



NZ Spinal Cord Injury Registry
Te Rēhita Whara Aho Tuaiwi ā-Motu

New Zealand Spinal Cord Injury Registry

Annual Summary Report 2023

In partnership with



The **New Zealand Spinal Cord Injury Registry (NZSCIR)** team would like to thank the 3,197 people with spinal cord injuries who have contributed their time and experience to the Registry. We would also like to acknowledge all the spinal service clinicians for their work and inputting data, and the Praxis Spinal Cord Institute for their ongoing Registry support and expertise.

Thanks also to statistician Asheel Ramanlal, for his specialist knowledge in developing this report, and Jo Kinley, from Hullabaloo Design, for bringing our vision to life.

And finally, a big thank you to the individuals who have allowed us to use their images. We ask that these images are not copied or used for any other purpose.

Cover photo: Jeremy Brick, ACC

How to cite this document:

New Zealand Spinal Cord Injury Registry (2024).
New Zealand Spinal Cord Injury Registry Annual
Summary Report 2023.





Contents

| | |
|---|----|
| About this report | 4 |
| NZSCIR 2023 data at a glance | 5 |
| Total 2023 NZSCIR participants..... | 6 |
| • Participants by type | |
| • Participants by gender | |
| • Participants by age | |
| • Participants by ethnicity | |
| Traumatic Spinal Cord Injuries 2023..... | 10 |
| • tSCI by cause/age | |
| • tSCI by gender | |
| Non Traumatic Spinal Cord Injuries 2023..... | 12 |
| • ntSCI by cause/age | |
| • ntSCI by gender | |
| tSCI and ntSCI comparisons across services | 14 |
| What is the level and severity of injury? | 15 |
| What is the length of hospital stays?..... | 16 |
| Where do people go after discharge from hospital? | 17 |
| How many people have surgery? | 18 |
| How many people walk on discharge?..... | 18 |
| Secondary complications | 19 |
| What does the NZSCIR Annual Report tell us? | 20 |
| Denominators for report summaries..... | 21 |
| Glossary..... | 22 |
| References..... | 23 |
| Contact..... | 24 |

Spinal Cord Injury and the Registry

Spinal cord injury/impairment (SCI) is a rare but complex condition. Every year in New Zealand approximately 220 - 270 adults are diagnosed with a SCI or **cauda equina injury (CEI)** sustained either through an injury (**traumatic spinal cord injury [tSCI]**) or due to an illness or medical causes (**non-traumatic spinal cord injury/impairment [ntSCI]**).

A SCI can occur at any age. Due to medical advances most people living with SCI now have a near normal life expectancy, but this brings progressive complexity for people and their lifelong self-management.

The NZSCIR was established in August 2016 to enable better information sharing, identify areas for service improvement, and to contribute to a national and international research effort to ensure best outcomes for people living with SCI.

The NZSCIR is jointly funded by the Accident Compensation Corporation (ACC) and Health New Zealand | Te Whatu Ora, in partnership with the Praxis Spinal Cord Institute, Canada.

Since August 2016, data has been collected from adults who have sustained a new tSCI or developed a new ntSCI and were admitted to either Auckland or Christchurch **supra-regional spinal service (spinal services)**. The journey through the spinal service for each participant is followed through their acute care (Christchurch Hospital or Middlemore Hospital), rehabilitation (Burwood Spinal Unit, Christchurch [BSU] or Auckland Spinal Rehabilitation Unit [ASRU]) and follow-up in the community. The data collected supports improvements to services and clinical practice; and provides a database for research. These activities assist in achieving the best outcomes for people living with SCI.

A governance group, representing consumers, researchers, clinicians, funders and spinal service managers, ensures the efficient and effective operation of the NZSCIR. Four Registry Coordinators, two employed at each spinal service, provide the day-to-day management, whilst the NZ Spinal Trust provides administrative support to the NZSCIR.

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

About this Report

The NZSCIR 2023 Annual Report is an overview of the data collected from 261 NZSCIR participants who sustained either a new tSCI in 2023 or developed a new ntSCI and were admitted to either spinal service from 1 January - 31 December 2023. The Registry contains the majority of those who sustain or develop a SCI in Aotearoa New Zealand. It does not collect data on those few who are solely treated in regional hospitals and are not admitted to the spinal services.

