NZ Spinal Cord Injury Registry

New Zealand
Spinal Cord Injury Registry

Calendar Year Report 2019

In partnership with
PRAXIS
Spinal Cord Institute

The New Zealand Spinal Cord Injury Registry (NZSCIR) would like to acknowledge the spinal service clinicians and coordinators for collecting and inputting data into the registry. Many thanks to statistician Asheel Ramanlal and Praxis Spinal Cord Institute for their support and expertise in developing this report. And finally, thank you to the participants who enrolled in the NZSCIR – those with a spinal cord injury (SCI) – for contributing their time and experiences to the registry.

How to cite this document

New Zealand Spinal Cord Injury Registry (2021). New Zealand Spinal Cord Injury Registry Annual Summary Report 2019.

Contents

About this report

Adult acute care, rehabilitation and follow-up services for people with SCI are provided for New Zealand by two supra-regional services. Services are located at Canterbury District Health Board (CDHB) and Counties Manukau Health (CM Health).

NZSCIR looks at traumatic SCI (tSCI) and non-traumatic SCI (NTSCI) of adults in New Zealand. The NZSCIR Annual Report 2019 is an overview of the data collected from 222 NZSCIR participants who sustained either a new traumatic SCI in 2019 or were admitted to either **supra-regional spinal service** 1 January - 31 December 2019 with a non-traumatic SCI.

This report includes information about participant demographics, type of SCI and its causes, length of hospital stay, functional outcomes and secondary complications after SCI. The report's aims to serve as a descriptive account with no endorsement of, or recommendations about, policies or programmes. Data may however, be informative for research and clinical practice, as well as policy and programme planning. Data from this report provides researchers, health care providers and decision makers with knowledge that may support strategies to improve SCI care services within their facilities.

The NZSCIR governance group welcomes feedback or questions on this report. Please contact either NZSCIR coordinator at NZSCIR@cdhb.health.nz or NZSCIR@middlemore.co.nz

More information about NZSCIR, is available from:
www.nzspinaltrust.org.nz/nzscir

Certain terms are bolded throughout this report. Definitions can be found in the glossary on page 13.

The NZSCIR would like to thank the NZ Spinal Trust for the images used in this report.

New Zealand Spinal Trust
Te Taratihi Manaaki Tuanui
Supporting Positive Futures

Spinal cord injury and the registry

Spinal cord injury

The cause of the spinal cord damage determines if it is a traumatic or non-traumatic SCI. An injury sustained from a physical impact, such as a fall or motor vehicle crash, is referred to as a traumatic SCI. An injury that occurs in other ways, such as from degeneration, infection or cancer, is referred to as a non-traumatic SCI.

About the Registry

The NZSCIR was established in August 2016 and is jointly funded by the Accident Compensation Corporation, CDHB and CM Health, in partnership with Praxis Spinal Cord Institute.

Data collected from the NZSCIR supports service improvements, research and improvements in clinical practice. Together these three activities help enable the best outcomes to be achieved for people with SCI.

A governance group which has representation from consumers, researchers, clinicians, funders and managers ensures the efficient and effective operation of the NZSCIR. Two registry coordinators, one employed at each DHB provide the day to day management of the NZSCIR. The NZ Spinal Trust also provides some back office functions for the NZSCIR.

The NZSCIR has Health and Disability Ethics Committee approval enabling collection of a non- consented minimal data set. Data collected beyond this, including follow-up data is subject to consent.

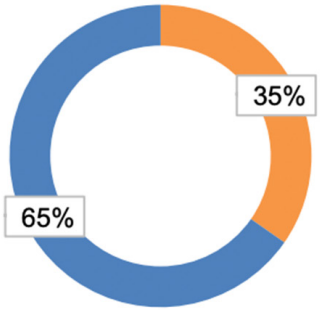
Contributors

The most vital and fundamental component of NZSCIR is its contributors - people with a SCI. Thank you to those who have contributed their time and experiences to the registry. Their continued participation determines the value and success of NZSCIR.

What are the causes of spinal cord injuries?

Prior to the establishment of NZSCIR, the NZ incidence of SCI was estimated at 30 per million, with approximately half related to a traumatic injury. The World Health Organization estimates the incidence of SCI is between 40 to 80 cases per million. Based on 2019 NZSCIR data, incidence in NZ is currently estimated at 46 per million. NZSCIR data across 2017-2019 calendar years found, 65-69% of spinal cord injuries are traumatic.

