Trauma rehabilitation

Whakaoranga kohuki

Te Pae Hauora o Ruahine o Tararua MidCentral case study: Implementing a major trauma pathway for coordinated care and timely access to allied health input

Tā Te Pae Hauora o Ruahine o Tararua rangahau: Te whakarite huarahi whētuki nui mō te tauwhiro ruruku me te tika o te whai wāhi ki te mahi tahi i te hauora

Te Hononga Whētuki ā-Motu
National Trauma Network

Te Whatu Ora
Health New Zealand
Te Pae Hauora o Ruahine o Tararua MidCentral

Te Kāwanatanga o Aotearoa
New Zealand Government

Health Quality & Safety Commission New Zealand
Kupu Taurangi Hauora o Aotearoa

Te Whatu Ora
Health New Zealand
Te Pae Hauora o Ruahine o Tararua MidCentral

In 2021, the trauma rehabilitation national collaborative brought together 11 teams of rehabilitation clinicians from across Aotearoa New Zealand to complete quality improvement projects that would improve outcomes in rehabilitation after major trauma. The rehabilitation collaborative formed part of a broader programme of work by the National Trauma Network, Accident Compensation Corporation (ACC) and the Health Quality & Safety Commission (the Commission) to establish a contemporary system of trauma care in Aotearoa New Zealand.

Overview | Tirohanga whānui

People admitted to Te Pae Hauora o Ruahine o Tararua MidCentral after major trauma require input from the multidisciplinary team, which includes a physiotherapist, an occupational therapist and a social worker.

The project team designed a major trauma pathway in which the nurse specialist conducted a daily follow-up. In following this pathway, the nurse specialist could identify people admitted with major trauma early, allowing the required referrals to allied health to be made promptly. As a result, coordinated interdisciplinary assessments and rehabilitation started sooner and patients and whānau were more involved in decision-making about care, post-discharge follow-up and linkages to required community supports.

The project has improved care processes within the medical, nursing and allied health teams. Through using an electronic whiteboard, teams know who is waiting for allied health follow-up. As nurse specialists have followed up trauma patients every day, they have lifted the knowledge and skills of the ward staff in how to care for people following trauma. Follow-up phone calls after discharge have enabled patients to make a smoother transition into the community.

Background and context | Kōrero o mua me te horopaki

Every year, about 120 people are admitted to Palmerston North Hospital in Te Pae Hauora o Ruahine o Tararua MidCentral following major trauma. An audit of 59 major trauma admissions over six months showed that 73 percent of patients had an injury severity score (ISS) of 13–24, and 27 percent had an ISS of 25–44. Māori were over-represented, making up 35.5 percent of people admitted with major trauma, compared with 22 percent of the MidCentral population as a whole.[1]

Diagnosing the problem | Te tātari raru

The problem

After people are admitted to Te Pae Hauora o Ruahine o Tararua MidCentral with major trauma, their experience of inpatient acute rehabilitation services varies significantly in terms of quality and consistency. To improve access to early acute rehabilitation, services need to make consistent referrals and assessments, include the patient as part of the multidisciplinary team (MDT) and undertake discharge planning.

How did you know that this was a problem? What data did you have to describe this problem?

The baseline data showed that 10 percent of people admitted to Te Pae Hauora o Ruahine o Tararua MidCentral following major trauma accessed acute inpatient rehabilitation. A small number received inpatient services through ABI rehabilitation services, a specialised traumatic brain injury service in Wellington. Of the major trauma patients who survived their injury, 61 percent were discharged directly home from the acute ward.

The team reviewed the number of days it took patients to access services such as physiotherapy, occupational therapy, social work and acute pain input after major trauma. We learned that some patients were being discharged from the acute ward setting without input from a coordinated multidisciplinary team. This meant that after discharge they had no access to the right follow-up and missed out on opportunities to start essential rehabilitation, impacting on outcomes.

1 Population statistics from: MidCentral DHB. 2021. *MidCentral District Health Board Annual Report for year ended 30 June 2021.* Palmerston North: MidCentral District Health Board.

This could potentially lead to longer hospital stays and increase the likelihood of readmissions.