This year comparative data has been included to demonstrate where 2023 data has similarities and differences to preceding years (2017-2022 combined). Percentages have been used to easily show comparisons when total numbers differ. This also provides a glimpse into the five-year report due in the following months. The first sections of the 2023 report will examine the whole SCI population, before dividing into tSCI and ntSCI for further analysis.

This report includes information about participant demographics, type and causes of SCI, length of hospital stays, functional outcomes and secondary complications after SCI. It serves as a brief descriptive account that may inform research, clinical practice, policy and programme planning.

Strict statistical rules have been applied to protect individuals from being identified. Raw numbers (n) have been kept where applicable. However, raw numbers have been removed where there are less than five persons in a group, and a percentage only has been used.

Certain terms are bolded throughout this report. Definitions can be found in the glossary on page 22

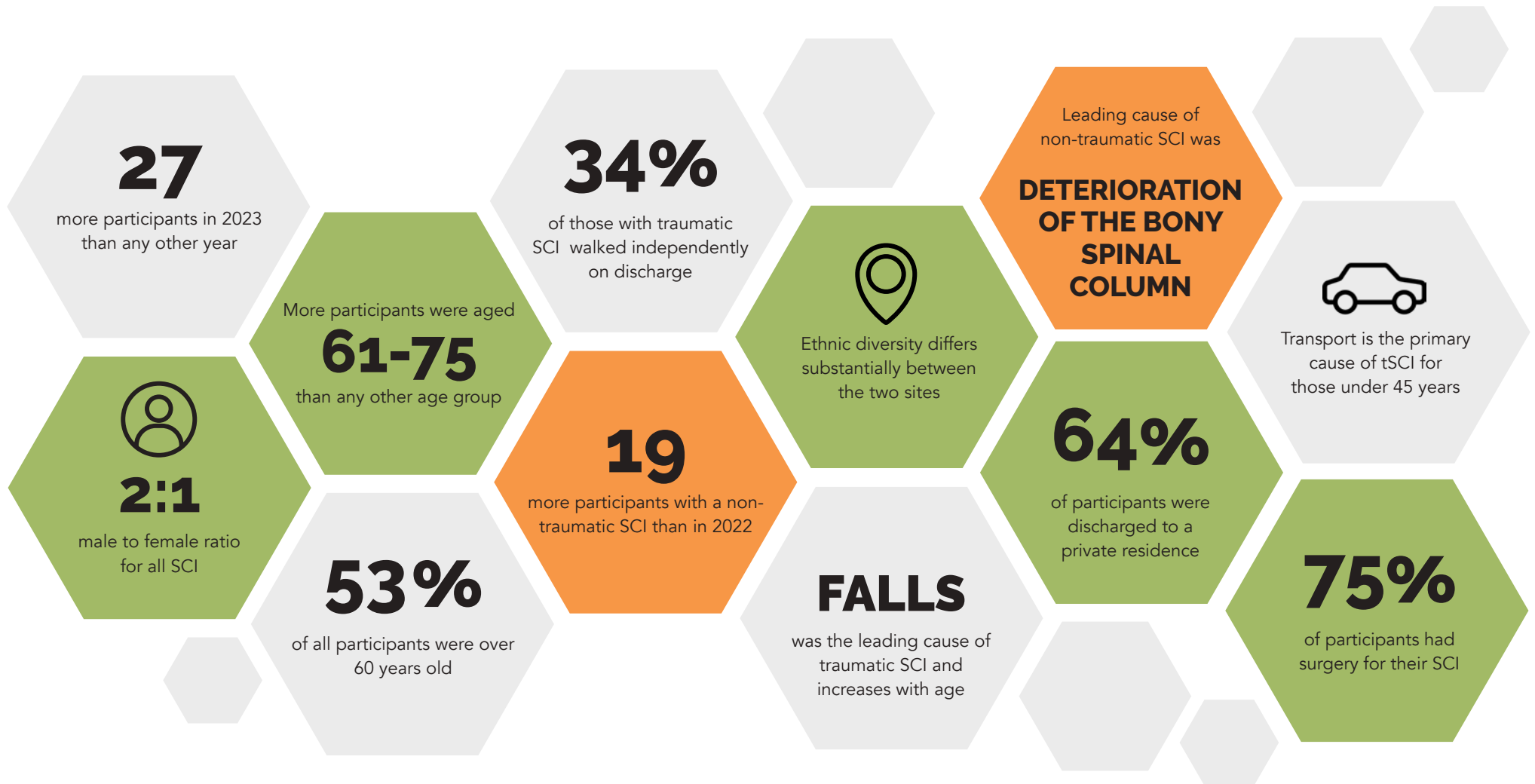
The NZSCIR governance group welcomes feedback or questions on this report. Please contact either NZSCIR Coordinators at NZSCIR@cdhb.health.nz or NZSCIR@middlemore.co.nz

