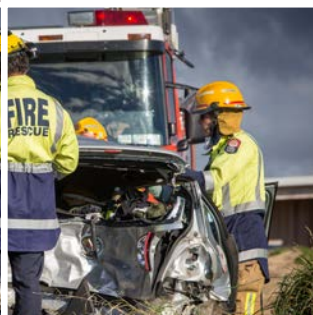
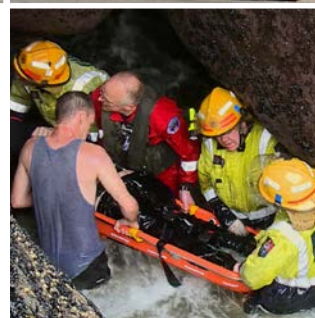


New Zealand Major Trauma Registry & National Clinical Network

Annual Report 2017-2018



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Foreword

The Major Trauma Network continues to mature and develop and this is its third annual report. It includes data from the 2017-2018 year and also includes some consolidated data from the triennium 2015-2018. This triennial data allows confirmation of some of the trends seen in each of the annual reports and allows conclusions to be drawn with greater confidence.

Performance improvement requires data and knowing targets and progress towards those an essential part of an improving system of trauma care. While development, maintenance and reporting on the data comprised within a trauma registry is a time consuming and resource consuming exercise, the results are an essential element in the Major Trauma Networks Performance Improvement programme.

The data reported on here is a consequence of the hard work of staff in each of the DHBs, central health governance and our funding agencies. Specific acknowledgement is made of the Accident Compensation Corporation (ACC) as well as the Ministry of Health (MoH) without whose direction and support this report would not have been possible. In addition, each of the DHBs have committed resources to this process and their present and ongoing support is appreciated.

This report offers the greatest level of understanding yet available about all categories of admitted major trauma patients throughout NZ in the past triennium. We expect it to inform trauma care strategies and improve outcomes for injured patients in the coming years.

Ian Civil

National Clinical Lead
Major Trauma National Clinical Network

Siobhan Isles

National Programme Manager
Major Trauma National Clinical Network

13 December 2018



Photo: Stuff

Executive Summary

This is the first year where there is full data collection in every acute hospital in New Zealand.

The burden of trauma on Maori is stark. We need to do more to understand the influence of geography, economic status and other factors on this vulnerable population group.

The case fatality rate is variable, and is statistically significant in a small number of hospitals. This variability is particularly noticeable in severe traumatic brain injury (sTBI). Changing the way we manage sTBI patients represents an opportunity to improve our performance to be more in line with international best practice.

ACC has approved long-term funding to enable the national trauma programme of work to achieve its strategic priorities, and ultimately to reduce death, improve the outcomes for those that survive, and reduce health system costs.

The 2017-18 results are:

Incidence

National Incidence
40/100,000

Northern Region

26/100,000

Midland Region

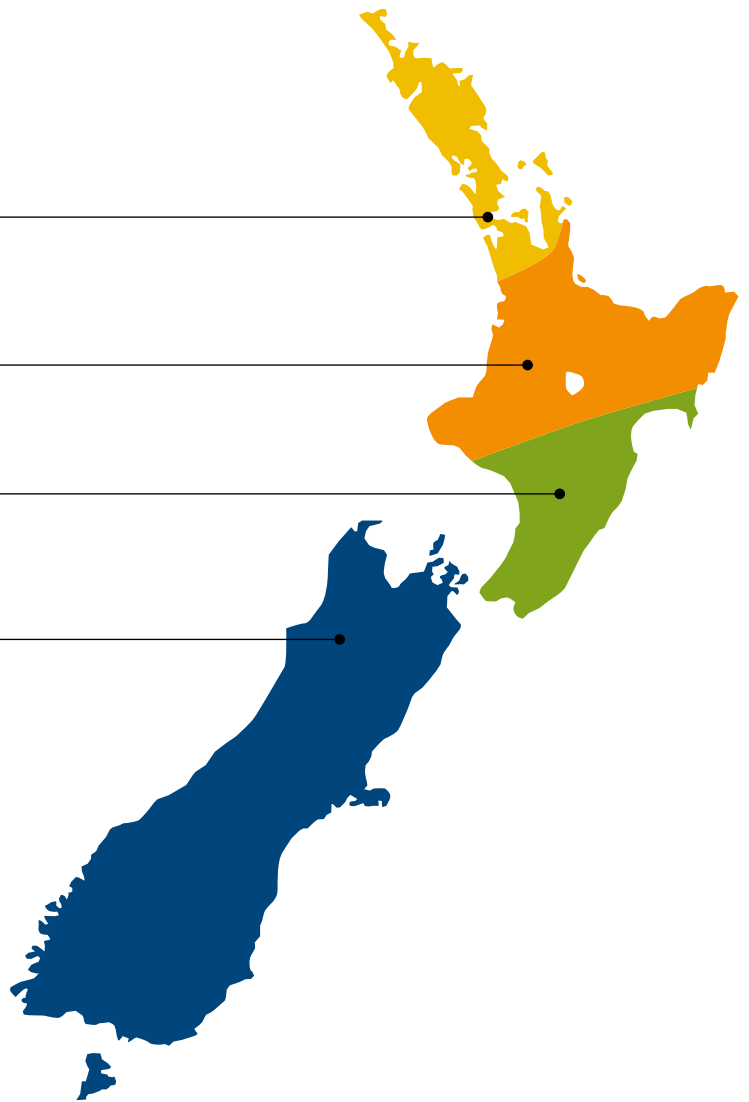
49/100,000

Central Region

47/100,000

South Island

51/100,000



Age

15-29 years

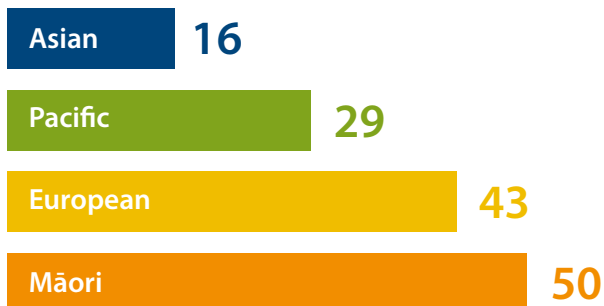
45-60 years

85+

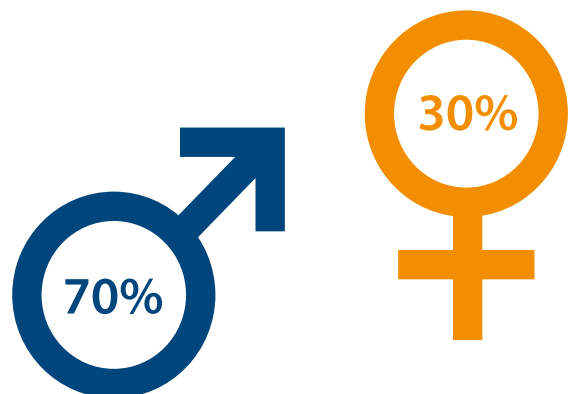
3 age peaks,
the **15-29** age group
has the greatest burden of injury.

