THE 20,000 DAYS CAMPAIGN
Health System Improvement Guide

SMOOTH* COLLABORATIVE

*Safer Medication Outcomes On Transfer Home

Development of a collaborative and
integrated medication management service
for patients at high risk of medication related harm
at discharge using an electronic Assessment of Risk Tool (ART)

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HEALTH SYSTEM INNOVATION AND IMPROVEMENT

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THE 20,000 DAYS CAMPAIGN

Our journey

Health systems worldwide are struggling with rising patient demand and Middlemore Hospital, which serves a growing and ageing population, is no exception. To meet the predicted 5.5% increase in bed days, we needed to save 20,000 days. Counties Manukau Health's 20,000 Days campaign aimed to do this by returning 20,000 well and healthy days to our community.

A whole-of-system approach brought together 13 collaborative teams to build on existing improvement work and deliver care in a different way. The 20,000 Days campaign launched in October 2011, and in May 2012 the collaborative teams came together, using the Institute for Healthcare Improvement's Breakthrough Series Collaborative Model for Achieving Breakthrough Improvement, to test a range of interventions.

By 1 July 2013 the campaign had achieved 23,060 days saved since June 2011, which is a reflection of the difference between the actual bed days used and the predicted growth.

Throughout our journey we also achieved many key successes and learned a lot about the essential collaborative components required to contribute to successful outcomes.

What worked well for our campaign?

» Alignment around a common goal
  › The campaign had a unifying goal to reduce demand on the hospital. This goal recognised we needed to do things differently and all the collaborative teams shared in this goal. In addition, each collaborative had specific aims and change ideas that would ultimately contribute to the overall campaign goal.

» Leadership and expert support for the collaborative teams
  › Geraint Martin, CEO Counties Manukau Health, as sponsor and Jonathon Gray, Director Ko Awatea, were involved throughout the campaign to ensure that the vision and milestones were met.
  › The Ko Awatea campaign team provided support via the campaign manager, campaign clinical lead, collaborative project managers, improvement advisors and a communications co-ordinator.
  › The campaign partnered with the Institute for Healthcare Improvement and Brandon Bennett, Senior Improvement Advisor at the Ko Awatea faculty, to provide continuous learning and guidance for the collaborative teams.

What the 20,000 Days campaign has built is a reusable network of skilled, passionate and committed health professionals who have the knowledge, skills and methodology to bring about sustainable change across the health sector.
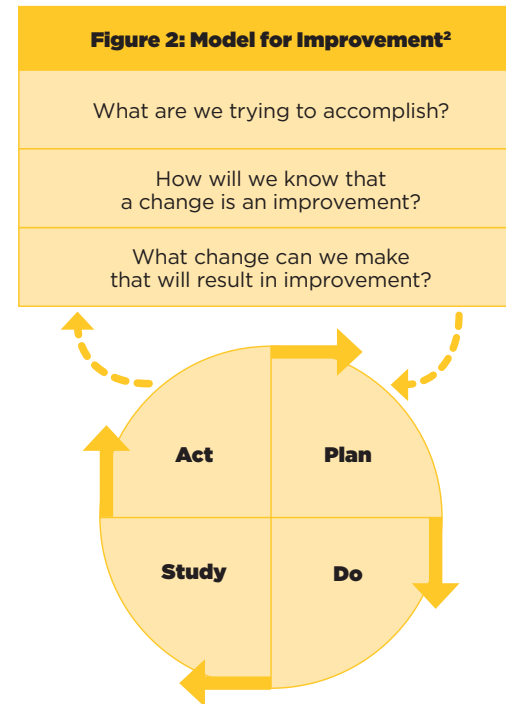   **Professor Jonathon Gray**
    Director, Ko Awatea

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» Multi-professional teams working across the health sector
  › Collaborative teams included health professionals, managers, clinical leaders, project managers, improvement advisors, data analysts and community members.
  › Teams worked on projects across the sector, including primary care, secondary care and in the community.

» A structured series of milestones and activities
  › The Collaborative Model for Achieving Breakthrough Improvement (Figure 1) provided an ongoing series of structured activities to support the teams in their use of the methodology and to promote collaboration between the teams.
  › During the campaign there were a total of six days of learning sessions attended by 100–120 people. Significant expertise has been built up across the organisation in the improvement methodology.
  › The collaborative methodology has been proven to work extremely well as a structured way to implement evidence-based practice, and has been enhanced by using local knowledge and skills within the Counties Manukau context.