Mr B is a 48-year-old Māori man with an ISS of 29. When the MDT reviewed him on day 1 of admission, it recommended he have physiotherapy, occupational therapy and acute pain services. Occupational therapy and acute pain services then reviewed him with no delay. However, there was a three-day delay for physiotherapy review and no further physiotherapy input until day six. Further, although a need for social worker input was identified on day six, this did not occur before discharge. Mr B's discharge was delayed by 24 hours due to poor coordination of MDT services and a lack of communication about whether allied health staff had cleared him for discharge. An orthopaedic consultation was supposed to occur on day 1 following admission; however, this was missed, potentially limiting Mr B's ability to understand his orthopaedic injuries and to ask the specialist team appropriate questions.

The aim | Te whāinga

By 1 March 2022, 100 percent of adult major trauma inpatients would have the appropriate multidisciplinary assessments completed as indicated by screening and the major trauma pathway, before they were discharged from the inpatient ward.

The measures | Ngā ine

See Appendix 2 for a detailed description of the measures.

Outcome measure

- The percentage of adult major trauma inpatients with the appropriate multidisciplinary assessments completed, as indicated by screening and the major trauma pathway, before discharge.

Process measures

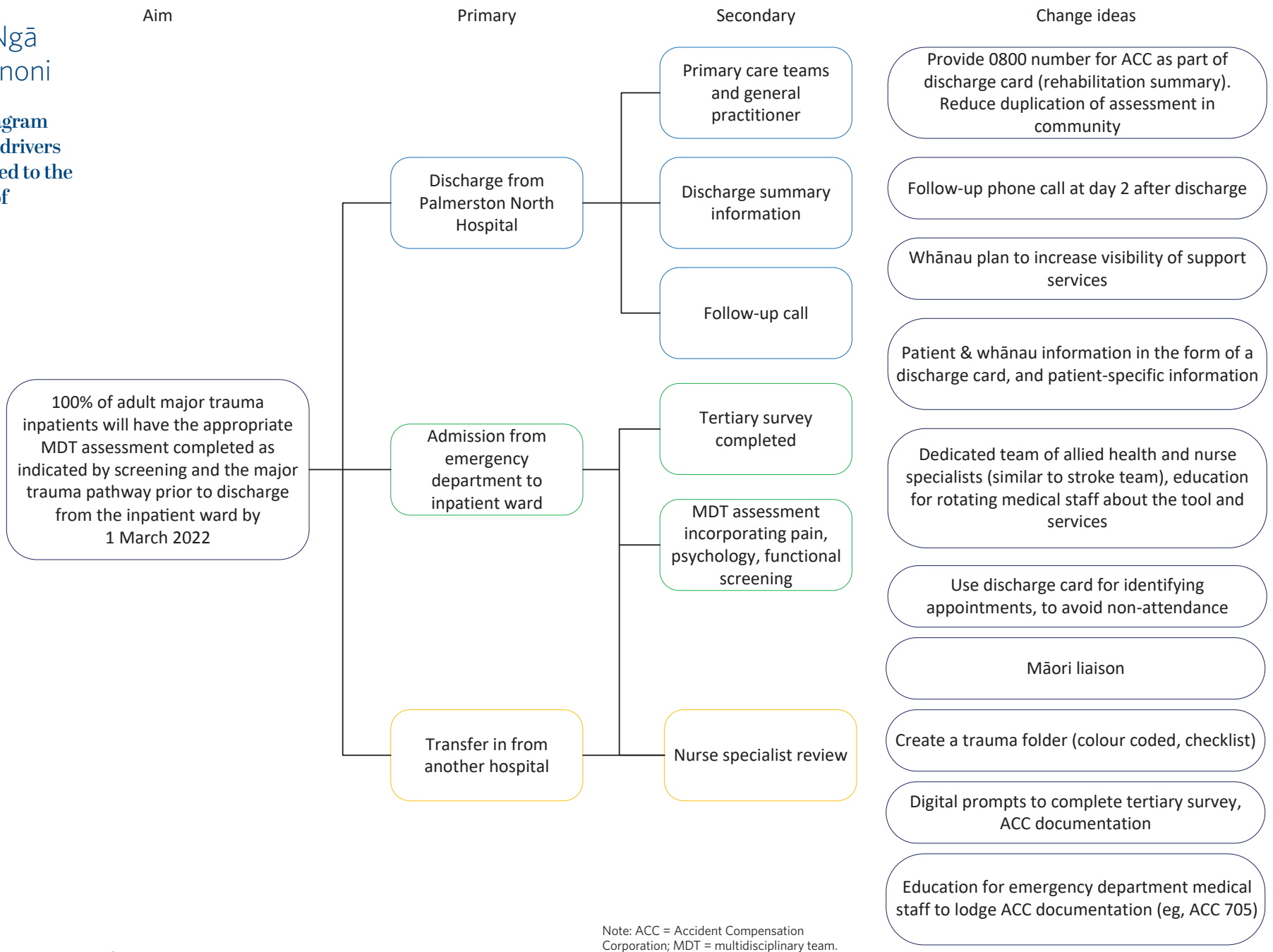
- The number of days between hospital admission and initial assessment by physiotherapist
- The number of days between hospital admission and initial assessment by social worker
- The number of days between hospital admission and initial assessment by occupational therapist.