More information about NZSCIR is available from www.nzscir.nz



Supporting
Positive
Futures

NZSCIR 2023 DATA AT A GLANCE



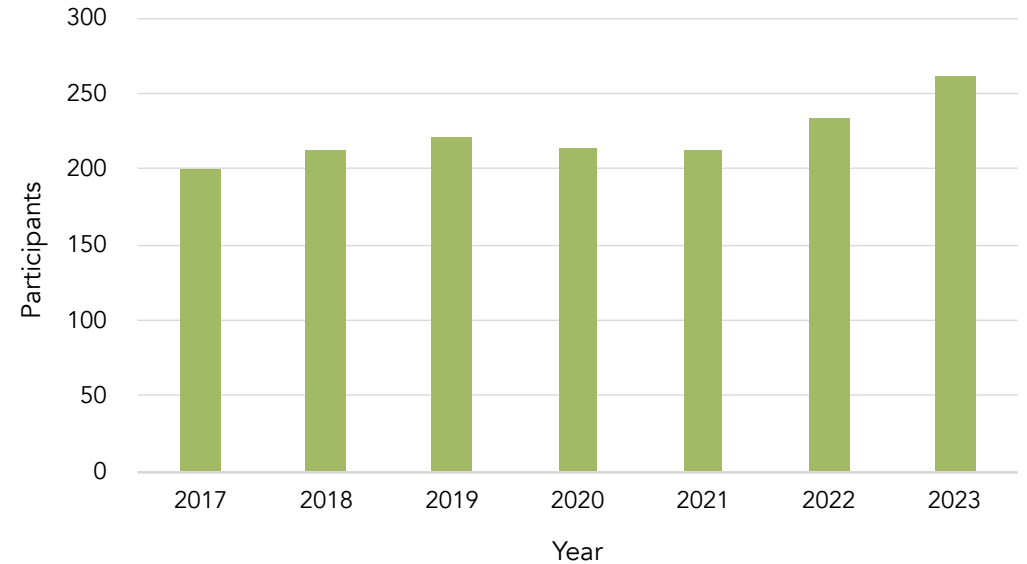
Total 2023 NZSCIR participants

Prior to the NZSCIR's establishment, the SCI incidence in NZ 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 million¹. In 2023, the incidence of those who attended either spinal service was close to 50 per million (based on NZ population in 2023 – 5,268,200)². This does not consider those with SCI not admitted to these services.



The total number of individuals with SCI in 2023 was 261. Figure 1 shows an increase of 27 participants when compared to 2022, which was the year with the greatest total prior to now. The rise is due to an increase in the number of ntSCI participants, particularly in the Christchurch catchment area. Possible reasons for this will be discussed on page 14.

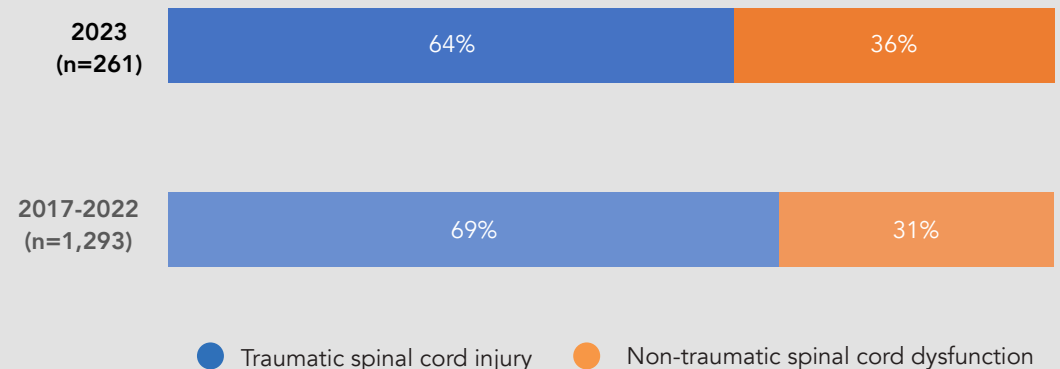
Figure 1: Total participants by calendar year (2017 -2023)



Participants by SCI type

Figure 2 shows a slight increase in the proportion of those admitted with a ntSCI compared to those with a tSCI in 2023. In 2024, the World Health Organisation reported that ntSCI are increasing, specifically in ageing populations, given increases in non-communicable (non-contagious) diseases such as tumors, degenerative and vascular conditions that can cause spinal cord damage³.