Ethnicity

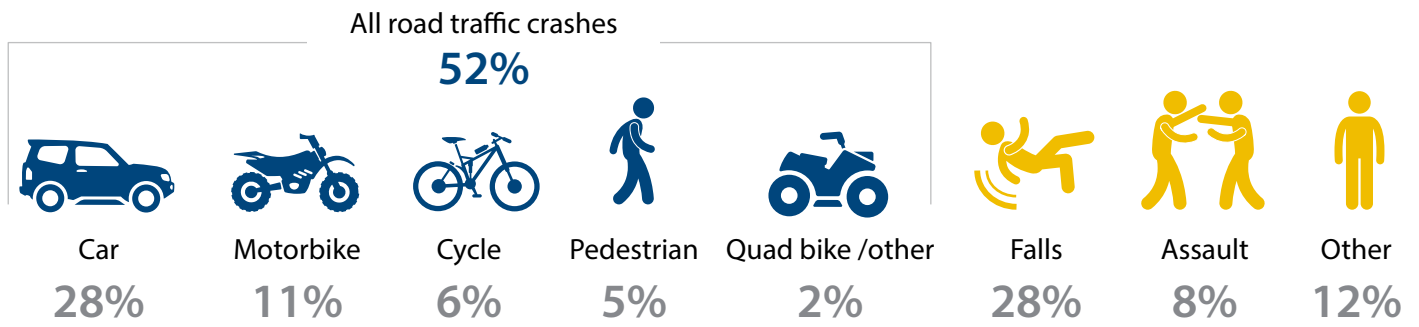
Incidence per 100,000



Sex

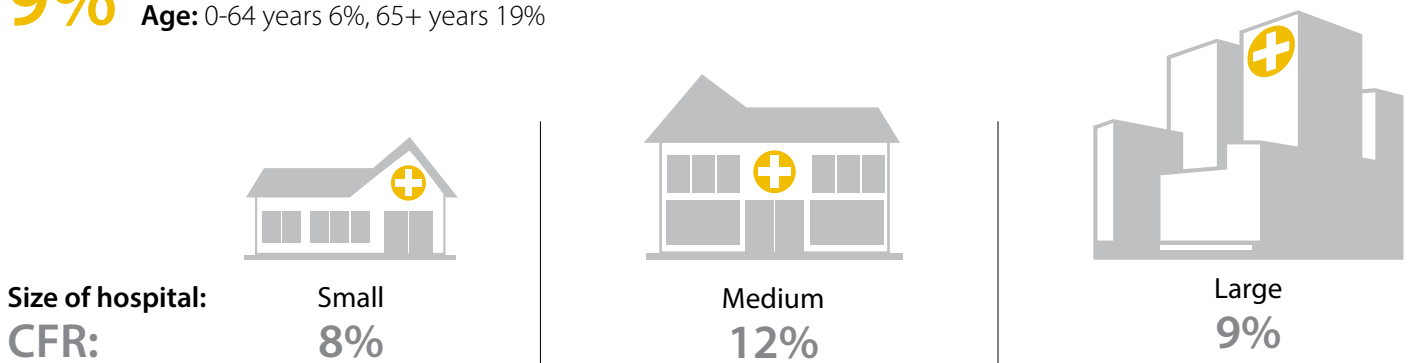


Cause of injury



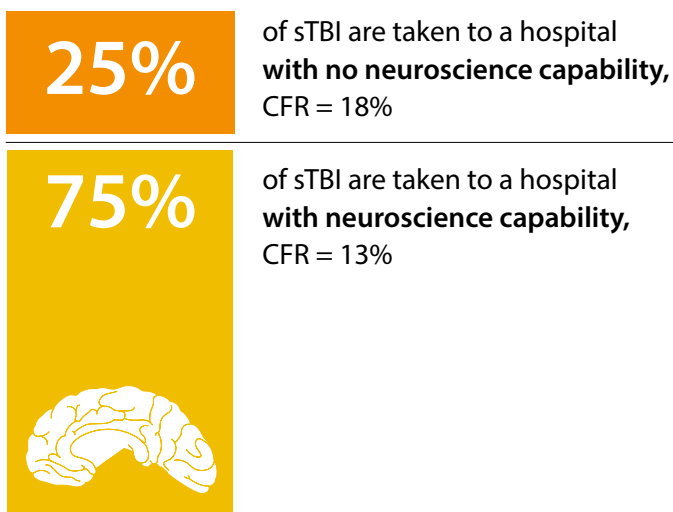
Case Fatality Rate

9% Range: 7-11% between regions
Age: 0-64 years 6%, 65+ years 19%



Serious Traumatic Brain Injury (sTBI)

Variance in CFR by size of hospital:



- Higher incidence of sTBI in northern and central region
- Isolated sTBI 72%, with other major injuries 28%

Process indicators

Improvements on all three process indicators on last year:



Time to index CT:
73% within 2 hours

up 7%



blood alcohol recorded: 48%

up 4%



Direct from scene to
definitive care: 79%

up 3%



Photo: Stuff

The Network

The four regional trauma networks are the backbone of the trauma system and have made progress in areas such as:

- Trauma education and training
- Coding and registry training, so that most (but not all) hospitals have at least two coders
- Appointment of permanent positions for trauma nurses, and increased allocation of nurses in some (but not all) hospitals. There is growing focus on the case management of the complex trauma patient
- The National network has been strongly supported by ACC's approval and funding of a business case to deliver the strategic direction. This will enable planning over a longer horizon, and resources to drive the performance improvement program, a research agenda, analytical and business intelligence support for DHBs, and more focus on areas such as workforce development.

The Royal Australasian College of Surgeons review of the New Zealand trauma system was undertaken and its 77 recommendations have been considered. The focus from senior executives from central government and the District Health Boards on trauma is a key result from this review. This type of review is unique in Australasia and provides expert advice on the future direction of the network.

The research agenda is expanding, and the Network has a role in the systematic analysis of road crash injury study involving five agencies and over seven datasets.

Introduction

This is the third Annual Report of the Major Trauma National Clinical Network (“the Network”). It is also the first year of full data collection where every acute hospital in New Zealand has submitted data to the NZ-Major Trauma Registry (NZ-MTR). The results of this collection are presented together with the highlights of the national network and four regional networks.

The Network is charged with ensuring the NZ trauma system delivers optimal trauma care and provides those who do not die immediately from their injury the greatest chance of uncomplicated survival. Our goal is to establish a contemporary trauma system in New Zealand which brings us up to international best practice and delivers the benefits to trauma patients, the population, and achieves efficiencies across the health system.

New Zealand - Major Trauma Registry

The NZ-MTR began on 1 July 2015 as a single web-based system to provide a comprehensive population based registry for the country. The National Minimum Dataset for Major Trauma which outlines the inclusion and exclusion criteria and other related material can be located at www.majortrauma.nz.

This year 1,910 patients have been entered into the NZ-MTR with a total of just over 5,000 since the NZ-MTR started. On a daily basis this means 5 people with major trauma are admitted to hospital.

It is the role of the health sector to ensure injured patients have the best possible outcomes.

The 2017-18 results are described in three categories:

- Demographic and cause of injury
- Focus areas:
 - Case fatality rate
 - Traumatic brain injury
- Process indicators

Data quality and coverage

There is full data collection in all acute hospitals in this reporting period.

Data quality is supported by routine quality assurance processes. All data submitted to the NZ-MTR is tested for completeness, logic, and accuracy. Fixes are advised to the filing data collector to remedy and are followed up. A national target is set for all entries to be entered into the registry within 30-days of discharge. These results are submitted quarterly by each region to the Ministry of Health. A quarterly exercise is done with all data collectors to ensure the consistency and quality of injury coding.

As we evolve our approach to ensure the interpretation of the data we collect is representative, we have changed the methodology in two key areas this year:

- Classification of size of hospital is now based on caseload (previously it was on number of beds). The patient caseload per year is
 - Small hospitals are <50
 - Medium hospitals are 50 – 150
 - Large hospitals are >150
- The sTBI caseload is now based on all patients who had an AIS score of 3 or greater. Previously it was based on all patients with any AIS score to the head region.

This year we have also standardised deaths based on age and ISS. This is a significant improvement from the previous crude case fatality rate as it more accurately compares like with like and provides useful information on potentially avoidable deaths. We are planning to continue to fine tune the tools and methodologies to enable comparative benchmarking with other jurisdictions.

Demographic results

Incidence

The incidence of major trauma is based on the number of cases in each region, and that region's population. The methodology is based on the hospital in which the patient receives definitive care, and the region that hospital belongs to. The results for 2017-18 are consistent with previous year's results.

The South Island has the highest burden of trauma in absolute terms, and based on its population. The Northern Region has the lowest burden of trauma as a proportion of its population, although it accounts for 26% of all trauma events. The Midland and Central Regions lie in the middle with similar rates and overall numbers.

