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Improving Teamwork and Communication within Surgical Teams

A Proof of Concept Project

Programme Review and Recommendations

Health Quality and Safety Commission

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Contents

Executive Summary

The purpose of this report is to present a comprehensive review of the activities undertaken to develop and implement the Improving Teamwork and Communication in Surgical Teams Proof of Concept project, and to provide the associated recommendations to expand the projects deployment to a national level.

The report highlights key findings and processes undertaken throughout the Proof of Concept, and also includes key recommendations that will guide the whole of sector deployment, and a pragmatic roadmap for delivery.

This report has been written and approved by the project's working group and approved by the three sites involved in the proof of concept project.

Background

The Improving Teamwork and Safety in Surgical Teams project was initiated by the Health Quality and Safety Commission (the Commission) in late 2013, as part of its wider Reducing Perioperative Harm Programme. The project was established in order to understand if the usage of the clinical and behavioural interventions would improve the perceived culture of communication and teamwork within surgical teams.

The Improving Teamwork and Communication in Surgical Teams project was designed as a Proof of Concept (PoC), and was given the mandate to design and test the validity of programme specific clinical interventions, behavioural interventions, a measurement approach (and related technology solution), education approach and deployment approach, and assess their impact on the culture of teamwork and communication in a selection of surgical teams.

Approach

The PoC was designed as a ten month project, and based on the IHI's Breakthrough Collaborative Model. This learning system approach was adopted to ensure that a clear, proven process was in place consistent with accepted improvement methodologies.

The PoC involved three streams: Development, Deployment and Measurement.

Collaborative Development

Three 'sites' were selected by the Commission to participate in the PoC, which represented a range of hospital sizes, locations and sectors across New Zealand. The three organisations selected were:

- Waikato District Health Board (DHB) - Waikato Hospital
- Lakes DHB – Rotorua Hospital
- Southern Cross Hospitals – Auckland Surgical Centre

The Commission also established a working group, with members representing PoC sites and Subject Matter Experts, across a range of fields related to the project's focus area and goals.

The working group designed, and/or modified, three clinical interventions to be trialled in the PoC: briefings, surgical safety checklist and a stop/start/improve huddle (debriefing).

A behavioural/cultural intervention toolkit and improvement methodology was also developed by the working group to trial during the PoC. All materials, guidelines and education content were developed for these interventions.

Collaborative Deployment

Once the interventions, education approach and measurement approach were designed, and related content and materials developed, the three PoC sites deployed these to their surgical teams over a six month period using the IHI collaborative approach.

The PoC site champions and site teams used both learning sessions (including both formal and informal training sessions) and action periods to refine and embed the interventions into their existing surgical

practices, with the compliance data collected showing that both intervention adoption rates and staff engagement significantly increased in each site throughout the period of the project.

Collaborative Measurement

A measurement approach was designed, in order to measure whether the project impacted on overall teamwork and communication. The approach included the development of outcome measures through the use of a safety attitudes questionnaire, which included undertaking a baseline and end of PoC survey on communication and collaboration, teamwork, safety climate, job satisfaction and perceptions of management from PoC site staff.

Process measures were also developed and measured using a web based reporting tool. Staff in theatres input data into the reporting tool on a daily basis, in order to measure the progress of deployment over time.

Key findings

Overall the project was highly successful from both a quantitative and qualitative perspective.

Results from the Safety Attitudes Questionnaire found very strong evidence / statistical significance that the implementation of the PoC resulted in an overall improvement in both the participants' perception of their colleagues' communication and collaboration skills, and on the overall culture of teamwork and communication.

The post PoC survey highlighted that there was a 68% increase in respondents who agree that moral in operating theatres is high and that there was also a 60% reduction in participants who felt that communication breakdowns, which lead to delays, were common.

Positive qualitative feedback was provided from a number of staff across professions on the interventions that had been deployed. Theater team members commented that the benefits of the PoC included improved levels of teamwork, a more inclusive culture, improved communication and an improved ability to prepare well for surgeries.

"When the PoC came through, we as theatre nurses had very negative thoughts about it – one more time consuming bureaucratic procedure burden on our shoulders. Now I have to admit we were so wrong about it" - ***Theatre Team Member***

"Information is not relayed by telepathy. The [PoC interventions] help clarify in my mind whether I have considered all aspects of patient's anaesthesia and interventions required" - ***Anaesthetist***

"The Proof of Concept is an important part now of every operation that I perform. The team meets first and fully discusses the entire list. This enables changes to be made if necessary prior to any concerns normally found during operating" - ***Surgeon***

Over the course of the PoC, data on the use of interventions showed that adoption rates increased, variability in adoption decreased and engagement improved:

Briefings:

- Team engagement in the briefing was shown to be positive, with an average score of 6.4 throughout the PoC. This engagement score steadily increased over time, from 6.1 in the first month to 6.6 in the final month
- The briefing intervention was well used, with a completion rate of 93% throughout the PoC. Of the briefings that were not completed, 50% of these were due to team members not being available (most commonly the surgeon or anaesthetist role)
- At the completion of the PoC 98% of participants agreed that team briefings before a surgical procedure are important for patient safety. This was an increase from 87% at the commencement of the PoC
- At the completion of the PoC the survey highlighted a 31% increase in respondents who found all necessary information was available before the start of a patient procedure

Surgical Checklist:

- Surgical teams were effectively engaged in the checklist throughout the PoC, with an average engagement score of 6.1

- The surgical safety checklist had high completion rates throughout the PoC, with all three components of the checklist being completed in 96% of instances
- The post Poc survey also indicated that there was 18% increase in respondents who agreed that patient safety is constantly reinforced as a priority in operating theatres at the completion of the project

Stop, Start, Improvement Huddle

- Despite this being a new activity for most teams, all surgical teams were engaged in the huddle, with an average engagement score of 6.3 across the POC
- Adoption of the huddle was positive, given sites had not previously had a formal debriefing or huddle intervention in place prior to the PoC, with an average completion rate of 78%
- Adoption of the huddle improved over the course of the PoC, from 74% in first month to 91% in final month
- The most common reason for non-completion of the huddle was due to team members being absent

Key Recommendations

As can be expected in a proof of concept, a number of areas for improvement were identified. The working group provided a set of recommendations based on their learnings in the Development, Deployment and Measurement parts of the project.

The following recommendations for a national deployment cover six areas: initiation, governance, construct, programme planning, implementation and sustain and improve:

Initiation

I. Confirm programme goal - To Improve Teamwork and Communication

II. Review PoC outcomes & recommendations and identify key stakeholder requirements

III. Develop a robust 6 month mobilisation plan

IV. Develop a 2 stage high level 18 month programme plan

V. Establish programme and deployment costs and obtain programme funding

VI. Revise QSM: Process – Engagement via observational audit, Outcome– Teamwork via periodic survey

VII. Design a high level engagement strategy and communications approach for 18 month programme

VIII. Document technology requirements to meet goal, stakeholder, planning and reporting needs

Governance

IX. Develop a programme governance structure and construct governance supporting arrangements

X. Establish a national programme team including a vendor/business integrator and consumer representative(s)

XI. Document the roles, responsibilities and terms of reference for members of all governance groups and establish a decision-making framework

XII. Develop meeting schedule that allows for efficient escalation of issues and confirmation of decisions through the different governance groups

Construct

XIII. Revise and document the agreed processes and guidelines for all interventions

XIV. Revise and document the agreed processes and guidelines for all tools

XV. Revise and document the agreed process and guidelines for all measurement and reporting activity

XVI. Prepare all training and knowledge transfer content, including guidelines, simulations, videos & classroom

XVII. Update Web Based Reporting tool to align to requirements, and revise format to meet user needs

XVIII. Develop all national communications, tailored to meet each professional grouping and stakeholder requirements

Programme Planning

XIX. Engage with all in scope sites leadership and surgical teams to understand appetite and enthusiasm for the programme

XX. Develop and finalise a comprehensive, multigenerational 12 month deployment roadmap

XXI. Engage with Senior Management and Clinical teams at each site to understand projected capacity, plans, and resource for FY 15/16

Implementation

XXII. Allocate "buddies" to sites to enable peer-to-peer sharing

XXIII. Develop organisation specific deployment plan and project management approach

XXIV. Create change management and communications plan with each organisation

XXV. Allow for incremental performance improvements over the 12 month deployment phase

XXVI. Ensure the form, function and delivery of training meets the recipients needs

XXVII. Continue to use the briefing template and require all surgical team members to be present. Continue to use the WHO Surgical Safety Checklist but modify aspects to suit different specialties. Modify the name of the Stop/Start/Improve Huddle to 'Debriefing' but continue to use the same activities

XXVIII. Continue to use and evolve the Behavioural/Cultural Toolkit

Sustain and Improve

XXIX. Implement a basic structured improvement methodology as part of the programme – to close the briefing loop

1. Introduction

1.1 Background

Each year, approximately 300,000 publicly funded surgical operations are performed throughout New Zealand. Indicative data from ACC indicates that 205 claims, between 2005 – 2006 and 2010 - 2011, were accepted for retained equipment or wrong-site surgery. Data also indicates that New Zealand is above the OECD average for foreign bodies left in during a procedure and accidental punctures or lacerations during surgery (405, compared to an OECD average of 220).

A systematic review of studies suggests that about one in ten hospital patients in developed countries experiences an adverse event and that over half of these are surgical patients. It is estimated that 14% of these events lead to permanent disability or death, and around 20% to temporary disability[1].

It is widely accepted that teamwork, and communication within a surgical team, is an essential component of an effective operating theatre, given that the perioperative environment is complex, involving multiple teams of health professionals and transitions of care. There is increasing evidence that poor teamwork and communication is associated with negative patient outcomes, including major complications or death[2].

Recent studies in developed countries, including England, Canada and USA, have shown that poor teamwork and communication in operating theatres has a negative impact on performance and patient safety, suggesting that improving teamwork and communication within surgical teams is critical to the success of reducing perioperative harm.

1.2 New Zealand Context

These international observations are consistent with findings within New Zealand. A recent New Zealand Clinical Governance Assessment found that only 57% of respondents agreed with the statement that health professionals in their DHB work together as a well-coordinated team[3]. Additionally within 2014 57% of all cases referred to the Health and Disability Commissioner are related to a breakdown in teamwork and communication, and of the 9 surgical cases referred 8 involved a breakdown of teamwork or communication[4]. These communication breakdowns may lead to team members being or feeling uninformed or misinformed[5], and indicate that there is the potential for considerable gains through improving teamwork and communication within New Zealand surgical teams.

Steps have been taken throughout the sector to develop both performance and capability within this area. An example of this was the introduction of the Surgical Site Checklist 2010. However, research by the Health Quality and Safety Commission (the Commission) into the attitudes towards using the checklist in New Zealand found that there was a lack of understanding on the intent of the checklist and that it was not seen as a team tool to facilitate teamwork and communication to ensure patient safety. Instead the checklist had become a compliance or audit tool.

The Quality and Safety Marker (QSM) used to measure the use of the checklist may have partially contributed to this compliance culture. This QSM measures the rate of procedures where there is evidence

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[1] De Vries, E., Ramrattan, M., Smorenburg, S., Gouma, D. & oermeester, M. (2008). The incidence and nature of in-hospital adverse events: a systematic review. Journal of Quality Safety and Health Care, 17(3), 216 – 223.

[2] Gawande, A.A., M.J. Zinner, D.M. Studdert and T.A. Brennan. 2003. "Analysis of Error Reported by Surgeons at Three Teaching Hospitals." Surgery 133: 614–21.

[2] Mazzocco, K., D.B. Petitti, K.T. Fong, D. Bonacum, J. Brookey, S. Graham et al. 2009. "Surgical Team Behaviors and Patient Outcomes." American Journal of Surgery 197: 678–85.

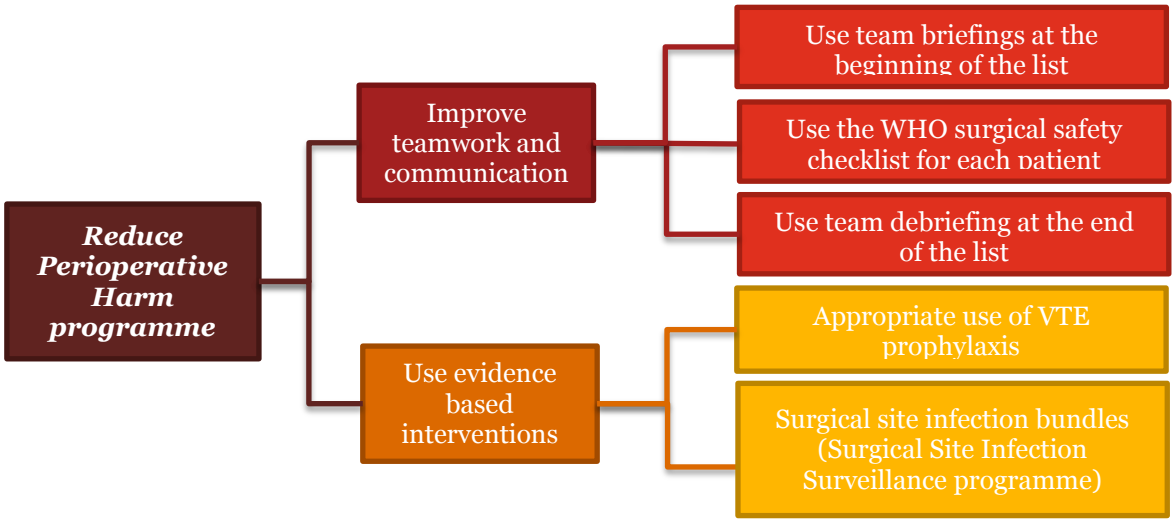
[3] Gault, R. & Horsburgh, S. (2012). Clinical Governance Assessment Project: Final Report on a National Health Professional Survey and Site Visits to 19 New Zealand DHBs. Dunedin, New Zealand: Centre for Health Systems, University of Otago

[4] http://www.hdc.org.nz/decisions--case-notes/commissioner's-decisions/2014?page=2&resultsPerPage=-1

[5] Einav, Y. et al. (2010). Preoperative Briefing in the Operating Room: Shared Cognition, Teamwork, and Patient Safety, Chest, 137(2), 443–449.

that all three components of the checklist are used. Hard copies are required to be filed for audit purposes as part of the QSM. The current measure did not demonstrate whether the checklist was effectively used.

Based on these results, the Commission, as part of its work to improve patient safety, developed a programme to focus on reducing perioperative harm and improving teamwork and communication within surgical teams. This programme was led by the Perioperative Harm Advisory Group (PHAG) and had two streams, as shown in the following diagram:



1.3 Improving Teamwork and Communication within Surgical Teams Proof of Concept project

During 2012, the Commission initiated their Reducing Perioperative Harm Programme ('the programme', with the aim to improve the quality and safety of health care services provided to patients undergoing surgery in hospital.

This programme was expanded in December 2013 to include a 10 month project that would encourage teams to consistently apply evidence based practices and safety checks to all patients, and improve teamwork and communication through focusing on:

- Fostering better communication and teamwork
- Supporting the effective use of the WHO surgical safety checklist
- Supporting the ongoing implementation of The Productive Operating Theatre programme (TPOT)
- Developing other evidence based interventions known to improve outcomes for surgical patients and not currently used in clinical practice in New Zealand.

The Improving Teamwork and Communication within Surgical Teams project was initiated in December 2013, as part of the Reducing Perioperative Harm programme.

During the scope development of the project the PHAG determined that it should become a Proof of Concept (PoC) project, in order to test the implementation of the three interventions and understand the impacts on teamwork and communication across a small number of organisations.

1.3.1 Objectives

The objectives identified for PoC project were:

- To design and evaluate the validity and application of clinical and behavioral interventions, a web based reporting tool and the programme deployment approach
- To test the hypothesis that the usage of the clinical and behavioral interventions would improve the perceived culture of communication and teamwork within surgical teams

1.3.2 Approach

The PoC was designed as a ten month project, and based on the IHI's Breakthrough Collaborative Model. This learning system approach was adopted to ensure that a clear, proven process was in place consistent with accepted improvement methodologies, and has also allowed the flexible adaption and selection of interventions based on international evidence and expert advice tailored to the New Zealand context.

The PoC involved three streams: Development, Deployment and Measurement:

Stream 1: Collaborative Development

December 2013– June 2014

A Multidisciplinary Proof of Concept working group was established by the PHAG. Membership of the working group included subject matter experts and individual clinicians from across the sector and project champions from each of the PoC sites together with project management support from PricewaterhouseCoopers (PwC).

Through participating in a number of development workshops the working group designed the specific intervention education content and resources for the deployment and measurement of the PoC, including appropriate aims, measurement strategies, and a list of evidence based interventions to improve both practice and culture within the operating theatre.

Stream 2: Collaborative Deployment

June 2014 – November 2014

Throughout two PoC learning cycles, PoC sites implemented the recommended interventions. The sites utilised learning sessions to develop their local capability in using the interventions and shared learning's across the project. Action periods were used to track each site's progress using quantitative measures. A study of the results of their work provided for insight on how to do better and act to make the changes successful and sustainable.

Stream 3: Collaborative Measurement

June 2014 – November 2014

Performance against all clinical and behavioral interventions was base-lined at the start of the trial period to understand current performance. All sites were required to report on their performance measures for every theatre session. Members of the key working group collated analysed and reported on progress and assessed the overall success of the PoC.

2.Collaborative Development

The Collaborative Development phase incorporated five key activities:

2.1 Collaborative Development Approach

2.1.1 Selection of PoC sites

An Expression of Interest request was sent to a number of organisations throughout the sector at the start of the project, and the Commission selected three sites to become the PoC sites. The sites selected represented a range of hospitals within the New Zealand Health and Disability sector.

The three selected sites were:

Waikato District Health Board (Waikato Hospital)

Waikato District Health Board (WDHB) employs over 6000 people, covering a large geographical area in the upper central North Island of New Zealand, known as the Waikato. Its corporate office and largest hospital are located in Hamilton city.

WDHB plans, funds and provides hospital, health and disability services to the more than 373,000 people, and includes a tertiary hospital, a secondary hospital, and three rural hospitals. Additionally, the District Health Board (DHB) provides a wide range of community-based and health promotion services and tertiary services (such as neurosurgery and other highly complex surgery, specialised medical procedures and specialist trauma services) to a Midland health region population of more than 846,600.

WDHB was selected by the Commission, as it was well known for previous work it had undertaken in implementing briefings and the surgical safety checklist. Waikato was viewed as one of the leading organisations in the use of briefings and checklists across the sector.

WDHB has 25 theaters, including 22 at Waikato Hospital. Waikato Hospital's theatres include 76 surgeons, 51 anaesthetists, 47 anaesthetic technicians, 127 nurses, 4 perfusionists and 30 healthcare assistants.

Lakes District Health Board (Rotorua Hospital)

Lakes DHB covers a population of 103,000 people, and spans an area just north of Lake Rotorua to Mount Ruapehu. Lakes has a population with a relatively high proportion of people living in the most deprived section of the population, compared to national averages.

Lakes DHB is a small to medium sized DHB, employing just over 1,400 people.

The DHB has two hospitals, based in both Rotorua and Taupo. Rotorua Hospital has six theatres, while Taupo Hospital has one theatre, which is currently closed for refurbishment. Consequently, the project did not include Taupo Hospital.

There are 117 staff that work in theatres at Rotorua Hospital, including 30 surgeons, 16 anaesthetists, 51 nurses, 11 anaesthetic technicians, 6 orderlies and 7 TSSU staff.

Southern Cross (Auckland Surgical Centre)

Southern Cross Hospitals is New Zealand's largest private hospital network, with nine wholly owned hospitals across New Zealand as well as a number of other partner hospitals.

The Commission's project sponsor determined that a private hospital should be included in the PoC, to understand the different challenges that private hospitals face. Southern Cross was selected, as the management was very interested in trialling interventions relating to a reduction in perioperative harm.

The Southern Cross Auckland Surgical Centre (ASC) participated in the PoC project. ASC has four theatres, all of which were involved in the project. ASC staff include: 24 theatre nurses, 5 anaesthetic technicians, 3 orderlies, 5 TSSU staff and 63 credentialled medical specialists (36 surgeons and 27 anaesthetists) who practice at the hospital.

2.1.2 *Selection of working group members*

During the design of the project, the Commission identified and invited a range of Subject Matter Experts and PoC site Champions to form a working group to manage the programme. Additional members comprised of a small Project Management and facilitation team from PwC and a project leadership team from the Commission.

Improving Teamwork and Communication PoC working group

The multidisciplinary group provided a variety of clinical and non-clinical expertise, including experience in designing and implementing many of the clinical interventions to be used in the project.

Subject Matter Experts

Subject Matter Experts supported the project, contributing their views on the benefits, range of uses and limitations of the interventions and learning experience. Their fields of expertise covered quality improvement, human factors, collaboratives, surgery and nursing.

Each Subject Matter Expert was chosen to ensure strong and visible clinical leadership of the PoC, and the responsibility of these individuals was to provide expertise in developing the intervention and education packages for the PoC, and to promote a culture of safety, communication and teamwork throughout the project portfolio.

The Subject Matter Expert group included:

Dr David Galler, Improvement Expert

Dr David Galler has worked for more than 20 years in the health sector both in the UK and in Auckland.

David is an Intensive Care Specialist by training and has worked as a Specialist at Middlemore Hospital since 1991 where he was previously the Clinical Director of Acute Care Services. During that time David was an Executive Member, Vice President and ultimately, the National President of the Association of Salaried Medical Specialists.

His clinical interests include Quality Improvement, new models of care, care of the burned patient and management of physiologically unstable patients on the wards. He continues to work at Middlemore half time.

Since late 2003, David has been on secondment to the Ministry of Health, as Principal Medical Advisor, from Counties Manukau DHB on a half-time basis. The role of the Principal Medical Advisor includes: provision of medical advice to the Director-General and the Minister; medical input into policy development; functioning as a liaison between the Ministry and the medical profession. The Principal Medical Advisor is seconded from the sector to ensure strong and on-going sector linkages.

David's major interests since arriving in the Ministry have been in the fields of Quality Improvement, improved relationships with the sector, new models of care within and across District Health Boards, shared decision making in Governance and in promoting a more inclusive and collaborative working style between the Ministry of Health and the sector.

Bob Henderson, Human Factors

Bob Henderson has over three decades of experience in management, training and research roles. He has served as a Royal New Zealand Air Force officer and a Captain and Manager for Air New Zealand. He also has extensive experience in safety and management roles in the international aviation sports arena.

Bob has a strong background in psychology and is a Human Factors Specialist. He lectures at the University of Auckland and consults to organisations on optimising safety, operational performance and company culture through the application of Human Factors in the workplace. He is a widely sought after trainer and international speaker.

"Human Factors" is a multidisciplinary field that combines human behaviour and capabilities with system and process design to maximise safety and optimise performance. Human Factors within the aviation industry is a highly developed field and Bob's knowledge and experience translate, logically, to provide critical insights to other industries and organisations. These include the health, telecommunications and transport industries

Mr David Volkes, ENT Surgeon

A graduate of the University of Auckland, David completed his training in Otolaryngology, Head and Neck Surgery in 2004. He then spent two years in the USA in post Fellowship subspecialty training: one year of Head and Neck Surgery and Laryngology at the University of California at Irvine, and one year of Laryngology at the University of Washington in Seattle.

David is the first Otolaryngologist in New Zealand to complete post Fellowship training in the Laryngology.

David returned home to New Zealand in 2007 to take up Consultant posts at Auckland City Hospital and North Shore Hospital.

David is a member of the Auckland City Hospital Multidisciplinary Head & Neck Clinic, and the Auckland City Hospital Voice Clinic, working together with Voice Therapists.

David's clinical focus is on disorders of the voice, swallowing, upper airway and head and neck, including cancers in the head and neck region.

David is also the Secretary of the Training Education and Accreditation Committee of the NZ Society of Otolaryngology, Head and Neck Surgery, which coordinates the surgical training of Otolaryngologists in New Zealand.

Miranda Pope, Clinical Lead Nursing

Miranda Pope is Clinical Lead Nursing for the Commission's Reducing Perioperative Harm programme.

Miranda is a registered nurse who was hospital trained in Christchurch. She has worked in the operating theatre for most of her career except for a short stint in the post-anaethesia care unit, just after graduation.

Returning to work following time at home with her children she worked in the private sector in a variety of roles in the operating theatre including several leadership roles. During this time she upgraded her nursing qualifications firstly to an Advanced Diploma of Nursing and a Bachelor of Nursing.

Since 2005 Miranda has worked at Christchurch Hospital and she has been a charge nurse in the operating theatre since 2007. Miranda is a long-time member of the Perioperative Nurses College; she is presently the chairperson of the Canterbury West Coast section. It was her term on the national committee of that organisation which lead her to the Commission's perioperative harm advisory group.

Dr Shawn Sturland, Clinical Lead Intensive Care

Dr Shawn Sturland is currently the Clinical Lead for intensive care services at Capital and Coast DHB. Shawn specialised as an anaesthetist, before changing to intensive care medicine in 1995.

His experience includes aviation, a lecturer in simulation and communication in high risk environments (Queensland and Otago School of Aviation Medicine), a consultant in anaesthetics and intensive care, the Deputy Chair for the New Zealand Council for College of Intensive Care and the Medical Director of LifeFlight Wellington.

Shawn's particular area of expertise is around 'collaboratives', where two or more organisations work together to realise shared goals. He was the National Clinical Lead for a national collaborative programme - the Prevention of Central Line Associated Bacteraemia (CLAB) programme.