NZSCIR total participants 2019 (n = 222)



Non-traumatic spinal cord dysfunction Traumatic spinal cord injury

Falls were the most common cause of traumatic injury. An injury related to a fall can be caused by anything such as a slip to a fall from a height. The proportion of SCI from a fall increases from 17% in the 0-30 age group to 82% in the >76years category. Falls are the leading cause of tSCI for people aged 46 years and above. Transport followed falls as the most common cause of tSCI. It is the leading cause of SCI in those under the age of 45 years. 50% of sporting injuries were from water sports such as diving into pools or rivers (up from 30% last year), and 25% from wheeled non-motorsports (mountain biking/cycling), up from 19% last year. 13% of sporting injuries were from equestrian (22% in 2018). The “Other” category relates to assault, deterioration of function post-surgery, or other non-classified causes.

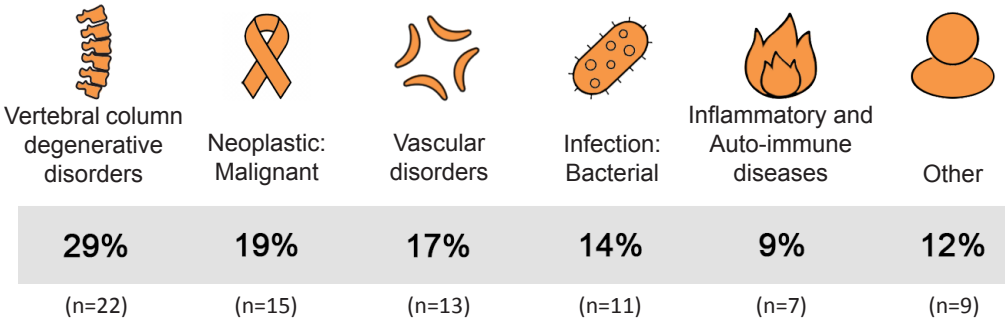
Traumatic spinal cord injury causes

Fall	Transport	Sports	Other
38%	26%	17%	20%
(n=55)	(n=37)	(n=24)	(n=29)

Disorders relating to degeneration of the spine were the most common causes of non- traumatic injuries (29%). The spinal cord is protected by the spinal column. Deterioration of the spinal column, either in the discs, ligaments, joints or bones can lead to spinal cord damage.

19% of NTSCI were due to malignant neoplasms; 7% were benign. Vascular causes (such as haemorrhage or lack of blood flow) account for 17% whilst infection is the cause of SCI in 14% of participants with a NTSCI. “Other” causes may include benign neoplasms, metabolic diseases and other non-classified causes.

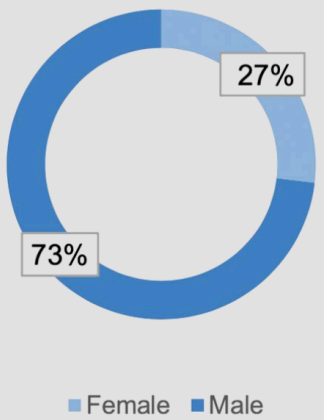
Non-traumatic spinal cord dysfunction causes (n=77)



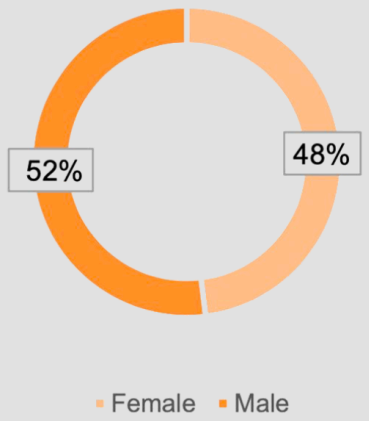
What does the population look like?

In 2019, males account for 66% of all SCI. This is down from 77% in 2018 with a decreasing proportion of male non-traumatic injuries. Non-traumatic injuries are approaching an even distribution in both genders. However, the proportion of males remains higher in traumatic injury groups.