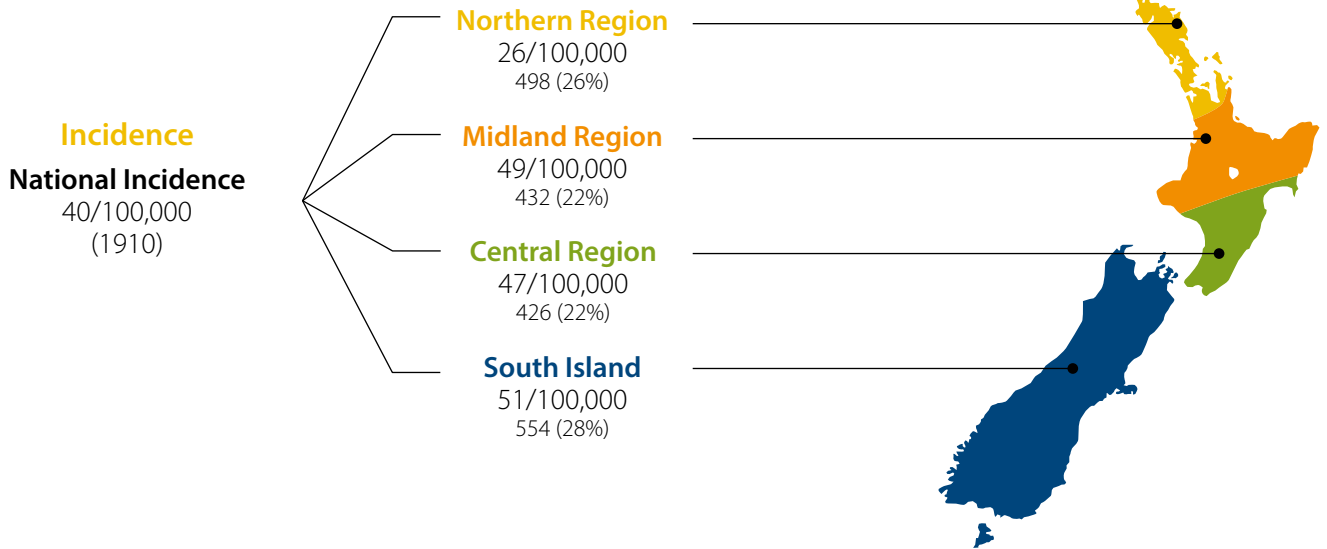
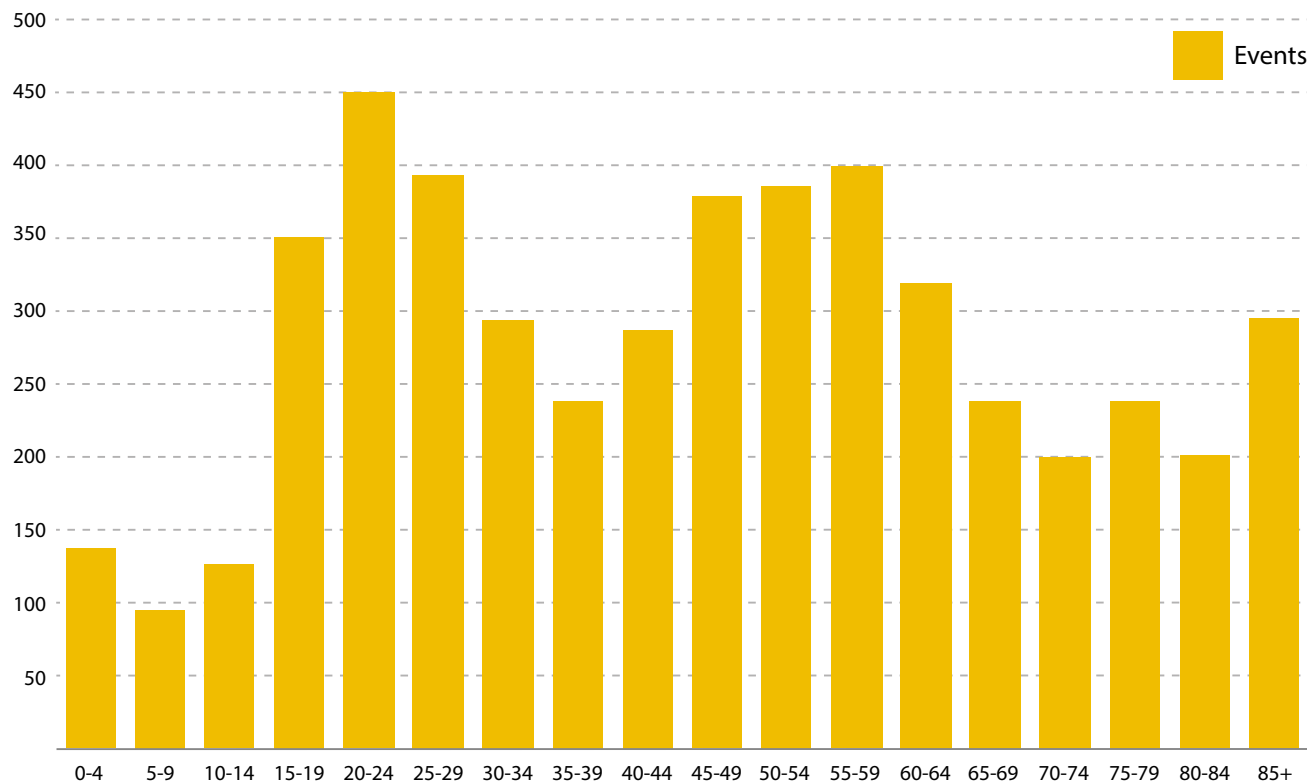


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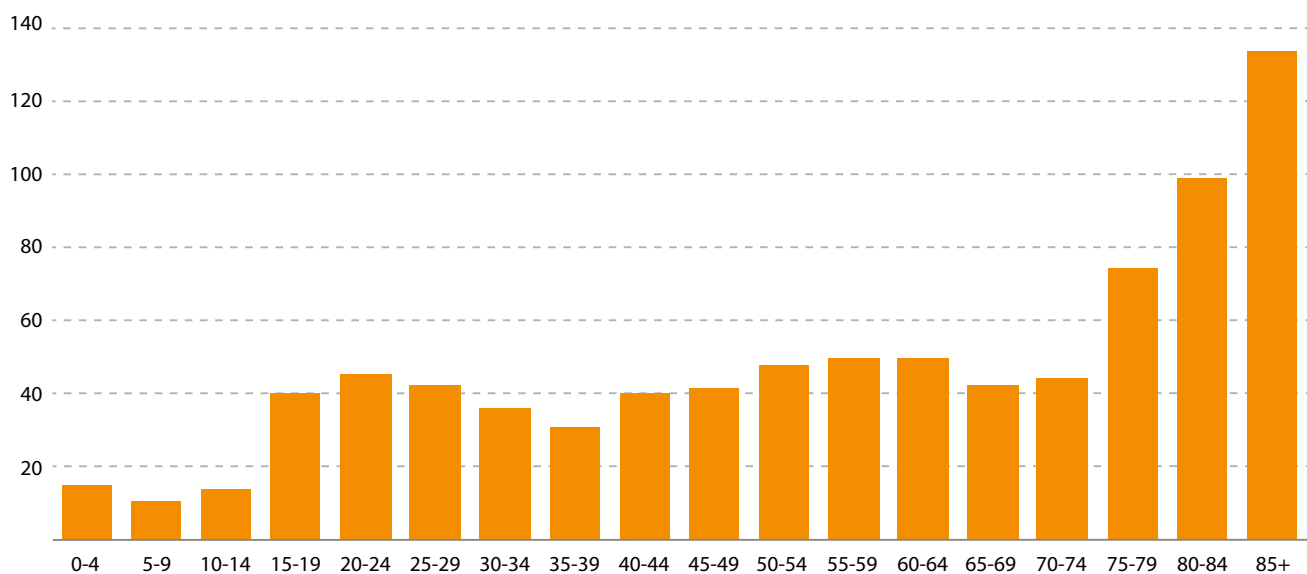
Age

Traditionally the burden of injury is on the young and indeed in most regions of the world it is the leading cause of death in those under 44 years of age. The three age peaks observed in previous years continue.

Major trauma by age (3 year total)



Incidence 2017-18 / Cases per 100,000, per year



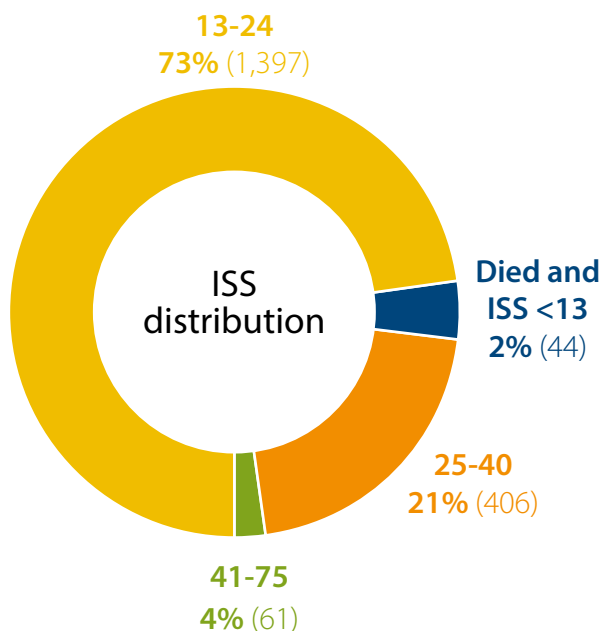
Children (those under 15 years old) have a lower overall incidence of major trauma (~12/100,000/yr) whereas those over 65 have a much higher incidence than the population.

Injury Severity Score

Injury Severity Score (ISS) is a numerical way of grading severity of injury that occurs in different body areas. Each injury is given a grade as described in the Abbreviated Injury Scale (AIS) between 1 to 5, with 1 being minor, 2 moderate and 3 or more being serious, severe or critical. The ISS sums the scores (when squared) for the three most severely injured body regions. A score of 13 or more implies either a serious injury in one body region, and/or lesser severity injuries in two or more body parts. The ISS can be directly correlated with a threat to life and to a lesser degree to complications, length of stay, cost and outcome. In line with the Network's focus on the most severely injured patients, the NZ-MTR collects data on patients described as meeting the criteria of ISS of 13 or more.

We use AIS 2005 Version with 2008 revisions.

Major trauma as defined by ISS can be stratified into any number of specific groups. In this report three groupings have been used.



Case study 1: Sarah's story

Sarah is a 14 year old girl who was hit by a large truck travelling at high speed on a country road. The impact was such that Sarah was catapulted into the air and thrown several meters. An ambulance was called and she was quickly taken to the nearest hospital.

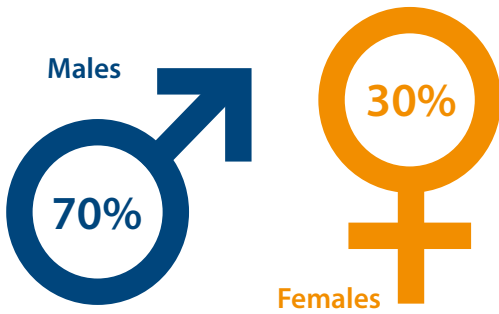
At the local hospital Sarah was found to have multiple injuries; She had suffered a bleed on the brain, multiple fractures of her spine, rib fractures with bleeding into her chest, a liver laceration, pelvis fracture and multiple fractures to her right arm and leg. A breathing tube was inserted and another tube placed in between her ribs to drain the blood from her chest.