Figure 1: Collaborative Model for Achieving Breakthrough Improvement[1]

LS – Learning session

The Breakthrough Series:
Institute for Healthcare Improvement Collaborative Model
for Achieving Breakthrough Improvement

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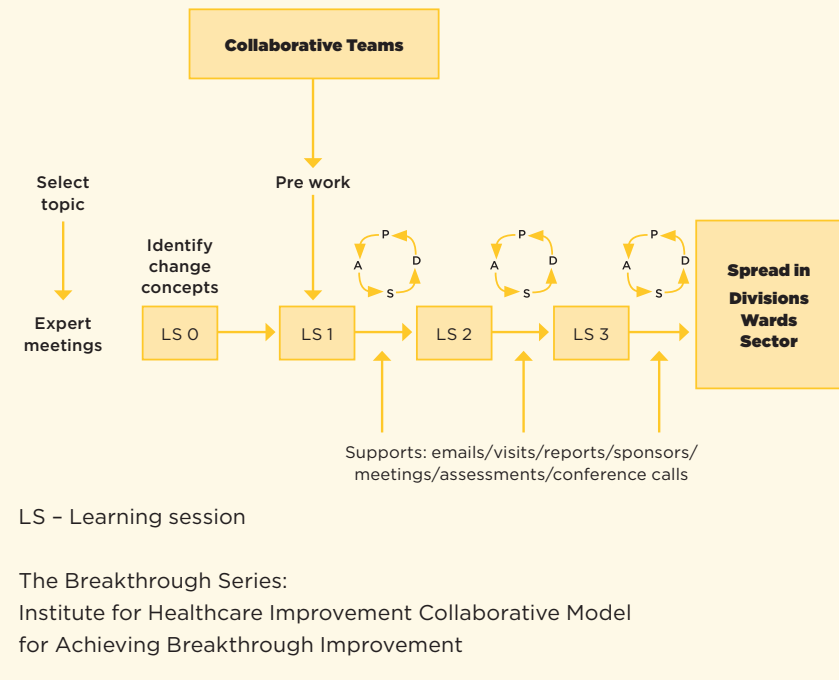
» The Model for Improvement
  › Each collaborative team applied the Model for Improvement (Figure 2).
  › Teams then tested their theory of change through Plan, Do, Study, Act (PDSA) learning cycles.
  › Teams tested many ideas, initially through small tests to gain confidence in their change ideas, then with larger scale tests, before moving to implement changes across the organisation or area of work.
  › Change packages are captured in the health system improvement guides, to be shared with other health service providers and support improvement initiatives beyond Counties Manukau Health.
  › Measures have been defined at both the 20,000 Days campaign level as well as for each of the collaboratives. The measures were analysed and displayed monthly on dashboards.
  › Each collaborative developed a driver diagram showing drivers of change. The driver diagram reflects the team's theories and ideas on the existing system and how it could be improved. This diagram was updated throughout the improvement journey based on lessons learned during the testing of ideas. Some of the ideas failed and were abandoned. Change ideas shown in the final driver diagram (p. 8) reflect successful ideas. These were tested using multiple PDSA cycles before implementation.

Figure 2: Model for Improvement[2]

What are we trying to accomplish?

How will we know that a change is an improvement?

What change can we make that will result in improvement?

Act — Plan — Study — Do

Collaborative Teams

» Healthy Hearts
» Safer Medication Outcomes on Transfer Home (SMOOTH)
» Better Breathing
» Very High Intensity Users (VHIU)
» Transitions of Care

» Early Delirium Identification and Management
» Enhanced Recovery After Surgery (ERAS)
» Hip Fracture Care
» Skin Infection

For further information refer www.koawatea.co.nz

WHY DID WE NEED TO DO IT?

What was the problem?

International evidence indicates that 2–3% of hospital admissions are drug related and are particularly common after recent hospitalisation.[3] In addition, medication errors occur commonly during transitions of care. Evidence suggests the incidence of adverse drug events following hospital discharge is as high as 11%.[4]

There are several causes of errors at the discharge interface. These include errors in prescribing at discharge, patient confusion from poor understanding of medication changes in hospital, inadequate patient education, non-adherence, poor communication to primary care at the discharge interface and inadequate follow-up.[5] Pharmacists are well placed to address these issues and systematic pharmacist-led discharge processes have been shown to reduce medication errors, to improve patient safety and to improve the integration of care at the secondary to primary care interface.[6,7,8]

In New Zealand hospitals, a systematic approach to pharmacist-led discharge services was lacking and a retrospective analysis at Middlemore Hospital found two medication errors per discharge summary. The SMOOTH project, with funding from the 20,000 Days campaign, employed three full time discharge pharmacists to develop and deliver a systematic medication management service at discharge and promote integration of care between secondary and primary care providers.