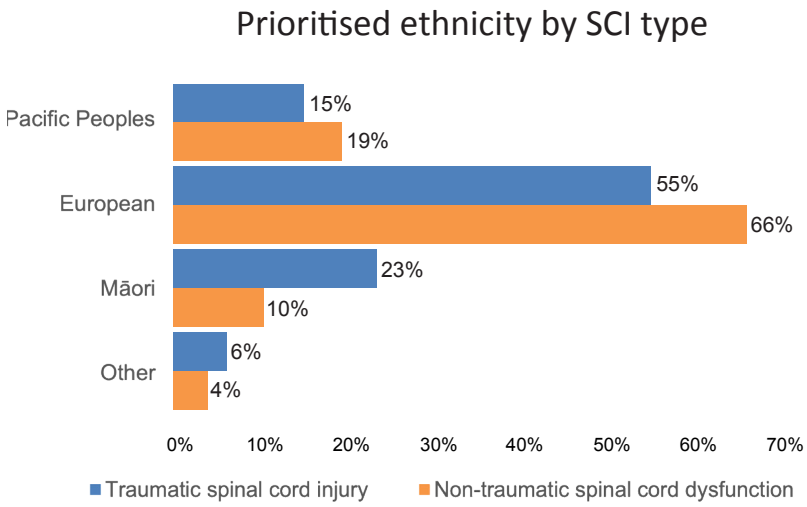
Traumatic spinal cord injury by Gender (n=145)



Non-traumatic spinal cord dysfunction by Gender (n=77)

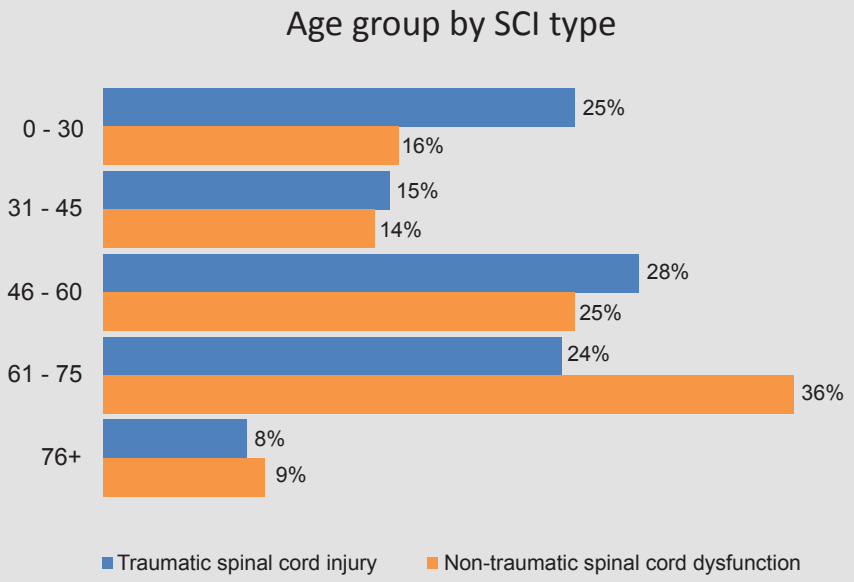


Using Ministry of Health prioritised ethnicity reporting[1], across all participants (tSCI & NTSCI), most were of NZ European descent (59%), followed by Māori (19%) and Pacific people (17%). Pacific people includes Samoan, Tongan, Niuean, and Cook Island Māori. Other (5%) includes Asian, Middle Eastern, Latin American and African ethnicities. People may choose more than one ethnicity and categories are not exclusive. European and Pacific people were more likely to have a NTSCI, whilst Maori were more than twice as likely to have a tSCI over a NTSCI.



The average age of NZSCIR participants was 51 years. Of those with tSCI, the international trend of bimodal age distribution is observed with the first peak being young adults between 15 and 29 years, and the second peak occurring among older adults. NZ's second age peak occurs, between age 46-60 which is earlier than international trends.

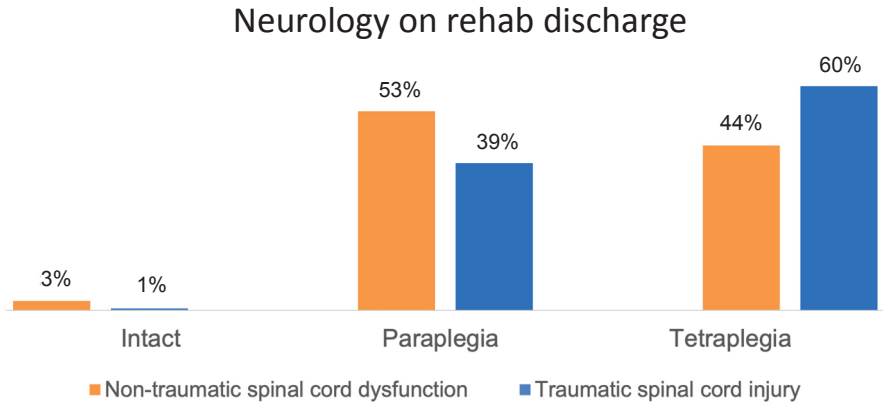
The number of those with non-traumatic injuries tends to steadily increase with age, peaking at age 61-75 years.