PoC site champions

At least one member of each PoC site was a member of the working group. The role of these PoC site champions was to help to implement change at their site through engagement with their theatre teams using a 'hub and spoke' model, to overcome barriers relating to perceived motives, trust, validity of ideas and interventions, and willingness to engage with the programme.

The 'hub and spoke' model is used for multi-location deployment. For the programme, the working group PoC site champions were the hub which provided a single line of communication to the PoC sites, which were the spokes.

Within this model, PoC site champions were responsible for the capability development of their theatre teams, for both the interventions and the improvement approach.

In a wider role, the PoC site champions were also ambassadors for the programme and contributed to the development of interventions and measures.

The PoC site champions included:

Katherine Foulkes, Waikato DHB

Katherine is a Nurse Co-ordinator in Quality and Patient Safety, (Q&PS) and works alongside Theatre and Perioperative, Emergency Department, Outpatients, Critical Care, and Radiology services to support their Q&PS initiatives. Katherine has 30 years of nursing experience which includes cardiothoracic surgical nursing, intensive and coronary care, neonatal intensive care and emergency nursing. She has previously held a lead project role for the Reducing Perioperative Harm OPEN campaign at Waikato Hospital.

Lesley Yule, Lakes DHB

Lesley Yule is the Quality and Risk Manager at Lakes DHB. She was trained as a Registered Nurse and spent much of her nursing career in the surgical area. For the last 20 years she has been involved in customer relations, quality improvement and risk management. Lesley provided executive support to this programme and her site.

Maggie Walsh, Lakes DHB

Maggie Walsh is the Clinical Nurse Manager for the perioperative area at Lakes DHB and is responsible for the theatre nurses, anaesthetic technicians, Day Stay Unit and TSU. Maggie's experience over the last 35+ years includes the Emergency Department, surgical nursing, practice nursing along with many years in the theatre setting with a particular interest in orthopaedics. She has been the clinical champion for the Reducing Perioperative Harm Project at Lakes.

Muriel McIntyre, Southern Cross Hospitals

Muriel McIntyre is Clinical Safety Quality Risk Coordinator working in the National SQR team supporting the network of hospitals. Muriel's nursing experience has included intensive and coronary care, post anaesthetic care and operating room nursing.

Tracy McConnochie, Southern Cross Hospitals (ASC)

Tracy McConnochie is the Theatre Manager at ASC. She is responsible for Clinical Services, Anaesthetic Technicians, Sterile supply and Orderlies within the hospital. Tracy has over 30 years' experience in the operating theatre, predominantly orthopaedics. In this time has held a variety of leadership positions until her appointment to Theatre manager.

Project Management and Facilitation

The Project Management and Facilitation team was provided by PricewaterhouseCoopers New Zealand, under the sponsorship of the Commission.

In addition to ensuring the successful delivery against all time, cost and quality requirements the team were also responsible for undertaking sector wide consultation on the PoC, developing the intervention and technology tools, facilitating workshops to develop interventions and design the measurement system, the development of communications materials and education packages, and to work with the PoC sites to implement changes.

External Support

The External Support team was provided by the Quality Hub and the First Do No Harm team, under the sponsorship of the Commission. This team did not sit on the working group, but attended some sessions and provided support, where required.

Quality Hub provided support to the working group on all matters relating to measurement and the design of the web based reporting tool. First Do No Harm provided quality oversight on the development of intervention guidelines and materials.

2.1.3 Intervention Design

The Collaborative Design phase involved the design of interventions and the creation of associated guidance materials to improve teamwork and communication.

The PHAG and the Commission's project sponsor had predetermined that the project should be responsible for reviewing, developing and defining three pre-existing clinical interventions: briefings, the surgical safety checklist and debriefings.

Briefings - enable the sharing of the operative plan, promote teamwork, mitigate hazards to patients, reduce preventable harm and ensure all equipment is available[6]. They supply a broader knowledge base for the planned procedure so that each team members has a better understanding of the tasks at hand and can anticipate future events and pre plan accordingly[7].

Positive results from the introduction of briefings have included a 25% reduction in the number of non-routine events when a briefing was conducted[8]. Wrong site surgeries were eliminated after the briefing process had been initiated[9] and there was a 31% reduction in unexpected delays[10].

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[6] Nundy, S. et al. (2008). Impact of Preoperative Briefings on Operating Room Delays: A Preliminary Report. Archives of Surgery, 143 (11), 1068-1072.

[7] Einav, Y. et al. (2010). Preoperative Briefing in the Operating Room: Shared Cognition, Teamwork, and Patient Safety, Chest, 137(2), 443–449.

[8] Einav, et al. (2010)

[9] Leonard, M., Graham, S., Bonacum, D. (2004). The Human Factor: The Critical Importance of Effective Teamwork and Communication in Providing Safe Care. *Quality and Safety in Health Care, 13*, 85–90.

Surgical Safety Checklist – the WHO Surgical Safety Checklist is widely recognised as a tool to reduce perioperative harm and improve teamwork and communication.

Evidence for the use of the checklist including a multinational research study was conducted to measure the impact of the WHO Surgical Safety Checklist across eight hospitals (including Auckland, London, Toronto and Seattle). This study demonstrated that the rate of death decreased from 1.5% to 0.8% after the introduction of the checklist, while inpatient complication rates decreased from 11% to 7% after its introduction – an overall complication rate decrease of 36% on average[11].

Two years later the same group of researchers published a study that found that the improvements in postoperative outcomes were associated with an improved perception of teamwork and safety that may be partially be a result of the use of the checklist, and that the checklist was held in such high regard that the overwhelming majority of clinicians would want it used should they ever require surgery themselves[12].

Similarly, work done by Patient Safety First in the UK found that 77% of Trusts that had implemented the checklist reported improved teamwork within surgical teams[13].

Debriefings - enable teams to take time to learn from real-time situations that went well or didn't go to plan by discussing what happened after an operating session. They provide opportunities for improvement, learning not blaming, improvement in staff wellbeing and a forum to say thank you[14].

Although these clinical interventions were already well established internationally, they needed to be reviewed, developed and refined by the working group to ensure that they met the needs of the New Zealand health and disability system and to ensure that they foster a culture of teamwork and communication for surgical teams.

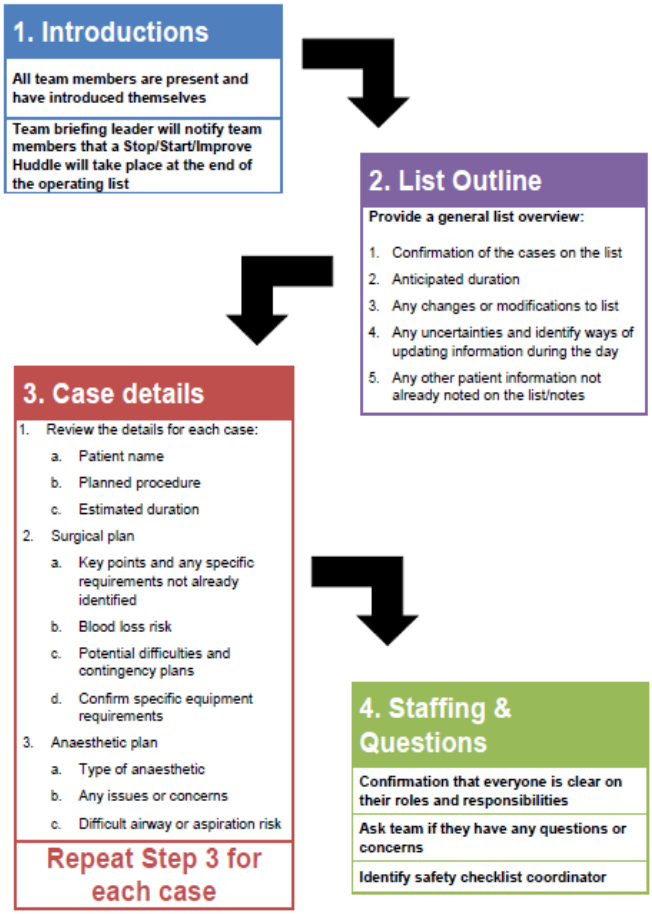
In addition to development of clinical interventions, the working group developed a bundle of behavioural/cultural interventions and an improvement methodology.

Interventions were developed in a series of workshops with working group members. Once a decision on the components of each intervention was agreed by the working group, PwC wrote up intervention guidelines, created diagrams, posters and other 'aids', which were brought back to the working group for final approval.

I. Briefing

The working group reviewed a number of briefing approaches and practices from published literature and existing practices both nationally and internationally. A number of these practices were adopted to enhance the briefing approach used by Waikato Hospital and, to develop the final PoC briefing approach

PoC Briefing Flow:



[10] Nundy, S. et al. (2008). Impact of Preoperative Briefings on Operating Room Delays: A Preliminary Report. *Archives of Surgery, 143* (11), 1068-1072.

[11] Haynes, A. et al. (2009). A Surgical Safety Checklist to Reduce Morbidity and Mortality in a Global Population. *New England Journal of Medicine, 360,* 491-499.

[12] Haynes, A. et al. (2011). Changes in Safety Attitude and Relationship to Decreased Postoperative Morbidity and Mortality Following Implementation of a Checklist-Based Surgical Safety Intervention. *BMJ Quality and Safety, 20,* 102-107.

[13] Patient Safety First UK (2010). Implementing the Surgical Safety Checklist: the journey so far. Retrieved from http://www.patientsafetyfirst.nhs.uk/

[14] National Health Service Institute for Innovation and Improvement (2009). The Productive Operating Theatre: building teams for safer care, Team Working. United Kingdom.

and guidelines. Guidelines around the briefing included:

Briefing leader - The working group elected to trial 'the staff member that knows the most about the patients on the list' to lead the briefing. It was hypothesised that the staff member who knows the most about the patient would be best equipped to keep the patient safe, and would typically be either the surgeon or anaesthetist. This was particularly likely to be the case in the private hospital, because the patient has selected the surgeon performing the operation. However, the working group chose not to mandate the role responsible for running the briefing; rather they chose to use the PoC to understand which role teams preferred to lead the briefing. In order for the working group to gain an understanding of which role led briefing, this data was collected in the reporting tool.

Members involved - It was agreed that the PoC briefing intervention would require all members of the surgical team to be present at the briefing. This was considered best practice as it would contribute to the goal of encouraging teamwork.

Timing - The working group chose to trial the briefing timing before the first patient on the list was anaesthetised (for both full day and half day lists).

Duration time - The working group also hypothesised that the briefing should take no longer than five minutes to complete. This was to be tested in the measurement phase.

The briefing designed by the working group covered four key areas. Further details of the briefing are provided in Appendix I:

1. **Team introductions -** Provides an opportunity for the team members to introduce themselves. The Team briefing leader also notifies the team members that the stop/start/improve huddle will take place at the end of the operating list.
2. **List outline –** Provides a general list overview including the list duration, number of cases, any changes or modifications to the list, any uncertainties on the list and the estimated list completion time and any potential delays.
3. **Case details for each case –** Case details are reviewed for each case on the list. Details reviewed include the patient name, planned procedure, estimated duration, surgical plan (including any potential difficulties, contingency plans and equipment requirements) and anesthetic plan. In this section, the working group trialed the addition of discussing any blood loss risk, difficult airways or aspiration risks
4. **Staffing and questions –** This final step provides an opportunity for all team members to confirm that they are clear on their roles and responsibilities and for staff to ask questions or raise concerns. The identification of a surgical safety checklist coordinator for the day was also added into this section.

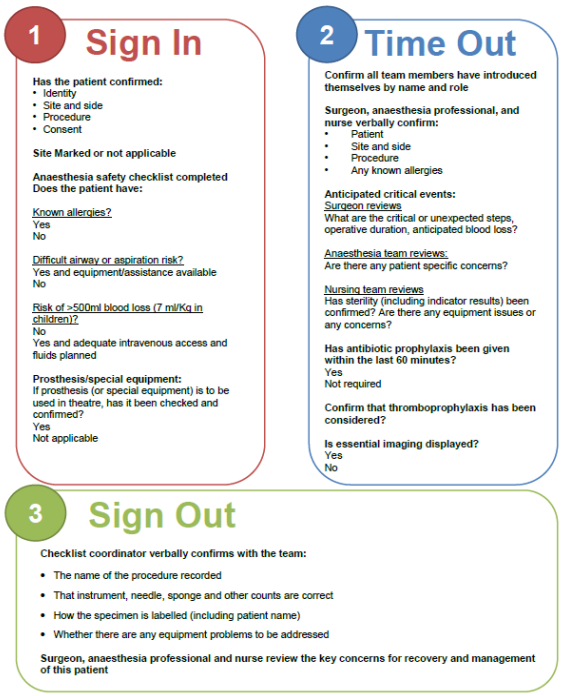
II. Surgical Safety Checklist

A number of varying surgical safety checklists had been adopted by different DHBs. The Commission's project sponsor determined that a uniform checklist should be trialled in the PoC and that this uniform checklist should not be modified by the individual sites.

The working group were given approval to adapt and reformat a standard PoC surgical safety checklist based on the Australia and New Zealand WHO Surgical Safety Checklist, created by the Royal Australasian College of Surgeons. Guidelines around the use of the checklist included:

Checklist leader – It was commonly agreed that sign-in should be led by an anaesthetist, time-out by the surgeon and sign-out by the nurse. Research from the Imperial College of London had found that when surgeons lead time-out, the whole team displays better communication, coordination,

PoC Surgical Site Checklist



corporation, leadership and situational awareness during the procedure[15]. However, the working group wanted to use the PoC to test which roles surgical teams preferred to use to lead the checklist. As a result, the PoC checklist allows surgical teams to nominate a 'checklist coordinator' in the briefing for each list. Data on the leader chosen in each section is captured in the reporting tool (further information on the reporting tool is provided in section *2.1.4 performance baseline metrics*).

Members involved – The working group determined that all members of the surgical team were required to be present for the completion of all sections of the checklist, including sign-out (where it was common for the surgeon to have left the operating room). This decision was based on research that demonstrated that teamwork and communication is better when all team members are present and make time for the checklist[16].

Tick-boxes removed - The working group removed all checkboxes from the checklist and reduced the amount of space available on the checklist for staff to use a 'tick'. Research undertaken by the Commission had found that although the checklist was implemented across New Zealand, the checklist was seen as a compliance document that individuals are accountable for. These findings match research undertaken by Patient First UK, which found 78% of surveyed organisations faced challenges around the checklist being viewed as a 'tick-box' exercise and where staff 'went through the motions', rather than as a tool to improve teamwork and communication. According to best practice, items on the checklist should be read aloud without relying on memory[17].

Paper checklists – Prior to the PoC, paper checklists were filed in individual patient notes. The PHAG and working group agreed that this practice was a compliance activity that did not match the intended purpose of the checklist. As part of the PoC, it was agreed that the checklist was no longer required to be filed to provide collective, rather than individual, accountability. In order to assist staff with completing all questions on the checklist without relying on their memory, the checklist was provided on a web based reporting tool, in notebooks, reference cards and on posters.

The working group also made three minor changes to the existing checklist. These changes were presented and approved by the PHAG prior to deployment of the PoC. Changes to the existing Surgical Safety Checklist (Australia and New Zealand) covered the following areas:

1. **Sign-in -** Removal of the pulse oximeter on patient check. It was viewed that this question was largely irrelevant in a New Zealand context. Pulse-oximetry is considered a standard part of patient preparation for theatre, much like applying electrocardiography leads prior to a surgical procedure.
2. **Time-out –** An additional check to confirm whether a patient has any known allergies. Time-out provides a final check prior to the procedure. The working group wanted to test whether including an additional confirmation around allergies was useful for surgical teams.
3. **Sign-out –**Replacement of the 'nurse' role, with a checklist coordinator role, responsible for leading this section of the checklist, as the working group wanted to test and understand which role surgical teams preferred to lead sign-out (as discussed in the 'checklist leader' section above).

   Further details regarding the checklist is provided in Appendix II:

III. Stop/Start/Improve Huddle

Unlike other clinical interventions, PoC sites did not have prior experience using any formal debriefing. Additionally, limited international literature and experience exists on debriefings, including their benefits and how they should be undertaken.

The working group wanted a debriefing intervention that would focus on continuous improvement. As a result, PwC's stop, start, continue approach was adopted. This approach was based on the principle of constructive learning, where an opportunity is provided for the team to learn lessons on how errors can be avoided and where all team members feel valued for their contribution. The stop, start, continue approach

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[15] Imperial College of London (2011). Surgical Checklist Implementation Project. Rout, S. & Russ, S. Retrieved from http://www.rcseng.ac.uk/surgeons/training/docs/reg-reps/16-nov-2011/15.%20RUSS%20-%20WHO%20Chesck%20List.pdf

[16] Imperial College of London (2011)

[17] Safe Surgery 2015 (2012). Webinar 12: Best Practices. Retrieved from http://www.safesurgery2015.org/call-series-wave-2-archives.html

was amended, based on the working group's clinical experience, to suit operating theatres. Guidelines around the use of the stop/start/improve huddle included:

Intervention language - The working group decided to trial the 'stop/start/improve huddle' terminology, rather than the 'debrief' language, which had negative connotations relating to serious events.

Stop/start/improve huddle leader – The huddle was designed to be led by the role identified in the briefing at the beginning of the list, as the working group wanted to allow surgical teams to test the role that worked best as the huddle leader.

Members involved - All members of the surgical team were expected to be present, as the huddle was designed to be a team activity

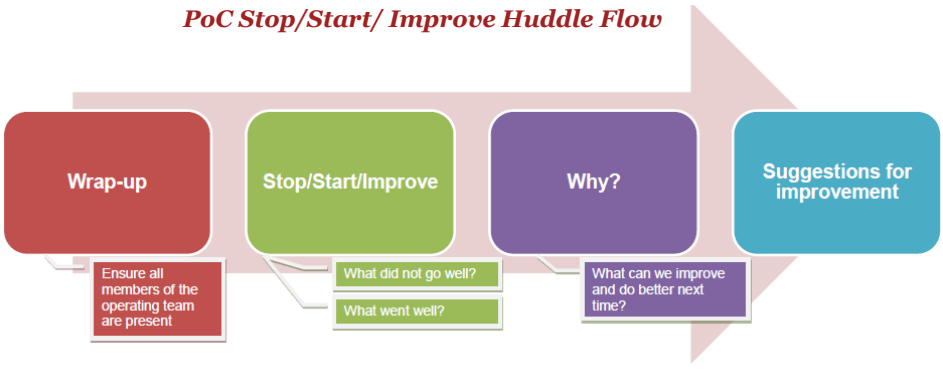
Timing – Based on clinical experience, the working group recommended that the huddle should be undertaken at the end of the list, before the last patient was delivered to post anaesthetic care. However, the working group wanted to use the PoC to understand the timing that worked best for surgical teams. As a result, each PoC site was allowed to establish the best time to undertake the huddle.

Duration – Given the limited experience, both internationally and in New Zealand, there was limited information on the 'normal' duration of a debriefing. The working group hypothesised that it should take approximately five minutes. The total duration time of the huddle was measured as part of the PoC, in order to understand the average duration.

The huddle designed for this PoC allowed teams to capture successes and improvement issues to action, which would prevent them from making the same mistake again. It was designed to provide an opportunity for improvement, for learning rather than blaming, to say "thank you" and to improve staff wellbeing. The huddle provided a forum for discussion across four components:

1. **Wrap up –** A step to ensure that all team members are present
2. **Stop/Start/Improve –** Discussion on what went well and what did not go well. This conversation is designed to recognise unexpected events, celebrate success and foster innovation to drive teamwork within the surgical team
3. **Why? –** A discussion around certain aspects of the surgery that did not go well, went well or could be improved. The purpose of this step is to answer the question, 'what can we improve and do better next time?', rather than to lay blame on other team members.
4. **Suggestions for Improvement –** The final step focuses on identifying how the team can improve in future.

PoC Stop/Start/ Improve Huddle Flow



IV. Behavioural/Cultural Intervention Toolkit

A serious of behavioural/cultural interventions (toolkit) were developed for surgical teams to use when applying the programme's three clinical interventions: the theatre team briefing, surgical safety checklist and stop/start/improve huddle. The toolkit provides a loose framework which wraps around all clinical interventions to help ensure that they are applied using the correct intent – to improve teamwork and communication.

It was commonly agreed among the working group that a number of surgical professions do not receive education on teamwork and communication skills. The behavioural toolkit aims to help increase capability in this area across surgical teams.

The working group reviewed a series of behavioural/cultural tools including the BC Patient Safety & Quality Council's behavioural tools[18]. Based on this review, 10 of the most relevant tools were selected and modified for the PoC's behavioural/cultural intervention toolkit:

1. **Explicit ask for feedback -** Not every member of a surgical team may be comfortable speaking up during the clinical interventions. This technique aims to increase input from all members by specifically asking a team member for feedback by using their names.
2. **Callouts –** When someone vocalises or shouts out an important piece of information that all team members need to know, or will be critical for subsequent actions. Callouts are most often used during emergency situations.
3. **Closed loop communication –** where the receiver of instructions repeats these back to the sender immediately to clarify what has been said and ensure that the receiver knows that they have the correct message. This tool is used to ensure that communication is not misinterpreted and ensures the sender of information knows that the receiver of their information has heard and understood their instructions.
4. **Critical language** – refers to an agreed upon phrase that can be used to halt activity if someone feels safety is a concern. For example, the phrase "I need clarity" can be used as critical language in a scenario. The use of critical language creates a clearly agreed upon communication method, avoiding any natural tendency to communicate indirectly.
5. **"C.U.S" words –** provides a simple phrase that can be used to confidently communicate risks to patient safety. C.U.S. words are effective at increasing the level of concern about a safety issue, without coming across as confrontational. For C.U.S. words to be successful, all team members need to know that these words are meant to imply a safety concern. The C.U.S words are:
    - I'm *concerned*
    - I'm *uncomfortable*… this is unsafe
    - I'm *scared*. This is a safety issue. Stop!
6. **ISBAR –** a framework that each team member can use to communicate information in a clear, contextualised and collaborative way. ISBAR aims to ensure that all team members are operating with the same level of understanding and within the same context. ISBAR has five components:
    - *Identify* – who are you and what is your role? Patient identifiers (at least 3)
    - *Situation* – what is the situation at hand?
    - *Background* – what is the relevant background information about the patient?
    - *Assessment* – what is your assessment of the situation?
    - *Recommendation* – what do you think should be done, or what is it that you need? What is the specific solution to the problem
7. **2 challenge rule –** supports the speaker to raise their concerns twice if they are not addressed the first time. This rule highlights the responsibility of the listener to respond to the speaker, at least the second time they assert their concern. If the listener continues to be unresponsive, the two challenge rule empowers the concerned speaker to act and raise their concern to someone with the ability to effectively address the situation.
8. **Roles and expectations –** a four step tool which aims to provide a simple and clear discussion about the roles, responsibilities and expectations of each individual team member to ensure that all team members have the same perception. This tool is particularly helpful during the team briefing intervention. The four steps include:
    - *State your name, position and role* in front of the entire team.
    - *Listen attentively* to all introductions to ensure that your understanding of roles and expectations are in line with those of others.

[18] BC Patient Safety & Quality Council (2013). *Culture Change Toolbox*. Retrieved from http://bcpsqc.ca/clinical-improvement/teamwork/resources/

- It is *the responsibility of all team members* to be aware of all team members' roles.
- *Raise any concerns* with your own or others' roles and expectations that may affect the operation.

9. **Multi-disciplinary team meetings –** It is important that all members of a surgical team have a shared understanding of the work completed by all members of the team. This can be done through getting all team members in the same place at the same time. The application of the briefing and stop/start/improve huddle at the beginning and end of an operating list provides the opportunity for multidisciplinary meetings to occur at least twice a day.
10. **Use of first names –** Studies have found that teams whose members call each other by their first names perform better than those that do not[19]. Knowing and using others' first names can help break down barriers formed by workplace hierarchies. For example, the increased familiarity may empower team members to more readily speak up about a safety concern.

Examples of each of these behavioural tools being applied in the operating theatre were developed by the working group. A 'day in the life of a scrub nurse' case study was also developed, which provided examples of how six of the behavioural tools could be used throughout the nurse's day during the briefing, surgical safety checklist and stop/start/improve huddle. All examples, and the case study, were incorporated into the behavioural/cultural interventions guidelines.

V. Improvement Methodology

The working group requested that an improvement methodology was created for surgical teams to drive improvements that relate to the surgical safety of patients in the operating theatre. Experience from working group members found that it was essential that staff see their identified improvements being put into practice. The development of an improvement methodology ensures that ideas generated in the huddle are acted on.

The six step Basic Problem Solving Improvement Methodology was created by PwC[20], which leverages information from the Institute for Healthcare Improvement (IHI) Collaborative: "How to Improve" methodology[21].

The improvement methodology framework provides an opportunity for surgical teams to understand, evaluate and begin testing changes that have been suggested in the 'Suggestions for Improvement' step of the stop/start/improve huddle. These changes can help make breakthrough improvements in surgical safety, as well as improved teamwork and communication.

This basic methodical approach to improvement encourages teams to ask the right questions whilst structuring problem solving activity and enhancing the team's creativity and innovation.

This is an activity that can be completed by all members of the surgical team, and assists with the culture shift of accountability and ownership of continuous improvement.