A PATIENT'S STORY

It was really helpful when they (SMOOTH) came in and explained every one of the pills I have... the medication side of it is actually falling into place.
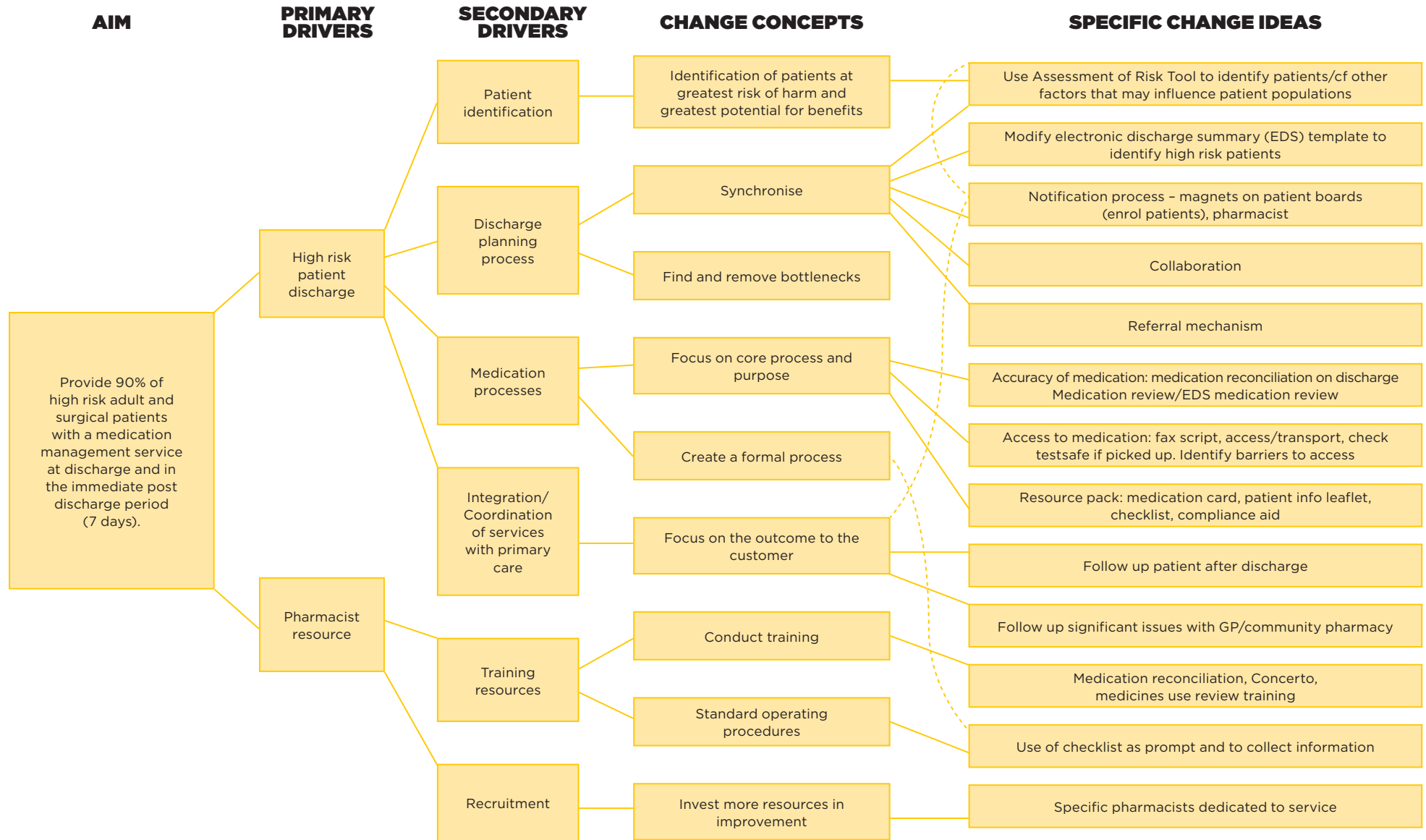
Agnes Marshall (Patient)

Agnes Marshall was admitted to hospital with a heart attack and history of severe coronary artery disease. She has paroxysmal atrial fibrillation and is on warfarin for this, a medication which requires close monitoring to ensure patient safety. Agnes also suffers from short term memory loss, which has a significant effect on her ability to cope with taking her medications regularly.

Agnes was caught in the middle of a change in funding agreements for community pharmacies which resulted in her blister packaging being changed from weekly to monthly packs. This created a significant amount of confusion and unnecessary stress for Agnes as she now had to juggle between several blister packs instead of just the one pack a week.

I was taking perhaps two times of the breakfast [pills] and probably once or not at all of the dinner [pills]. I was over dosing and couldn't remember what I had taken to the extent that I couldn't even take my warfarin properly.

Agnes was referred to SMOOTH by a team pharmacist who was concerned she was not coping at home with her medications. After identifying what was really troubling Agnes the SMOOTH team realised the problem was easily fixed. The team reorganised her medications into weekly blister packs and ensured she had the financial support to cover the additional costs. In addition, Agnes was given a medication card and shown multiple methods to assist her to remember to take her medications regularly. During the SMOOTH team's visit, Agnes explained how much better she was feeling and the difference that simply communicating with her primary care providers had made to her life. It was great to see her looking healthy and well in her home.