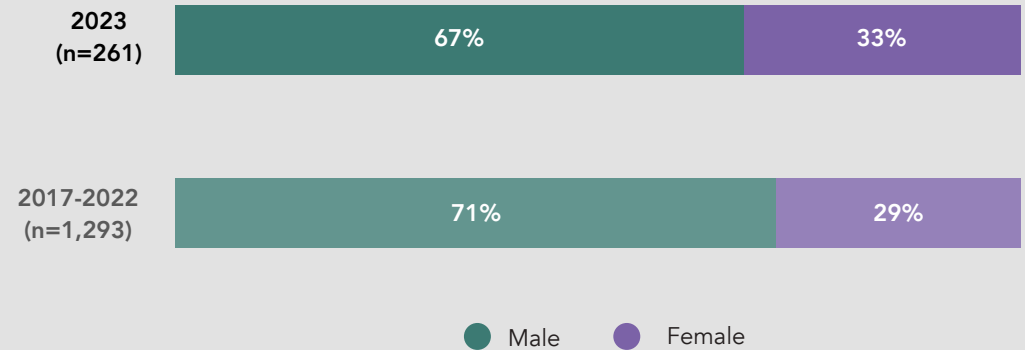
Figure 2: Total participants by type (%)



Participants by gender

In 2023, males accounted for 67% of persons with a SCI coming through the spinal services. The 2:1 ratio has remained consistent across the SCI population in Aotearoa NZ between 2017 to 2022 (Figure 3).

Figure 3: Total participants by gender (%)



Participants by age

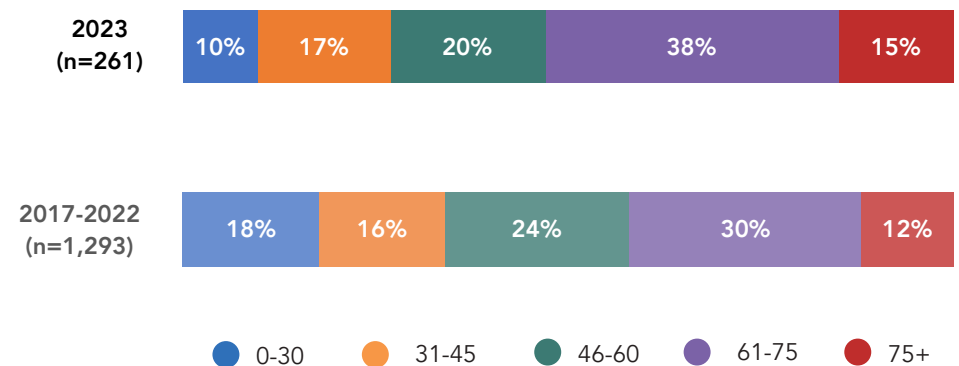
In Figure 4, over 50% of patients admitted to the spinal services in 2023 were aged 60+. This is an 11% increase compared to the previous six years. In 2023, the most common age group for having a SCI in NZ was 61-75 years.

The average age for having a SCI has been on the increase every year since 2016. This complex ageing population brings a higher number of co-morbidities to the rehabilitation journey.

The most common pre-existing conditions on admission to the spinal services has remained consistent since data collection started. These are high blood pressure, diabetes, depression or mood problems, arthritis, and asthma.

Causes of SCI, filtered by age, will be discussed on pages 11 & 13.

Figure 4: Total participants by age (%)



Participants by ethnicity

In previous reports, NZSCIR has followed the Ministry of Health’s Ethnicity Data protocols for reporting. This recently changed from using **prioritised ethnicity** to using total response **ethnicity**.⁴ A person can belong to more than one ethnic group, and the NZSCIR caters for multiple responses.

- **Prioritised ethnicity** - the participant is allocated to a single ethnic group using a weighting system. The aim of prioritisation is to ensure each ethnic group is represented fairly and is not overwhelmed by the New Zealand European ethnic group.
- **Total response ethnicity** - recognises and reports every ethnicity selected. One single participant can have more than one ‘ethnicity response’ (e.g. Mr A identifies as Tongan and Samoan so records two ethnicity responses).