Balancing measures

- The average length of stay (LOS) for adult major trauma inpatients who had an appropriate MDT assessment.

Drivers of change | Ngā tūāhua panoni

This driver diagram shows the key drivers that contributed to the achievement of our aim.



Note: ACC = Accident Compensation Corporation; MDT = multidisciplinary team.

What we did | Tā mātou i mahi

Were there any ethical considerations to be aware of?

There were no ethical considerations for this project.

What aspects of the project were co-designed with consumers? How did you involve consumers in co-design? What processes did you use?

The team recognised the importance of engaging consumers from the beginning of the process and tried different strategies to engage a suitable person who had experienced trauma. Eventually the team did engage two consumers, but this occurred later in the project than anticipated.

Before developing the pathway, the project team had two meetings with a consumer who had experienced major trauma from a motor vehicle crash. He shared his experiences of the care he received and the transition from hospital to home. Once the team had developed the pathway, a different consumer reviewed it. This consumer was from outside of the region and had experienced a cycling injury. They supported the need for the pathway and suggested amendments, which the team followed up to make whānau involvement very clear. The team plans to continue engagement with consumers as the pathway is implemented.

What quality improvement tools did you use, that you would recommend?

The Institute for Healthcare Improvement's model for improvement was useful. It included:

- forming the team with good representation from a range of professions
- creating a cause and effect (Ishikawa) diagram to explore the causes contributing to the current outcome
- creating a driver diagram to understand what drivers contribute directly to achieve the aim, and what change ideas need to be tested
- completing plan-do-study-act (PDSA) worksheets to document and test change ideas.

We also recommend using data and auditing to inform decision-making.

Finally, a flow chart is useful to map the patient journey, relevant processes and assessment as a way of developing consistency in the patient care journey.

What changes did you test that worked?

We identified specific change ideas from the driver diagram. We then tested them using PDSA cycles.

- A pathway was developed for all patients presenting with trauma, outlining the multidisciplinary referrals that were required during the inpatient stay.
- Nurse specialists undertook early identification and daily follow-up of major trauma inpatients. Where people had an ISS greater than 12, they followed up daily, which included making all the required allied health referrals. They also followed up all Māori and Pacific trauma patients, regardless of the severity of their injury.
- Before discharge from hospital, nurse specialists identified specific supports the patient might need, such as help with transport or picking up their prescriptions.
- Written information was sent to the wider Te Pae Hauora o Ruahine o Tararua MidCentral team about the trauma service the nurse specialists offered.
- Nurse specialists made a follow-up phone call to patients about 48 hours after discharge. The purpose of this phone call was to check that people had the support and information they needed once they were home. If a person was concerned they may not be able to attend their outpatient appointment due to a lack of transport, support was arranged in the form of taxi vouchers or petrol vouchers. The follow-up phone call also meant that patients had the nurse specialist's phone number, if they had any further questions.
- The nurse specialists proactively liaised with community care providers to ensure joined-up care. If a person required follow-up by a general practitioner but was not enrolled with a practice, they were supported to enrol with one.
- The hospital's travel assistance scheme was accessed so that patients could have appropriate whānau support when they were transferred to another district for their care. Helping with the financial burden of travel and accommodation reduced stress on the whānau.
- A special icon on the electronic patient flow whiteboard (Miya board) identified trauma inpatients, which helped with early identification and ward follow-up.