THE DRIVERS OF CHANGE

everybody every day
20,000 DAYS

AIM	PRIMARY DRIVERS	SECONDARY DRIVERS	CHANGE CONCEPTS	SPECIFIC CHANGE IDEAS
Provide 90% of high risk adult and surgical patients with a medication management service at discharge and in the immediate post discharge period (7 days).	High risk patient discharge	Patient identification	Identification of patients at greatest risk of harm and greatest potential for benefits	Use Assessment of Risk Tool to identify patients/cf other factors that may influence patient populations
		Discharge planning process	Synchronise	Modify electronic discharge summary (EDS) template to identify high risk patients
				Notification process – magnets on patient boards (enrol patients), pharmacist
				Collaboration
			Find and remove bottlenecks	Referral mechanism
		Medication processes	Focus on core process and purpose	Accuracy of medication: medication reconciliation on discharge Medication review/EDS medication review
			Create a formal process	Access to medication: fax script, access/transport, check testsafe if picked up. Identify barriers to access
		Integration/ Coordination of services with primary care	Focus on the outcome to the customer	Resource pack: medication card, patient info leaflet, checklist, compliance aid
				Follow up patient after discharge
	Pharmacist resource	Training resources	Conduct training	Follow up significant issues with GP/community pharmacy
			Standard operating procedures	Medication reconciliation, Concerto, medicines use review training
				Use of checklist as prompt and to collect information
		Recruitment	Invest more resources in improvement	Specific pharmacists dedicated to service

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WHAT WAS OUR AIM?

Our aim

To develop a systematic medication management service which will deliver efficient, reliable and standardised quality of care for patients at discharge by reducing variability in care and improving patient safety. To achieve this, we used collaborative Institute of Healthcare Improvement methodology and quality improvement principles.

The SMOOTH service is one such systematic approach to improving patient care at discharge. The project aimed to reduce medication related readmissions by providing 90% of high risk adult medical and surgical patients a medication management service at discharge and during the immediate post discharge period (seven days).

The SMOOTH programme objectives were:

» To improve accuracy and reliability of information on discharge through pharmacist-led medication reconciliation at discharge*

» To improve patient safety through review of discharge medicines list

» To facilitate better communication and follow up of medication problems identified to community pharmacies and general practitioners

» To increase understanding and compliance with therapy by providing counselling and explaining the changes made, thus empowering the patient to self-manage their medicines

» To facilitate care integration through improved links with primary care providers

» To improve patient satisfaction

» To improve provider satisfaction from more timely and accurate flow of information regarding medicines

» To improve acute care demand management through a reduction in readmissions

* Medicine reconciliation is about obtaining the most accurate list of patient medicines, allergies and adverse drug reactions and comparing this with the prescribed medicines and documented allergies and adverse drug reactions. Any discrepancies are then documented and reconciled.

WHAT DID WE DO?

What did we do?

SMOOTH is a value-adding initiative introducing a systematic approach to pharmacist-led discharge services. The SMOOTH team developed a care package of interventions (p. 13) that improved patient safety, improved accuracy of discharge documentation and provided tailored patient education. It has improved the quality of healthcare for patients, while expanding the role of pharmacists at Middlemore Hospital.

Identifying and preventing errors reduces patient harm, while a focus on communication of high quality information at the discharge interface improves integration of care between primary and secondary services. This has fostered collaboration between healthcare providers working towards a common goal of optimising patient health.

WHAT DID WE DO?

The Plan

The following key steps were taken to develop the service:

1. A small working group was formed to begin designing and testing interventions and develop the SMOOTH process. The drivers of change were identified (p. 8) and key measures developed (p. 17) that would determine success within the project. Robust baseline information was also obtained to ensure improvements were clear.

2. Three full-time care integration pharmacists were recruited in order to test, deliver and continuously improve the interventions designed. The core team met on a weekly basis to track progress and discuss key challenges and successes.

3. Buy-in was gained from leadership at the organisation, and other key players (such as pharmacists working within the service) by raising the problem, the proposed solution and the benefits. This was essential to reduce any resistance to change and to ensure people felt involved in the change process.

4. Multiple PDSA cycles (p. 5) were used to define and identify the target population (p. 12), create an interventions package and systematic checklist (p. 13) and develop a method for notification of discharges (p. 14).

5. Maaori and Pacific health representatives, nurses and doctors were involved to help modify processes to align with patient needs and include cultural and whaanau perspectives.

6. Feedback was collected from key stakeholders (doctors, nurses, pharmacists and patients) on the new service with the intention of maximising benefit and minimising the impact on usual patient discharge flow.