Specific guidance is provided on how each step should be undertaken and on tools which can be used to encourage innovative problem solving. The six steps included in the improvement methodology are:

1. **What's the problem –** This step focuses on defining a strong problem statement.
2. **Why is this happening? –** Focuses on identifying the root cause of the problem, rather than looking to find a solution.
3. **What's the answer? -** In order to identify the best solution for implementation, the IHI Collaborative improvement methodology is recommended. This also involves testing ideas using Plan Do Study Act (PDSA) cycles.

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[19] BC Patient Safety & Quality Council (2013)

[20] Pricewaterhouse Coopers New Zealand. (2014). Basic Problem Solving – Improvement Methodology. Auckland, New Zealand: Halliday, P.

[21] Institute for Healthcare Improvement, (n.d). How to Improve - Improvement Capability. *Institute for Healthcare Improvement*. Retrieved on May 6, 2014 from http://www.ihi.org/Topics/ImprovementCapability/Pages/default.aspx

4. **Do it –** The focus of this step is on wider implementation. After testing change on a small scale, learning from each test, and refining the change through several PDSA cycles, the change is ready for implementation on a broader scale.
5. **Check it –** The 'current state' is assessed against the initial baseline, in order to understand the impacts that the improvement has had.
6. **Celebrate** – The final step provides an opportunity to recognise a team's success and share stories to encourage teams to challenge problems again in the future.

2.1.4 Performance baseline metrics

In order to understand the impact of both the clinical and behavioural interventions on improving teamwork and communication in surgical teams, the working group defined a number of metrics and channels to measure success.

It was determined by both the working group and Perioperative Harm Advisory Committee (PHAG) that the project would determine whether the interventions would lead to improvement in teamwork and communication within the following areas:

- Overall culture and teamwork within surgical teams
- Usage of the three clinical interventions
- Team engagement within the three clinical interventions

Two measurement tools were designed, in order to evaluate the PoC on the identified measures of success:

I. Safety Attitudes Questionnaire (covering overall culture and teamwork within surgical teams)

II. Web based reporting tool covering the usage of clinical interventions and team engagement)

I. Safety Attitudes Questionnaire

The Safety Attitudes Questionnaire[22] (SAQ) was selected by the working group as a tool that could be used to measure the PoC participant's perception of the teamwork and communication culture in their respective sites.

The SAQ was derived from a survey widely used in the aviation sector, the Flight Management Attitudes Questionnaire, which was created after researchers found the majority of airline accidents were due to factors such as poor teamwork, communication and collaboration in decision making.

Developed by Bryan Sexton, Eric Thomas, and Bob Helmreich with funding from the Robert Wood Johnson Foundation and Agency for Healthcare Research and Quality the SAQ was specifically designed for the health sector and further adapted for operating rooms, intensive care units, general inpatient wards and ambulatory clinics.

The working group selected the SAQ after a review of literature. Research into the use of the SAQ has found that it has been used more widely and for a longer period of time than other medical safety climate and culture surveys. Research has also found that the SAQ can be effectively used by healthcare organisations to prompt interventions to improve safety attitudes, to measure changes over time and the effectiveness of safety interventions[23].

The aim of using the questionnaire was to provide evidence based data to test the impact of the PoC on teamwork and communication in the operating theatre, which will ultimately impact on perioperative harm.

The selection of the Operating Room SAQ was endorsed by the PHAG as it focussed on communication & collaboration within hospital operating theatres, teamwork & safety climate, job satisfaction and general perceptions of management. Minor modifications to the survey language were made to the questionnaire to ensure it fitted the New Zealand context (e.g. role and ethnicity titles).

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[22] Sexton, J., Helmreich, R. Neilands, T, Rowan, K., Vella, K., Boyden, J., Roberts, P., Thomas, E. (2006). The Safety Attitudes Questionnaire; psychometric properties, benchmarking data and emerging research. *BMC Health Services Research*, *6*(44)

[23] Sexton, et al (2006)

The SAQ was created within an online survey tool, and was sent to all operating theatre staff involved in the project prior to the project's launch to create a baseline measurement. The survey was also circulated midway through and at the conclusion of the PoC, with the intent to use the data gathered to identify any improvements in the teamwork, communication and safety climates of the PoC sites.

II. Web based reporting tool

Throughout the Collaborative Development phase, quantitative measures were developed to measure the usage of the interventions. A web based reporting tool was designed to collect this data and report on the designed measures in 'real time'.

A web based reporting tool was selected, rather than paper, to measure progress of the project. Data collection was seen as onerous and could be a barrier to implementation in this PoC. In order to increase buy-in from surgical teams, data collection needed to be made as user friendly and simple as possible. The web based reporting tool was selected in order to increase the chance of buy-in from surgical teams, ensure data accuracy, efficient and simple data collection and provide real time results for management implementing the interventions.

The reporting tool was developed to collect, collate and report on the data collected. Staff were able to enter data into the tool using mobile phones, iPads/tablets or computers. Reports were available on a real time dashboard which could also be viewed on the same devices. In addition, the reporting tool provided a background to the project and guidelines for all interventions.

The reporting tool measured the uptake of interventions, how they were being used and the level of team engagement. The purpose of measuring team engagement was to ensure that measurement focused on more than compliance, and included measurement of nontechnical skills during the use of the interventions: teamwork and communication[24].

Data collected on usage predominantly covered the following areas:

- Whether the intervention was fully completed (including additional information on aspects that were not completed and reasons for non-completion)
- The level of team engagement (based on the WHOBARS Likert scale)
- The behavioural tools that were used

Once the measures were agreed by the working group, PwC worked with Quality Hub to design and develop the reporting tool. This included designing of reporting outputs and the real time dashboard. The reporting tool and dashboard was then approved by the working group

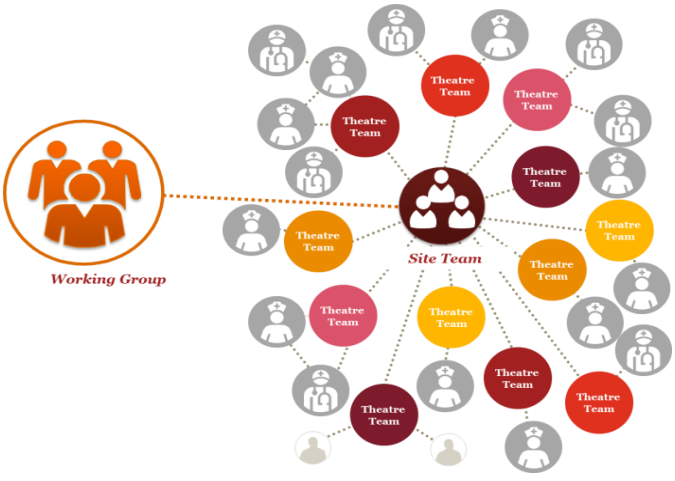
PoC site surgical teams were asked to use the reporting tool each time an intervention was, or should have been, used – i.e. for every surgical safety checklist and once per list for the briefing and huddle.

Development of the reporting tool was an iterative process, with additional questions being added, based on the request of the PHAG midway through the project.

2.1.5 Education approach

The education approach was developed by the working group throughout the series of workshops run during the Collaborative Development phase. The training approach was designed to give all participants sufficient knowledge and understanding to successfully complete the PoC within the Improving Teamwork and Communication project.

PoC Education Approach



[24] University of auckland (2014). *An introduction and guide to using WHOBARS*. Auckland: New Zealand

The objectives of the education activities were determined by the working group and included:

- Building the capability required to complete the PoC
- Utilising the data to drive best practice as outlined within the checklist, briefing and stop/start/improve huddle manuals and technical guidelines
- Supporting each of the PoC sites during the proof of concept phase with the implementation and refinement of the interventions and tools

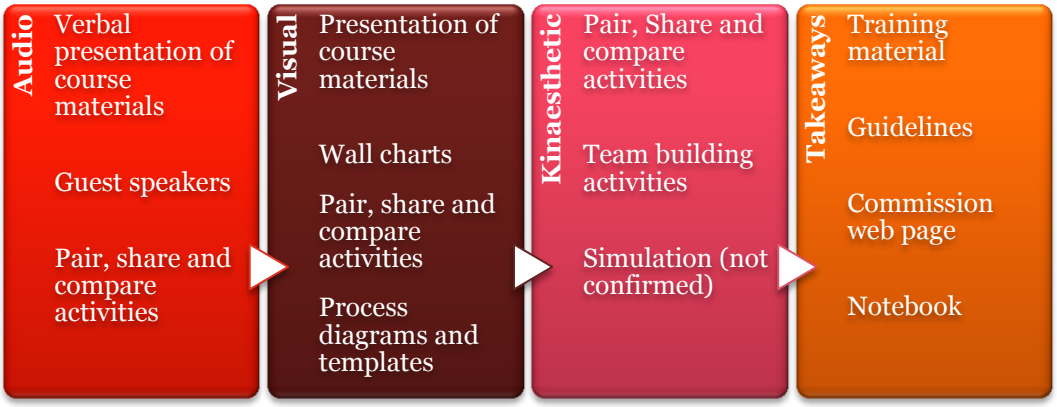
A 'train the trainer' education approach was defined for the PoC. Multidisciplinary Site Teams were selected from each site, to attend a formal training session where all interventions, tools and guidelines were taught, alongside additional training in human factors, project management and continuous improvement.

From this initial education workshop, the PoC site teams were charged with delivering training to all PoC participants at their respective sites. As shown in the diagram on the previous page.

The Site Teams were provided with training materials and guidelines which could be used to run education sessions at PoC sites, and were also offered support if needed by PoC site champions, the Commission and PwC.

This methodology for the formal education workshop is outlined below:

- **Participants** – PoC site champions were required to identify and nominate participants from their organisation, who would participate in a joint full day workshop and become trainers back at their PoC sites.
- **Workshop objectives** – Each module within the workshop was designed to develop participants understanding of the importance and purpose of the project, as well as improving participants capability to implement the proposed interventions and tools.
- **What** – The training content focused on the key protocol and activities required to implement the proposed interventions, tools and use of the reporting tool, providing guidelines and technical understanding for each participant to utilise. Additional participant learning needs were to be addressed on a one-to-one basis.
- **How -** Training was to be delivered by interactive knowledge transfer workshops. Additional coaching and guidance was to be delivered on a one-to-one basis. The education workshop was to take a blended approach, which used a variety of training methods, in order to ensure that all participants easily achieved the learning objectives.



2.2 Collaborative Development Findings

Overall, the Collaborative Development phase was successful. The desired results were achieved, including the design and development of interventions and materials, education approach and content and a measurement approach, metrics and web based reporting tool. All interventions were signed off by both the working group and the PHAG.

As can be expected from a proof of concept project, a number of learnings were identified, which could be improved in a future national deployment. The findings, including successes and challenges of the Collaborative Development phase, are provided below.

2.2.1 Selection of PoC sites

- The initiation of the PoC 'Collaborative Development' stage was significantly delayed. Identification of potential PoC sites, and agreement from these sites, took approximately five months, rather than the initial one month that was scheduled in the project plan. This led to project slippage of one month, and significantly reduced the time that the working group had to design interventions, education and measurement and reporting. The impacts of this slippage are discussed in the following sections.
- Despite the engagement of the PoC site champions, the requirements of time and input that would be required of both PoC site champions and surgical team members were not fully understood. As a result, the first PoC did not achieve the required resourcing and attention at the PoC sites that would have enabled greater successes within the first few months of the PoC

2.2.2 Selection of working group members

- The selection of working group members was also significantly delayed. The Commission was responsible for selecting SMEs from every surgical profession, and from any other relevant fields (e.g. human factors), to sit on the working group. This activity also took approximately five months, rather than the planned timeline of one month. Additionally, the Commission was unable to find an anaesthetist or anaesthetic technician to sit on the working group (note the Collaborative SME, Shawn Sturland, did have prior experience working as an anaesthetist).
- The working group lacked active representation from subject matter experts across a number of professional groups during the 'Collaborative Design' phase. The Commission initially selected a nurse, surgeon, human factors, collaborative, and improvement expert to act as SMEs on the working group. Three of these SMEs were surgeons (surgeon, collaborative and improvement expert). However, only the Nursing SME was present at all four 'Collaborative Design' workshops where interventions, education and deployment approaches were designed. As a result, the working group did not achieve diversity across the three theatre clinical professions, as all members who consistently participated were the PoC site champion nurses.
- The PoC site champions were very engaged – all PoC site champions were highly engaged in the programme from the outset. They took ownership and accountability of the PoC at their sites and implemented it with very little support from their respective sites in addition to completing their existing role activities.
- Governance arrangements lacked formality and were also delayed. Formal letters for PoC site management and working group members were drafted, whereby members would agree to their role, responsibilities and time requirements. However, these letters were not signed by all working group members. Additionally, the working group did not have an agreed Terms of Reference. This was drafted in the early stages of the project, but not implemented by the Commission.

2.2.3 Design of clinical and behavioural interventions and development of materials

- The working group members were highly active participants, and took all activities required of them on board throughout the design phase, including pre read and review of intervention guidelines. This was a difficult task in such limited time.

- The working group operated as a successful group in the design of interventions. This was attributed to having PwC facilitate the working group, bringing external innovative and collaborative techniques. The combination of staff from the health sector and PwC worked very well. The working group members were able to define their key requirements for interventions and tools. PwC then documented all guidelines and diagrams for each of these interventions. Working group members also provided positive feedback on the intervention diagrams and guidelines that had been created.
- The time available to design interventions and materials was too short, due to changes to project timeframes as a result of the delays in site and working group selection. This meant that all clinical interventions were designed, guidelines and diagrams were created and all documentation agreed within a two week period, across two workshops.
- Significant changes were made to the purpose, design and requirements of the project which caused challenges in the Collaborative Design phase. For example, the PHAG had not come to an agreement on areas that the working group could change on the checklist during the period that the checklist was being designed. This was partially due to a lack of cohesion and communication between the PHAG, Project Sponsor, and work currently underway at Auckland DHB, the University of Auckland, and the working group.

  Additionally, the Commission was unable to provide a representative at all the design workshops, resulting in a lack of communication relating to the PHAG's project requirements. Despite these challenges, all interventions were signed off by the PHAG before the implementation of the PoC.
- The clinical intervention guidelines were written by PwC and involved very little clinical input. This was due to the lack of representation on the working group from clinical SMEs outside of the nursing field. Despite this, all interventions were signed off by the working group and PHAG, and PoC site champions were expected to work with their clinical teams to obtain any necessary feedback and input.
- Working group members found it difficult to update the behavioural/cultural tools with case studies and operating theatre language was difficult to obtain to suit the operating theatre environment. This was due to a lack of time during the design phase. This activity was completed in time for deployment, so did not negatively impact on the implementation of interventions, but did put pressure on PoC site champions during the development phase.

2.2.4 Development of a baseline measurement approach and metrics

- The use of a real time web based reporting tool had never been used in the health sector in New Zealand. This was seen as a positive advancement in data collection and reporting across the sector.
- Positive feedback was received on the inclusion of intervention guidelines within the web based reporting tool. This increased the ability for staff to easily and simply access the guidelines. The information provided in 'question mark' icons was also positively received by theatre staff.
- Quality Hub was strongly involved with the working group and PwC, through attendance at all working group sessions and education workshops
- The web based reporting tool, although innovative, efficient and effective lacked a level of sophistication within its usability and also within the reporting and analysis components which resulted in a number of amendments needing to be made throughout the pilot. However, the concept of using a real-time web based tool to collate and report all data collected within the PoC has been unanimously well received as a positive aspect to the project from both participants within the PoC and key stakeholders.
- Significant support was provided to Quality Hub from PwC in the development of the web based reporting tool to ensure that the working group and PHAG's requirement were met, that the reporting tool's dashboard was consistent and clear for users, and to develop training guidelines for theatre staff.
- The reporting tool's real time reporting dashboard was rarely used by the PoC sites. Sites found that the reporting tool created useful data, but most sites did not have time to view it on a regular basis. Operating theatre staff were unaware that of the reporting functionality, as information on reporting functionality had not been socialised.
- The SAQ survey had low response rates both at the beginning and end of the project. Staff provided feedback that the survey included too many questions and took too long to complete (10-15 minutes). PoC sites also struggled to identify the staff members that should be followed up to complete the SAQ.

- The scope of the SAQ was too wide for the purpose of this programme, despite being fully endorsed by literature and the working group. The SAQ included sections on job satisfaction, perceptions of management and perceptions on safety procedures. These questions had limited relevance to teamwork and communication.
- Change control procedures were not put in place for change requests relating to the web based reporting tool. For example, changes to the Likert scale, from a five point scale to a seven point scale, was requested by the PHAG and made midway through the project. No formal change control process was undertaken for this change, which was partially due to a disconnect between the working group, Commission and PHAG.
- Poor communication existed around the status of change requests which had been requested by PoC site staff. Sites that had requested changes were unaware of whether the change had been approved and unaware of the timeframes for completion.

2.2.5 *Development of an education approach and materials*

- The development of an education approach and education content was undertaken in a very constrained time period, due to delays early in the project. Intervention guidelines were still being drafted and approved at the same time as education content was being created.
- The education approach did not focus on the difference in availability and development needs of different professional groups. This was partially due to the lack of diversity in professions on the working group, as none of the active members were used to educating surgeons or anaesthetists.
- The education approach focused on one face to face education 'train the trainer' session. However, it did not allow for the fact that scheduling staff to attend this session would be difficult, and that many staff could not leave theatres for a full day of training.
- The development of education content was written by lacked clinical input, due to the lack of multi-disciplinary clinical working group members. Clinical input would have helped to ensure that education content covered examples and scenarios of how to use the interventions in practice. The lack of clinical input was due to lack of diversity on the working group and a lack of time to make it relevant to professions. Despite this challenge, the education content developed was still successful and signed off by the clinical working group members.

2.2.6 *Use of a third party project management team (feedback provided by PoC Site Champions)*

- The proof of concept was a directive to PwC to facilitate and organise a working group to meet the objectives and goals set out by the Health Commission
- PwC supplied comprehensive background information and reading material to prepare the selected working group for the proof of concept as directed by the Commission.
- The working books were detailed and time was obviously taken to research the subject to ensure their knowledge was accurate and appropriate to deliver to members within the health sector.
- Additional supporting evidence based Intervention guidelines and tool kits provided excellent resources to take back to the staff. These workbooks are routinely used throughout the working group and at our hospital have become standard education guidelines.
- The strong development and progress made with this project is indicative to the depth of knowledge PwC supplied to the group.
- PwC were not constrained by the conventional approach the health sector takes to achieve a goal. They encouraged the group to be proactive, innovative and to make decisions that were appropriate to them and their hospitals. A high level of support was freely available when required, the trust the working group put into PwC was demonstrated, by the way their advice and request for educational support was asked for and delivered.
- Reflecting on the process has highlighted the short period of time given for the group to understand the concept and be prepared for POC 1. The development of this project has highlighted the professionalism a third party brings to" project manage" an assigned brief.

- It was primarily the hard work from all parties (PwC and working group) that goals were met and data collected to hypothesise about the effectiveness of the proof of concept.
- "The working group feel strongly that an external party is a key component to the success of the programme. As well as providing an objective viewpoint and a sound structure on which to build the case for change.
- The skills and tools PwC provided were invaluable to the site champions when engaging the teams and implementing the changes. They are experts in change processes, and provide impetus, momentum, guidance and support to the clinical champions in the workplace.

3.Collaborative Deployment

Collaborative deployment focused on implementation of the interventions at PoC sites in two Proof of Concept phases. Deployment covered three key areas:

3.1 Collaborative Deployment Approach

3.1.1 Implementation

The implementation of the PoC was split into two learning cycles over 6 months.

Learning Cycle One was designed to understand the challenges to effective team functioning in the operating room and to test the usability and validity of the clinical interventions, improvement approach, behavioural change tools and technology solution.

All interventions and tools were planned to be trialled by one surgical specialty per PoC site, with all clinical practice and behavioural changes to be trialled alongside the proposed deployment, education and reporting approaches for a three month period.

Learning Cycle Two was designed to demonstrate the PoC sites ability to successfully deploy both the interventions and measurements approach to other specialties and surgical teams.

Deployment of this cycle was to be managed and led by PoC site champions. Workshops were held with PoC site champions to create a site specific deployment plan, with project timelines and deliverables that needed to be incorporated into their planning.

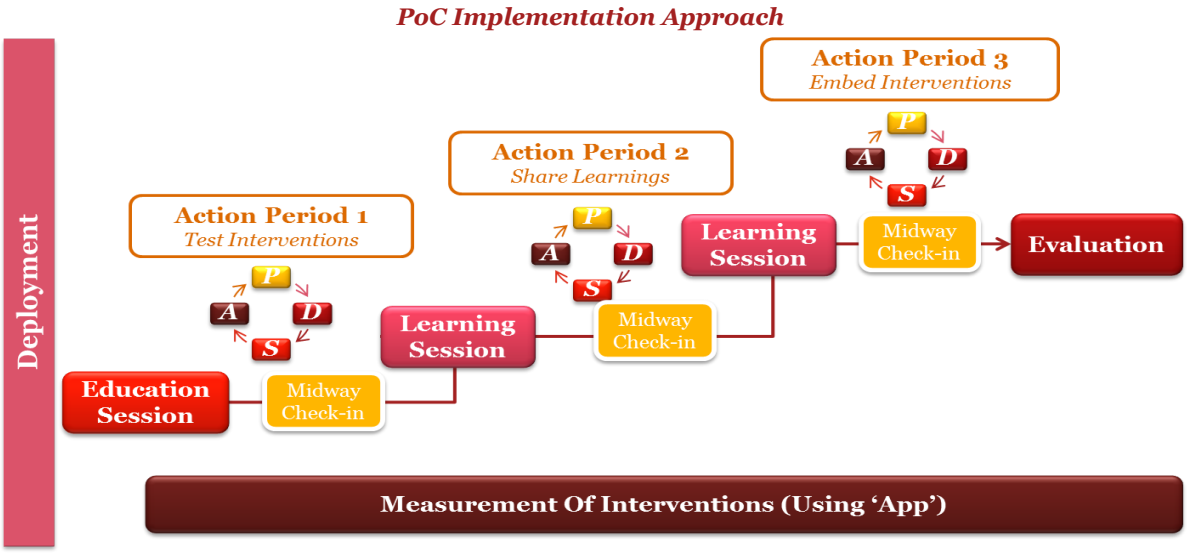
Throughout both of the learning cycles, the IHI Collaborative Breakthrough Model was planned to be utilised to refine and improve all elements of the deployment approach, with monthly learning sessions and action periods planned to further develop capability within the surgical teams, and to maintain the projects focus on continuous improvement.

Additionally, each intervention was to be applied on a daily basis, throughout both learning cycles, with intervention compliance and outcomes recorded and reported via the real-time reporting system.

Following each education session, PoC sites would run ‘action periods’, where they would implement the recommended interventions, study the results for insights on how to improve and act to make successful changes.

Surgical teams would develop their capability and share experiences regarding the application and utilisation of both the clinical and behavioural interventions at each learning session and would apply these learnings and look for continual improvements during each action period.

The web based reporting tool was designed to be used to monitor and report on progress around usage and engagement of the interventions. All PoC participants were also given notebooks where they could record their feedback and challenges that they were facing. PoC participants were able to review results from the reporting tool and notebooks in order to analyse results to gain insights on whether the actions were resulting in successful change.



At the completion of stage one, an initial assessment was to be completed to identify what improvements were required to the interventions and tools, and to also understand the impact, if any on the level of engagement, team work and communication experienced by the pilot teams.

Following this, the wider teams will undertake the revised interventions, improvement activities and reporting processes for a three month period.

At the completion of stage two, a secondary assessment was to be completed to understand the impact of the interventions on the level of team work and communication within the surgical team, and further analysis will be completed to ascertain the success of the deployment approach and feasibility for national application

3.1.2 Training

A 'train the trainer' education approach was initially defined in the Collaborative Development phase. However, as the PoC evolved, a number of different training methods and materials were used, depending on each site's needs.

This section will provide an overview of the three channels that were predominantly used throughout the project:

- Formal face to face training (with training materials provided)
- Quick reference cards, posters for display
- Ad hoc additional face to face training as required

I. Formal face to face training

Formal training sessions were delivered to staff that had been identified as PoC site 'change champions'.

The training content and materials were developed by PwC and approved by working group members. Training was delivered by three members of the working group: PwC, a PoC site champion (Waikato DHB) and a SME (human factors). Participants were provided with training materials, which included guidelines on all interventions, behavioural tools, the reporting tool, and the improvement methodology. See Appendix IV for training content used throughout the project.

This full day training workshop included the following components:

Introduction and principles –included the purpose of the overall Reducing Perioperative Harm programme and the Improving Teamwork and Communication within Surgical Teams project. It also focused on the case for change to ensure that training participants understood the importance of the project and were committed to being a part of the PoC.

Setting up – included the objectives and requirements for the PoC. The aim of this component was to ensure that participants had clarity around their roles, responsibilities and expectations for participation in the PoC.

Making it happen – detailed guideline and information on how to use all clinical interventions, behavioural tools, the improvement methodology and a hands on session on using the reporting tool. The focus of this section was to ensure that participants could implement protocols, guidelines and data management within their PoC sites.

Where to from here? – Expectations from the Commission and information on support options available were provided, to ensure that participants understood the next steps and could identify potential future support requirements and options. This included an interactive session where teams created deployment plans to roll out the interventions at each PoC site.