The results | Ngā hua

What outcome measures improved?

In the three months of data collection following the introduction of the major trauma pathway, 100 percent of inpatients had all required referrals made and responded to within one working day of admission.

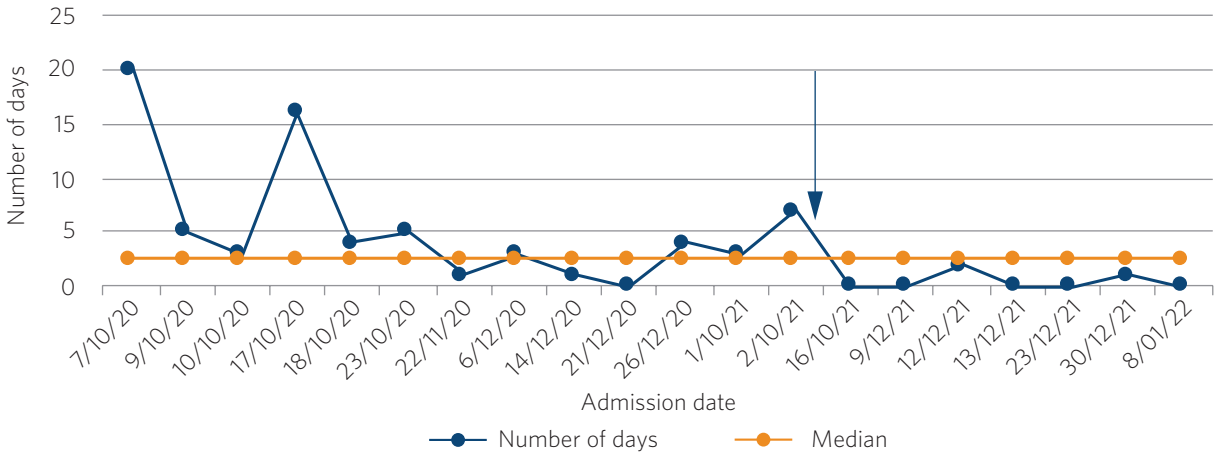
What equity measures improved?

The baseline data had shown that Māori and Pacific peoples represented 60 percent of those who did not attend appointments. After implementing the pathway, the overall percentage of people who didn't attend outpatient appointments decreased substantially, from 20 percent in 2020 to 5 percent in 2022. This decrease occurred across all ethnicities equally. It is likely that the decrease is due to improved communication during the follow-up phone calls after discharge and the support offered to people to help them attend appointments.

What process measures improved?

Following the introduction of the pathway in mid-October 2021, the number of days between trauma admission and physiotherapy input reduced. The run chart (Figure 1) shows seven data points at or below the median, indicating a shift.

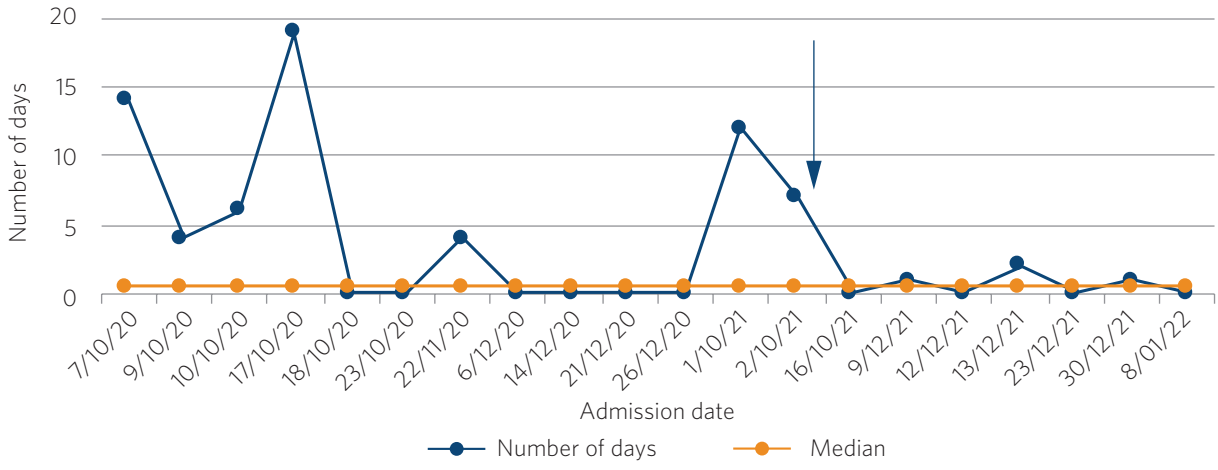
Figure 1: Number of days between trauma admission and physiotherapy input, October–December 2020 and October 2021–January 2022