What is the severity and level of injury?

The level of injury identifies the lowest level of the spinal cord (from the head) that has normal movement and sensation. A person with a **cervical** (neck) injury has decreased control or sensation in the arms, trunk and legs (tetraplegia). Those with a high cervical injury may not be able to breathe independently. With a **thoracic** injury, the person may have mild difficulties with their hands, but are affected in the trunk and legs (paraplegia). A person with a **lumbar** or **sacral** (lower back) injury may have decreased control or sensation in the trunk and legs (paraplegia). People with incomplete injuries at any level may be able to stand and walk depending on how their spinal cord was affected.

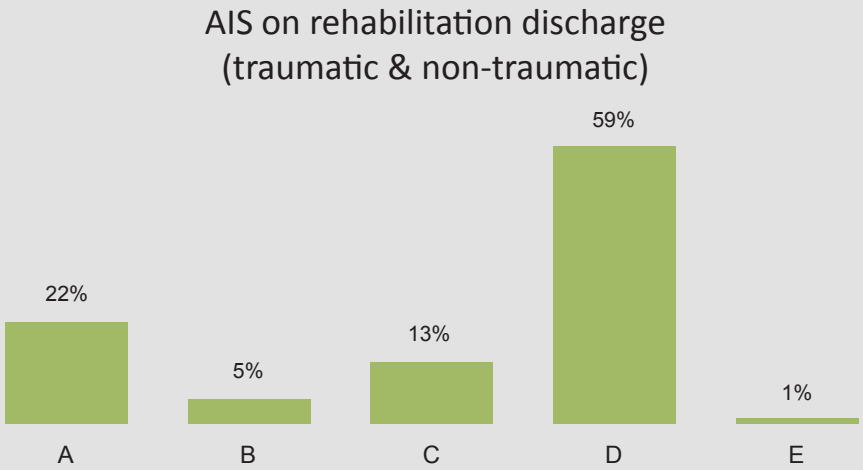
Participants' severity and level of injury are routinely assessed throughout their recovery using a standardised assessment form at one of the two supra-regional spinal services. The trend continues as per 2018, with those with a tSCI being more likely to be tetraplegic (60%), whilst 52% of NTSCI are paraplegic.



The extent of a participant's SCI is defined by the American Spinal Injury Association (ASIA) Impairment Scale (AIS).

Grade A: Impairment is complete; no motor or sensory function below injury level.
Grade B: Impairment is incomplete; sensory function, but not motor function, is preserved below the neurologic level (the first normal level above the level of injury) and some sensation is preserved in the sacral segments S4 and S5.
Grade C: Impairment is incomplete; motor function is preserved below the neurologic level, but more than half of the key muscles below the neurologic level have a muscle grade less than 3 (i.e. Insufficient strength to move against gravity).
Grade D: Impairment is incomplete; motor function is preserved below the neurologic level, and at least half of the key muscles below the neurologic level have a muscle grade of 3 or more (i.e. the joints can be moved against gravity).
Grade E: Participant's functions are normal; all motor and sensory functions are unhindered.

AIS D remains the most common SCI classification in NZ and has the highest predictability for independent mobility one year post traumatic injury[2].



What are the length of hospital stays?

NZSCIR captures length of stay (LOS) in acute and rehabilitation settings. Median length of stay was 16 days in acute care (down from 17 in 2018) and 55 days in rehabilitation (down from 63 in 2018). Those with tetraplegia spent more time in acute and rehabilitation settings (median 72 days) than those with paraplegia (59 days). Combined median length of stay (not shown on graphs) in rehabilitation for those with tetraplegia is trending down, year on year (2019 - 52 days; 2018 - 57 days; 2017 - 76 days).