The extent of Sarah's injuries was such that she was transferred by helicopter to Starship Children's hospital where she was admitted to the intensive care unit. The expert care Sarah received means she is now close to being discharged to a rehabilitation centre for the final part of her treatment, and will continue to spend time away from her family and friends.

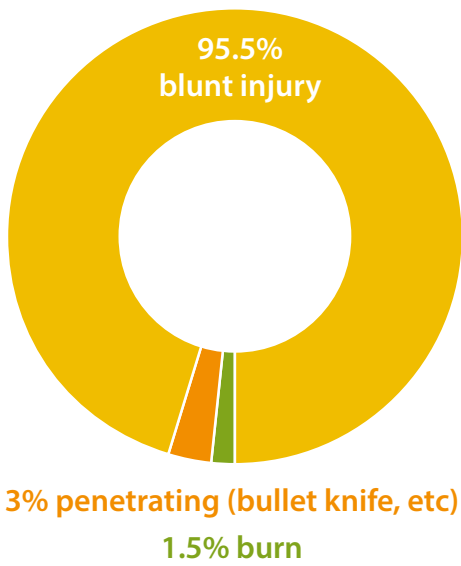
The coordinated approach from the pre-hospital team through to the local hospital, transfer to specialist services and then rehabilitation are a prime example of the effective trauma system New Zealand now has in place.

Sex

Males are more than twice as likely to suffer major trauma.



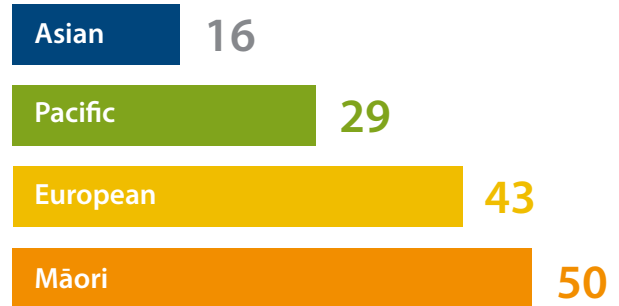
Injury type



Ethnicity

In many health indicators Maori are over-represented, and this is also true for major trauma. When the rates of major trauma are denominated by the ethnic population numbers the high burden of trauma on Maori is evident.

Incidence per 100,000

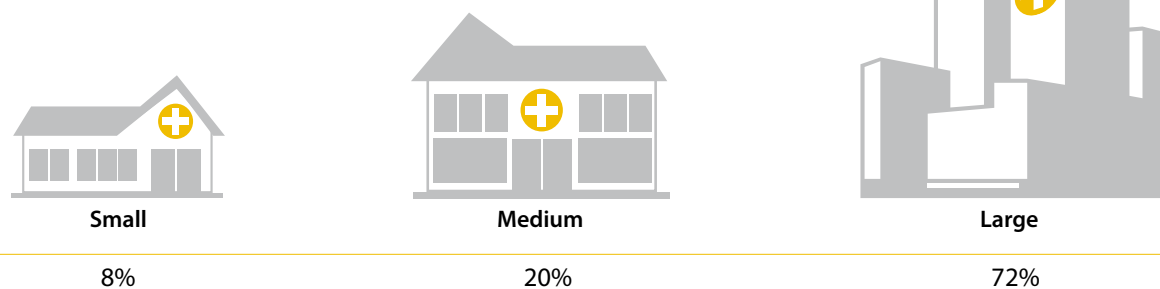


The high incidence of major trauma in Maori is identified as a key area for further research so that we can understand if there are specific locations or causes or other factors involved. With this knowledge we can work with partners to intervene and hopefully reduce the burden.



Size of hospital

Hospitals were categorised as small, medium, and large based on caseload.



Nearly three quarters of major trauma patients received definitive care in a tertiary hospital, and a further 20% in hospitals which provide a comprehensive range of secondary services. It is possible that a proportion of patients sent to small and medium hospitals may have better outcomes had they have been able to be transported to a tertiary hospital. Risk adjusting the data would provide a more accurate reflection of the relationship between size of hospital and mortality.

Cause of injury

Road related injuries including cars, motorbikes, pedestrians, cyclists, and off-road quad bikes, are the most common cause of injury, accounting for 52% of all major trauma. This is followed by falls (26%), other (13%), and assault (9%).

Casemix by cause of injury (3 year data)

	Northern	Midland	Central	South Island	National
Fall	26% (441)	22% (261)	34% (399)	30% (298)	28% (1399)
Assault	9% (153)	7% (82)	10% (114)	5% (50)	8% (399)
All RTC	52% (877)	60% (709)	45% (530)	51% (514)	52% (2630)
Car occupant	26% (446)	33% (393)	22% (259)	30% (300)	28% (1398)
Motorcycle	10% (172)	14% (170)	11% (134)	10% (98)	11% (574)
Pedestrian	8% (135)	4% (46)	4% (50)	2% (22)	5% (253)
Pushbike	6% (97)	6% (68)	6% (68)	8% (83)	6% (316)
Quad bike	2% (27)	3% (32)	2% (19)	1% (11)	2% (89)
Other	13% (215)	11% (132)	11% (132)	14% (139)	12% (618)

There are marked regional differences in cause of injury:

- Northern region has a higher proportion of pedestrian injuries than other regions
- Road traffic crashes in the Midland region account for 60% of all major trauma, and motorcycle riders comprise a greater proportion than in other regions
- Falls and assaults feature in the Central Region
- The South Island case mix sees a high proportion of car driver/passenger, cyclists, and falls (the low numbers are due to missing data in the first two years of collection).

Overall road traffic crashes continue to dominate the cause of injury accounting for 52% of all major trauma.

Focus Areas

Case Fatality Rate

Case Fatality Rate is a key marker of a trauma system.

Unadjusted hospital case fatality rate

There were 173 in-hospital deaths with a national CFR of 9%.

- Northern 10%
- Midland 8%
- Central 11%
- South Island 7%

The CFR is reduced by 1% from last year and is progressing toward the best performers of 6-8%.

Further analysis of the CFR showed:

- Outliers: CFR and age: The risk of death increases with age. The CFR ranges from:
 - 6% in 0-14 year age group
 - 6% in the 15-64 age group
 - 19% in the 65+ age group

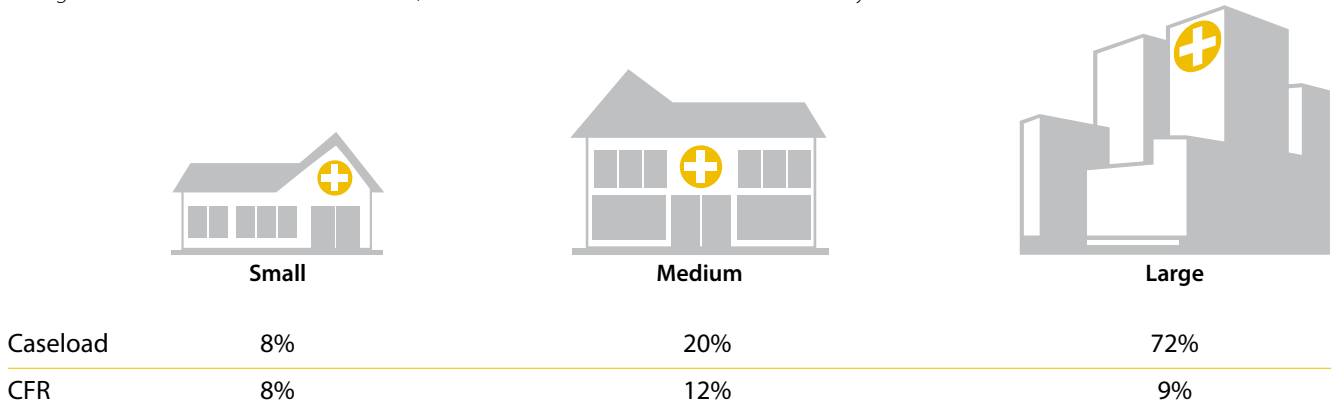
Cause of injury

Falls account for 46% of all deaths, followed by all road traffic (29%), other (16%), and assault (9%). When compared to rate of all causes, the risk of death is much higher in the Falls group than it is by any other cause (probably as a result of the age of those suffering falls).