Source: Te Pae Hauora o Ruahine o Tararua MidCentral data collection.

The number of days to access a social worker in the baseline period ranged from 0 to 19 days. Although the median waiting time was already low at 0.5 days, waiting time was more consistent after the introduction of the pathway in mid-October 2021 (Figure 2).

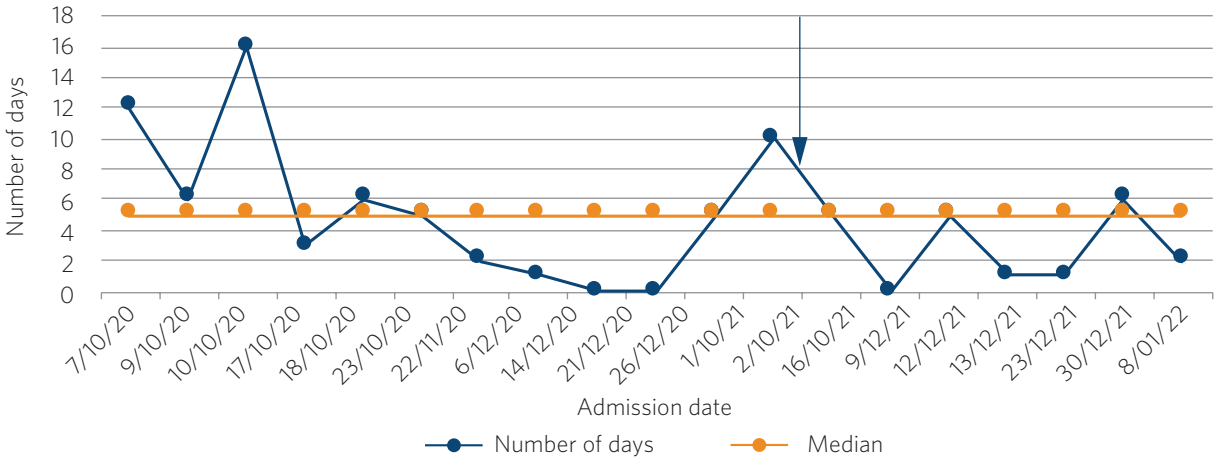
Figure 2: Number of days between trauma admission and social worker input, October–December 2020 and October 2021–January 2022



Source: Te Pae Hauora o Ruahine o Tararua MidCentral data collection.

During the baseline period, the time to access occupational therapy input ranged from 0 to 16 days, with a median of 5 days. After the introduction of the pathway in mid-October 2021, the waiting time became more consistent (Figure 3).

Figure 3: Number of days between trauma admission and occupational therapy input, October–December 2020 and October 2021–January 2022



Source: Te Pae Hauora o Ruahine o Tararua MidCentral data collection.

Were there any unintended consequences such as unexpected benefits, problems or costs associated with this project?

The length of stay has increased slightly, from a median of four days in the baseline period to a median of five days after implementing the pathway (Appendix 3). However, re-presentations to hospital within 30 days of discharge have reduced from 8 percent at baseline to 2 percent in 2022.

Since implementing the trauma pathway and daily follow-up, we have seen an increase in tertiary survey completion, from 28 percent in 2021 to 57 percent in 2022.

Over the time that the project ran, both surgical wait times and mortality for trauma patients have reduced. However, other service improvements that happened over the same period may help explain this reduction. These included introducing a two-tiered trauma call and making changes to the major haemorrhage protocol.