7. Once the intervention package was determined, the SMOOTH service was gradually implemented throughout medical and surgical teams by raising awareness of the project with doctors, nurses and allied health professionals on the ward.

8. Ongoing education sessions were delivered to staff (doctors, nurses and pharmacists) and a training guide and validation tools for pharmacists were developed to ensure the changes made were sustainable.

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Middlemore Hospital discharges about 6000 patients each month. Resourcing constraints (three full-time pharmacists) meant it was not possible to provide SMOOTH services to every patient discharged from hospital, so we needed to identify the patients at greatest risk of harm and those who had the greatest potential to benefit from the service. The adult medical and surgical wards have the most medication errors associated with incomplete and inaccurate medicines information at discharge. They also have the highest throughput (average length of stay three days). We therefore prioritised these wards, leaving a still unmanageable 3000 discharges.

Utilising the Assessment of Risk Tool (ART)

The target population needed to be narrowed down further, so it was proposed that the Assessment of Risk Tool (Figure 3)[9] be used to predict patients' risk of medicine related harm. The ART takes into consideration many patient factors including age, ethnicity, co-morbidities and number and type of medicines to calculate a risk score.[9] Set thresholds determine whether a patient is at high, medium or low risk of medicine related harm. The target population was therefore 'high risk' patients discharged from medical and surgical wards.

An alternative was to implement a pharmacist referral based system to identify patients to receive the intervention, but it was felt this approach would have been associated with

Figure 3: Assessment of Risk Tool
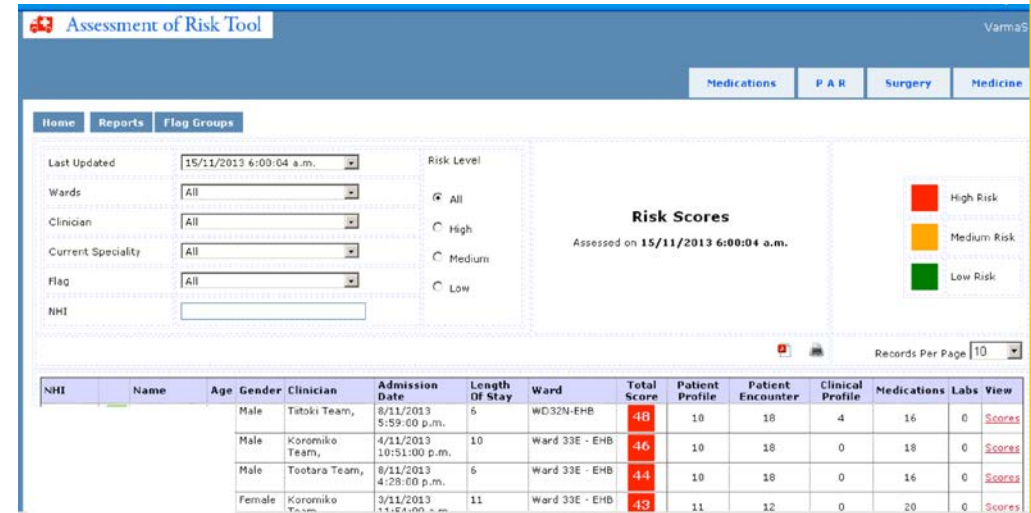
problems of inconsistency between pharmacist thresholds for referral. Additionally, utilising a manual system to communicate patients eligible for SMOOTH services was not practical.

The approach of using the ART was validated by running a PDSA cycle (p. 5), which found that 70% of patients referred by clinical pharmacists to receive SMOOTH services would also be identified as 'high risk' by the tool. Based on this, the service was targeted to patients discharged from adult medical and surgical wards identified as high risk using the tool.

An interventions package provided to each patient seen by SMOOTH was developed based on activities that would support the project achieving the set objectives and the proposed benefits.

After a series of tests and considering evidence from international literature, it was decided that the following seven aspects should always be considered when developing a tailored interventions package for each patient:

» Accurate and complete medicines list in the electronic discharge summary (EDS)

» Clinical review of medicines

» Changes in therapy documented in EDS and communicated to the patient and primary care

» Patients' access to medications after discharge – considering possible barriers such as finance, transport etc.

» Contacting primary care provider: for example contacting community pharmacies if required to communicate changes in therapy and faxing prescriptions for preparation of blister packs after discussion with the pharmacy

» Returning patients' own medicines (where appropriate)

» Ensuring counselling has been provided on high risk medicines started this admission

Medicines reconciliation at discharge is essential to identifying errors in therapy, as it prevents unintentional discrepancies from occurring. For example, medicines started in hospital are often omitted from the patient's discharge medicines list. The SMOOTH service provides a system where errors of this type are identified and resolved before harm occurs.