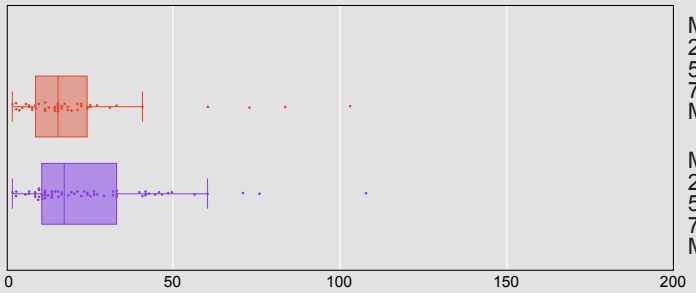
Medians are one way to show the middle point of data, but it is important to look at the whole range to understand the full picture. The box and whisker graphs to the right show these ranges.

For the acute hospital LOS, the spread of data is relatively similar for both services. However, for rehabilitation, the graphs look quite different. At BSU the LOS for people with paraplegia ranges from 4 to 184 days. Half of these people stayed between 19 and 89 days (shown by box edges). In contrast to this, people with paraplegia at ASRU have a LOS range from 3 to 110 days. Half of these people at ASRU stayed between 30 and 65 days.

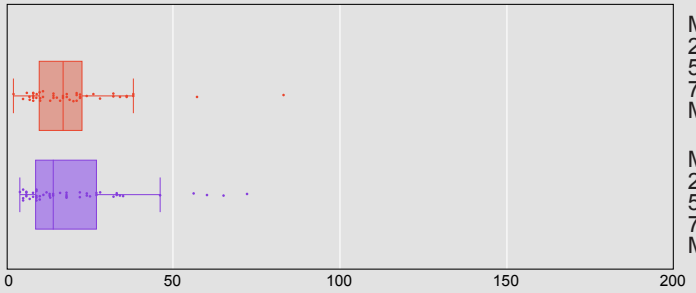
Therefore, even though the median LOS for those with paraplegia at BSU (44 days) is lower than at ASRU (50 days), the range shown by the upper edge of the box (ASRU 65 days; BSU 89 days) indicates people stayed for longer at BSU.

Similarly, those people with tetraplegia at BSU had a lower median LOS (BSU 54 days; ASRU 63 days), the range shown by the upper edge of the box (ASRU 81 days; BSU 98 days) indicates people with tetraplegia also stayed for longer at BSU.

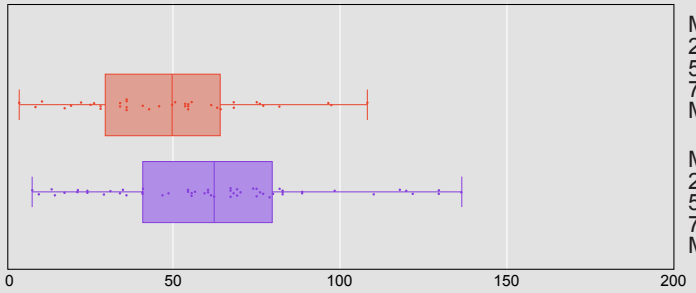
ASRU Acute: 2019 LOS (days) distributions



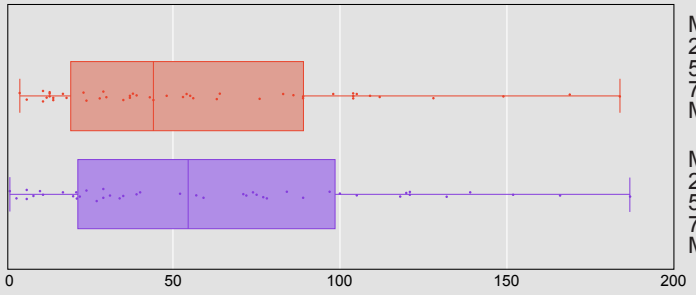
BSU Acute: 2019 LOS (days) distributions



ASRU Rehab: 2019 LOS (days) distributions



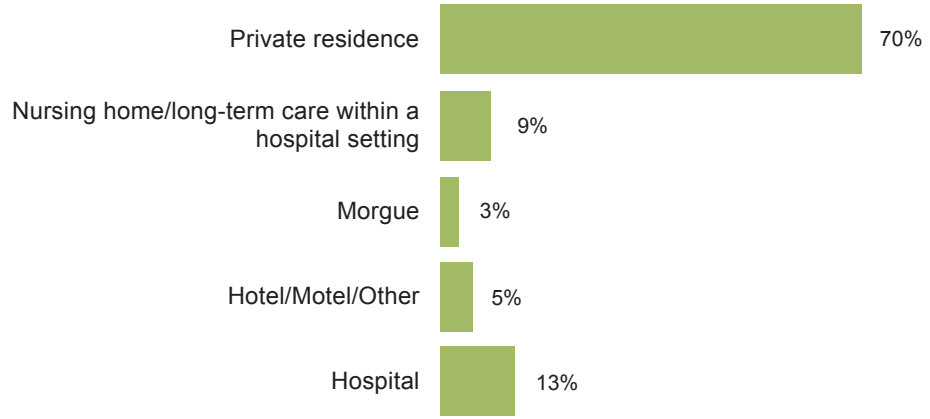
BSU Rehab: 2019 LOS (days) distributions



Where do people go after discharge from hospital?