Is there evidence that the knowledge of quality improvement science in the team or in the wider organisation improved?

The team developed a greater understanding about using measurement in quality improvement and about how to use quality improvement methodology in driving change.

Post-project implementation and sustainability | Te whakaritenga me te whakapūmautanga

Have the successful changes been embedded into day-to-day practice? How have you managed this?

This change has been embedded but relies on having a minimum of one full-time equivalent (FTE) nurse specialist, with time spread over two people to cover leave. Work is in progress to maintain this nurse specialist time following the initial project. The team is monitoring the workload pressures of delivering a timely allied health response with appropriate skill mix, alongside other patient flow pressures.

How did you communicate your progress and results to others?

- We presented this project at the:
  - National Trauma Symposium, September 2022
  - trauma nurse coordinator study day, September 2022
  - hospital trauma committee meeting
  - regional trauma associate directors of nursing meeting, October 2022.
- We displayed e-posters at the:
  - New South Wales Agency for Clinical Innovation conference, November 2022
  - Annual Rehabilitation Network Education Forum, August 2022.

Summary and discussion | Te whakarāpopoto me te matapakinga

What were the lessons learned?

- This process led to a more collaborative approach to patient-centred care across the MDT.
- Through case management, nurse specialists followed up patients appropriately, leading to an improvement in outpatient appointment attendance and a reduction in unnecessary re-presentations to the emergency department.
- Increasing the visibility of the trauma service and working collaboratively with clinicians across the hospital enabled a smoother patient journey and improved the communication of the patient's team with the patient and their whānau.
- Deliberate input to improve the equity gap for Māori and Pacific peoples improved their access to services and maintained the participation of the patient and their whānau in services.
- Further work is needed to enable patient follow-up when the trauma nurse specialist is on leave.

What are the key steps that another team would need to take to implement this in their own area?

- Complete a detailed gap analysis of the current state (pathway) and desired future state.
- Take an 'all of system' approach, listening to the perspectives of the MDT and consumers, to understand gaps in current service and reasons for these.
- Commit adequate resource for the new process and actions, including to cover the extended roles of the nurse specialists and the responsiveness required of the MDT.
- Maintain clear communication with key stakeholders throughout the development and trialling of the process.
- Have strong quality improvement support to conduct appropriate data gathering and evaluation.

Are there any future steps or ongoing work that you intend to continue with on this project topic?