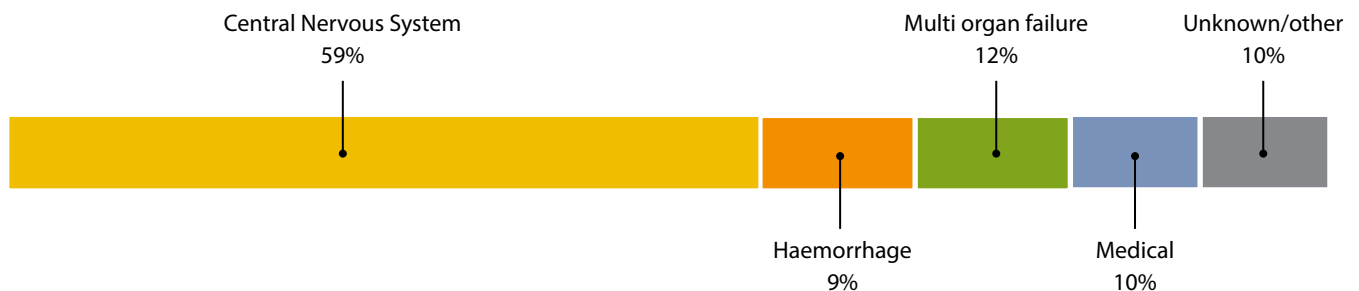
As expected the CFR increases with age and with ISS score.

CFR and caseload

There continues to be some variance in CFR by caseload of hospital. The difference is greater than last year because the methodology has changed from number of beds to caseload, and the inclusion of the full South Island this year.



Cause of Death



Medical deaths include those related to comorbidities rather than directly as a consequence of the injury. Haemorrhage refers to cases where bleeding resulting in hypovolaemia and its consequences caused death. In general this occurs in thoracic, abdominal and pelvic injuries. Cerebral bleeding results in neurological rather than hypovolemic death.

While prompt and effective prehospital care, neurosurgical intervention where indicated, and brain oriented intensive care will reduce the morbidity and mortality of traumatic brain injury, much is irreversible and the outcome determined at the moment of injury.

In contrast all haemorrhagic deaths are potentially preventable with the determining fact being how quickly the patient gets effective treatment for this consequence of injury (haemostatic resuscitation, interventional radiology, and surgery). Compared to last year, death due to haemorrhage has reduced from 15% to 9%, an improvement which brings us more in line with the 3% seen in other jurisdictions.

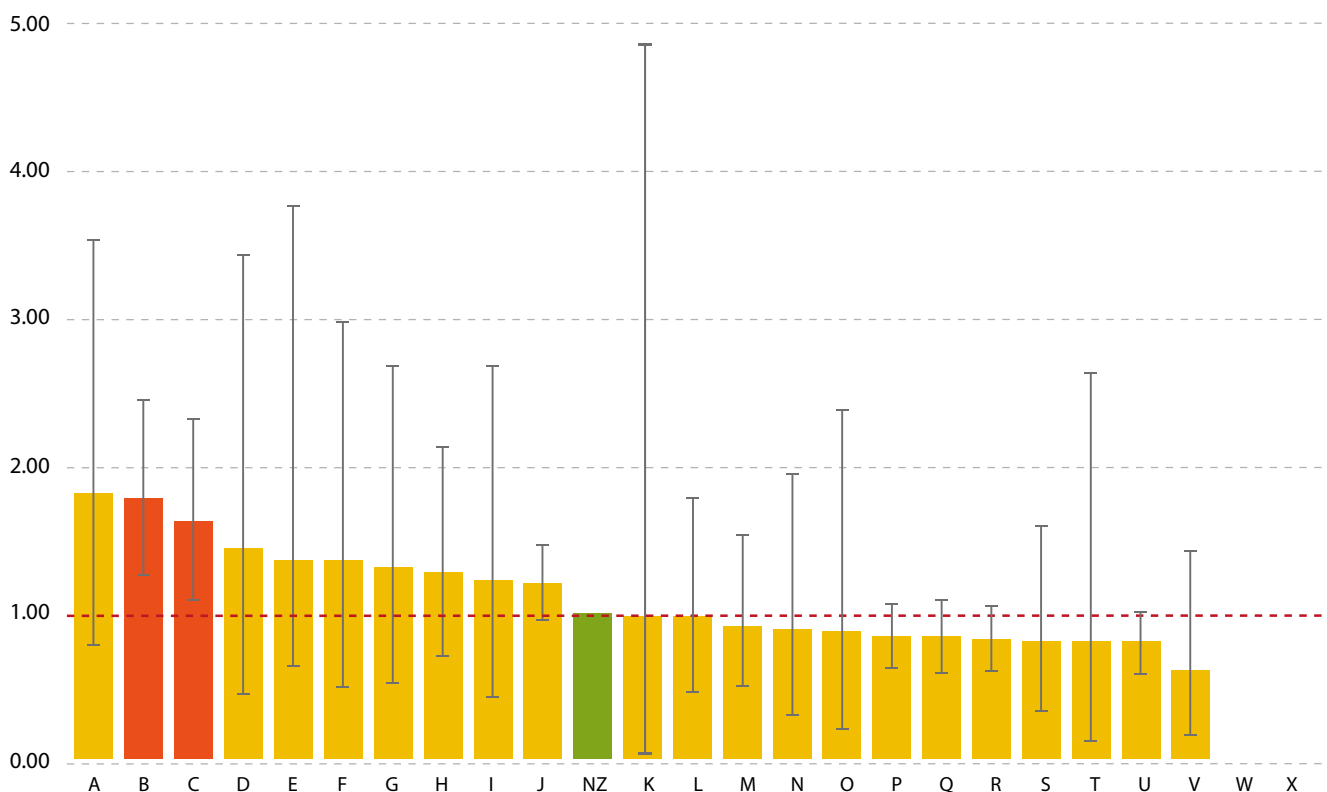
Risk adjusted case fatality rate

The risk of dying has a direct relationship to severity of injury (as reflected by ISS) and age (as a broad surrogate to co-morbidity).

Any given hospital with a high proportion of severe injuries will almost certainly have a high mortality rate. Comparison of hospital outcomes therefore requires adjustment for both these factors. This is commonly expressed as relative risk with the overall risk of the population being 1.0. In hospitals where the relative risk is higher than 1.0 patients have a greater risk of dying, and hospitals which are lower than 1.0 have lower risk.

As would be common for the deliver of any health provision, there is a degree of variation in outcomes, however it would be expected these would be within the error of measurement. Interestingly, although the variation in outcomes in 20 of 22 hospitals is not statistically different from the national average, there are two institutions where mortality is statistically higher. We need to investigate further why there is this apparent difference. As we get more data in the NZ-MTR we expect the confidence intervals to narrow.

Risk ratio for standardised mortality



Serious Traumatic Brain Injuries (sTBI)

sTBI patients were identified if they had an Abbreviated Injury Score (AIS) of three or more. This implies a moderate severity injury in the head region and one which would be expected to be associated with a short term risk of death and a longer term expectation of a need for rehabilitation.

There is significant variation in the incidence of sTBI between regions.

	Northern	Midland	Central	South Island
Number 2017-18	181	95	152	118
As % of all major trauma	36%	22%	36%	27%

The number of trauma patients with sTBI is higher in the Northern and Central regions both in absolute terms, and as a percentage of all sTBI, and as a proportion of all major trauma cases. We know there is a strong relationship between sTBI and case fatality rate and this picture is consistent here. Further work is prioritised to standardise our findings to age, cause, AIS, and GCS to understand why these differences may occur. We are also engaging with international researchers to participate in research to compare our sTBI data with comparable jurisdictions overseas.

Of the 546 patients with serious sTBI, 139 (25%) had a GCS <9 at scene, and 47 (9%) were intubated at scene.

sTBI occurred in 29% of all major trauma patients. The sTBI group are split into two categories:

- Isolated sTBI where the head is the only body part with a significant injury
- Complex sTBI where there is a head injury and a significant injury to another body part with an AIS score of 3 or more.

Note a change in methodology from last year where all patients with an AIS score for the head region were counted. This year it is limited to only those with an AIS of 3 or more.

	Isolated sTBI	Complex sTBI
All sTBI = 546	% (n)	% (n)
As proportion of all sTBI	72% (401)	28% (145)
As proportion of all major trauma	21%	8%
sTBI patient subset with GCS ≤9 at scene	17% (67)	50% (72)
And of this group, were intubated prior to arriving at hospital	5% (21)	18% (26)
sTBI patient subset taken to hospital with no neurosurgery on site National = 24%	26% (104)	19% (28)
Time to CT under 2 hours National = 52%	National: 49% Northern: 55% Midland: 53% Central: 40% South Island: 49%	National: 60% Northern: 71% Midland: 56% Central: 46% South Island: 56%
Case Fatality Rate All sTBI = 18%	15% (61) Large hospital: 13% (40) Medium hospital: 22% (17) Small hospital: 14% (4)	26% (37) Large hospital: 25% (29) Medium hospital: 27% (26) Small hospital: 33% (2)

The identification of sTBI injury at scene, particularly in the isolated sTBI group, remains problematic. Only 25% were assessed as having an impaired GCS at scene. Half of those patients with other injuries were identified with an impaired GCS, while only 17% of isolated head injuries were. There is no obvious reason why sTBI patients with other injuries are more readily identified as sTBI than patients where sTBI is the only injury. The intubation rate on scene remains low but has increased from last year.

24% of patients with a serious sTBI were managed definitively in a hospital with no neuroscience capability. This is an improvement from 36% seen last year, and is attributed to the introduction of the pre-hospital destination policy. However the case fatality rate for sTBI in small and medium sized hospitals is significantly higher than for hospitals with neurosurgery and this presents a further opportunity for improvement.