II. Quick Reference Cards, posters for display

PwC designed and created diagrams, posters and notebooks for each of the PoC sites to use throughout the project. Each site was provided with approximately:

- 20 notebooks (which included intervention guidelines and diagrams and a space for staff to record learnings)
- 20 sets of booklets containing interventions , behavioural tools and improvement methodology guidelines
- A set of posters containing intervention diagrams to be placed in theatres (including A0, A1, A2 and A3 sizes)
- Electronic copies of guidelines
- Electronic copies of the briefing notes templates, where staff could write notes from each briefing

Rotorua Hospital also created and distributed small laminated reference cards to further encourage adoption at their sites.

III. Ad hoc training

Additional ad hoc training was delivered as the need arose. This included:

- Midway through the project, ASC identified a capability gap in a number of their staff around the ability to use the web based reporting tool. As a result, Quality Hub was asked to deliver a tailored interactive training session to a selection of nursing staff on how to input data into the reporting tool.
- ASC was the only organisation to undertake formal training sessions, based on the 'train the trainer' approach. Education sessions were run by a PoC site champion and one of the 'champions' that had attended the formal face to face training workshop. The ASC training sessions were tailored to their operating theatre nurses and focused on the 'why', 'how', and 'what' principles relating to the PoC.
- A limited number of Waikato Hospital staff attended the formal full day face to face training workshop. At the end of the first PoC, it was identified that staff consequently lacked capability on the interventions, tools and web based reporting tool. Waikato Hospital requested an additional half day education workshop to be run prior to the launch of the second PoC for selected theatre staff. This education session was run by PwC and covered the objectives of the project (including the case for change), how to use the interventions and behavioural tools and how to use the reporting tool. Approximately 15 nursing and anaesthetic technician staff participated in this half day training.
- Informal knowledge transfer:
    - The Waikato DHB site champion regularly delivered training in theatres on how to use the reporting tool to individuals and small groups.
    - Rotorua Hospital lead nurses travelled around theatres informally educating staff on the use of the PoC interventions

3.1.3 Interventions

Throughout deployment the clinical interventions, behavioural tools and improvement methodology were used as developed in the Collaborative Development phase.

The use of these interventions was measured through collating qualitative feedback from staff and through the web based reporting tool.

The reporting tool was used to collect data on the adoption of interventions throughout the PoC and to provide an understanding of various aspects of how these interventions were used (including the roles leading interventions and their duration).

Questions on usage of interventions related to briefing, huddle and the three individual components of the checklist (sign-in, time-out and sign-out) were defined. These included:

- Adoption of the interventions:
    - Was the [intervention] fully completed?
    - If the [intervention] was not fully completed, why not?
    - If the [intervention] was not fully completed, which aspects were not completed?
- How the interventions were undertaken:
    - Which role led the intervention? If not the suggested role, why not?
    - How long did the intervention take (briefing and huddle only)?
    - Which behavioural tools were used during the intervention?

PoC site staff were asked to enter data into the reporting tool each time an intervention was used, or should have been used, over the duration of both PoC phases. Data was collated throughout the project to track the change in intervention adoption and usage over time.

3.2 Collaborative Deployment Findings

The findings section details the successes, challenges and feedback received from staff at PoC sites based on the implementation, training and knowledge approach.

3.2.1 Implementation

Both the phased PoC approach and the IHI Collaborative Breakthrough Model, defined in the Collaborative Design phase, were not effectively utilised by the PoC sites. On evaluation of Learning Cycle One, all PoC sites found that they had not understood the level of planning, resourcing and time that would be involved in the implementation of the PoC and the associated interventions. From that learning, they approached the second cycle with a longer lead time to allow time for planning and communication activities ahead of the implementation launch. Each PoC site deployed interventions differently, based on their individual needs. The interventions were slowly rolled out across all surgical specialties, rather than using the two phased approach.

Some common themes arose in the findings around deployment across the PoC sites. These included the following:

- **The biggest challenge that sites faced in deployment related to human factors and change management.** Resistance to change was initially high across all PoC sites, particularly from surgeons. On evaluation, the PoC deployment plans did not focus strongly enough on change management, particularly in Learning Cycle One. The lack of buy-in from surgeons and anaesthetists may be due to a lack of engagement with executive teams and clinical leads at the beginning of the project, which resulted in the design and deployment of interventions only being championed by nursing staff.

  In the deployment phases, all 'champions' who were selected to help support the deployment of the PoC were from the nursing profession.
- **The time between the design of the PoC interventions and deployment was too short**. This short lead time resulted in limited planning around a deployment approach, hence limited staff buy-in across the operating teams. In contrast, all sites had a longer lead time to plan for the deployment of Learning Cycle Two. The PoC site leads found that this longer lead time was crucial to more successfully deploy the interventions in Learning Cycle Two.
- **PoC sites found that having one clinical and one non-clinical PoC site Champion was the best structure for deployment.** Champions were able to be supported when they had another team member who was also acting as a PoC site Champion. A clinical champion provided credibility and accessibility to theatres and staff, and took ownership and leadership of the interventions in practice. A non-clinical champion adds value to deployment through oversight, providing direction, teaching and coaching, support of the clinical champion, and facilitate continuous improvements when issues arise
- **A 'cookie cutter' approach to deployment across organisations does not work –** Although one approach to deployment was initially planned, each site had different needs and faced individual challenges. As a result, deployment approaches and plans needed to be tailored to each PoC site.

The section below outlines some of the key deployment activities that each site undertook and the successes and challenges that they faced:

I. Large DHB – Waikato Hospital

Deployment activities

The deployment of the PoC was led by one PoC site Champion, who held a non-clinical Quality role within Waikato Hospital. The deployment approach was as follows:

- Banners and posters were prominently displayed in theatres to increase visibility of the PoC prior to the Learning Cycle Two launch date.
- An additional training session was run for a selected group of staff who were personally invited to attend the session.
- Bob Henderson and Ian Civil, a surgeon and member of the PHAG, were invited to speak at a Theatre and Intervention Governance Group (TIGG) meeting.

- The PoC site Champion attended the PoC theatres for the first 10 days after the launch of Learning Cycle Two to facilitate and train staff on the floor. Stickers were used to identify the staff who had participated each day.
- Senior nurses provided support through oversight and role modeling of behavioural tools.
- An information booth was set up in the theatre area, which provided explanations about the interventions, and 'hands on' practice use of the reporting tool.
- Unplanned 'one to one' conversations were used to engage with various professional groups as opportunities arose. These conversations were led by nursing staff, and were particularly useful in engaging with surgeons and anaesthetists.

Successes

- A longer planning lead time was scheduled for Learning Cycle Two, which helped Waikato to take a more planned and more successful approach to deployment. This increased lead time gave the PoC site Champion and supporting team time to increase visibility and awareness of the PoC and access different professions at a time and place that was convenient for them.
- Inviting Ian Civil and Bob Henderson to speak at the TIGG meeting (a forum for surgeons and anaesthetists), was considered very successful in helping to socialise the PoC interventions among these doctors. This meeting provided an opportunity for the clinicians to hear about the benefits of the interventions directly from one of their peers. It also promoted discussion on specific areas of the interventions, and an opportunity for questions on how specific situations could be managed.
- Role modelling the interventions in the operating theatres, and policing the use of the interventions, helped to increase awareness and use of the interventions

Challenges

- Waikato faced a unique challenge. A briefing and a different surgical safety checklist had previously been implemented in theatres. Although these interventions were no longer widely, consistently or properly used, some staff still viewed the deployment of the PoC as 'another suite of tools which had already been done before'.
- Only one PoC site Champion, who was external to theatre, was responsible for leading the PoC. This was a challenge as the Champion, who was in a quality role, did not have another clinical team member responsible for supporting the deployment of the PoC. The absence of a clinical PoC site Champion also limited access to theatres and staff on a day-to-day basis because the nurse coordinator for quality and patient safety did not have the same level of visibility in theatres as a theatre-based champion in a clinical role.
- Waikato's ICT team were not engaged prior to the commencement of the PoC. As a result, the PoC struggled to access the reporting tool due to issues with internet in theatres.

Case Study 1: Waikato Hospital - Championing the interventions

"The nurse manager and I attended a theatre session one morning. The surgeon operating that day commented that he probably couldn't lead a team briefing, because he didn't know his patients, and really, it was three routine operations that were planned. And how could he possibly find out what he needed to know when he hadn't seen the patient very recently, they didn't attend a pre-admission clinic, and may not have been one of his patients in the first place?

As we talked through the philosophy of a team briefing, which he could clearly see the benefits of; he postulated that he could perhaps look up the patient records in the clinical workstation.

He randomly selected the second "routine" case, and read the last clinic letter. He then said, "Well, that proves your point about the importance of team briefing really. This patient is paraplegic, requires a hoist transfer and suffers from epilepsy".

An ah-ha moment really!"

II. Medium DHB – Rotorua Hospital

Deployment activities

The deployment of the PoC was led by two PoC site Champions, one in a theatre clinical management role and one in a quality role (external to the core theatre staff). The deployment approach was as follows:

- The PoC aimed to develop a level of curiosity throughout the department.
- Nursing champions were identified in each theatre to support the deployment of interventions across Rotorua Hospital operating theatres. These champions made themselves available prior to the commencement of Learning Cycle Two and attended other specialty briefings/debriefings by invite to provide support.
- A 'how-to guide to the web based reporting tool was developed, and staff in each theatre were trained on the tool, to help overcome 'fear of the digital age'.
- Lead nurses educated and encouraged the use of the interventions in each theatre.
- Each fortnight period focused on a different behavioural tool to increase staff understanding of these tools. This included tailoring the 'dialogue' examples for each behavioural tool to each specialty, using posters on walls and handing out laminated cards to staff.
- Information on the PoC interventions was shared at a Regional Nursing Study day and at a "patient safety perioperative harm" workshop during "patient safety week".

Successes

- Strong support from the senior nursing team was fundamental in achieving a smooth deployment. This support included education as well as active encouragement of the use of the interventions.
- Additional education materials and training on the use of the reporting tool was essential in the adoption of the reporting tool for staff who were not used to using apps, iPads or tablets.

Challenges

- Champions at Rotorua Hospital found that the interventions had to be slowly deployed in order to gain buy-in from surgeons. For example, initially surgeons wanted to have briefings while they were in the car, instead of in theatre with the surgical team. However, over time these clinicians became more engaged in the use of the interventions and even began to initiate the briefings themselves in theatre.
- The project team faced challenges around using the reporting tool on tablets due to concerns from the ICT team around data security and patient confidentiality.

Case Study 2: Rotorua Hospital – Staged deployment and progress in buy-in over time

Initially some medical staff did not want to lead the briefing or debriefing. They preferred that nursing staff organised briefings and some surgeons would attend the briefings by phone on the way to hospital or in the car park.

Rather than enforce that the surgeons had to be present from the beginning of deployment, the champions worked with them to make progress over time. The surgeons involved now get to theatre at 8.15am so that they can attend briefings with the team. As long as the nurses and other members of the team do the 'housekeeping', in getting the team together, the surgeons are now stepping up to lead the briefing.

III. Private organisation – ASC

Deployment activities

The deployment of the PoC was led by two PoC site champions, one in a theatre manager role and another in a national Quality Management role external to the hospital. ASC felt that a 'bells and whistle' approach had little impact in launching the project at their site. It was decided this approach did not suit their theatre culture, so ASC aimed to make the PoC and the interventions 'local'. This was done through the following activities:

- Established a central team of three champions, who were responsible for implementing the PoC, and communicating and encouraging the use of the interventions. The selected champions were not

necessarily the most senior team members, but were viewed as 'change makers' who were respected and influential within their teams.

- ASC intentionally utilised its existing culture and strong working relationships across theatre teams, where communications could be based on a foundation of existing trust and respect. An emphasis was placed on using 'one on one' conversations through deployment, which would be done in way which was appropriate to each individual. Tailoring one on one communication was particularly used to engage with surgeons.
- The champions attended a training course to ensure they had a broad knowledge of both the PoC and the interventions.
- Champions supported the spread of knowledge into other surgical teams through working on other operating lists with other team members.
- Charge nurses were also educated and encouraged to support the deployment of the interventions through engagement and communication with surgeons, anaesthetists and other team members
- A 'local' education session was developed by the PoC site Champion, which focused on explaining the value of the interventions and how their use could deliver better outcomes. Three education sessions were held (2 hours duration) and were planned on days when theatre sessions were not being fully utilised. More detail on the nature of this education session can be found in section 2.2.1 Training – Proof of Concept Approach III Ad Hoc Training.
- Deployment focused on effective communication and encouragement to use the interventions.
- Part of the deployment approach was ensuring flexibility and allowing interventions to be made appropriate to an individual's situation in order to increase engagement. For example, starting a list with a briefing initially on only the first two smaller cases, and then stopping to undertake a briefing on the final and more complex case.
- Deployment occurred slowly in a staged process, rather than aiming for 'perfection' being full adoption of the PoC interventions from day one.
- Regular team meetings were planned to monitor progress of the PoC.

Successes

- Surgeons did not begin to adopt the interventions until mid to late July. However, by the beginning of November, 34 of the 36 surgeons and all other surgical team members were utilising the clinical interventions.
- ASC had an established culture of natural leaders, which mean many theatre staff were willing and able to take on the role of "champion" for this PoC.
- Staff responded well to having one of their peers 'own' the PoC interventions. The education and effective communication from respected team members was seen as key to successfully initiating and influencing the on-going change.
- 'One on one' conversations were found to be essential to achieving buy-in from staff. ASC found that the best approach was to tailor conversations to an individual, recognising an individual's different personalities, styles and reception to a new concept. These conversations helped staff to understand how the interventions could result in improving patient outcomes.
- Leveraging established relationships between team members, resulted in effective communication around deployment of the interventions
- The ASC specific education session was a successful deployment approach, which provided a forum to engage with staff that were able to ask questions and provide their ideas for the PoC.

Challenges

- The majority of the challenges that ASC faced related to a lack of resourcing or staff availability. Below are some of the challenges and workarounds that ASC used:
- Despite the success of the deployment, two of the 36 surgeons at ASC still did not use the interventions at the end of Learning Cycle Two. These surgeons prefer to complete a briefing at their desk. They believe that they can 'trust their teams' and that requirements are already noted.
- ASC faced challenges relating to resourcing constraints, which led to the initial deployment of the PoC being scaled back. Initially, ASC was unable to provide high quality education, as staff were unable to leave theatre to attend education sessions or meetings and access the external support that was available to them. ASC had to wait until a there was a period of decreased theatre activity so that they could plan to deliver three education sessions. The school holidays proved to be the opportunity to

protect the three blocks of time for the education sessions as theatre activity was planned to decrease due to surgeons being on leave.

- Staff were not consistently able to access the reporting tool to input data, due to time constraints, theatre productivity demands or technology failure.
- As expected, some individuals took longer to process and accept the new initiatives. ASC found that the best way to deal with this challenge was to keep the end goal front of mind, but accept that a longer staged approach would be more appropriate to enable success and sustainability
- Educating and socialising the interventions had to be made suitable to theatre environment, which included short staffing and high pressured lists. In order to overcome some of these challenges, education and spread of the intervention rollout was predominantly undertaken during theatre lists, between lists, in 'corridor conversations,' and in the PoC site Champion's office.

Case Study 3: ASC - Use of 'one on one' conversations to encourage adoption of the interventions

"One of the most senior and respected surgeons was initially uninterested in using a briefing prior to the list. ASC had always had one senior member of the staff discuss the surgical requirements of the day with the surgeon; however, this did not involve the whole team.

On this particular day, the surgeon said that he was sick of being asked the same questions time and time again, and that the scrub nurse was already gowned up and not party to this and had to be informed after the initial conversation. One of the champions used this as an opportunity to persuade the surgeon that having the briefing discussion in theatre, with all of the theatre team, would help to avoid unnecessary duplication of information.

The surgeon agreed. From that time, he has been fully engaged and enthusiastic about the benefits of shared information and communication. He has even begun discussing this with other surgeons and asking if they were also doing a briefing."

3.2.2 Training

The findings relating to the three aspects of training are provided below:

I. Formal face to face training

Successes

The formal training session prior to Learning Cycle One was well received by participants. 100% of attendees who filled in the evaluation survey of the formal training session for Learning Cycle One agreed or strongly agreed that:

- the training session provided them with enough content to successfully use the interventions and tools during Learning Cycle One
- the training session adequately prepared them to use the reporting tool
- they felt confident that they had the knowledge and resources to share learnings and encourage others to participate in the PoC
- the training and supporting materials provided relevant and user friendly supporting materials

Information from the training evaluation survey found that the four areas that trainees found most useful were:

- seeing and using the web based reporting tool
- seeing how other organisations had implemented tools
- improvement methodology
- the ability to link the concept and outcome with the associated tool

Challenges

- The purpose of the formal education session was to educate participants to become 'trainers' at their PoC sites (as per the education approach developed in the Collaborative Development phase). However,

the majority of PoC site champions, and the 'trainers' who attended the formal training workshop, found that they lacked the time to undertake the training sessions at their sites.

- Despite the success of the formal education session, attendance at the training was limited. PoC sites found it challenging to find staff who could attend a full day training session, rather than being in theatre. As a result, only nursing and quality staff attended the education workshop. The lack of professions represented impacted on the success of the capability development at PoC sites.

II. Quick Reference Cards, posters for display

Successes

- Waikato and Rotorua Hospital both found that the provision and display of large posters displayed within their theatres worked well, enabling all staff to see at a glance the contents and flow of each clinical intervention.
- ASC preferred to use a 'Case for Change' poster to create buy-in to using the interventions.
- PoC sites found that the education packages on the use of the reporting tool were essential, especially for providing information on user support.

III. Ad hoc training

Successes

Ad hoc training on the interventions and reporting tool was considered to be successful:

- Training small groups or individuals in theatres on the use of the reporting tool was the best way to ensure that staff with limited experience using touchscreen and online technology would be able to use the reporting tool.
- A 'show and tell' training session on the reporting tool from Quality Hub was effective in ensuring that ASC staff could use the reporting tool.
- ASC staff responded positively to the education session, which provided information on why and how the interventions could improve patient outcomes. Feedback on this education session was that the staff who attended were eager to implement the interventions.
- Positive feedback was received on the additional training workshop run by PwC for Waikato Hospital staff. This session helped to develop the capability across both nursing and anaesthetic technician staff around the objectives of the PoC, on the use of interventions and the reporting tool.

Challenges

- Ad hoc training was not requested, and therefore not delivered, to theatre professions outside of nursing. Despite the best efforts to ensure multiple professions could attend the additional Learning Cycle Two training session at Waikato Hospital, only nurses and a small number of anaesthetic technicians attended. None of the PoC sites delivered formal training sessions to other professions.
- Ad hoc training was predominantly provided to teach staff to use the reporting tool. Feedback from the initial formal education workshop was that all participants felt confident in using the reporting tool (using the reporting tool was the most common area that training participants found most useful in the training evaluation survey).

  Despite this confidence, and the provision of step by step guides, knowledge transfer on use of the reporting tool seemed challenging and capability gaps were identified. The reason for this may be due to the low attendance rates at the initial formal education workshop or due to the lack of engagement with each PoC site's IT teams.

3.2.3 Interventions

The following section discusses the adoption of interventions and how the interventions and tools were used/modified throughout the PoC. Information is based on both data collated from the reporting tool and feedback collected from PoC site staff.

Overall, positive feedback was received from staff across PoC sites on the three clinical interventions.

- PoC participants identified a number of perceived benefits from using the three clinical interventions including:

- Promoting a more inclusive culture
- Ensures communication is accurate and not duplicated around information on the list
- Feeling like they were a part of the surgical team
- Providing an opportunity to stop and think about the details of each procedure
- Providing the opportunity to prepare well for surgeries (e.g. equipment needed)
- Improved levels of teamwork
- Increased confidence by staff, knowing a plan is in place for the day and has been communicated

Positive comments were received on the overall PoC from a number of staff involved, including:

"When the PoC came through, we as theatre nurses had very negative thoughts about it – one more time consuming bureaucratic procedure burden on our shoulders. Now I have to admit we were so wrong about it" – **Theatre team member**

"One of the things I have found very significant over the past months participating in the PoC is that the OR teams seem tighter, the teams run well and all members of the team know what is going on" – **Theatre Coordinator**

"Communication is happening with all the team, so that information is not having to be repeated and therefore reduces the risk of things being misinterpreted or forgotten" – **Theatre team member**

"When all the team, especially those unfamiliar or new to the list, are given an opportunity to speak at the beginning, it is more likely they will speak up during the list if they have a concern" **Theatre team member**

Specific information relating to each intervention and tool is provided below

I. Briefing

Although a number of theatres across the sites were undertaking a briefing of sorts, prior to the deployment of the PoC, these generally did not involve the entire surgical team. A number of positive verbatim comments were received on the inclusion of the entire surgical team in the briefing was positive, including:

Information is not relayed by telepathy. The [PoC interventions] help clarify in my mind whether I have considered all aspects of patient's anaesthesia and interventions required....The briefing completes the team" ***- Anaesthetist***

"The Proof of Concept is an important part now of every operation that I perform. The team meets first and fully discusses the entire list. This enables changes to be made if necessary prior to any concerns normally found during operating" – ***Surgeon***

"Application of the concept and usage improved safety to patients. Now the surgeon clarifies what kind of special instruments he needs and identifies expectations from each case. It helps all of the team be prepared and be well organised for each case" – **Theatre team member**

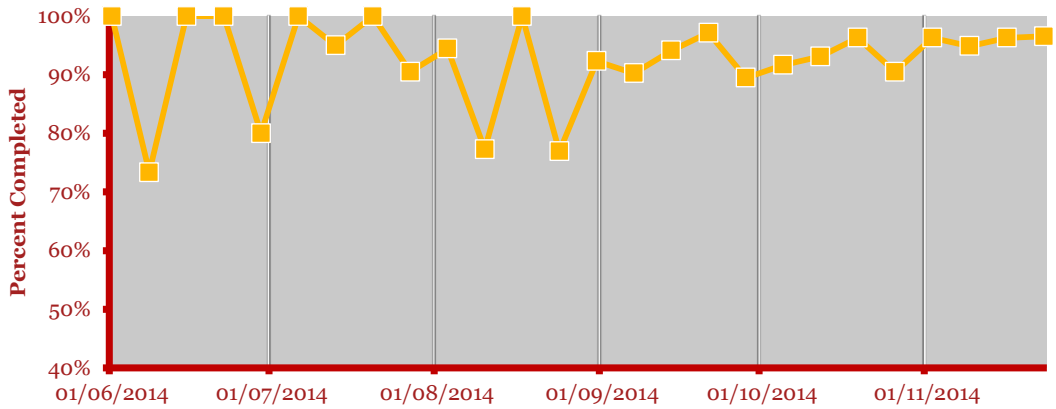
"The briefing was brilliant for complex procedures e.g. Multi ligament knee reconstructions. Each step is discussed and written up on the white board and what instrumentation and implant is required in sequence." - **Theatre nurse**

"Overall the concept of team briefing is excellent. Everyone has an overall view of the day and problems are discussed before the list starts, e.g. allergies, positioning, equipment, etc." - **Theatre team member**

"One of the surgeons has said that the initiative is brilliant and he likes the idea of gathering together before the list starts to discuss the cases. It makes him think and remember details of the procedures. It works well for us too" – **Theatre team member**

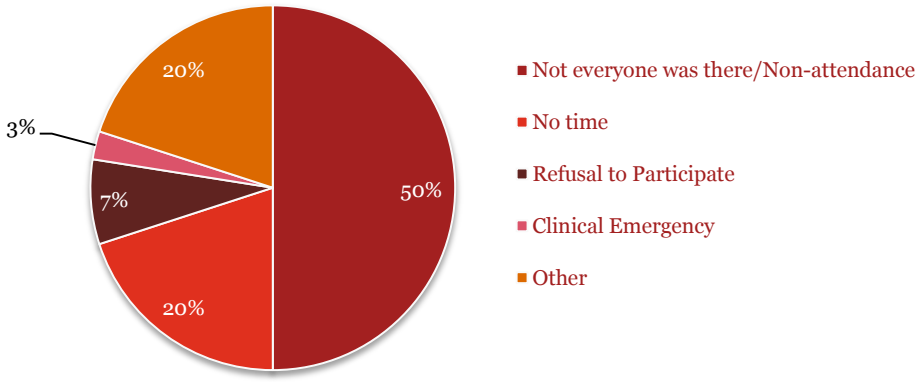
Adoption rates - Implementation of the briefing was positive, with briefings being completed in 93% of instances. The beginning of the PoC showed high variability and a lower number of entries in the reporting tool; the number of entries increased over time from 33 in the first month to 122 in the final month. Considering the usage of briefings prior to the PoC, this increased completion rate and increased number of entries into the reporting tool should be viewed as successful.

Briefing completion rate



Reasons for non-completion – Briefing non-completion was most commonly due to not all team members attending. Surgeons and anaesthetists were the team members most likely to not be present at a briefing, where they were not present in 75% of the instances that briefings could not be completed due to team members not being present.