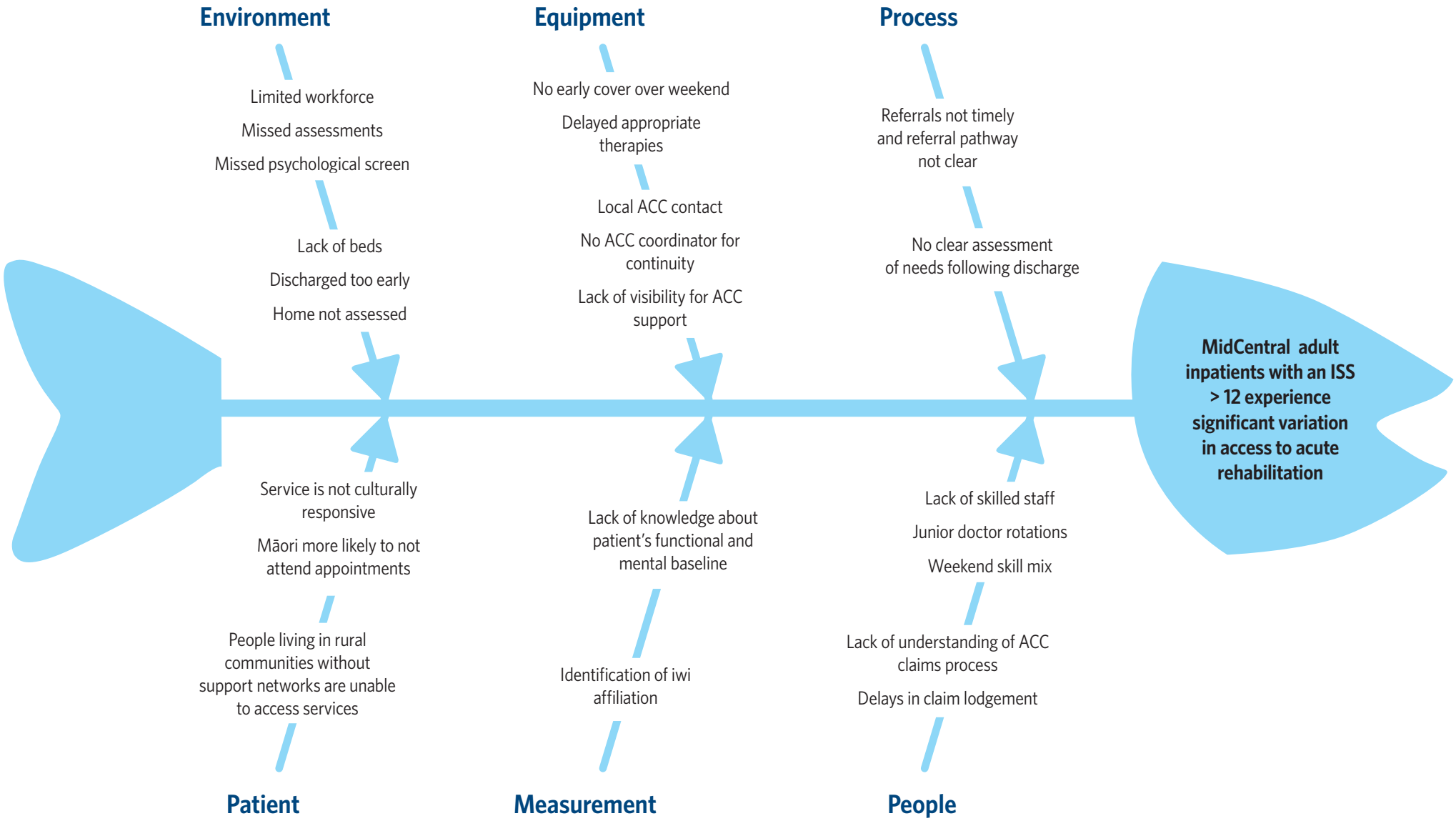
We are developing a guideline that will go through the official document management system process to formalise the Te Pae Hauora o Ruahine o Tararua MidCentral – major trauma pathway. You can download a PDF of the major trauma pathway here.

We have recently recruited a psychologist in our healthy ageing and rehabilitation directorate who will be able to join the MDT in responding to the needs of our trauma patients and their whānau.

The team | Te rōpū

- Operations executive
- Associate director of allied health (therapies)
- Physiotherapy professional leader
- Quality improvement advisor
- Clinical nurse specialists
- Occupational therapist
- Nurse educator
- Social worker
- Consumer representative