A private residence in the community was the most common location for discharged participants. “Hospital” indicates ongoing rehabilitation post-supra regional spinal service admission. Discharge destinations remain very similar to 2018, with all categories only varying 1-2% from the previous year.

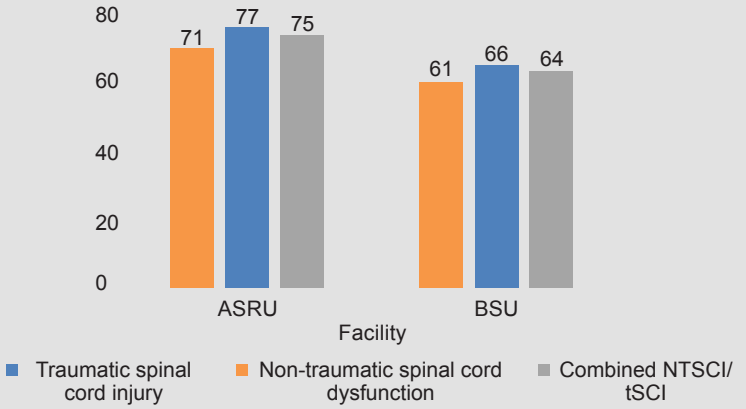
Discharge destinations (traumatic & non-traumatic)



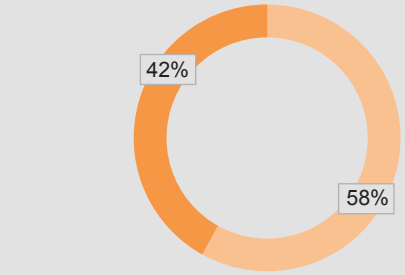
How many people have surgery and how many walk 100m on discharge?

Rates of surgery are higher in those with tSCI compared to those with NTSCI (72% vs 66%). Surgery rates differ between supra-regional services (CM Heath 75% vs CDHB 64%). On discharge from rehabilitation, 36% of participants were **independently walking in the community** (able to walk 100m outdoors unsupervised, with or without a mobility aid). Those with NTSCI were more likely to be walkers in the community (NTSCI 42% vs tSCI 34%), based on records of 162 participants.

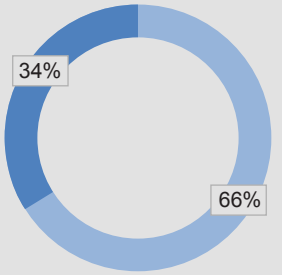
Surgery rates by site and SCI (n=222)



Mobility on rehab discharge Non-traumatic spinal cord dysfunction (n=52)



Mobility on rehab discharge Traumatic spinal cord injury (n=110)



How often do secondary complications occur in acute and/or rehabilitation care?

Pain on discharge to the community was a commonly reported secondary complication. 72% of participants were receiving treatment for pain on discharge based on the records of 165 participants with complete pain data.

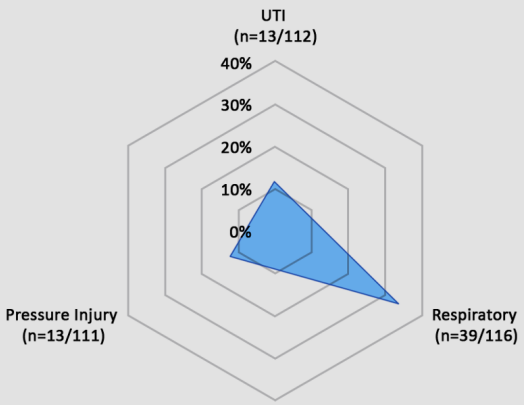
Urinary tract infections had a 13% incidence rate occurring during acute stay and a 34% incidence rate occurring during rehabilitation. Information is based on the records of 164 acute and 167 rehab participants with complete UTI data.