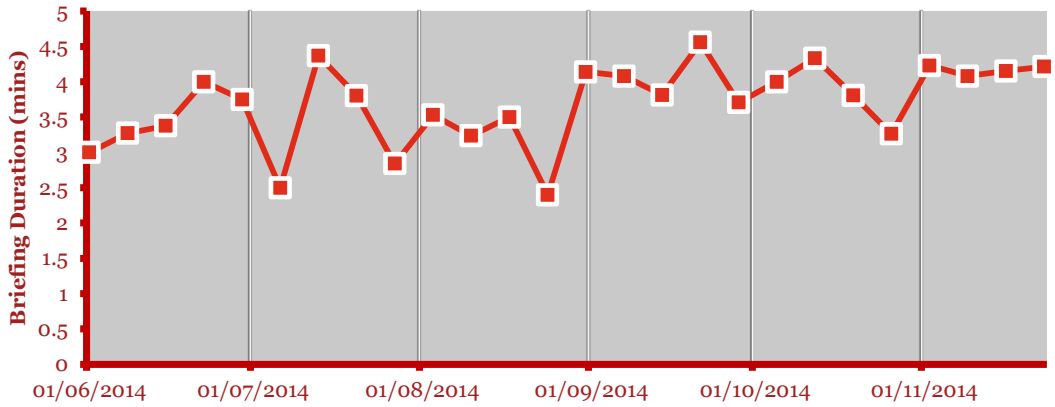
Reasons for non-completion of briefing



Briefing leader - The briefing was designed to be led by the role that knew the most about the patient, which the working group hypothesised, would typically be the surgeon or anaesthetist. Data collection, combined with verbatim feedback from both phases of the PoC, demonstrated that nurses generally initiated briefings (both operating theatre nurses and nurses in a leadership position). However, staff feedback from all PoC sites has indicated that once the briefing was initiated, it was almost always led by a surgeon.

Duration - The working group had wanted to understand how long the briefing would take PoC site surgical teams to complete, as they did not want to impose an onerous or lengthy intervention process on surgical teams. Results from the reporting tool show that the average time to complete a briefing over the PoC was 3 minutes and 53 seconds. 91% of the briefings recorded in the reporting tool were completed in 5 minutes or less.

Average duration to complete briefing



Briefing components - The working group chose to trial a briefing that covered details for each case on the list, despite potential duplication with discussions on individual cases later in the day. No feedback was provided from staff to the effect that discussing individual case details was too onerous. In contrast, staff found that discussing potential problems in the briefing, such as allergies, positioning and equipment, helped them to prepare for the day.

Briefing templates - Templates were developed for staff to record any information discussed in the briefing. These templates were used differently across different surgical teams. However, staff responded positively to having templates available.

Case Study 4: Rotorua Hospital: Use of briefings saves time throughout the day

"An orthopaedic surgeon asked to reduce his list from 4 joint procedures to 3 procedures in order to eliminate problems around not being able to complete the list within the allocated timeframe.

After implementing a structured briefing, checklist and debriefing, in addition to a 7.30am start in his theatre, the list was able to be increased back to 4 joints per day. Introduction of these interventions helped to prove that: discussing the pattern of the day, communicating each patient's requirements, medical issues, specialist equipment and any potential problems with the whole team works."

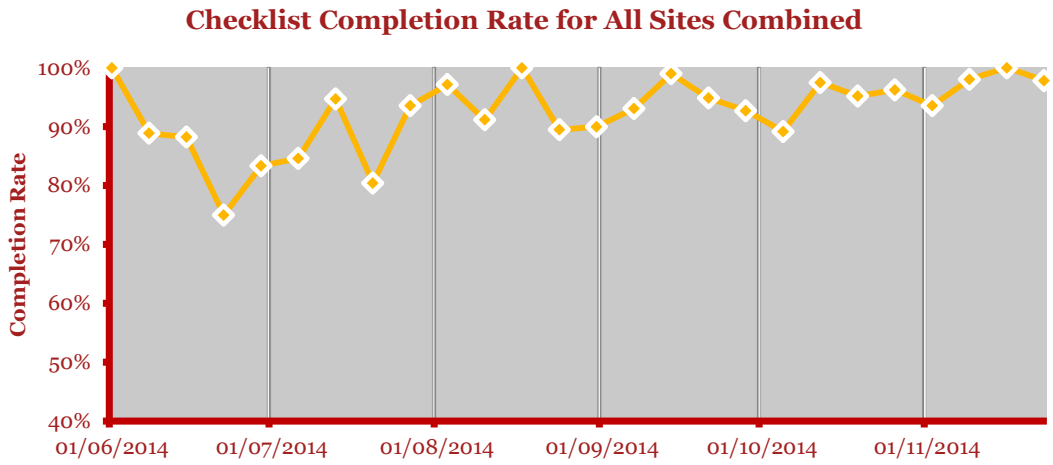
II. Surgical Safety Checklist

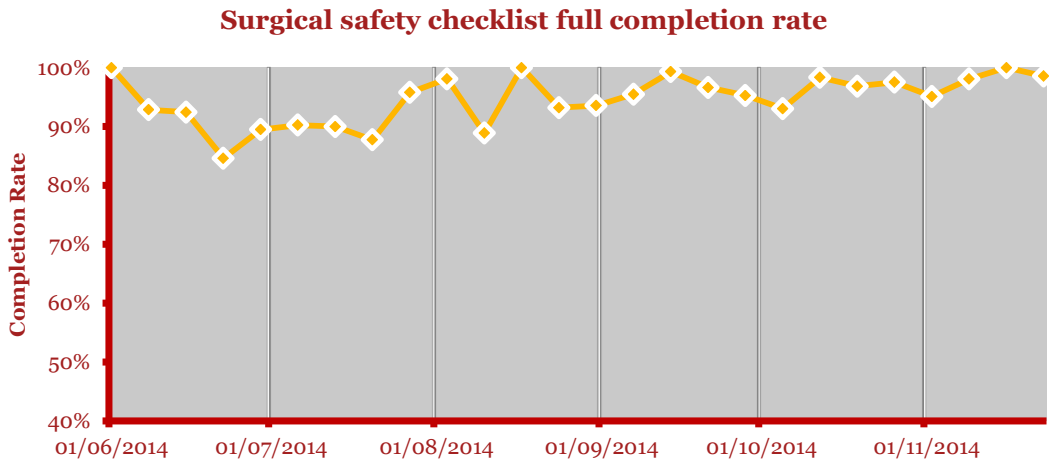
Prior to the implementation of the PoC, a number of PoC site staff believed that they were already using surgical safety checklist interventions in theatres.

Through the PoC, staff found that these interventions were not currently being used correctly. For example, when the checklist was implemented at Rotorua Hospital, the team realised that the timing they had previously been using to carry out sign-in was incorrect and needed to be improved (i.e. timing should be before induction of anaesthesia).

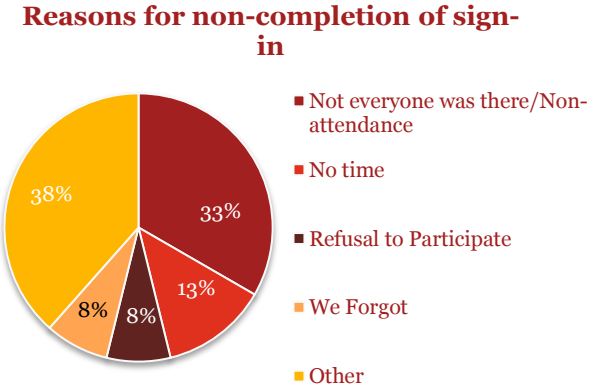
A small group of staff provided feedback that they still wanted the checklist to be ticked and signed by a member of the surgical team, and filed in patient notes, to provide an audit trail that the checklist had been completed. This indicates that some surgical teams still do not understand that the purpose of using the checklist was to improve teamwork and communication.

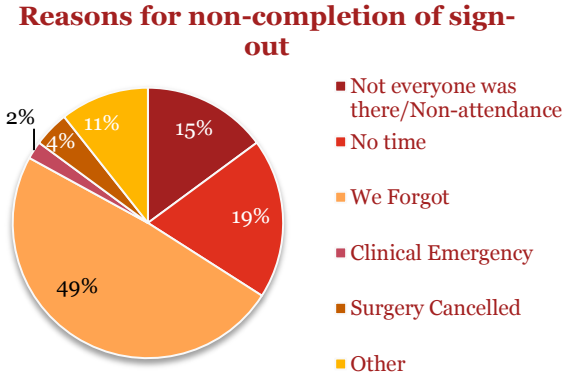
Adoption rates - Adoption of the checklist showed positive results, with all three components of the surgical safety checklist being completed in 94% of instances. Full completion of all three areas of the surgical safety checklist improved over the duration of the PoC. The average completion rate improved from 87% in the first month of the PoC to 97% in the final month. It should also be noted that the number of entries into the reporting tool significantly increased over the PoC, from 46 in the first month to 390 in the final month, indicating that the checklist had increased in adoption. The completion rate is shown on the graph below:





Reasons for non-completion - The majority of instances where non-completion of the checklist was recorded related to sign-in or sign-out components. Over 70% of reasons for non-completion of sign-in related to 'other' reasons or 'not everyone was there' (33%). In contrast, 70% of reasons for non-completion of sign-out were due to staff forgetting (49%) or having 'no time' (19%).





Checklist leader - The checklist designed by the working group did not prescribe the role that should be responsible for leading each section of the surgical safety checklist. Instead, the role was to be identified in the briefing at the beginning of the list.

Midway through the project, the Perioperative Harm Advisory Group (PHAG) sought information on which roles ran each section of the checklist and why this occurred. It was assumed that the anaesthetist should run sign-in, the surgeon should run time-out and the nurse should run sign-out. The leader of each part of the checklist varied across sites:

A. **Sign-in –** Overall, sign-in was only run by anesthetists in 4% of checklists. Sign-in was predominantly led by the anesthetic technician at Waikato and ASC (87% and 94% respectively). Sign-in was predominantly led by the operating theatre nurse at Rotorua Hospital, as shown in the table below:

Site	Anaesthetist	Anaesthetic Technician	Nurse (Leadership)	Nurse (Operating Theatre)
Waikato Hospital	9%	87%	1%	3%
Rotorua Hospital	3%	1%	5%	92%
ASC	2%	94%	2%	2%
Overall	**4%**	**41%**	**3%**	**52%**

Over 85% of reasons for sign-in not being led by the anaesthetist were due to standard ways of operating at each PoC site. Staff commented that it was standard procedure for the sign-in to be led by the anaesthetic technician to at Waikato Hospital and ASC and by the nurse at Rotorua Hospital. A further 6% of instances, where the anaesthetist did not run sign-in, related to the anaesthetist being unavailable or busy.

B. **Time-out –** Surgeons only led time-out 10% of the time. Time-out was most likely to be led by either the operating theatre nurse, or by a nurse in a leadership position. Similar to sign-in, Rotorua Hospital was most likely to delegate leadership of the time-out to a nurse (97% of the time), compared to Waikato Hospital and ASC (75% and 87% respectively).

The most common reason that surgeons did not lead time-out was that it was not their 'standard way' of operating (80%). Interestingly, approximately 15% of the time, the surgeon did not lead time-out because they were 'scrubbed'. Given that the checklist was no longer a paper checklist, being scrubbed should not impact on the leadership of timeout. However, a number of these responses specifically mentioned that, although they did not lead it, the surgeon was still engaged in the time-out process.

Site	Surgeon	Nurse (Leadership)	Nurse (Operating Theatre)
Waikato Hospital	25%	42%	33%
Rotorua Hospital	2%	9%	89%
ASC	13%	21%	66%
Overall	**10%**	**19%**	**71%**

C. **Sign-out –** Overall, nurses led sign-out 99% of the time.

Checklist components - No negative feedback was received relating to the changes made to the checklist by the working group (including the removal of pulse oximeter check, additional confirmation on allergies and introduction of a checklist coordinator role). Positive feedback was received to the addition of the allergies confirmation in the time-out phase – see case study below in section *III. Stop/Start/Improve Huddle)*

III. Stop/Start/Improve Huddle

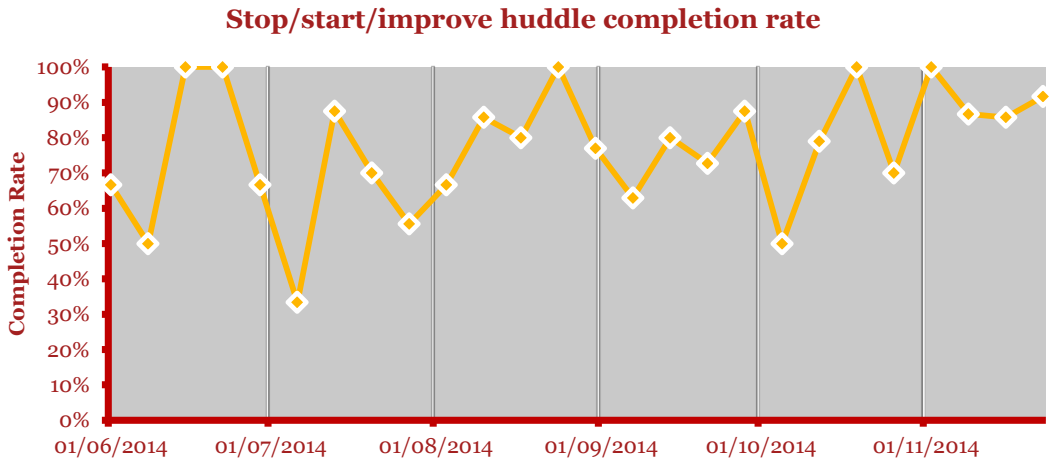
Overall feedback on the use of the huddle was positive, including:

""Team debriefs highlight areas that can be improved, e.g. always needing this piece of equipment for this particular surgery. I think it makes everyone feel part of the team"

Nurse Coordinator

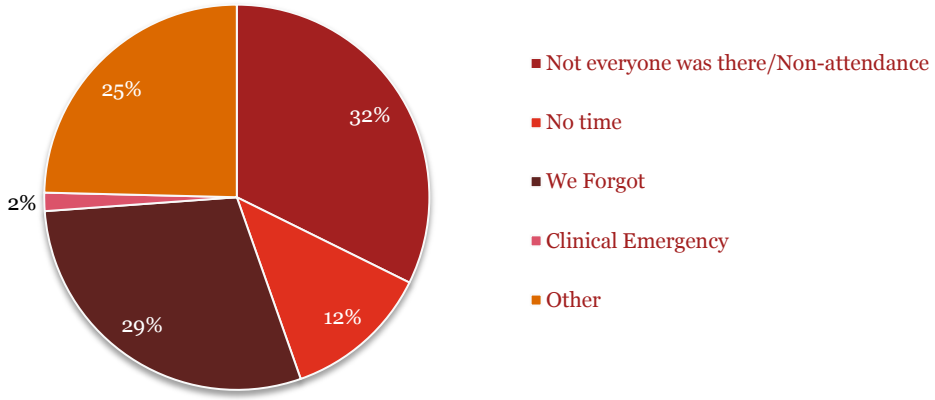
Adoption rates - The stop/start/improve huddle significantly increased in its usage over the PoC. The huddle had an overall completion rate of 78%, despite being a new concept to all surgical teams participating in the PoC.

However, it should be noted, that the reporting tool response rate on the huddle was significantly lower than expected (298 responses over the course of the six months), indicating that the actual completion rate of the huddle is likely to be lower than 77%. Despite this, the use of the huddle has improved over time, increasing from a 74% completion rate in the first month of the PoC to 91% in the final month of the PoC. Additionally, the number of instances input into the reporting tool has increased 200% from the first month to the final month of the PoC, from 19 entries to 57 entries respectively. The completion rate is shown in the graph below:



Reasons for non-completion - The most common reasons for non-completion of the huddle included team members not all being present, staff forgetting and 'other'. The surgeon was the most likely role to not be available to complete the huddle, being unavailable almost 60% of the instances. Verbatim feedback collated from staff found that it was often difficult to complete the huddle at the end of the day. The main reasons being: staff relieving in other operating theatres, difficulty getting all staff together and surgeons and anaesthetists wanting to finish their day after an overrun of operating lists

Reasons for non-completion of stop/start/improve huddle

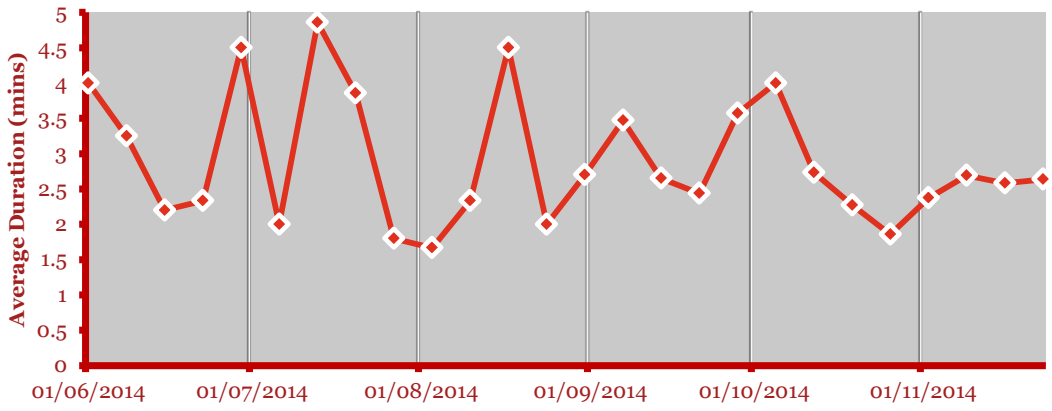


Stop/start/improve huddle leader - Data was collected on the role that led the huddle in order to understand how surgical teams preferred to run this intervention. Nurses, both in a leadership position and operating theatre role, were most likely to lead the huddle, recording 86% of huddles in the reporting tool. Surgeons led the huddle 13% of instances. The leader of the huddle varied across sites. Surgeons at ASC led the huddle almost half of the time, but this rarely occurred at other sites:

Case Study 5: ASC - Use of the debriefing to identify actions for improvement				
Waikato Hospital	4%	4%	81%	11%
Rotorua Hospital	3%	2%	42%	53%
ASC	48%	-	18%	34%
Total	**13%**	**1%**	**42%**	**44%**

Duration - On average, the completion of the huddle took 2 minutes and 47 seconds. Of all instances entered in the reporting tool, 97% of huddles were completed in 5 minutes or less. The variation in time taken also reduced over the PoC.

Average duration to complete stop/start/improve huddle



Stop/start/improve huddle components - The four sections of the huddle appear to have worked well for surgical teams, with feedback relating to wording of each section, rather than content. These are discussed in the recommendations for a national roll-out.

Timing - Staff initially found it difficult to ensure that the huddle was completed at the end of the list. Over time, feedback was provided that the huddle worked best if it was undertaken while the last patient on the list was still on the table, as the surgeon was generally still in the theatre at this point.

"A patient on the list had an allergy to latex. This allergy was communicated through the usual channels: as a patient alert on the system (recorded as part of pre theatre setup), and communicated to staff at the briefing. However, the allergy was not displayed on the board.

At sign-in, the anaesthetic technician introduced the patient to staff and communicated that the patient was allergic to latex. The scrub nurse already had latex gloves on and had set up instrumentation.

As a result of doing the sign-in, the latex allergy was identified and the contaminated instrumentation was removed from the theatre and replaced. The scrub nurse rescrubbed and put on fresh gloves.

The debriefing was used to identify why this error had occurred and determine actions that should be taken in future or improved to ensure this error doesn't happen again:

1. *Use the briefing notes to record and highlight relevant patient information*
2. *Write on the operating list and highlight*
3. *Use the additional whiteboard to write up any alerts in red when setting up"*

IV. Behavioural/Cultural Interventions Toolkit

Positive feedback was received on the use of behavioural/cultural interventions.

'Callouts', 'Explicit ask for feedback' and 'Use of first names' were the most commonly used behavioural tools in across all three clinical interventions. These tools were used both individually and in combination with each other over 60% of instances where interventions were undertaken.

V. Improvement Methodology

The improvement methodology was not used by PoC sites. Staff found that the methodology complements the suggestions for improvement identified in the huddle/debriefing. However, it was not implemented in the PoC, as emphasis was put on encouraging adoption of the huddle first.

4. Collaborative Measurement

Under Collaborative Measurement, overall teamwork/culture and engagement during the use of interventions were baselined using the Safety Attitudes Questionnaire and the web based reporting tool. The two key areas of measurement were:

4.1 Collaborative Measurement Approach

4.1.1 Overall culture and teamwork

Culture and teamwork were baselined and measured through the Safety Attitudes Questionnaire. The questionnaire covered a number of areas, including:

- Background information – including organisation, role, level of experience
- Communication and collaboration – the quality of communication experienced with staff from each profession in the operating theatre
- Teamwork climate – covers 24 questions relating to how comfortable staff feel in discussing issues, perceptions of teamwork, perceptions and use of briefings
- Safety climate – covers 16 questions relating to staff perceptions on whether adequate safety procedures and behaviours are in place
- Job satisfaction – covers 15 questions on overall job satisfaction, stress levels and related performance
- Perceptions of management – covers six questions relating to perceptions on hospital leadership and the support that it gives to operating theatres and safety
- Comments – provides an opportunity for participants to provide recommendations to improve safety, teamwork and communication in the operating theatre

In order to baseline teamwork and culture, the SAQ survey was sent to all participants of the first and second PoC, prior to the launch of each PoC (the baseline survey). At the end of each PoC, participants were asked to complete the SAQ survey again, to identify any improvement in teamwork and culture (end of PoC survey).

4.1.2 Team engagement

Team engagement was also measured through the web based reporting tool. The design of the engagement question was an adaption of WHOBARS, which is an appraisal method that rates behavioural performance against a Likert scale (with a 1 – 7 rating) to build a platform for comparing behavioural change[25].

The Likert scale for team engagement allows for a range of ratings to be given to the engagement and participation of the whole team during the administration of the checklist. The key to scoring this domain is observing the extent to which team members devote their attention to both the tasks set out in the checklist and to the checklist reader.

Raters were asked to focus on the following question: Are team members fully attentive to completing the checklist in a supportive way, or are they preoccupied with other activities unrelated to good communication and support of the checklist process?

Performance against all interventions was monitored through a real-time dashboard which reported on the three clinical interventions and behavioural/cultural interventions. This dashboard monitored both process and outcome measures, designed to provide information on how interventions were used and their impact on teamwork and communication.

4.2 Collaborative Measurement Findings

4.2.1 Overall culture and teamwork (SAQ results)

A low number of responses were received in the end of Learning Cycle One survey. The low response rate was perceived to be due to the high number of questions in the survey. PoC site Champions promoted completion of the SAQ with all Learning Cycle One and Learning Cycle Two staff in the final month of Learning Cycle Two.

The SAQ had 57 responses in the baseline survey and 55 responses in the end of PoC survey. This response rate was a large enough sample to allow for robust analysis and to identify whether there have been significant changes in communication and teamwork attitudes over the PoC. Sites attributed the low response rate to the time required to complete the survey (10 – 15 minutes) and the number of questions included.

The Mann-Whitney-Wilcoxon (MWW) test was used to analyse whether the differences between the baseline and end of PoC surveys were statistically significant. The MWW test is a nonparametric hypothesis test that is more appropriate than the t-test for peaked and skewed distributions of data. The MWW test is almost as appropriate for normal distributions with regards to data represented in a Likert scale[26]. The MWW was selected for analysis, over the t-test, as the SAQ data is skewed in the majority of cases.

The MWW test has also been recommended for Likert scale type data when comparing two unpaired samples[27] . Although the Chi squared could be used, it is less informative than the MWW test as it ignores the ordinal nature of the data.

The use of this test assumed that the responses were ordinal, independent and that the distributions of both groups would be equal under the null hypothesis. These assumptions have been satisfied appropriately by the way the survey has been designed.

Statistical significance is based on a p-value of less than 0.05, in order to have reasonable confidence that null hypothesis can be rejected.

Communications and Collaboration

Respondents were asked to rate the levels of communication and collaboration that they experienced with other professions in the operating theatre. Overall improvements were demonstrated across professions, with strong evidence for improvements in communication with nurses and anaesthetic registrars

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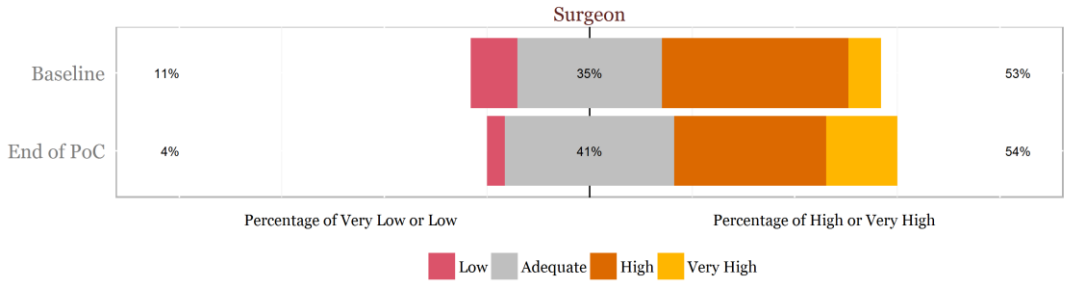
[25] Health Quality and Safety Commission (2014). *Surgical Safety Checklist Quick Assess Tool v3.3*. Wellington: New Zealand

[26] de Winter, J. C. & Dodou, D. (2012). Five-Point Likert Items: t test versus Mann-Whitney-Wilcoxon. *Practical Assessment, Research & Evaluation, 15*(11). Retrieved from http://pareonline.net/getvn.asp?v=15&n=11.

[27] Learning Technology Dissemination Initiative (1999). Edinborough, Scotland: Mogey, N.

