all theatres – Improvement number 4

PDSA Cycles

This programme has adopted the use of PDSA (Plan, Do, Study Act) cycles as one of its principle methodologies. The use of PDSA cycles allows us to try ideas, study them and act upon the results we see. This is evident in the introduction of briefings within theatres.

The use of PDSA cycles allows us to ensure any changes we put in place are producing the results we seek but also they allow us to ensure the changes are sustainable and move us to a continuously improving environment.

Project Methodology

HBDHB project management framework is based on PRINCE2 methodology. This process ensures the effective functioning of all key roles within the TPOT programme including the role of the Project Sponsor, the Steering Group, Project
Manager and Project Delivery Team Leaders. The project management process also ensures that a prompt issue detection and escalation process is in place. Monthly meetings are held with the Project Sponsor, the Project Manager, the Theatre Manager and the Project Management Office to monitor the progress of the TPOT programme and to develop response plans for any identified barriers. In the recent transition from a contracted Project Manager to the appointment of an internal Project Manager, the project management framework has provided a mechanism to ensure that the TPOT programme has continued including the creation of sound plan to fully implement all modules.

5. Changes Implemented as a result of this Programme

The programme has made a number of changes to the delivery of surgical services. In this section we will describe some of the major changes.

It is important to note that due to the nature of this programme e.g. its modular approach and the full implementation of all modules form a system wide structure for change within surgical services only then will we see the collective benefits across the system in terms of changes and improvements. However there have been some substantial gains in the first 13 months of implementation.

All theatres have gone through an improvement programme of improving flow within theatres. Staff have redesigned how the theatre is stocked in terms of items held in the theatre cupboards. The benefits of this change is the amount of time staff leave theatre during procedures is greatly reduced, and the ease of finding supplies held in the cupboard is noticeably improved.

The department is working with information services on the creation of real time patient status throughout theatre. This will enable staff within theatre and the ward see where their patients are throughout their surgical journey. The benefits of this are numerous. Some examples – Staff will be able to prep patients more accurately than before therefore reducing the anxious waiting times patients experience prior to having surgery.
Increase patient throughput, therefore making better and improved utilisation of theatres.
Ward staff will be able to plan better for patients leaving and returning to the ward therefore improving recovery rates.

The team has introduced the concept of briefing pre and post lists. Prior to the list starting the briefing is held, this is a new process which only takes a couple of minutes at the start of the list but, the benefits are potentially huge.

The briefing is led usually by the surgeon and is carried out when all staff are present. The essence of the pre list briefing is to ensure everyone working on this list is known to each other if not introductions are given. Each patient is discussed in terms of any issues relating to their surgery, a discussion on equipment is held, and the expected times for the cases is looked at so planning for staffing is in hand.
The post list briefing again is being led by the surgeon and the list is discussed in terms of identifying any issues that came up during the list and improvements are discussed.

Communication improvements implemented include to introduction of ISBAR. (Introduction, Situation, Background, Action, Response) ISBAR is a tool to help staff communicate patient status. It is a tool that helps staff communicate patient status at any stage of a patient journey, to accurately transfer the responsibility of care. Staff training has been provided and results are expected to show an improved patient handover as well as giving and receiving precise information to help increase the safety and quality of patient care. This is in its first stage of trials at the time of report.

Changes to the way staff receive patients following surgery are in place. Instead of staff waiting to receive their patients in PACU staff now attend theatre to receive their patient. The benefits of this change in process means recovery nurses can communicate with the whole team, and have the opportunity to more actively visualise their patient status in preparation for their care in PACU.

The management of consumables has and will significantly improve processes within theatre. Procurement is working with the theatre team to streamline the process of storing and ordering of consumables. This change will free staff to concentrate on clinical activity instead of spending time ordering consumables. We are also looking at freeing up space within theatre due to the moving of stock to the imprest system, therefore reducing removing the number of stock items to the warehouse. This is predicted to be in excess of 40,000 items. At present we are predicting a 25% increase in space within theatre.

6. Productivity Changes

The above chart shows how we have reduced the variation in turnaround time. This change has produced a significant stability in the system. You can see from the latest data entries that we are trending a reduction in turnaround times this is
expected to continue as the programmes becomes more sustainable with the changes that are being implemented that have been previously described.

The above chart shows a reduction in variation and also a significant increase in utilisation over time. The chart also shows how the programme is continuing to show improvements by a further reduction in variation, this gives us great confidence in our ability to sustain and continue to improve our systems.

Theatre 6 has also shown a reduction in variation overtime and the changes have made the system of turnaround times to be more stable and predictable with also a reduction in turnaround times.
The above chart illustrates the changes made in theatre 6 in terms of utilisation. The reduction of variation gives us the ability to continue our improvements. The charts also shows how.