Although not all sTBI patients require neurosurgical intervention it is the package of care these patients receive which is important.

Ideally patients with neurological deficit receive a CT scan within two hours of arrival to provide definitive diagnosis. Between 50 – 60% of sTBI patients receive a CT with wide variation between regions, and improved hospital processes to shorten the time to CT would benefit this cohort of patients.

Process markers

Time from scene to first hospital

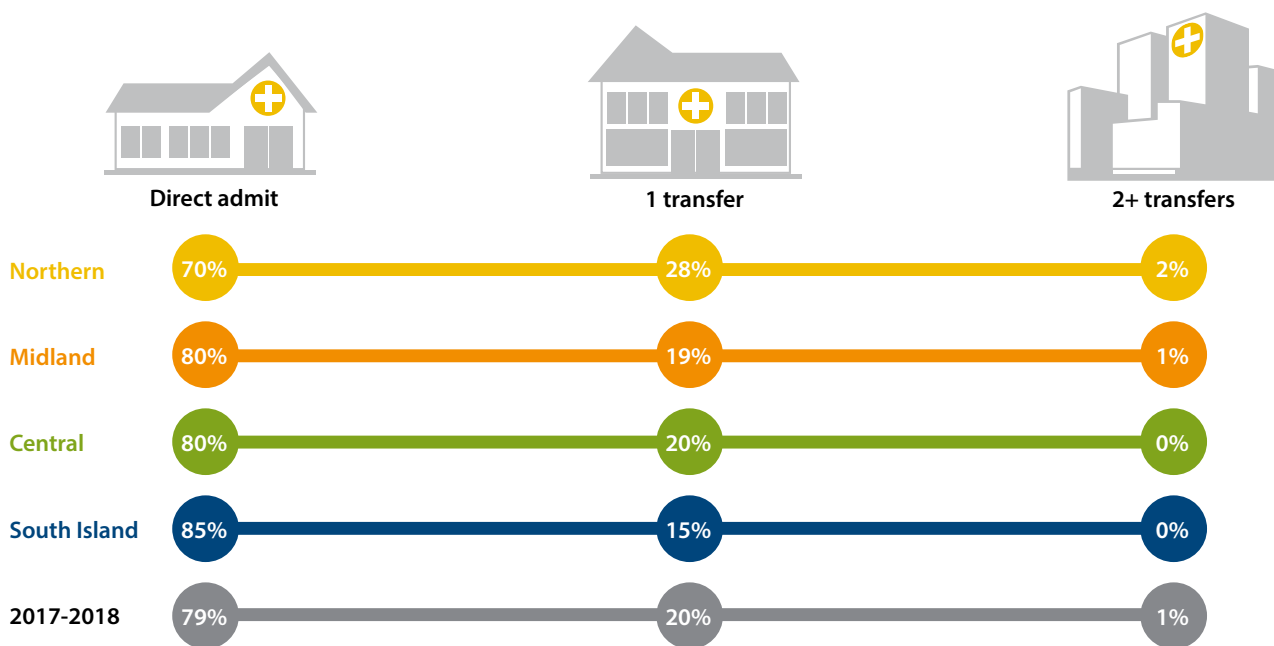
From the time R Adams Cowley first coined the term "The Golden Hour", time has been recognised as an important variable in patient survival. Numerous studies have shown that the sooner patients get to the hospital that can provide definitive care the better the chance of survival. The Australian Trauma Registry has shown that patients can arrive at a major trauma hospital under 2 hours in most States and given our smaller but more challenging geography whether that figure was also relevant for NZ was unknown.

Nationally 76% of patients were transported from scene to the first hospital two hours, with some differences between the regions. This is a 11% improvement from last year and may be attributed to the pre-hospital destination policy which aims to improve the identification of major trauma injuries, and the focus on timely transport to hospital, and the developments in the air ambulance services

Number of hospitals patient went to before receiving definitive care

One of the goals of an effective trauma system is to get the patient to the hospital that can provide them definitive care directly. Any patient who has to be transferred from one hospital to another (or from two hospitals to a third) represents an opportunity for destination policy to be refined so that patients get to a hospital which could care definitively for their injuries directly.

In March 2017 the Out of Hospital Destination Policies were introduced across New Zealand, and outlines updated triage criteria, and the most appropriate destination hospitals based on the person's injury. This reporting period is the first full year post-implementation of the destination policy.



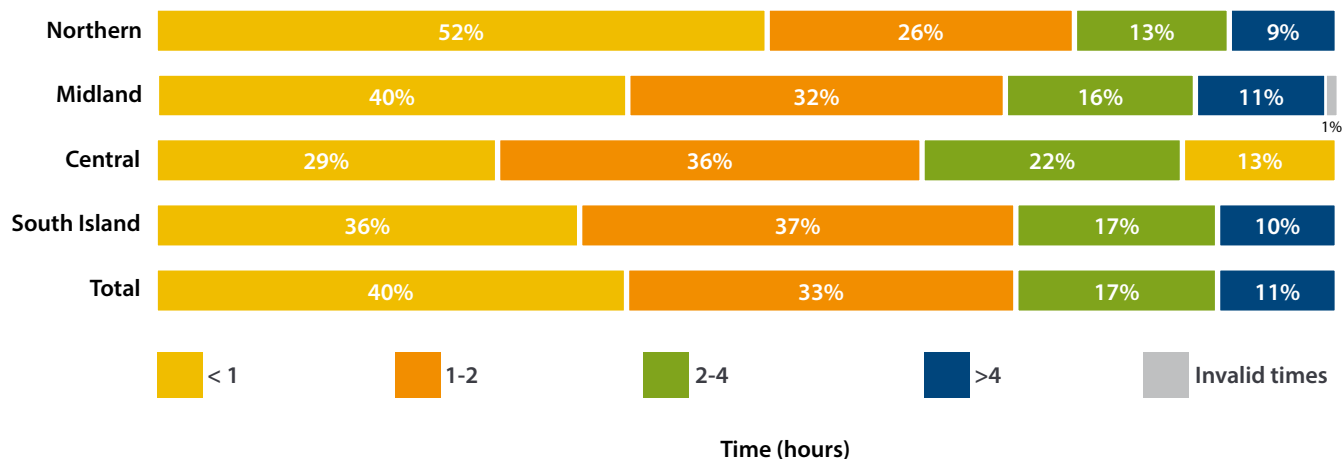
Overall nearly 80% are taken to definitive care from scene, a 3% improvement from the previous year.

The transfer rate has improved in the Central and Midland regions, but in the Northern Region region more patients are transferred to more than one hospital despite the introduction of pre-hospital destination policies. The 21% who required one or more transfer represents a sub-group who could have their care trajectory improved. The appropriateness of the transfer should be taken into account in this analysis, as hospitals which inappropriately hold onto patients may have a lower transfer rate, but a higher CFR, which is not necessarily in the patients best interests.

Time to diagnostic imaging

Once a patient arrives in hospital, one of the important process of care markers is time to first CT as evidence of effective in-hospital systems. Most major trauma patients need a CT of at least one body region and therefore this indicator is an important marker of the process of care of trauma patients.

Time to CT



Change from previous year



These results suggest improvements in systems of care leading to more prompt radiological evaluation of major trauma patients' injuries.

Case study 2: Ben's story

Ben was involved in a high speed crash while riding his motorbike and became lodged beneath a heavy car. He suffered a *STBI*, fractures to his face, ribs, shoulder, spine and pelvis, and numerous lacerations. Fortunately he was taken to a hospital direct from the scene which had all the clinical specialities he needed, and the care he received contributed to his survival. After nearly a month in hospital, and a further month in residential rehabilitation, Ben was discharged home.

Six long hard months on from Ben's crash he still has limited range of movement and continues to suffer pain, numbness and weakness in various parts of his body. After 6-months he is cleared to drive again and is back at work. He attributes his supportive family and the care of health professionals from ambulance to hospital to rehabilitation to his recovery.

We share Ben's story with you because it shows the effects of major trauma can extend for many months, and sometimes their whole life. The impact on their families is enormous.