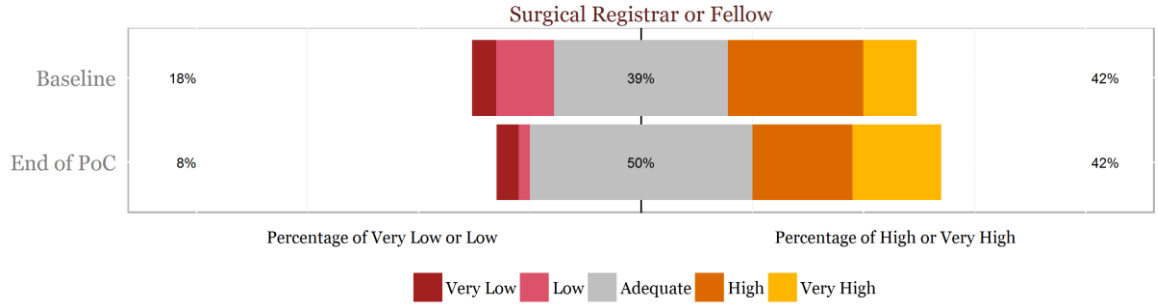
I. Quality of communication and collaboration experienced with surgeons

The percentage of respondents who gave a high or very high rating to communication with surgeons remained relatively the same. However, the percentage that gave a 'low' or 'very low' rating decreased from 11% to 4%.



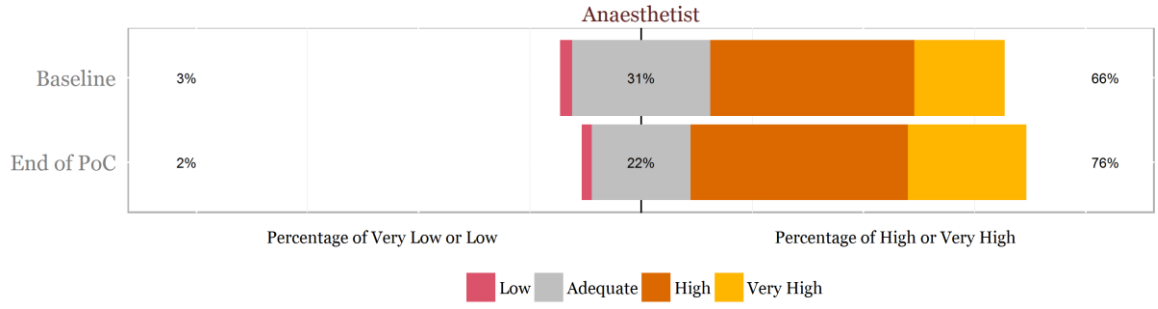
II. Quality of communication and collaboration experienced with surgical registrars/fellows

The percentage of positive responses to communication with surgical registrars remained the same. However, the percentage of respondents who rated communication as 'low' or 'very low' with surgeons decreased by 55%.



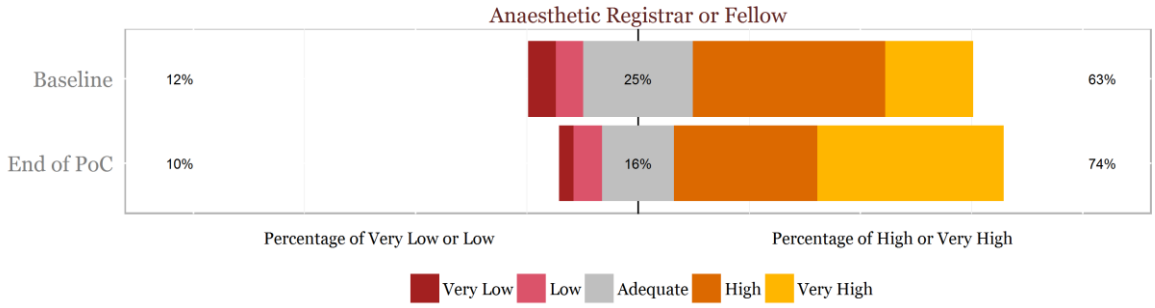
III. Quality of communication and collaboration experienced with anaesthetists

Respondents that rated communication with anaesthestists as high or very high increased by 15% from the baseline to end of PoC.



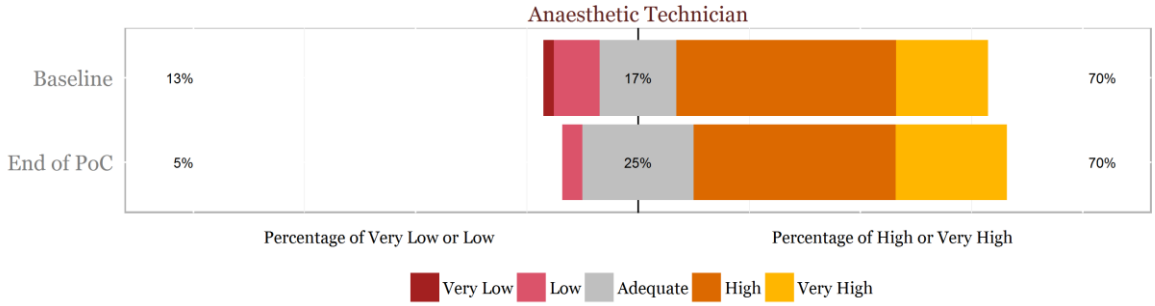
IV. Quality of communication and collaboration experienced with anaesthestist registrars/fellows

Respondents who rated communication as 'high' or 'very high' increased by 17% between the baseline and end of PoC survey.



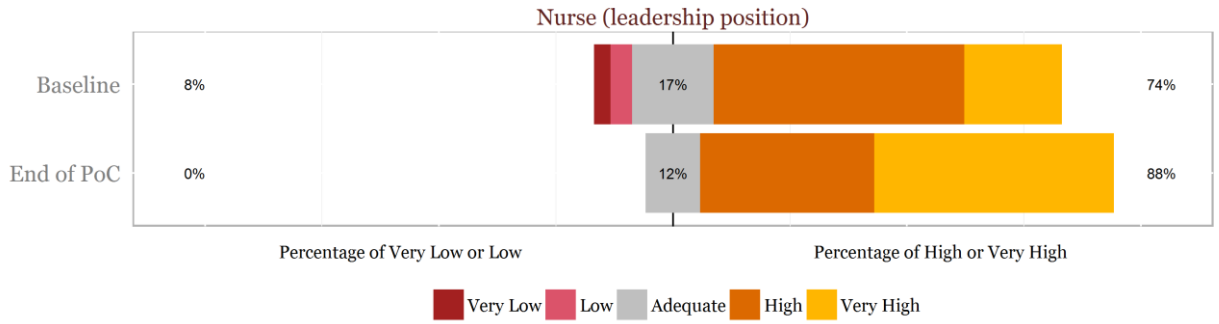
V. Quality of communication and collaboration experienced with anaesthetic technicians

The number of respondents who gave a 'high' or 'very high' rating to communication with anaesthetic technicians remained the same. However, the number of respondents who rated communication low or very low reduced by 62%.



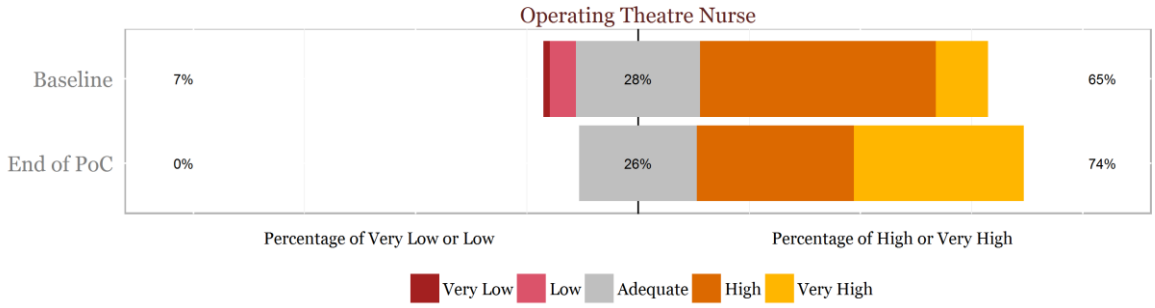
VI. Quality of communication and collaboration experienced with nurses in a leadership position

There is strong evidence for an improvement in communication with nurses in a leadership position (p-value = approximately 0). 'High' and 'very high' responses increased by 19% between the baseline to end of PoC surveys.



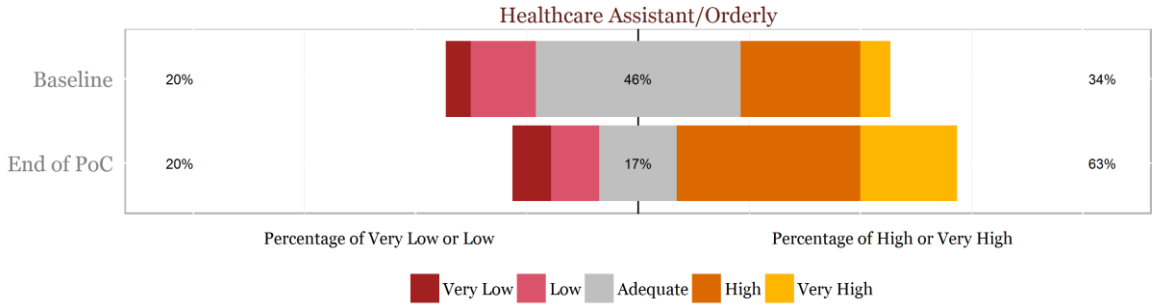
VII. Quality of communication and collaboration experienced with operating theatre nurses

There is strong evidence for an increase in positive responses relating to communication with nurses (p-value = 0.009). Communication experienced with an operating theatre nurse increased by 14%. No participants responded that communication was low or very low in the end of PoC survey.



VIII. Quality of communication and collaboration experienced with a healthcare assistant/orderly

There is strong evidence for an in communication with healthcare assistants (p-value = 0.005). 'High' or 'very high' ratings increased by 88% between the baseline and end of PoC survey.

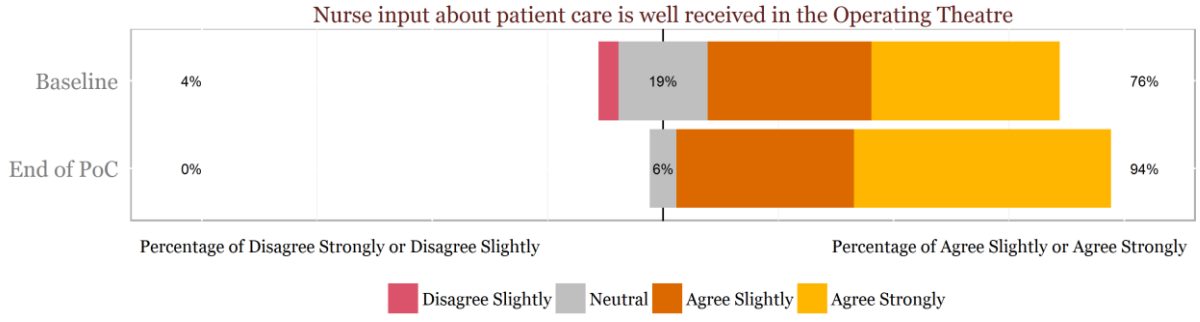


Teamwork and Climate

The SAQ tested whether the teamwork climate had improved over the course of the PoC. Overall, the SAQ results demonstrate that there has been a significant improvement in teamwork within surgical teams involved in the PoC across teamwork, safety, perceptions of management and job satisfaction.

IX. Nurse input about patient care is well received in the operating theatre

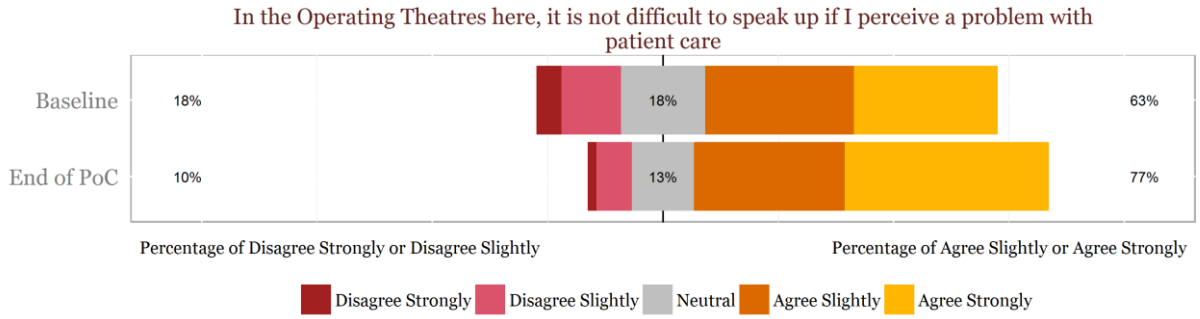
A 23% increase is noted in respondents who agreed that, "nurse input is well received in the operating theatre" from the beginning to the end of the PoC. This change was statistically significant (p-value = 0.008).



X. It is not difficult to speak up if I perceive a problem with patient care in the operating theatres

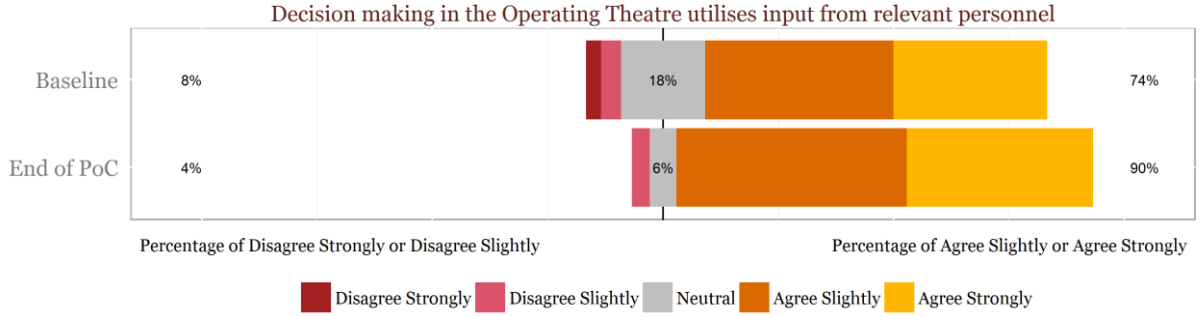
There is very strong evidence that there is an improvement between the baseline and end of PoC survey (p-value = 0.027).

Survey results showed an increase of 22% in respondents who believed they could speak up if they perceived a problem with patient care.



XI. Decision making in the operating theatre utilises input from relevant personnel

There is very strong evidence that there is an improvement between the baseline and end of PoC survey (p-value = 0.004). The percentage of respondents who agreed or strongly agreed with this question increased by 22%.

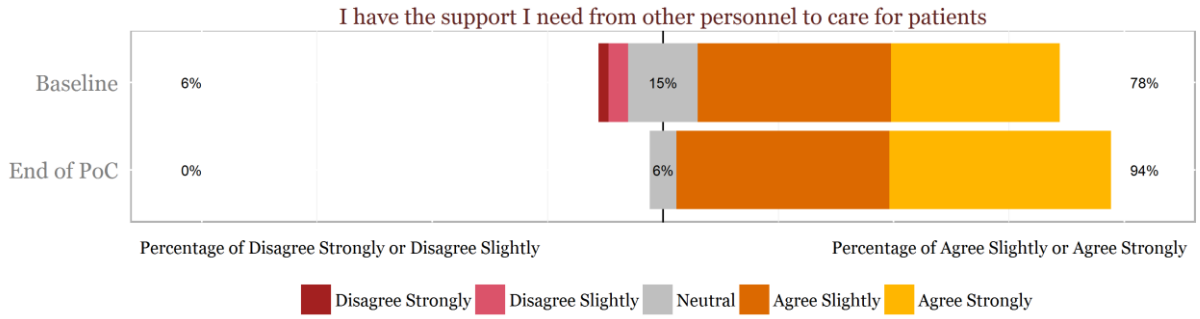


XII. I am able to express disagreement with staff when the situation arises

Strong evidence exists that there is an improvement between the baseline and end of PoC survey (p-value = 0.047). There was a 31% increase in respondents who agreed with this question, which may be attributable to the behavioural tools implemented in the PoC to help staff effectively express disagreement:

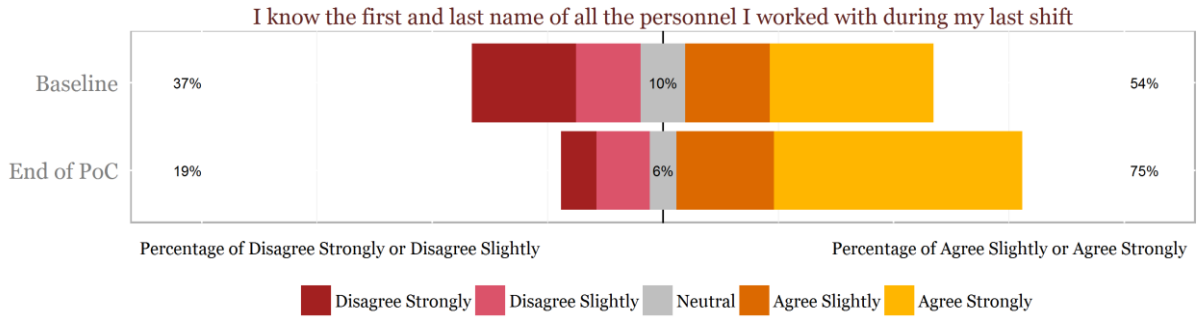
XIII. I have the support I need from other personnel to care for patients

It is statistically significant that there has been an improvement in the support for this statement (p-value = 0.018). All respondents were either neutral or agreed with this statement at the end of the PoC.



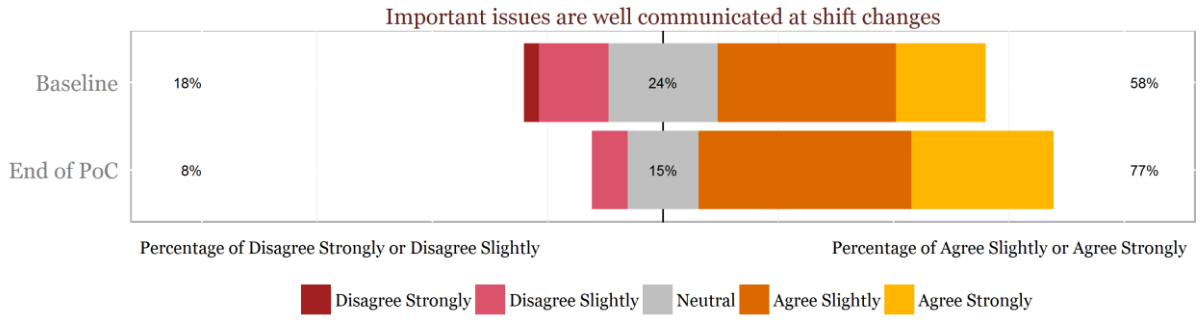
XIV. I know the first and last name of all the personnel I worked with during my last shift

There is very strong evidence that there is an increase between the baseline and PoC (p-value = 0.004). Respondents who agreed with this statement increased from 54% in the baseline survey to 75% in the end of PoC survey.



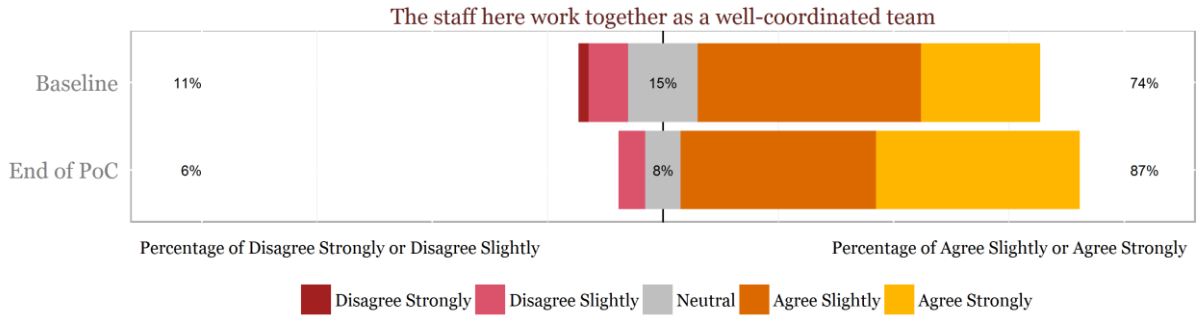
XV. Important issues are well communicated at shift changes

It is statistically significant that there has been an increase in the support for this view (p-value = 0.008). There was a 33% increase in respondents who agreed with this statement.



XVI. The staff here work together as a well coordinated team

18% more respondents believed that staff worked together as a well-coordinated team in the end of PoC survey. There is very strong evidence for this improvement between the baseline and end of PoC survey (p-value = 0.007).

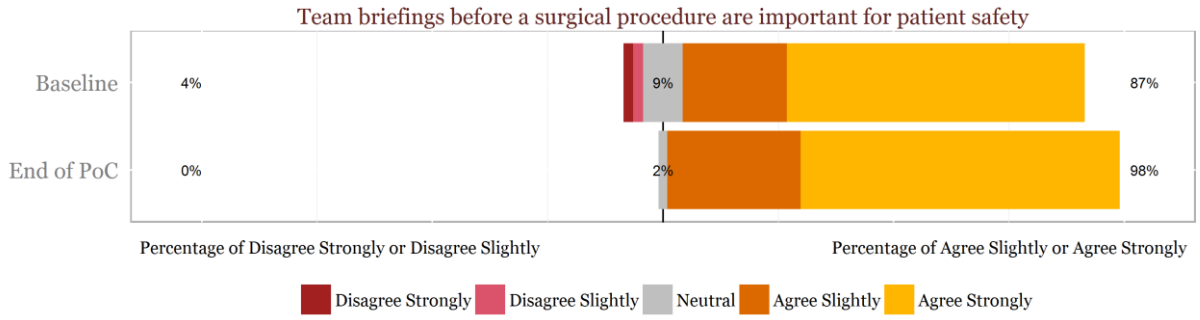


Safety climate

The SAQ asked respondents a number of questions around safety in the operating theatre. Overall, there was strong evidence against the hypothesis that there was no difference in the average survey response between the baseline and end of PoC survey. Significant results from this section of the survey are provided below.

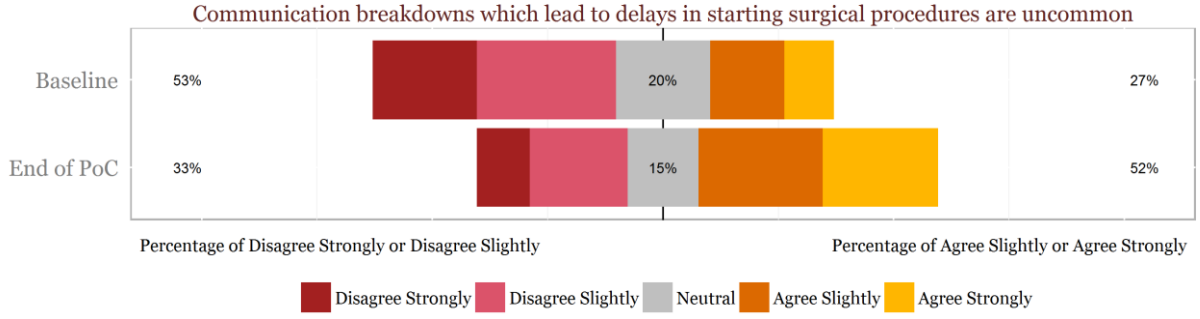
XVII. Team briefings before a surgical procedure are important for patient safety

All respondents in the end of PoC survey were neutral or agreed with this statement and no respondents disagreed. These results are indicative that there has change in support for briefings relating to patient safety.



XVIII. Communication breakdowns, which lead to delays in starting surgical procedures, are uncommon

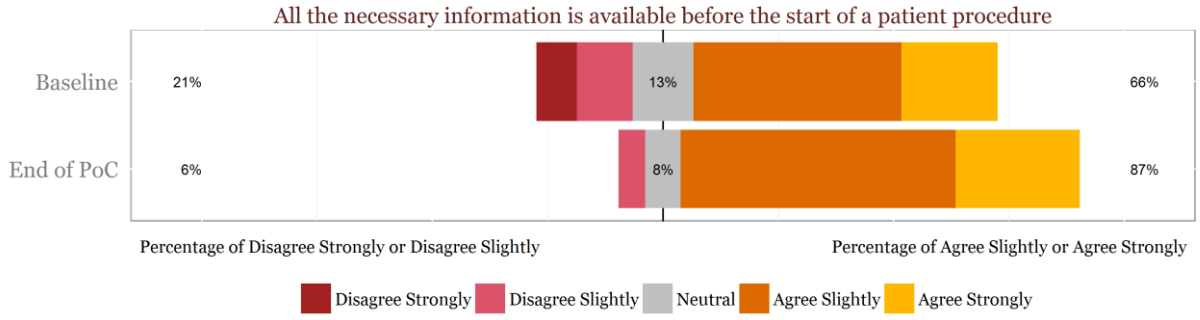
Respondents who felt that communication breakdowns, which led to delays were common decreased by 60%. There is strong evidence for the improvement between the baseline and end of PoC results (p-value = 0.002).