As previously discussed one of our main objectives whilst implementing the TPOT programme was to maintain our productivity levels. The above chart shows activity across all theatres with no significant reduction since August 2011.
The above charts shows a reduction in late starts across all theatres. More recent data, shown by the month will be available when the SPC methodology is handed over to the current TPOT team.

7. Value for Money

The programme attracted funding from the Ministry of Health. The funding allowed us to resource the programme with a dedicated programme leader. In these days of reduced funding and greater demand for healthcare services we may have not been in a position to provide this resource. The funding also allowed us to backfill where possible for staff to attend training events. The value of this project is yet to be fully realised as the progress needs to be well thought out and have buy in from all stakeholders to be sustainable. It has allowed impetus at the beginning of a programme that will continue to evolve within the peri operative environment.

8. Lessons Learned

The time taken to implement the TPOT programme, in hindsight may not have been ideal. Theatre had recently undergone operational restructuring, new management, along with acting and secondment positions. Should it be starting now with the new structure bedded down and the management team in place, it would have been easier to gain momentum. Now with a settled environment and the engagement of a facilitator with dedicated time in theatre, more momentum is being gained and staff engagement is now more apparent.

The transformational emphasis of the TPOT programme was initially seen as more changes to be trialled and adopted. The introduction was challenging, especially with little additional resources.

The build of the new theatre also added pressure to accommodate this capacity and current systems and processes are being reviewed with that in mind.
However the new theatre has also provided opportunities for many improvements.

. The programme urgently needs more clinical engagement and clinical lead. Greater clinical input from the beginning would have helped the programme gain traction earlier.

Staff are enjoying the opportunity to have a mechanism for improvement and are participating well with initiatives, and providing spontaneous suggestions for improvement.

9. Impact of the Programme

The impact of this programme will not be accurately felt until all modules have been implemented and embedded into the system; however we are seeing some impact already.

Most importantly we have improved the safety and quality of care for our patients by improving how we communicate; the increasing use of briefings will have an impact on reducing the potential of errors to occur by discussing cases prior to performing surgery

Space is being created as we move to the opening of theatre 7. Space is not just needed for the theatre but also for the ergonomics required to allow for a further theatre.

. We have reduced the amount of time spent ordering consumables and equipment, and with more items on imprest this will reduce the chance of supplies not being ready when needed. Savings will definitely be made with rationalised stock levels in many areas.

10. Effective Scheduling

We are very fortunate in Hawke’s Bay, we are implementing Cap Plan theatre as our tool to help model and plan our theatre schedules. CapPlan theatre is a capacity management tool that allows us to model scenarios based on understanding and measuring intrinsically demand for acute theatres. Once this demand is understood CapPlan theatre allows us then to plan and meet effective elective demand matched to beds available. Booking Clerks, Associate Change Nurses and consultants are also working closely together to ensure that lists are scheduled appropriately and fully.


With no extra resources allocated to the programme in terms of staff time, and no full time facilitator the funding has not been well utilised to this point. This has definitely been the reason for the project not gaining as much traction as may perhaps have been expected.
12. Intended and Unintended Consequences

To date, some of the work that is being done in conjunction with the new theatre build has been brought together along with the other TPOT initiatives, and provided some good momentum in the change process. The TPOT framework has also given some structure to the inter-relationships of many of the projects underway.

Staff are enjoying the opportunities for input with the rewards that there is a formal process for change operating. There is a general increase in engagement around all aspects of daily work, and a willingness to question and bring ideas forward that may otherwise not have had a platform for initial discussions.

The regular meeting of a quality group has lifted the amount of initiatives being examined, though some areas are still time poor and it seems difficult to reach targets that are planned.

Increased engagement of external stakeholders - procurement, IT and finance, in the operational arena of theatre is also starting to occur. This will facilitate a much better strategic focus for theatres, enabling more defined planning with Capex and budget, in an area of high cost equipment and maintenance.

13. Conclusion and Next Steps

In conclusion Hawke’s Bay District Health Board intends to continue the implementation of the Productive Operating Theatre Programme. We are at a stage of implementation where we are seeing great improvements to the way we plan and carry out surgical services for our population. We have every expectation to build on and increase the benefits this programme can provide.

We are developing strong buy in from front line staff as long as we continue to engage and involve our staff we are sure the programme will continue to grow. An increase in clinical involvement is one aspect that would benefit the traction of ongoing work, it is hoped that the value of the team briefing may be transformational in gaining this involvement.

Succession planning is in place from a leadership level to implementation. We know we have a long way to go. The operational restructuring is settling down, roles have been established and adopted into everyday working. With this in place we are now in a better place to continue and in some areas start the rapid implementation of the remaining modules to all theatres.