Issues such as polypharmacy and recommendations for medicines optimisation are addressed as part of the clinical review. Other important considerations include recommending appropriate therapeutic monitoring in the community, hand-over to primary care and ensuring funding requirements for medicines in the community are met.

A checklist has been developed to include all of these factors and ensure that a systematic approach to medicines management at discharge is adopted (p. 22). This checklist doubled as a data collection form.

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Once the target population and the interventions to be delivered were established, one of the main hurdles to overcome was a means of notifying other health professionals about the patients who required the SMOOTH service. This is because ART is predominantly used by pharmacists to prioritise delivery of services and not by other health professionals. A number of methods were trialled to achieve this.

Magnetic labelling
The first method was through the use of SMOOTH labelled magnets to be used on the ward patient whiteboards to highlight that patient to the team when discharging.

Despite understanding and successfully utilising the concept of trialling other change concepts via PDSA (p. 5), the team moved straight to implementing this as a change idea and ordered sufficient magnets for three wards, only to find that the magnets were not effective. They did, however, improve awareness of the SMOOTH team and the project.

Sentence
Our second method involved collaborating with team pharmacists to insert a standard sentence into the EDS which prompted the doctors to notify SMOOTH pharmacists at discharge. This intervention saw the number of eligible patients seen by the SMOOTH team increase from 25% to 70% up until June 2013.

Figure 4: Magnetic labelling

Figure 5: SMOOTH notification sentence

NOTIFICATION PROCESS FOR DISCHARGES

Team pharmacist collaboration

While this sentence proved successful, there were still some eligible patients not being seen by SMOOTH at discharge. This was due to various reasons including non-compliance with entering the sentence into the EDS and non-compliance with doctors calling SMOOTH upon viewing the sentence.

We trialled an additional method of notification which saw the team pharmacist act as an intermediary to communicate confirmed discharges each day to the SMOOTH team. PDSA cycles were carried out to test this process and during the test cycles, we saw 100% of our patients. This method is in the process of being implemented.

INITIATING CULTURE CHANGE

A significant challenge has been instilling a change of culture by highlighting the benefits of pharmacist involvement at discharge. This was fundamental to our success, as we essentially needed to transform the way our doctors, nurses and pharmacists thought about medications at discharge to lead to new norms of behaviour. Achievement of this has allowed the progression of the SMOOTH service from being perceived as an optional add-on at discharge, to being seen as an integral part of the discharge process improving patient care and safety. We used various means to improve key stakeholder engagement and increase the SMOOTH team's organisational profile.

» Branding and marketing materials: We developed brochures and wallet cards to distribute to other health professionals. This improved their understanding of the SMOOTH project and the proposed benefits and encouraged earlier notification of discharges.

» Ward presence: The SMOOTH team pharmacists built rapport with nurses, medical team doctors and pharmacists by visiting the wards daily.

» Key stakeholder engagement: We collected local data to demonstrate evidence of benefit and communicated this at continued education sessions for pharmacists, medical handover sessions for doctors and inpatient services for nurses to improve team profile and maintain stakeholder engagement.

To ensure the changes being implemented resulted in an improvement, a set of key measures was developed.

Table 1 – Key measures

Denominator	Number of patients eligible for SMOOTH service (Assessment of Risk Tool high risk or by referral)
Performance	Number (%) of eligible patients seen by SMOOTH
Impact	Number of discrepancies and errors prevented Proportion of harm prevented by grade
Process	Number of patients educated (counselled) Number of patients provided with medication card Number of patients for whom compliance aids are initiated Number of patients referred to community pharmacy Number of patients receiving a follow up phone call
Other	ART score Number of medications changed during stay Number of discrepancies in electronic discharge summary list Number of patients who did not pick up their medicines

As the project progressed into the implementation phase, the key measures collected were refined to the performance, impact and process measures seen above.

Figure 7: Error grading system

GRADE	DESCRIPTION
5	An error that resulted in SERIOUS/CATASTROPHIC HARM to patient.
4	An error that resulted in MAJOR HARM to patient. Major harm is that requiring increased hospital stay or significant morbidity.
3	An error that resulted in MODERATE HARM to patient. Moderate harm is that requiring treatment with another drug OR cancellation/postponement of treatment.
2	An error that resulted in MINOR HARM to patient. Minor harm is that requiring minor (non-drug) treatment or treatment change.
1	No harm or only minor harm – not requiring treatment