XIX. All the necessary information is available before the start of a patient procedure

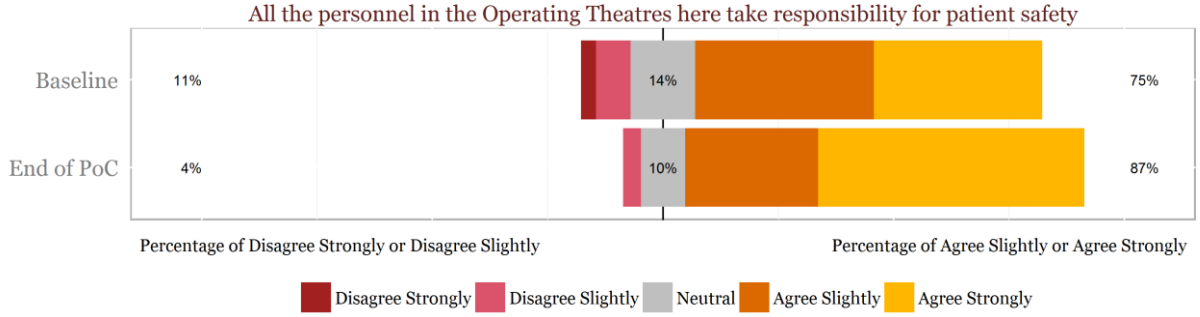
Respondents who found all necessary information is available before the start of a patient procedure increased by 31% between the baseline and end of PoC survey. It is likely this is directly attributable to the

increase in briefings. There is very strong evidence for this improvement (p-value = 0.010).



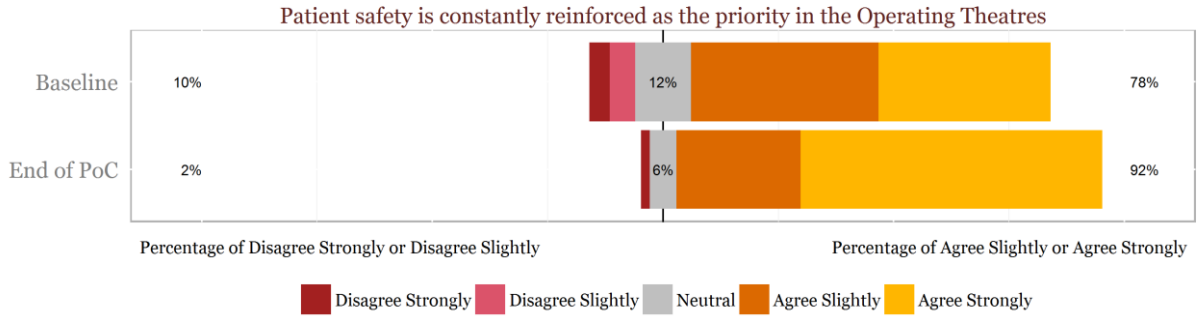
XX. Personnel in the operating theatres take responsibility for patient safety

Respondents who agreed with this statement increased by 16%. The increase in respondents who agreed from the baseline survey was statistically significant (p-value = 0.006).



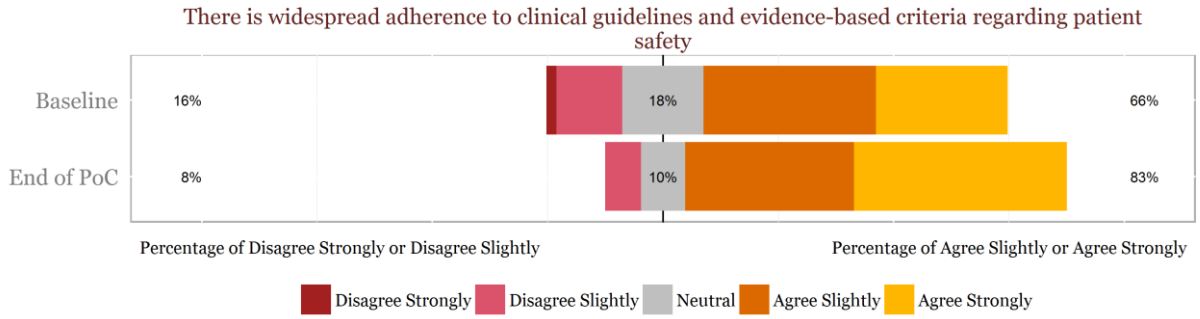
XXI. Patient safety is constantly reinforced as the priority in the operating theatres

There is strong evidence that there is an improvement between the baseline and end of PoC survey response for this statement (p-value = approximately 0). Respondents who agreed with this statement increased 18% from the baseline survey.



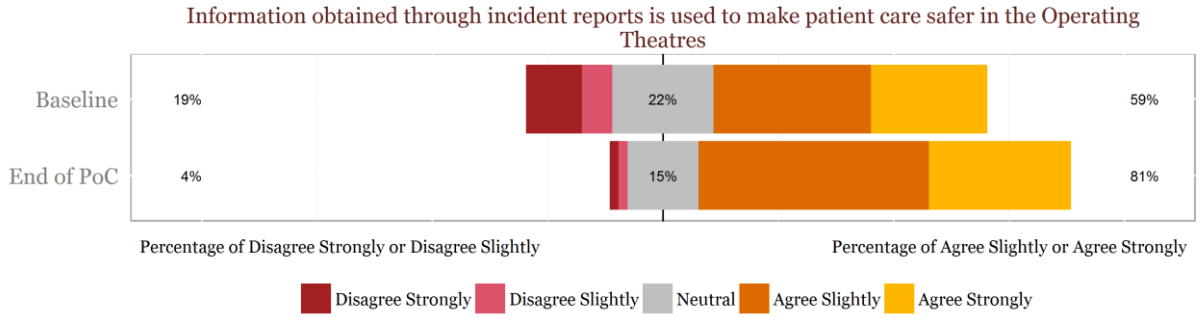
XXII. There is widespread adherence to clinical guidelines and evidence-based criteria regarding patient safety

Respondents who agreed with this statement increased by 26%. It is likely that this may refer to adherence to the briefing, checklist and stop/start/improve huddle used in the PoC. There is strong evidence for this positive change (p-value = 0.006).



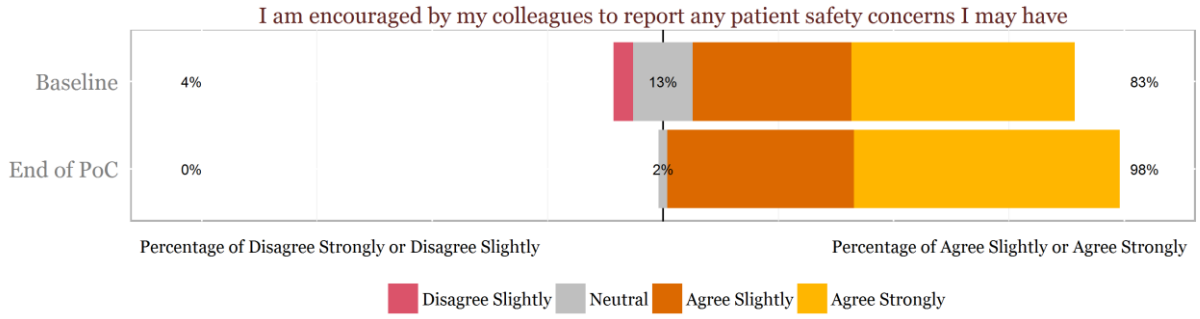
XXIII. Information obtained through incident reports is used to make patient care safer in the operating theatres

There is strong evidence for an increase in support of this statement (p-value = 0.013).



XXIV. I am encouraged by my colleagues to report any patient safety concerns

All respondents were either neutral, or agreed with this statement. There is strong evidence for the increase in support of this statement (p-value = 0.042)

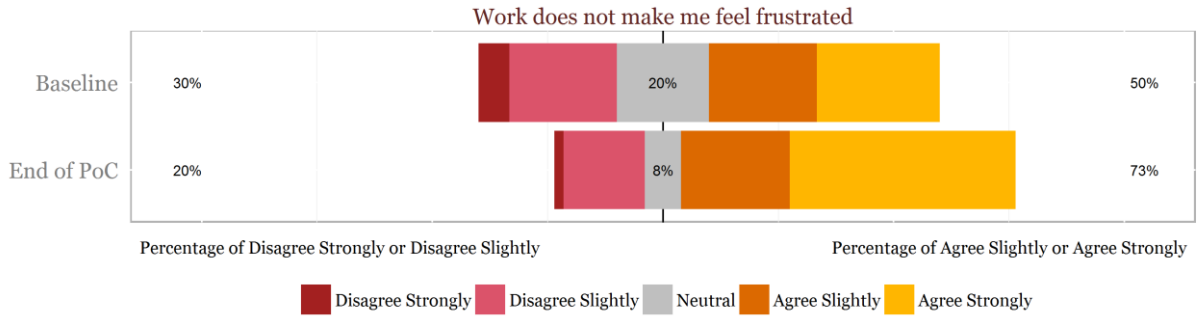


Job satisfaction

Results from the end of PoC survey demonstrate that there is evidence for improvements in job satisfaction among staff involved in the PoC. A short summary of some of these results is provided below:

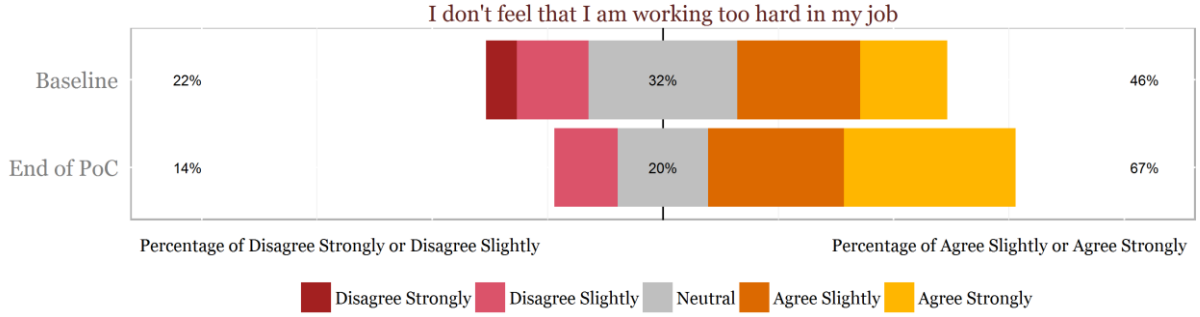
XXV. Work does not make me feel frustrated

There was a 50% decrease in respondents who found that work made them feel frustrated, between the baseline survey and end of PoC survey. This change is statistically significant (p-value = 0.003).



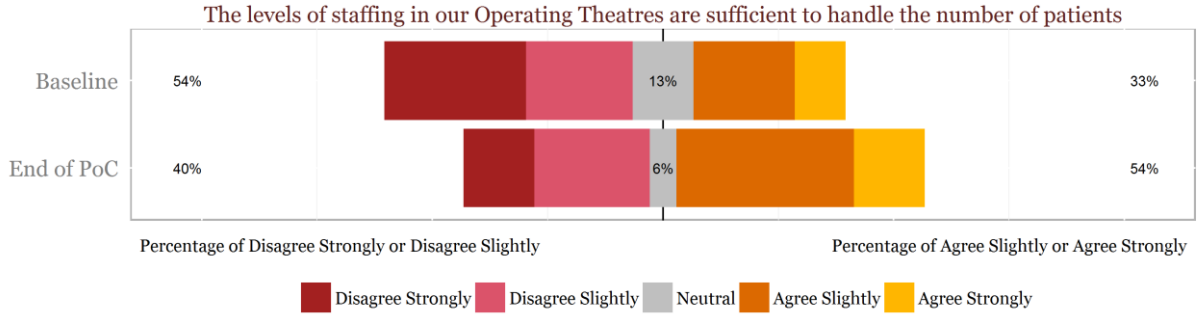
XXVI. I don't feel that I am working too hard in my job

Results between the end of PoC and baseline survey showed a 57% decrease in respondents who felt that they were working too hard in their job. There is strong evidence for the overall improvement (p-value = 0.004).



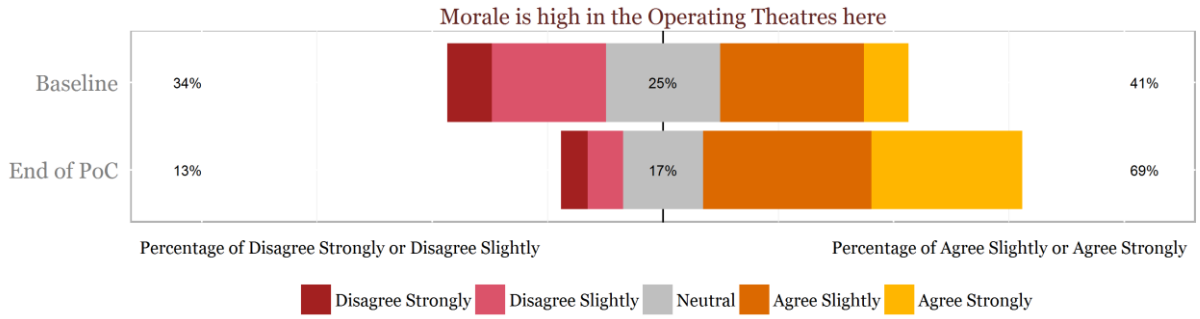
XXVII. The levels of staffing in our operating theatres are sufficient to handle the number of patients

There is very strong evidence for a positive increase in respondents who agreed with this statement (p-value = 0.013). A 63% increase was found in respondents who agreed with this statement between the baseline to end of PoC .



XXVIII. Moral is high in the operating theatres

It is statistically significant that there is a positive increases in responses to this statement (p-value = approximately 0). There was a 68% increase in respondents who agreed with this statement.

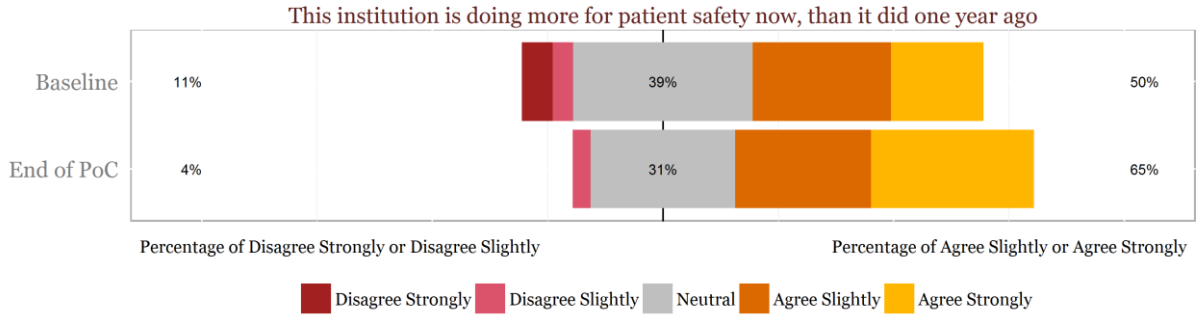


Perceptions of management

There is strong evidence that there is a positive increase from the baseline to the end of PoC survey on questions relating to perceptions of management. A summary of key positive improvements are provided below.

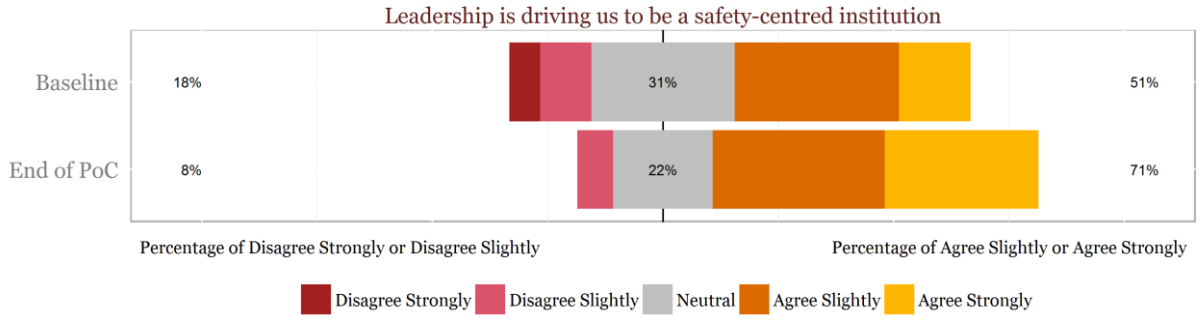
XXIX. This institution is doing more for patient safety now, than it did one year ago

There is strong evidence of a positive increase from the baseline to end of PoC survey statement (p-value = 0.013). There was a 30% increase in respondents who agreed with this statement in the end of PoC.



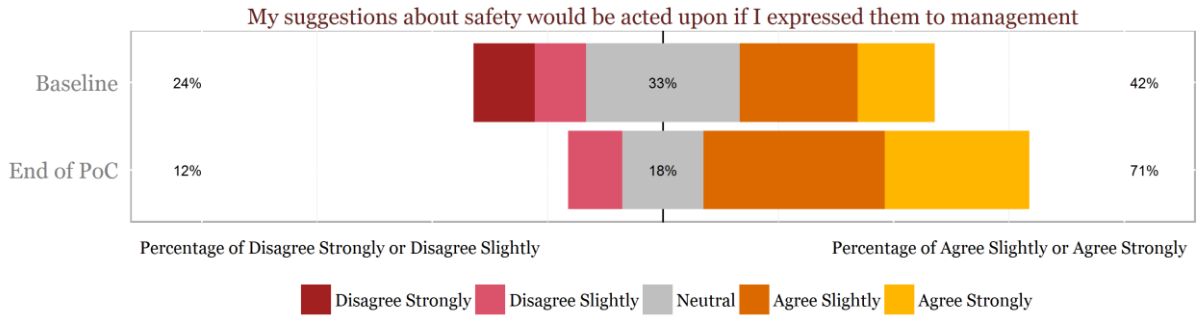
XXX. Leadership is driving us to be a safety-centred institution

There is strong evidence for an improvement in the baseline and PoC positive survey response for this statement (p-value = 0.002). The end of PoC survey found a 39% increase in respondents who agreed with this statement, compared to the baseline survey.



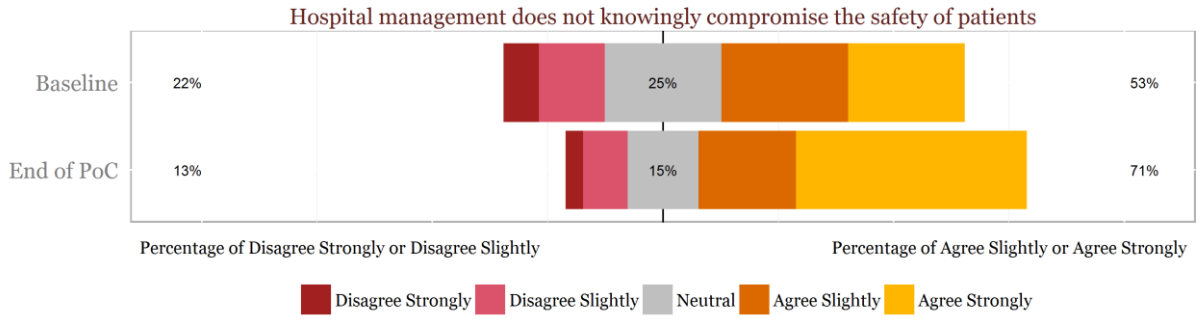
XXXI. My suggestions about safety would be acted upon if I expressed them to management

The end of PoC survey had a 70% increase in respondents who agreed that their suggestions about safety would be acted upon if expressed to management. There is very strong evidence that there is a positive increase from the baseline to end of PoC survey (p-value = approximately 0)



XXXII. Hospital management does not knowingly compromise the safety of patients

There is strong evidence for a positive increase in support of this statement (p-value = 0.003). The percentage of respondents who agreed with this statement increased by 34% between the baseline and the end of PoC



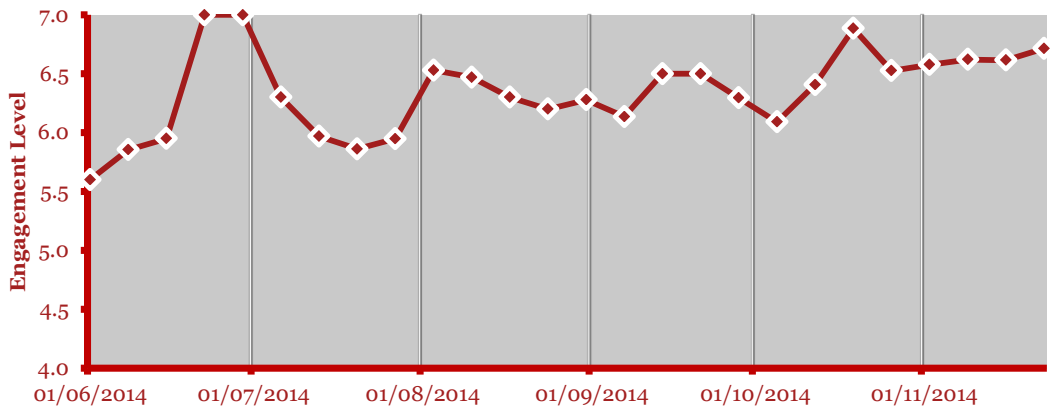
4.2.2 Teamwork and engagement (web based reporting tool)

Teams positively engaged in all three clinical interventions. All three interventions had average engagement scores over the PoC of above 6 (out of a maximum 7). More detail on team engagement in the each clinical intervention is provided below:

Briefing

The average engagement during the briefing was positive, with an average score of 6.4. This engagement score steadily improved over time, with an average engagement level of 6.1 in the first month, which rose to an average 6.6 score in the final month of the PoC.

Average briefing engagement score



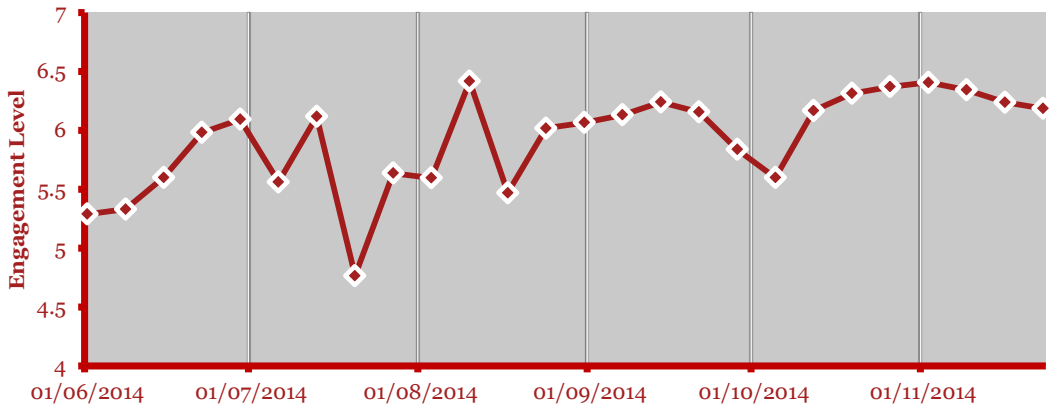
Surgical safety checklist

The average engagement levels in the use of the checklist were positive and appeared to improve over the course of the PoC. The checklist had an average engagement level of 6.1. The engagement level was highest in time-out, as shown below:

- Sign-in: 5.9
- Time-out: 6.4
- Sign-out: 6.0

Engagement levels also improved over the course of the PoC. In the first month of the PoC, the average engagement level in the checklist was 5.5. Engagement increased to an average score of 6.3 in the final month.

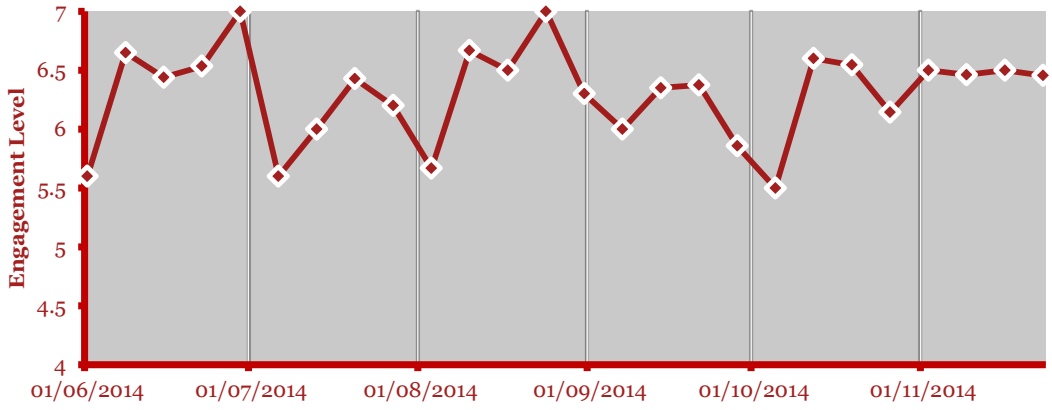
Average surgical safety checklist engagement score



Stop/start/improve huddle

The average engagement during the stop/start/improve huddle was positive, with an average score of 6.3 across the PoC. This result is particularly successful, given that a formal huddle had not been in place at any site prior to the PoC.