Appendix 1: Ishikawa (fishbone) diagram | Āpitihanga 1: Hoahoa tuaika



Appendix 2: Measures | Āpitihanga 2: Ngā ine

Data collection plan

Measure	Type of measure	Operational definition	Data source(s)	What	How	When	Who
Name of measure	**(Outcome, process, balancing)**	**Formula, definition of terms used in measure**	**What is the source of data?**	**What are we going to collect?**	**How will the data be collected?**	**When will the data be collected, how often?**	**Who will collect the data?**
Percentage of inpatients aged ≥ 16 years with an ISS > 12 who have an appropriate MDT assessment completed, as indicated by screening and the MT pathway prior to discharge from inpatient ward by 1 March 2022	Outcome	**Numerator**: Total number of MT patients aged ≥ 16 years (ISS > 12) completing assessments identified by ward MDT as per MT pathway before hospital discharge **Denominator**: Total number of MT patients discharged that month **Formula**: (Total number of all completed assessments x 100)/ Total number of MT patients **Other**: Patients must have all assessments completed as per MT pathway to be counted	Clinical notes or electronic record	Data on MT patients discharged Data on whether they had pain assessment, psychology assessment and functional screening assessment completed before discharge	• Audit of clinical notes after discharge • Audit if each assessment completed; all three must be completed to count towards outcome measure • Record which assessments are not being completed for eligible patients	Monthly	Nurse specialist
Average length of stay of MidCentral inpatients aged ≥ 16 years with an ISS > 12 following completion of appropriate MDT assessment as indicated by screening and the MT pathway before discharge from inpatient ward by 1 March 2022	Balancing	**Numerator**: Average length of stay of MT patients aged ≥ 16 years (ISS > 12) discharged having undergone assessment identified by ward MDT as clinically indicated as per MT pathway before hospital discharge **Denominator**: Total number of days for MT patients discharged that month **Formula**: (Total number inpatient days)/ Total number of patients aged ≥ 16 years (ISS > 12) discharged	Clinical notes or electronic record	Admission data Discharge data (Trial effective from 11 October 2021)	• Audit of clinical notes • Request data from data quality team	Monthly	Nurse specialist
Time taken to MDT referral for MidCentral inpatients aged ≥ 16 years with an ISS > 12	Process	**Numerator**: Total number of MT patients aged ≥ 16 years (ISS > 12) identified in ED or transferred to MidCentral having MDT Miya Icon completed **Denominator**: Total number of MT patients admitted via ED that month **Formula**: (Total number of all patients x 100)/Total number of MT patients **Other**: Patients who fit the MT pathway flowchart included	Clinical notes or electronic record	Data on number of MT patients discharged Number of completed process measures per patient	• Audit of clinical notes after discharge • Review Miya board	Monthly	Nurse specialist
Time taken to action MDT referral for inpatients aged ≥ 16 years with an ISS > 12	Process	**Numerator**: Total number of major trauma patients aged ≥ 16 years (ISS > 12) with MDT Miya completed who are seen within 48 hours **Denominator**: Total number of major trauma patients admitted via ED that month **Formula**: (Total number of all patients x 100)/Total number of major trauma patients **Other**: Patients who fit the MT pathway flowchart included	Clinical notes or electronic record	Data on number of MT patients discharged Number of completed process measures per patient	Audit of clinical notes after discharge Review Miya board	Monthly	Nurse specialist

Note: DHB = district health board; ED = emergency department; ISS = injury severity score; MDT = multidisciplinary team; MT = major trauma.

Appendix 3: Profile of trauma patients, July to December 2020 and January to June 2022 | Āpitihanga 3: He pūkete mō ngā tūroro whētuki, Hōngongoi ki Hakihea 2020, Kohitātea ki Pipiri 2022

		Jul–Dec 2020	Jan–Jun 2022
Total		59	57
Ethnicity	Māori	21	13
	NZ European	31	39
	Other/European	7	3
ISS	13–24	43	41
	25–44	16	16
Discharge destination	Deceased	10	3
	Home	30	31
	Hospital for ongoing care	15	18
	Rehabilitation	3	4
	Special accommodation	1	1
Admitting destination from emergency department	Intensive care unit	26	20
	Ward	30	31
	Deceased in emergency department	2	0
	Operating room	1	5
	Transfer to other hospital	0	1
Length of stay (days)	Mean	5.7	6.8
	Median	4	5

Other resources

The following resources can be downloaded from: www.hqsc.govt.nz/resource-library/Te-Whatu-Ora-MidCentral-case-study

Te Pae Hauora o Ruahine o Tararua MidCentral – Major Trauma Pathway (PDF)

Glossary | Te kuputaka

Balancing measure: Determines whether changes made to one part of the system are causing any unintended consequences in another part of the system.

Cause and effect diagram: A tool used in quality improvement to analyse the problem by identifying potential causes. Also known as an Ishikawa or fishbone diagram.

Driver diagram: A visual display of a team's theory of what contributes to the achievement of the project's aim.

Equity measure: Measures that have an equity focus.

Injury severity score (ISS): An established score to assess trauma severity. The score ranges from 1 to 75. A score greater than 12 indicates major trauma.

Outcome measure: Determines the extent to which the aim has been achieved.

Process measure: Determines the degree to which processes or change ideas have been implemented.

Run chart: Visual representation of data on a graph, used to assess the impact of changes over time.

Published in February 2023 by
the Health Quality & Safety Commission and the National Trauma Network.
Available online at www.hqsc.govt.nz.