Figure 6: Grade of medication error identified and prevented by the SMOOTH pharmacists (November 2012–October 2013, 1520 patients)
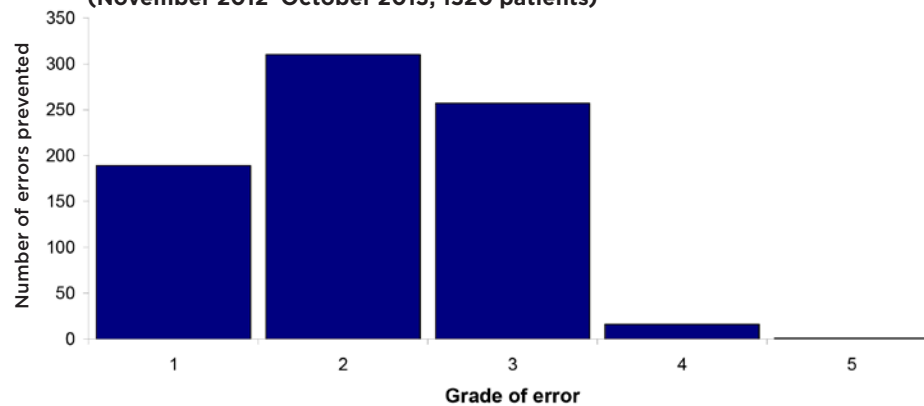
Medication errors

From 1520 patients who were reviewed by the SMOOTH team, 770 medication errors were prevented and corrected to avoid harm to the patient. Each error identified was corrected to avoid harm and then graded (as shown in Figure 6) according to the grading system (Figure 7), which provides each error with a grade ranging from 1 to 5 based on its potential to lead to future harm. Of these, 273 were graded as being clinically important. One potentially life-threatening case was also prevented as a result of SMOOTH intervention.
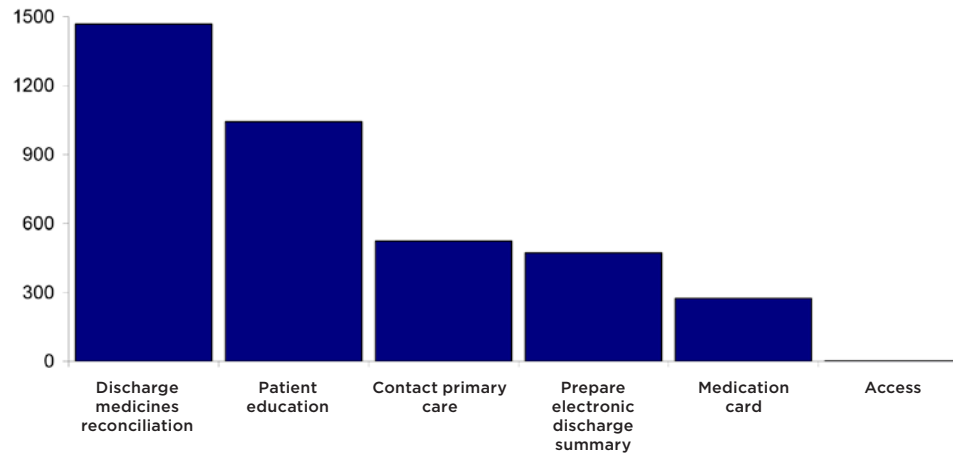
The estimated financial gain for Counties Manukau Health through the delivery of the SMOOTH project is $220,000. This would represent a return on investment of over 100%.

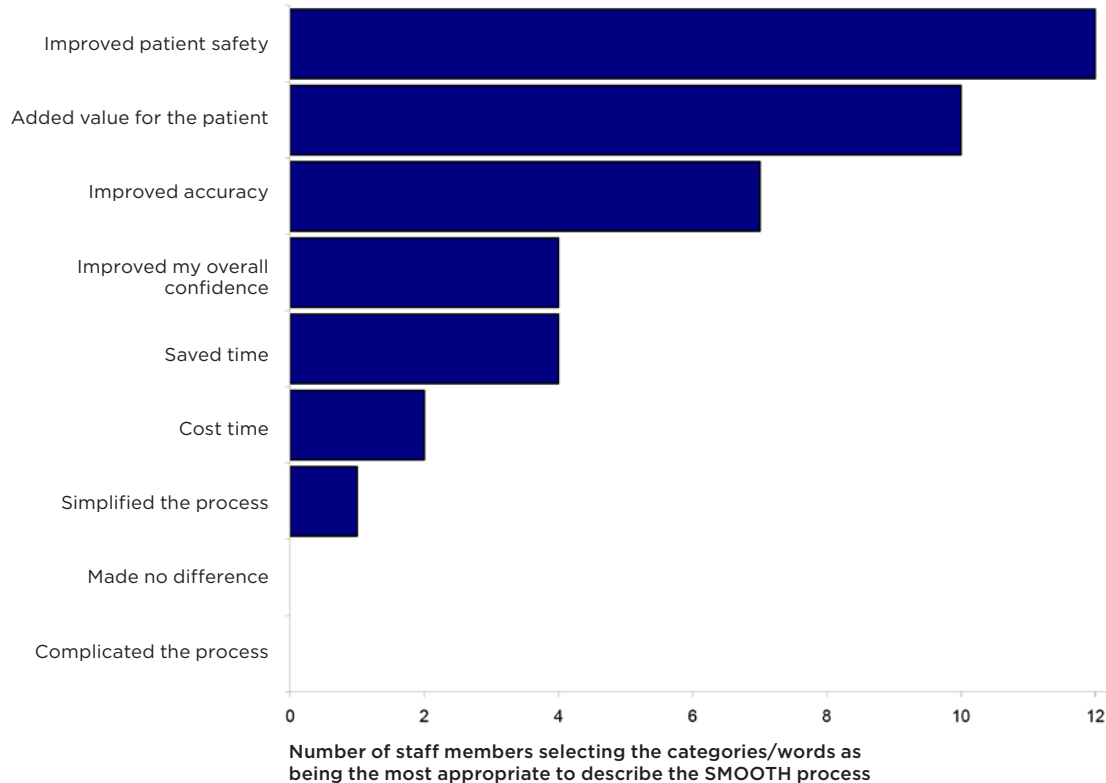**Figure 8: Histogram of SMOOTH pharmacist interventions (November 2012–October 2013, 1520 patients)**