Respiratory complications occurred in 26% of participants during the acute phase (traumatic SCI 34%; NTSCI 11%), and 19% during rehabilitation (traumatic SCI 24%; NTSCI 7%). Those with traumatic SCI were much more likely to have respiratory complications compared to those with NTSCI (Based on records of 172 participants [acute care] and 167 [rehabilitation]).

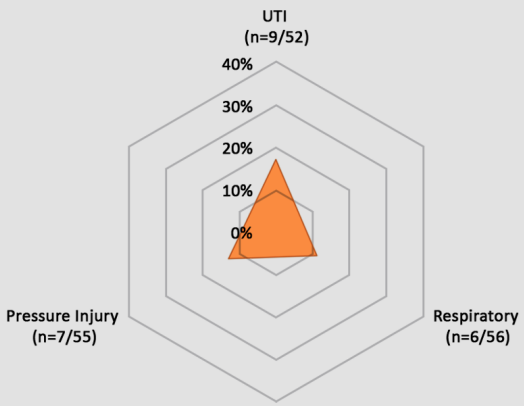
Pressure injuries occurred during rehabilitation in 22% of cases based on the records of 166 participants. Pressure injuries also occurred during acute care in 12% of cases, also based on the records of 166 participants.

Pre-injury co-morbidities reported were similar between the traumatic and non-traumatic SCI participants. The most common co-morbidities were hypertension, followed by depression, osteoarthritis, diabetes and asthma.

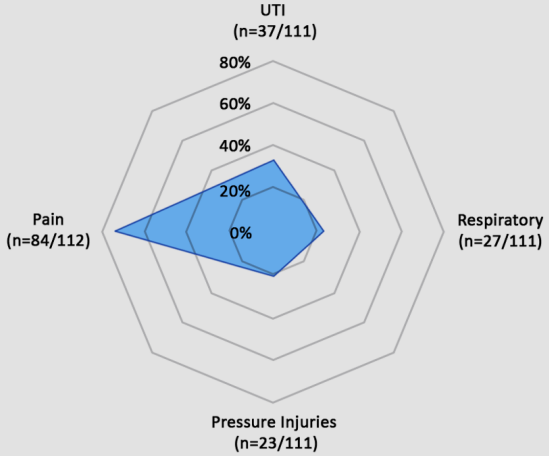
Traumatic SCI acute care complications



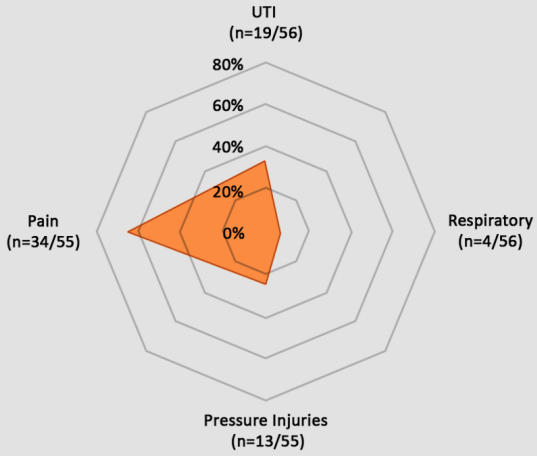
Non-traumatic SCI acute care complications



Traumatic SCI rehab complications



Non-traumatic SCI rehab complications



What does the NZSCIR Annual Report 2019 tell us?

NZSCIR helps connect clinicians, researchers, health care administrators and people living with SCI in order to facilitate the translation of research into clinical practice, and promote evidence-based practices to improve outcomes for those living with SCI. This report represents the third complete calendar year of data from the NZSCIR.

With three calendar years available, comparisons can start being made. Even with limited data, it will inform improvements in how SCI is managed in NZ.

NZSCIR will keep evolving to ensure it facilitates world class research, promotes excellence in care and meets the needs of people living with SCI.

Refinements will continue to be made to the data sets and collection methods to gather more complete data moving forward. Community follow-up on data collection is now underway as well as plans to enable more people with SCI to participate in the registry.

Report summary information

NZSCIR collects an expanded data set for participants who consented (n=170, 77%) and a minimal data set for those who were not consented (n=52, 23%). Consents were up from 2018. Participants were deemed to have complete data if key expected admission and discharge data had been entered into the database. The NZSCIR data used for this report were extracted on 2nd December 2020.

[1.] Ministry of Health HISO 10001:2017 Ethnicity Data Protocols. September 2017.