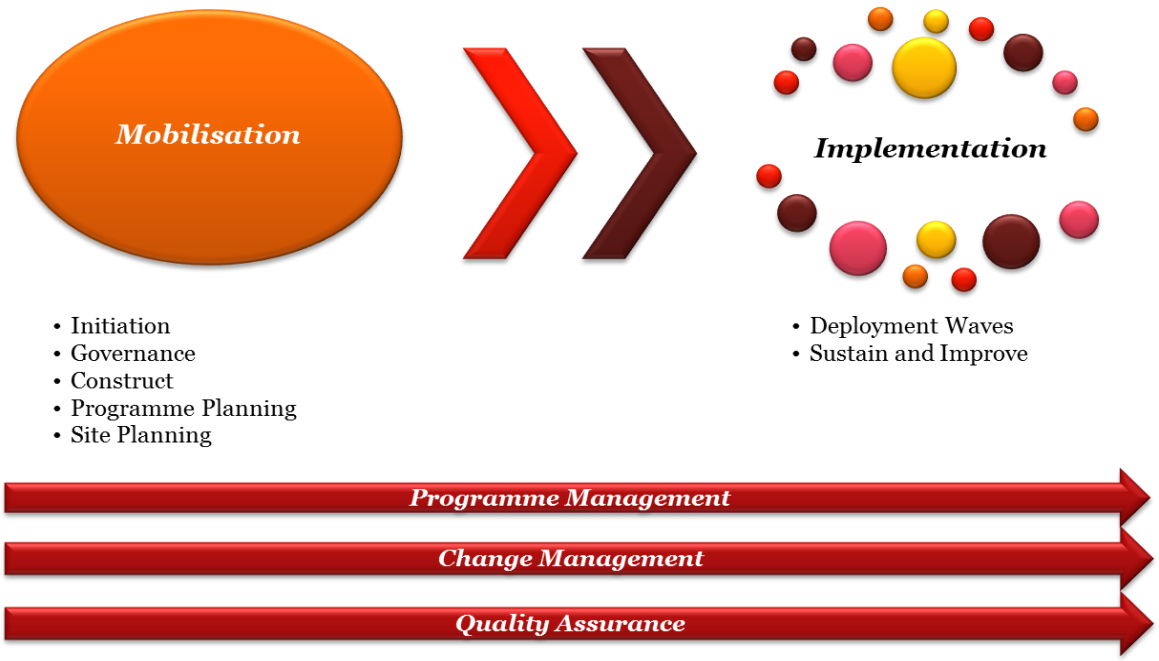
Average stop/start/improve huddle engagement score



5. Recommendations

Recommendations for the national deployment have been identified based on working group discussions and feedback collated from all participants throughout the PoC.

To maintain momentum and to ensure the realisation of the Improving Teamwork and Communication programme it is recommended that the national rollout is split into two phases; mobilisation and implementation, with a consistent approach to programme management, change management and quality assurance applied through both phases.



5.1 Mobilisation

The diagram below outlines the five key stages recommended within the mobilisation phase:

5.1.1 *Initiation*

Purpose: To establish the foundations of the programme, confirming needs, requirements and timeframes.

I. Confirm programme goal and scope

The goal and scope of this programme needs to be clear and agreed by all stakeholders.

It is recommended that the goal of this programme be, 'To improve teamwork and communication in surgical teams'.

This programme should be implemented on a national scale in both public and private secondary health care sites across New Zealand.

In the first instance it is recommended that the programme is deployed to surgical teams throughout the sector, with the opportunity to expand to wider teams in the health care setting, where the implementation of the interventions would positively impact teamwork and communication culture and health outcomes.

II. Review Proof of Concept outcomes and recommendations and perform a high level (national) stakeholder analysis

A review of the PoC outcomes and a stakeholder analysis is required to inform a national programme of work and a high level programme plan including expected outcomes, costs, funding, engagement strategy, technology requirements, and a communications approach, which is clear about the need and the benefits which might be expected.

III. Develop mobilisation plan

It is recommended that there is a significant time investment to the planning of the mobilisation phase to ensure a robust approach to planning, governance and change management.

Feedback from the PoC suggests that the mobilisation phase should be in place, for a period of six months (see Section 5.3 for a suggested timeline).

IV. Develop a high level programme plan

Once the programme funding has been secured and the objectives of the PHAG for the programme are understood, a high level programme plan should be developed. This plan should outline:

- a master timeline
- time, cost and performance parameters
- key milestones
- high level phased approach to roll-out

V. Establish programme and deployment costs and confirm programme funding

It is important that high level programme and deployment costs are understood by key stakeholders and that funding has been secured prior to beginning work on the development of a programme plan. It is recommended a risk contingency is built into the programme costs.

VI. Establish measurement and reporting requirements

Measurement and reporting requirements need to be confirmed at the outset of the programme.

It is recommended that a Quality Safety Marker (QSM) be used as a process measure to understand team engagement in theatre. Measured through observational audits centered on WHOBARS and the Likert scale, team engagement can be monitored and tracked over time.

Furthermore, we believe that a culture survey should be used going forwards as the outcome measure. Rather than continue with the Safety Attitudes Questionnaire used in the PoC, It is recommended surveying hospital surgical staff periodically, using either a refined SAQ or the Surgical Safety Culture survey developed by the Harvard School of Public Health/South Carolina Hospital Association.

VII. Design a high level (national) engagement strategy and communications approach

The early development of an engagement and communications strategy is essential to inform change management activities during the roll-out.

It is recommended that a comprehensive national engagement strategy is created for this programme of work, that is tailored to meet the needs of all stakeholders, specifically the different professions within surgical teams. An engagement strategy should include:

- A strategic vision statement
- An assessment of the current situation
- An engagement approach and action steps required to attain the strategic vision
    - short term
    - medium term
    - long term
- Metrics and reporting

To support an engagement strategy, It is recommended that a communications approach is developed. A communications approach or plan is a road map for sharing the strategic vision and participants' required input. A communications approach should include:

- A stakeholder analysis
- Key messages
- When key messages need to be delivered to each stakeholder
- How key messages need to be delivered to each stakeholder

VIII. Document technology and system requirements

In order to perform the observational audits required to meet the QSM under Recommendation VI, we endorse the continued use of a web-based reporting tool. The technological requirements for this application need to be understood up-front so that development of any IT can be completed within expected timeframes. Therefore, this tool needs to be developed collaboratively between the Commission and a chosen systems vendor to bridge the gap between the Commission's QSM requirements and programming/coding needs.

It is recommended that data collected by observational auditors be displayed on the web-based tool's reporting dashboard. The use of this reporting dashboard should be integrated into the service quality environment and regular reports prepared that coincide with quality forums, or governance meetings, to provide valuable real time information to quality managers and staff.

As evidenced by Lakes DHB during the PoC, once the interventions become embedded as part of daily practice, the tangible data that the reporting dashboard shows helps to encourage the ongoing usage of interventions and provide transparency of progress. We recommend that access to the reporting dashboard remain open to all participating sites to allow staff to see their progress in real time.

5.1.2 Governance

Purpose: To design and document an effective programme governance approach and the various underpinning governance strategies.

IX. Develop a programme governance structure and construct governance supporting arrangements

It is recommended that a clear governance structure is established to oversee this programme of work. The supporting governance arrangements should include a clear and well-structured decision making and communication framework that includes a risk and issues register together with an agreed escalation and sign off procedure.

X. Establish a national programme team and establish a vendor/business integrator

A national programme team (or working group) should be established and include Advisory and Active roles.

As evidenced during the PoC, involvement from clinicians/subject matter experts is critical to generate engagement at sites. These clinicians and/or subject matter experts also help to give a credible voice to the programme goal and processes.

We recommend having multi-disciplinary Subject Matter Experts on the programme team as Advisory members to bring diversity and a practical understanding of how to implement and use interventions. It is recommended that these Advisory members be expected to attend all working group meetings where major decisions will be made. Furthermore, advisory members should be encouraged to help train and lead by example on-site.

Active roles in the programme team need to be leaders from each site who can dedicate a significant amount of their time to the active roll-out and management of this programme. Active members of the programme team need to take ownership of the programme at their site. Deployment of the interventions is, therefore, best led by two "champions" per site, one from a clinical background and the other from a quality background.

Within the PoC, a lack of patient involvement meant that the "client" was not represented when designing the interventions or tools. It is recommended that, where appropriate, patients be involved on a small scale during the design and implementation of this programme as advisory members of the programme team. This will ensure that the programme is smoothly integrated into business-as-usual in theatre and does not negatively affect the patient experience.

The PoC working group feels strongly that an external party is a key component to the success of the programme. An external party provides an objective viewpoint and a sound structure on which to build the case for change. Furthermore, the skills and tools they bring are invaluable to the site champions when engaging the teams and implementing the changes. They are experts in change processes, and provide impetus, momentum, guidance and support to the clinical champions in the workplace. Therefore, we recommend that the programme team include a vendor/business integrator whose role it will be to provide unbiased oversight of the programme, and direction. The vendor/business integrator should also have in-depth experience in change management, communications, and preparing education material.

XI. Document the roles, responsibilities and terms of reference for the programme team, and establish a decision-making framework

It is recommended that each member of the programme team be provided with a letter, outlining their role, responsibilities, and terms of reference for their involvement in this programme. Asking them to sign this would ensure that they acknowledge the commitments they are required to undertake.

It is important to involve the senior leadership/executive teams at each site where an active member of the programme team works. It is recommended that a member of the senior leadership team co-signs each active member's letter. This will ensure that the time commitments of the programme are socialised and understood.

XII. Develop meeting schedule

Planning activities are time consuming and require significant Advisory and Active programme team member involvement. It is recommended a planning phase of six months prior to mobilisation during which the programme team should meet for a workshop every three to four weeks (see Recommendation III). It is important that meetings are scheduled for the programme team at least one month in advance.

5.1.3 Construct

Purpose: To create all documentation, technology, training and communications content.

XIII. Document the agreed process and guidelines for all interventions

Once the programme team is established, the processes and guidelines for all interventions must be agreed and documented. It is our recommendation that all of the interventions used in the PoC are upheld and that the changes put forward by the working group are accepted. The process by which amendments can be made to the interventions can be found under Recommendation XXVII.

XIV. Document the agreed process and guidelines for all tools

Based on the feedback received from sites during the PoC, It is recommended that all of the tools used in the PoC be introduced to sites in the programme. These tools include the behavioral/cultural toolkit, intervention specific "how-to's", briefing notes templates, individual notebooks and visual aids (posters). We also recommend that the improvement methodology is rolled-out to sites to complement the use of the interventions. Like the process and guidelines for each intervention, we also recommend that the working group's suggested amendments are accepted. See Recommendation XXVII.

XV. Document the agreed process and guidelines for all measurement and reporting activity

User guidelines for observational auditors will be required to understand how to use the web-based reporting tool The Commission will need to be heavily involved in the development of this training material to ensure that all of their requirements are communicated clearly to enable the auditors to collect the right data. Formal classroom training for observational auditors is also recommended. Furthermore, guidelines for both observational auditors and staff on how to use the reporting tool will be required.

It is recommended that the QSM is supported by an annual Surgical Safety Culture survey to measure the outcomes of this programme and identify any change in safety culture required (See Recommendation VI above). Detailed communications with site staff will be required to explain what this survey entails.

XVI. Prepare all training and knowledge transfer content

It is recommended that the education approach and materials are prepared with input from the PoC sites, SMEs, the PHAG, and the vendor/business integrator. It is extremely important that the goal of the programme, and how it fits into the wider group of improvement projects run by the Commission, is explained during training.

The education approach needs to allow for the fact that it is difficult to schedule staff to attend sessions, and that many staff cannot leave their theatre for a full day of training. It is recommended that the education approach is multi-faceted to allow for this and that there are significant lead-times to give each site time to arrange staff schedules and enable higher rates of participation.

The training material also needs to allow for differences between sites and between the development needs of different professional groups. For example, training will need to be run on a larger scale for a hospital with over 30 theatres, as compared to a smaller hospital with only four theatres.

In addition, we believe the training content should include:

- Strong clinical input
- Examples and scenarios that illustrate how to use interventions in practice
- Material that is relevant to different professions
- Interactive or simulation based material
- Training materials on the web based reporting tool including a training video attached to the home screen of the tool to help staff to see how to use reporting tool and dashboard

Feedback received recommends that this training is delivered in such a way that every profession across each surgical team is well informed of the interventions and their required activities. It is recommended that this training be performed using a formal "train-the-trainer" approach and led by a senior clinical member of staff, in conjunction with the programme team and the vendor/business integrator. It would be useful to have a "buddy" (a staff leader or programme enthusiast) at every training session from a site that has already completed this programme.

XVII. Develop all technology components

As per Recommendation VIII, a web-based reporting tool is recommended to be used for observational audit purposes. A reporting dashboard that collects data in real time and is accessible by all staff is also recommended. User testing is recommended to test early iterations through to the final version of this application to help mitigate any challenges users may face when working with new technology.

Feedback from the PoC suggests that it was useful for staff to be able to easily access the guidelines for interventions and toolkits on the Quality Hub application. It is recommended that these guidelines remain accessible to observational auditors as well as to staff who access the reporting dashboard.

XVIII. Develop all national communications

A greater focus on change management during planning is recommended. This will help minimise the risks associated with changing surgical staff's business-as-usual activities. Communications material should be developed in line with the communications approach as per Recommendation VII.

5.1.4 Programme Planning

Purpose: To prioritise the deployment schedule to generate a delivery roadmap:

XIX. Engage with all in scope sites to understand appetite and enthusiasm for the programme

Although this programme will be rolled-out to all sites as a requirement, it is important to understand the attitudes of staff at each site and how willing they are to accept change. The PoC revealed that staff culture and appetite for change strongly affected the success of deployment. It is recommended that early and formalised discussions with senior leadership teams, clinical leads and surgical teams are held to test staffs' appetite for the programme to deal with any issues or concerns they may have.

XX. Develop and finalise deployment roadmap

It is recommended that the national deployment of the programme is deployed in three sequential waves over a period of twelve months, with an objective that all theaters within all in scope organisations have completed both the training and learning cycle, and is progressing to the sustain and improve components of the programme by July 2016. Please see section 5.3 for a suggested timeline.

It is recommended organisations self-select the deployment wave most suitable for them. The wave that organisations opt into will depend upon:

- Current capacity
- Resourcing
- Individual organisational plans
- Support available
- Current performance and culture
- Time required to implement across all surgical teams with the organisation by June 2016

This approach will require a far greater level of support and coordination from the programme team. However, all feedback has recommended that individual accountability and ownership within each organisation for the programme is essential, encouraging the culture of 'done by us, for us', as opposed to 'done to you for you'.

The development of a deployment roadmap should be undertaken in consultation with sites and site-specific deployment plans should be signed-off by the site's Senior Leadership Team.

A finalised implementation roadmap should contain contingencies based on identified risks relating to time, cost and quality and should be signed off by all governance groups prior to implementation.

XXI. Engage with senior management, clinical teams, and ICT at each site

Senior management and clinical leaders at sites need to be formally engaged prior to deployment to gain their support of the programme. For the programme to be successful, senior managers and clinical leaders from each site need to be engaged and fully informed about the project– enabling them to provide strong, visible leadership and support of the programme to ensure that the changes are sustained.

ICT teams need to be engaged early in the project if an application is used in a national rollout. Early engagement with ICT should help to mitigate the risk of any delays relating to use of the reporting tool once deployment is underway.

In addition, an implementation team should be identified at this stage at each site. The team should include a number of champions across the range of theatre professions to support the successful deployment of the programme and the interventions. These champions should will be educated and endorse the programme, support the deployment and encourage the adoption of the interventions across the range of theatre professions.

5.1.5 Site Planning

Purpose: To develop detailed deployment plans for an individual organization/site.

Based on the outputs and engagement completed to develop the detailed deployment plan it is recommended that the programme team work with each organisation to develop an implementation plan for each site defining the what, who, when and how:

Each site plan should include:

- Stakeholder analysis
- Engagement strategy and communications approach
- Project governance structure
- Project team
- Roles, responsibilities and terms of reference
- Decision making framework
- Meeting schedule
- Specific technology and system requirements
- Learning needs analysis and individual training plan
- Detailed project plan

5.2 Deployment

The diagram below outlines the two components of the deployment phase:

5.2.1 Implementation

The following recommendations relating to implementation of the interventions have been identified by the development sites:

XXII. Allocate "buddies" to sites to enable peer-to-peer sharing

Interaction between the Commission and DHBs through peer-to-peer sharing should be undertaken to secure buy-in prior to deployment. Recommendations around peer-to-peer sharing include 'grand rounds' (hospital forums for surgeons) or a travelling 'road show'.

XXIII. Plan for each site

A key learning from the deployment of PoC 2 was that it was much more successful than PoC 1, due to the time set aside for deployment planning. To replicate this success, it is recommended that adequate time is given to planning the deployment of the programme in each organisation. This will enable a robust approach to be taken to planning deployment, stakeholder engagement and governance/project setup.

XXIV. Perform change management for each site

A strong emphasis is needed on change management in order for deployment of the interventions to be successful and sustainable. This needs to include frequent engagement with all professions to encourage adoption of the interventions. More information is provided in section VII on this topic.

XXV. Allow for incremental performance improvements

Organisations should not expect 'overnight' adoption of the interventions, on improved teamwork and communication. All sites during the PoC found that uptake was a slow or, at least, a staged process, which may begin with interventions being partially used.

XXVI. Training

Recommendations for training under a national rollout include:

- **Tailor training to suit the site:**
  Deliver training to the full range of professionals within surgical teams as a group, not just to individual professions. Where possible, teams that work together should be trained together, as training that includes all members of the team has been shown to improve patient outcomes.

- **Provide interactive or simulation based training:**
  While feedback from the training sessions was positive, sites have recommended that the use of scenario based training will help staff to best understand how to put the interventions into practice. The recommended Collaborative Approach uses classroom, WebEx and simulation/scenario learning techniques for the intervention, behaviour, technology and observational audit elements of the programme.

  Using simulation is a good way to put the interventions and behavioral tools into practice, to increase interdisciplinary understanding and provide an opportunity for culture change[28]. Interactive training could include videos of staff using interventions (videos of positive and negative levels of engagement). A number of existing videos have already been created by the Commission and the University of Auckland and as part of the work on the WHOBARS Likert scale.
- **Involve "buddies" in training:**
  Staff from development sites, who have implemented these interventions, should be used in training during the national rollout. Positive feedback was received in the initial formal training during the PoC on being able to hear how other organisations had implemented the tools.

XXVII. Interventions

Throughout the PoC, feedback was collected from staff on all interventions, including successes, challenges and recommendations. This feedback was collated and discussed at working group sessions. The working group agreed on recommendations for each intervention for any national rollout. These are provided below.

Briefing:
The guidelines should continue to include the current information and templates (eg briefing notes

[28] Weller, J., Boyd, M., & Cumin, D. (2014). Teams, tribes and patient safety: overcoming barriers to effective teamwork in healthcare. *Postgraduate medical journal*, *90*(1061), 149-154.

template). However, additional information could be provided in the guidelines which provide the benefits of undertaking each section of the briefing.

A national rollout should continue to require all members of the surgical team to be present at the briefing, in order to support the goal of improving teamwork and communication in surgical teams. Although all members should be present for the briefing, 'how' the teams choose to meet together should be allowed to differ, based on the practices of each hospital.

Surgical safety Checklist
The modified WHO Surgical Safety Checklist, used in this PoC, should continue to be used in a national rollout. The checklist should continue to be used without tick boxes and should not be part of the patient file. This is to encourage the checklist to be used as a tool to improve communication and teamwork, rather than as a compliance tool.

Surgical teams are encourages to select a 'Checklist Coordinator' to lead each section of the checklist.

It should be recognised that aspects of the checklist may need to be modified within different specialties. For example, Ophthalmology may need to run the time-out section differently to General operating theatres.

Concerns have often been raised throughout the PoC on whether blood loss and difficult airway confirmations should be made in front of a patient. The working group have recommended that this question remains, but that a 'how-to' guide may help clinicians ensure that the patient is aware of any difficult airway or blood loss risks, so that these conversations are not new to the patient.

Checklist materials, such as posters and laminated reference cards, should be provided as a prompt to ensure that the checklist is fully completed in the absence of tick boxes.

The confirmation on whether antibiotic prophylaxis has been given should be changed to "has antibiotic prophylaxis been given within the last 5 – 60 minutes?" This change will align the confirmation to antibiotic prophylaxis standards.

Stop/Start/Improve Huddle
The name of this intervention should be changed to 'debriefing' in any national rollout.

The recommended timing of the debriefing should be changed to "before the last patient leaves the theatre, while all team members are still present, or before teams change". This timing was found to the most workable for PoC sites. For example, Southern Cross Hospital found that the best time to undertake the debriefing was as the last patient's wound was being sutured, after the 'sign-out' section of the checklist was completed, as the critical elements of surgery have been completed at this point and the surgical team is still in the room.

The activities within a debriefing should remain the same. However, it is recommended that the wording on four aspects of the debriefing is changed to provide more useful prompts. The new wording should be:

- Ensure all members of the operating team are present
- What went well and what did not go well?
- What can we improve and do better next time?
- Suggestions for improvement

A list of potential strategies for improvement, which can be used by participants of a debriefing, should be added to the debriefing guidelines in any national rollout in order to encourage continuous improvement.

XXVIII. Behavioural/Cultural Toolkit

The Behavioural/cultural toolkit should continue to be used as part of a national rollout.

Tools should be allowed to evolve locally, but the PoC sites recommended that five tools should be referenced on materials in theatre. These tools included:

- Closed loop feedback
- Call-outs
- Explicit ask for feedback
- ISBAR (Identify, Situation, Background, Assessment and Recommendation)

- 2 challenge rule

5.2.2 Sustain and Improve

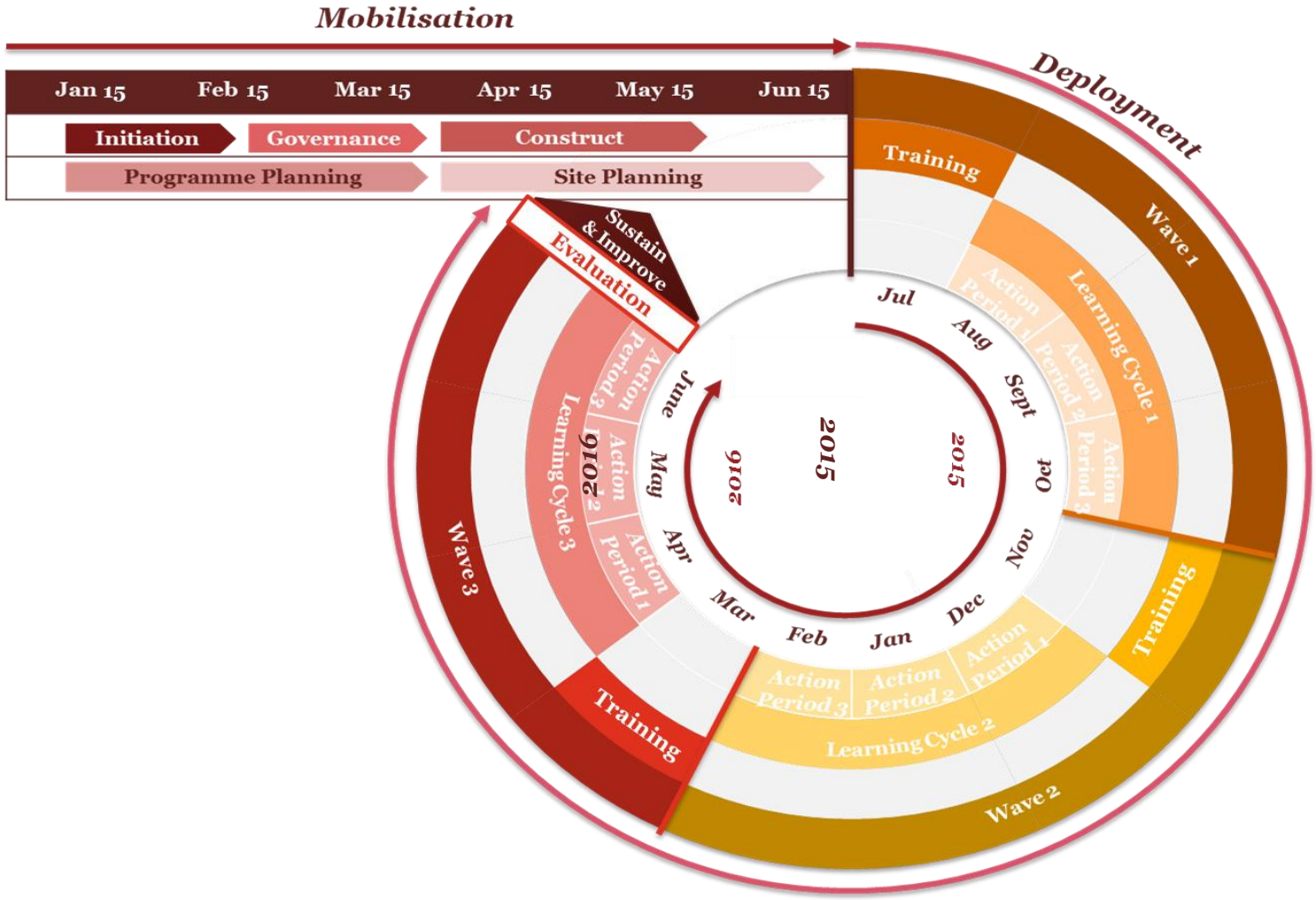
XXIX. Improvement Methodology

The Improvement Methodology should be utilised in a national rollout, as it complements the suggestions for improvement identified in the debriefing and fosters a culture of continuous improvement.

The working group recommend that the improvement methodology is not implemented in parallel with all clinical interventions. Rather, it should be implemented once surgical teams have begun to adopt the debriefing to ensure that the 'loop can be closed' through the implementation of initiatives to improve teamwork and communication and health outcomes.

5.3 Suggested Timeline

A suggested timeline has been developed to capture proposed timeframes for each of the recommended activities for a national rollout of the Improving Teamwork and Communication in Surgical Teams project. This proposed timeline is provided below:



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In preparing this document and providing our recommendations, we have relied upon, and assumed the accuracy and completeness of, all information available to us from public sources and furnished to us by the Health Quality and Safety Commission, the Reducing Perioperative Harm Advisory Group and the Improving Teamwork and Communication Proof of Concept Working Group

It should not be construed that we have conducted an audit of the information we have used.

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