The SMOOTH team have successfully provided the care interventions package to 1520 patients.

Contributions

Figure 8 shows the number of contributions provided to patients, which corresponds to the checklist seen in the appendix. These contributions are in addition to therapeutic recommendations made by the SMOOTH pharmacists.

Figure 9: Staff feedback of SMOOTH process

Category	
Improved patient safety	
Added value for the patient	
Improved accuracy	
Improved my overall confidence	
Saved time	
Cost time	
Simplified the process	
Made no difference	
Complicated the process	

Number of staff members selecting the categories/words as being the most appropriate to describe the SMOOTH process

Feedback from other hospital staff has been positive. A sample of house officers were surveyed at the end of their rotation with a large number of respondents indicating they believed the process improved patient safety, improved accuracy and added value. Figure 9 summarises the results of this survey.

Some quantitative and qualitative feedback was obtained from patients through the use of a telephone survey. Some of the statements received are listed below.

So good to understand what each tablet does, please do for everyone.
   Patient One

Excellent service, good initiative. Hope the hospital bosses keep the service on, keep up the good work.
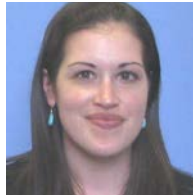   **Patient Two**

I was nervous about taking my husband home, but they [the pharmacist] put me at ease and I felt more relaxed.
   Patient Three

Ideally I wish everyone would have SMOOTH discharge planning because in terms of the discharge they really are a warrant of fitness for the patient before they leave.
   Dr Suluama Fuimaono-Sapolu
   House Officer

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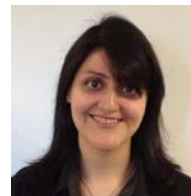**Ahmed Marmoush**
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If you have an apple and I have an apple and we exchange these apples then you and I will still each have one apple.
But if you have an idea and I have an idea and we exchange these ideas, then each of us will have two ideas.
George Bernard Shaw

APPENDIX

Discharge process checklist

☐ Discharge medication reconciliation:
- ✓ Provide medication reconciliation at discharge – document any issues in patient notes
- ✓ Complete clinical review to assess appropriateness of therapy/optimise patient care

☐ Prepped electronic discharge summary:
- ✓ Ensure accurate and complete medicines list documented on discharge summary
- ✓ Ensure changes documented on discharge summary, with reasons for changes

☐ Access/Availability/Funding:
- ✓ Ensure patient can access medicines when discharged – consider finance, transport etc.
- ✓ Assess need for supply (To Take Out medication, antibiotics)
- ✓ Apply for special authority or named patient pharmaceutical assessment/check expiry of current special authority
- ✓ Return Green Bag

☐ Primary care contacted:
- ✓ Blister packs: contact community pharmacy, fax prescriptions + discharge summary
- ✓ Contact GP if required
- ✓ Assess need and refer for medicines use review/long term care

☐ Patient education/compliance:
- ✓ Assess understanding of medication and any changes
- ✓ Assess patient compliance
- ✓ Assess need for and arrange compliance support

☐ Med card:
- ✓ Medication card (Yellow card)

☐ SMOOTH follow-up:
- ✓ Check if medications collected via testsafe
- ✓ Check if there are any discrepancies between discharge script and dispensing
- ✓ Follow-up phone call to patient/pharmacy/doctor

☐ Number of errors prevented:

Grade: ☐   ☐   ☐   ☐   ☐
        1   2   3   4   5

Intervention information (Grade 3–5):

Contributions (T) therapeutic (B) bureaucratic:

Comments:

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