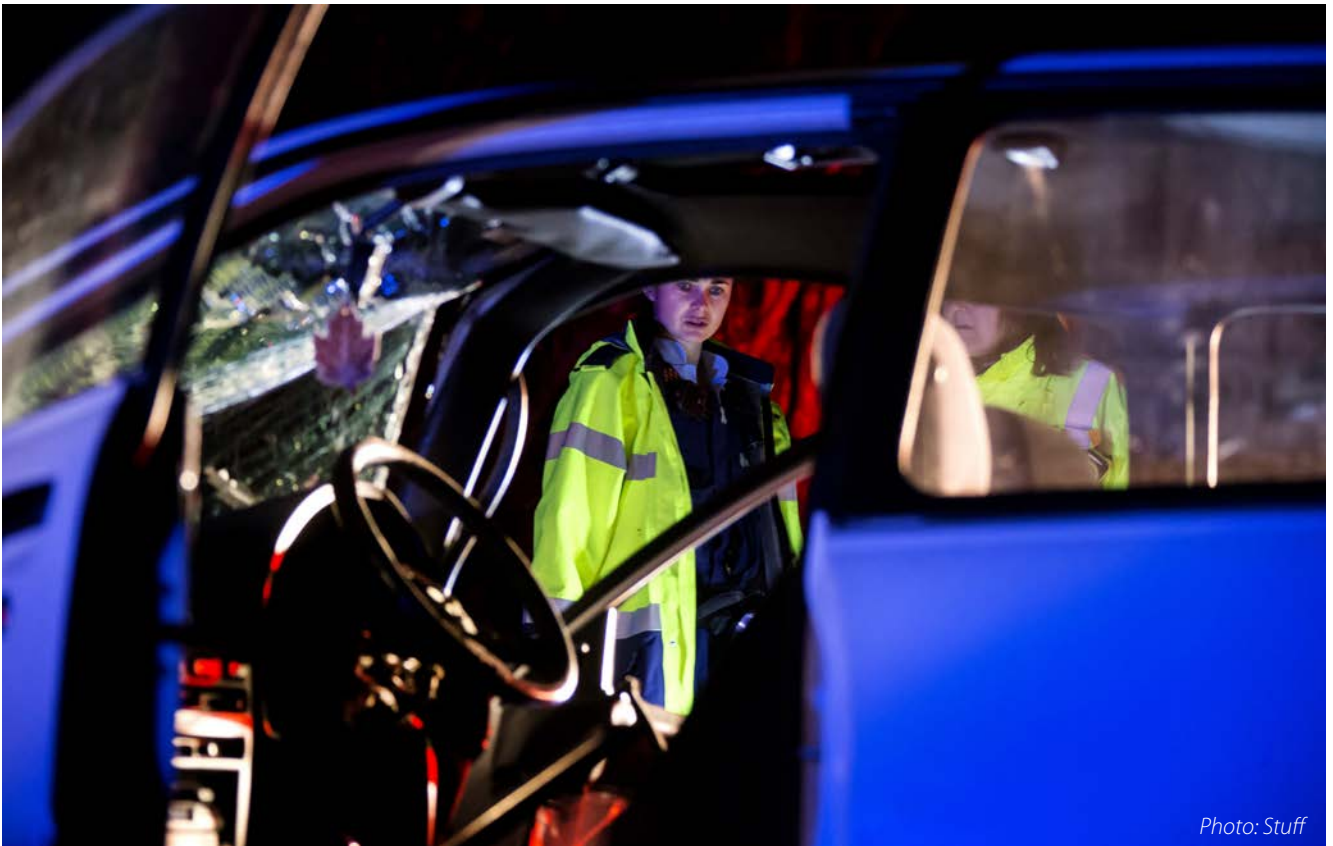
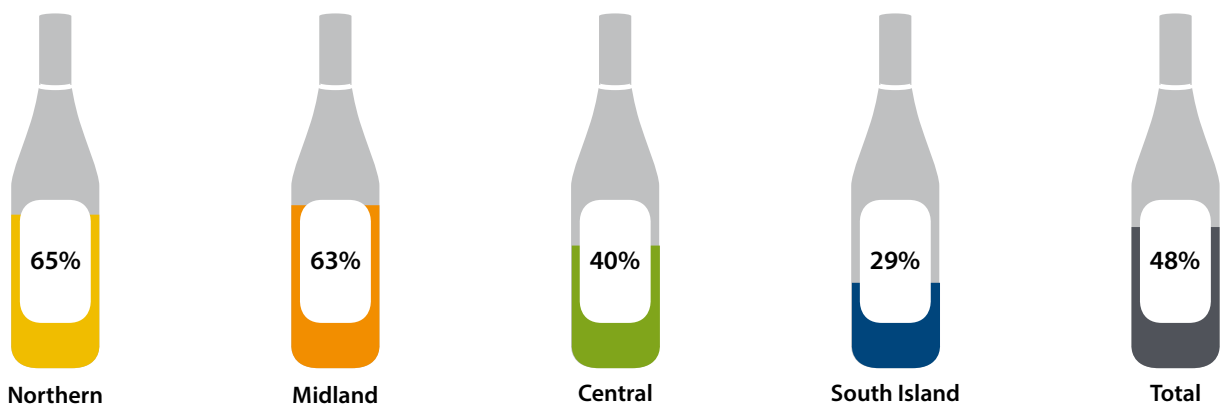


Photo: Stuff

Blood alcohol (as measured by Ethanol Levels (ETOH))

Alcohol is an important association with major trauma. While there are legal blood alcohol limits applied to driving, many other forms of trauma such as falls and assaults are also associated with alcohol intoxication. Before being able to suggest interventions that might be relevant in the different forms of trauma important to know how many patients may have been affected by alcohol. Various aspects of clinical care can be affected by elevated blood alcohol so having blood alcohol levels recorded on major trauma patients is evidence of an effective process of care and one of the recognised KPIs.

% Blood alcohol level recorded 2017-2018



Recorded blood alcohol in the Central Region and South Island have increased significantly (up 13% and 16% respectively), while Midland rate is static and the Northern Region has decreased slightly.

The major hospitals are progressively introducing ETOH collection as part of the routine trauma blood screen which should increase the percentage of coverage.

National Clinical Network Activities

The Network was established in 2012 and has achieved its three initial priorities:

1. A formal trauma system: A national network and four regional networks are established and supported by a governance group comprising Accident Compensation Corporation as lead sponsor and representation from Ministry of Health, District Health Boards, New Zealand Transport Agency, and the National Ambulance Sector Office.
2. Universal data collection in all acute hospitals across New Zealand and a national registry.
3. Nationally consistent guidelines such as the pre-hospital destination policy

This year we commenced work on a new strategic direction to lay the pathway for the next five years. It has four components:

- Increase service excellence across the trauma pathway, by introducing performance improvement initiatives in ambulance, hospital, rehabilitation and injury prevention
- Further develop enablers like the trauma workforce and the registry
- Initiate research including long term outcomes research on trauma patients after they have left hospital, and an academic program
- Continuing governance

A significant milestone has been achieved with ACC's approval to fund a business case which secures long-term funding and resourcing for the national work program. This funding will enable the strategic plan to be realised and signals a shift from a project on a 2 year funding cycle to a more comprehensive program of work.

ROYAL AUSTRALASIAN COLLEGE OF SURGEONS



Royal College of Surgeons Review of the NZ trauma system

In 2017 the New Zealand Transport Agency commissioned the Royal College of Surgeons to undertake a review of the NZ trauma system as part of its focus on Post Impact Care. This is the fifth pillar of the safe system, as identified through the United Nations, Decade of Road Safety Action 2010 - 2020 and is focussed on crash victims in the event of a safe system failure.

Seven leading trauma experts from Australia visited several hospitals and held meetings with key stakeholders. The result of their review was made publicly available several months later. Of the 77 recommendations made by RACS:

- 20 are completed or planned
- 37 are supported or partially supported
- 11 are not supported, and
- The remaining 9 need further work or advice

A further key outcome of the review is heightened focus on trauma across central government and senior executives in ambulance, hospital and rehabilitation services.

Education

Arguably the best evidence of the growing interest in trauma is the flourishing symposiums and education events across the country, and in particular in the Central and South Island regions. From a baseline of 2–3 nationally each year, in 2017-18 there were seven well attended events across the country, and several smaller training sessions. Some events are recorded and the videos are uploaded to the national website.

The AIS training session in Wellington had over 15 participants and most hospitals now have at least two coders trained in AIS. Three people have completed the AIS Accreditation exam and one is part way through training to be an AIS instructor. This is a goal to support the sustainability of AIS training and competency in New Zealand.

The Network funded three Trauma Team Training pilots based on advanced high-fidelity simulation scenarios and multi-disciplinary teams in-situ in the Emergency Department. This unique training builds on the methodology and resources of the Operating Room simulation funded by ACC and implemented by the University of Auckland. The outcome of the pilots will inform the requirements for broader national roll out.

Planning started to introduce the Trauma Outcome Performance Improvement Course (TOPIC) to New Zealand. This course is supported by the Society of Trauma Nurses in the US and broadly implemented within the US for all trauma staff.

Research and Audit

Research using NZ data was used in 58 publications in national and international journals (see Appendix A).

The Network is also contributing to SORTED - the Study of Road Trauma; Evidence and Data. This is a systematic analysis of seven databases across five agencies to quantify the burden of road trauma in New Zealand. This first phase is a proof of concept with a focus on testing the feasibility of the analysis, and is due to be finalised late 2018. This is a unique study for New Zealand and internationally and is anticipated to contribute to injury prevention initiatives to reduce the burden of road trauma.

The first audit of the pre-hospital destination policy has started with input from ambulance services and the Network.

Agreement with the Australian Trauma Registry has been finalised and data from seven New Zealand hospitals will be included for 2017-18 benchmarking report.

Eight performance measures proposed by RACS have been endorsed and will be included in a broader performance framework under development.