[2.] Roberts TT, Leonard GR, Cepela DJ. Classifications In Brief: American Spinal Injury Association (ASIA) Impairment Scale. Clin Orthop Relat Res. 2017;475(5):1499- 1504. doi:10.1007/s11999-016-5133-4

Data collected from 222 new injuries between 1 January 2019 and 31 December 2019 (or NTSCI admission to rehabilitation between these dates).

Number of participants represented in each data summary:

Traumatic SCI vs non-traumatic SCI: 222

Mechanism and cause of Injury: 222

Gender/ Ethnicity/ Age: 222

Pre-existing conditions: 170

Severity and level of injury: AIS 222 and level of injury 222

Surgical intervention rates: 222

Walking in the community: 162

Length of stay: 222

Discharge destination: 222

Complications during acute care:

UTI: 164
Respiratory: 172
Pressure injuries: 166

Complications during rehabilitation:

Pain: 165
UTI: 167
Respiratory: 167
Pressure injuries: 166

Glossary

Cervical spine - The upper seven vertebrae located in the neck (C1 - C7). The nerves in this area control head and neck movement, the diaphragm, deltoids, biceps, and muscles controlling the wrist and hands.

Complete injury - An injury where there is no sensory and motor function (inability to feel or move) preserved in the last nerves leaving the spinal cord (sacral 4th and 5th nerves). This usually results in a total lack of sensory and motor function below the level of the injury.

Incomplete injury - An injury where there is some sensory or motor function (ability to feel, touch or move) below the level of the injury. This must include the last nerves leaving the spinal cord (sacral 4th and 5th nerves).

Independently walking in the community – Classified by physiotherapists as someone who is able to walk 100m outdoors unsupervised, with or without mobility aids.

Lumbar spine - The five vertebrae in the lower back (L1 - L5). Injury to this area damages the very lowermost tip of the spinal cord (known as the conus medullaris) or the cauda equina which results in decreased control of hips and legs, as well as bladder, bowel and sexual function.

Non-traumatic spinal cord dysfunction/injury (NTSCI) - A spinal cord injury that occurs as a result of a medical cause such as degeneration, infection or cancer.

Paraplegia - Complete or partial loss of sensation and/or movement in the legs and often in part of, or the entire trunk. It is caused by an injury to the spinal cord in the thoracic (trunk) region or below including cauda equina.

Pressure injuries -Tissue injured by pressure and/or shear.

Respiratory complications – Includes pneumonia, venothromboembolic events (including pulmonary embolus and deep vein thrombosis), obstructive sleep apnea and other respiratory conditions.

Sacral spine -The five vertebrae located in the pelvic area (S1 - S5). As with lumbar injuries, damage to the sacral nerves can result in decreased control of hips, legs, bladder, bowel and sexual function.

Supra-regional spinal service/facility - NZ has two supra-regional spinal services and four facilities. Canterbury District Health Board: Christchurch Hospital (acute) and Burwood Spinal Unit (acute/rehabilitation). Counties Manukau Health: Middlemore Hospital (acute) and Auckland Spinal Rehabilitation Unit (rehabilitation).

Spinal cord injury (SCI) - Damage to the spinal cord resulting in impairment of muscle function, sensation and/or autonomic function (bowel, bladder and sexual function).

Tetraplegia or Quadriplegia - Complete or partial loss of sensation and/or movement in the arms, and typically in the trunk and legs. It is caused by an injury to the spinal cord in the neck.

Thoracic spine - The twelve vertebrae that extend through the chest area (T1 - T12). The nerves in this area control chest and abdominal muscles.

Traumatic spinal cord injury (tSCI) - A spinal cord injury that occurs as a result of trauma such as a vehicle crash or fall from a building.

Urinary Tract Infection (UTI) - A bacterial infection of the urinary tract, treated with antibiotics.

NZSCIR is sponsored by the Accident Compensation Corporation, Canterbury DHB and Counties Manukau Health

Tracey Croot
Canterbury DHB NZSCIR Coordinator
Burwood Spinal Unit, Christchurch
Phone: 03 3837559
0211456300
NZSCIR@cdhb.health.nz

Greta Minty
Counties Manukau Health NZSCIR Coordinator
Auckland Spinal Rehabilitation Unit, Auckland
Phone: 09 2709000
0211920377
NZSCIR@middlemore.co.nz

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Te Poari Hauora ō Waitaha

COUNTIES MANUKAU HEALTH