Workforce sustainability

The sustainability of the trauma workforce is improving, although concerns in some hospitals continue. More trauma nurses have been put on permanent contract and overall nursing FTE allocation has increased. Medical FTE allocation has only slightly improved. In one major trauma hospital the FTE allocation remains seriously under-resourced.

Trauma system developments

Not directly led by the Network but with important contribution to achieving a contemporary trauma system are initiatives such as:

- The air ambulance strategy which aims to modernise the air ambulance fleet and streamline delivery of service
- PATCH 2 trial which is part of a large international study looking at the effectiveness of Tranexamic Acid on bleeding trauma patients
- Ambulance electronic Patient Run Forms implemented in both ambulance services in early 2018. This is significant as it will allow easier interrogation of prehospital data.

Cross-sector relationships

Relationships with other agencies and groups continue to strengthen and are a key part of our work. These relationships include the tertiary education sector, Health Research Council, rehabilitation providers, transport agencies and groups, clinical groups, DHB Executives, other central government agencies such as statistics, and others.

Key priorities for 2018-19

Procurement of a provider to deliver on the business case, including research, analytical support, performance improvement and other functions.

Research

Delivering a research program and working with researchers in NZ and overseas to support empirical research on injury.

Performance Improvement

Implementing a world class performance improvement programme across NZ

Sustainability and consistency

Continuing to work with partners to improve the sustainability of trauma services and delivery of best practice care consistently across NZ.

Regional Trauma Network Reports

Each of the four regions report on their progress in 2017-18.

Northern Regional Trauma Network

The Northern Region Trauma Service has continued to progress following its strong developments in previous years. Most notable in 2017/18 is the ongoing education for trauma nursing, establishing a regional website platform with uploaded regional agreed clinical guidelines, standardised case reviews of regional trauma retrievals and inter-hospital transfers, and initial NZ-MTR data review and KPI development. Specifically the Northern Regional Trauma Network has;

- Promoted trauma nurse training for more equitable access to external courses across the region for Emergency Services' nurses. A high level review of the education opportunities for inpatient trauma nurses has identified the need for better awareness and access to external courses.
- Published the Regional Trauma Network website and hosts the agreed regional trauma clinical guidelines. The guidelines are promulgated for the region's use and monitored.
- initiated standardised regional peer review of cases against the regional retrieval guidelines and inter-hospital transfer guidelines is conducted each quarter, supporting continual quality improvement.
- Used NZ-MTR data to provide information on assaults and paediatric injuries. An inter-hospital transfer KPI was developed to establish a base measure and monitor for changes.
- Scoped and identified the need for the region to focus further on trauma rehabilitation concerning patients with non-weight bearing fractures, post traumatic stress disorder (PTSD) and better pain management.

The ACC incentive Fund has been used to sponsor; 10 nurses plus allied health to attend the Injury 2017 conference and Kids Trauma Conference, seven nurses to attend national NZ-MTR data workshop in Wellington, three staff to attend Abbreviated Injury Score (AIS) training and one nurse specialist/trauma coordinator to attend the Trauma Society in Melbourne. The fund has also enabled the planning for a Trauma Nurse Care Coordinator course which will support 21 nurses in the region to attend later in 2018.

Midland Trauma System

Good progress is being made with the strategic objectives. Current activities include:

Operational development: Each DHB has developed work plans consistent with the MTS strategic objectives and incorporating local and regional recommendations from the Midland RACS verification reports 2017. This has encouraged standardised and reportable activity and service development in the DHBs. Key principles are improving equity and efficiency across all of our systems

Clinical training and education: Two Trauma Nurse Core Courses (TNCC) were supported using seed funding from ACC incentive funds. These courses were run in Lakes and Taranaki DHBs. Planning is underway for a further 4 courses in the region next year. Along with trauma forums, symposiums and study days being held throughout Midland DHBs we worked in collaboration with the Central Region Trauma Network (CRTN) coordinating the Abbreviated Injury Scoring (AIS) course. It was decided to hold this in Wellington this year to improve access for other regions. We continued with community outreach programmes including the Right track and Critical Point programme that has reached over 2500 year 11-13 students

Information Use: The MTS has been concentrating on streamlining our information outputs so that DHBs can see the status and progression of trauma care in their districts.

Summary reports (www.midlandtrauma.nz/what-we-do/data) have been produced that have allowed us to measure and track agreed quality indicators so that when changes occur, the impact can be measured. This will provide better understanding of both trends and changes in hospitalised trauma care in our region. Snapshot reporting e.g ethnicity, paediatric etc has raised the profile of groups at risk highlighting the variability of trauma across our region and potential opportunities for injury prevention.

Registry Support: The Midland Trauma System (MTS) continues to support the work of the MTNCN with the hosting of the New Zealand Major Trauma Registry. Servicing 20 DHBs keeps our registry helpdesk and staff busy providing training and education, answering queries, quality checking and reporting on submitted data.

Roadshows: This year instead of a conference the MTS decided to conduct Roadshows in each of the DHBs to maximise the exposure to local trauma information and also help the trauma services in each hospital work operationally and strategically with their executive groups. The roadshow format consisted of foyer displays, grand rounds, executive meetings and meetings with local community groups concerned with trauma

Research: The Midland Trauma Research Centre (MTRC) is producing a steady stream of peer reviewed publications that are providing detailed understanding of the burden of trauma on our communities. This work has included collaborations with NZTA, University of Waikato, WINTEC, University of Auckland, Regional and local councils and community groups. Linking of data is giving us fascinating new views on old problems.

TQIP: Now that we are able to monitor the MTS in more detail Quality Improvement has become an important focus. The MTS has recruited a Trauma Quality Improvement Coordinator to help the 5 Midland DHBs monitor and improve performance over a range of indicators.

ACC funds have been used to:

- Support training and education including AIS course, TNCC course, communication training
- Assist clinicians and data managers to attend national and Australasian conferences/symposiums
- Support travel for MTS nursing members to attend key meetings

Central Region

The annual Central region trauma symposium continues to go from strength to strength. This year's symposium sold out, with over 180 attendees & faculty from around the country.

The region has seen an increase in nursing trauma education and training enabled by the ACC Incentive Fund. Through this funding nurses have attended regional and national trauma symposiums.

The region has hosted training for nurses new to data entry to the NZ-MTR and a refresher course for existing nurses. The region has also hosted the Abbreviated Injury Scale course in Wellington. Both the database and AIS coding courses are necessary to be able to input data into the NZ-MTR, so providing this educational opportunity will help provide sustainability and additional resilience into the CRTN and national major trauma programme. Five of the six Central region DHBs now have at least two nurses trained in both injury coding and NZ-MTR data entry.

Workforce development is a key focus for the 2018/19 Regional Services Programme. In particular adequate nursing FTE is needed to support the regional major trauma programme and enable case management for complex trauma patients. Trauma quality improvement is also a priority.

Access to clinical and analytical support has impacted the Central region to meet key process indicators set by the National Network. The network is working with the Central region DHBs to remedy this, with the goal of publishing a Central Region Major Trauma annual report to stakeholders and the public in order to demonstrate the burden of trauma in the region and identify opportunities for trauma quality improvements regionally and in individual DHBs.

South Island

The South Island region has made great progress with timely data collection and submission to the NZ-MTR.

Training and education sessions have been held in Christchurch, Dunedin and Invercargill, and the network of motivated trauma nurses has encouraged new initiatives in trauma care and education. There has been an obvious desire to provide and attend local and regional trauma training opportunities. The financial incentives provided by ACC which are used for nursing education will help the provision of further regional symposia in the future.

Access for patients across the South Island's diverse geographic area continues to be monitored and coordinated efforts are being built and maintained with St John Ambulance for transporting patients according to agreed destination policies.

A robust system for data recording, reporting and analysis is under investigation for the South Island to expand the quantity of available data and to have meaningful information to act on. National and regional options will be explored.

Adequate resourcing continues to be a challenge although the overall FTE allocation has increased and nurses on fixed term contracts have changed to permanent contracts. The lack of administration support for data entry is a particular concern, as are the hospitals which have only one trauma nurse and no back up for leave.

The region is looking forward to working with the National Network to expand opportunities now that the national business case has been approved and recommendations are available from the review of New Zealand trauma services by the Royal Australasian College of Surgeons.



Photo: Stuff

Glossary

ACC	Accident Compensation Corporation
AIS	Abbreviated Injury Score
CFR	Case Fatality Rate
DHB	District Health Board
ETOH	Ethanol Levels for blood alcohol concentration
GCS	Glasgow Coma Scale
ISS	Injury Severity Score
MoH	Ministry of Health
MTNCN	Major Trauma National Clinical Network
NZ-MTR	New Zealand Major Trauma Registry
RTC	Road Traffic Crash
sTBI	Serious Traumatic Brain Injury

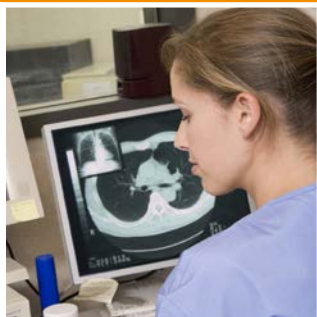
Appendix A:

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