The prioritisation model is inconsistent with the concept of self-identification, where one identifies as more than one ethnicity. As a result, going forward, NZSCIR will be using the total response method. The prioritised ethnicity model has been included (Figure 5), as a means of comparison with previous years, which shows very similar results over the years. However, Figure 6 uses the total response ethnicity model, and this will be used for future reports. For ease of comparison in this document each ethnicity response is included then converted to a percentage.

Figure 5: Total participants by prioritised ethnicity (%)

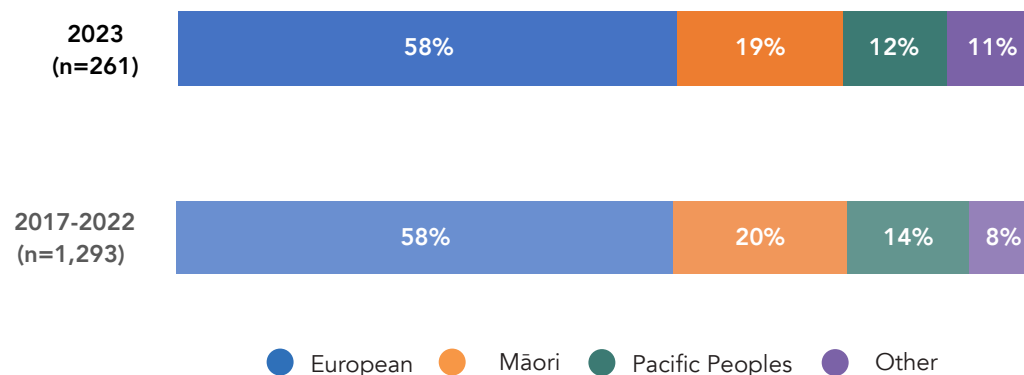
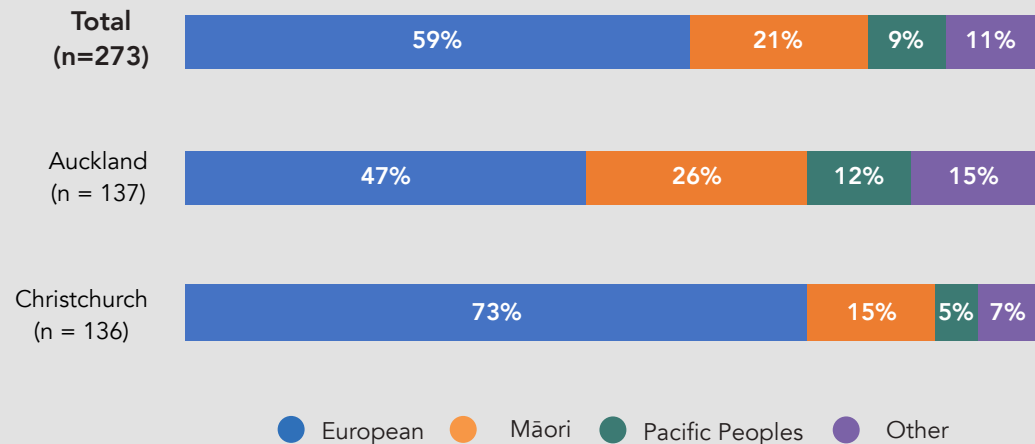


Figure 6 highlights the ethnic makeup of the two regions.

- The ethnicity ratio of people identifying as European: Māori /Pacific Peoples/Other in Auckland is close to 1:1, whilst in Christchurch it is closer to 3:1, showing the ethnic diversity between regions.
- Auckland has a greater proportion (over half) of participants who identify as either Māori, Pacific Peoples or Other ethnicities.
- These findings align with what we know about the ethnic makeup of these two regions.⁵

Figure 6: Total response ethnicity (%) by enrolling facility





Bringing connection
between all ethnicities.
Sharing cultural
experiences developing
friendships
whilst encouraging
and embracing cultural
diversity
with a strong sense of
belonging
and motivation to
succeed.

*Artwork and poem gifted to
ASRU by Hilton Hikawai-Poi*



Traumatic Spinal Cord Injury tSCI

A SCI sustained from an accident or a surgery-related injury is referred to as a traumatic SCI. NZSCIR data across 2017-2023 shows 66-73% of SCI's, admitted to either spinal service, were traumatic in nature (Figure 7).



Figure 7: Comparison of tSCI by year

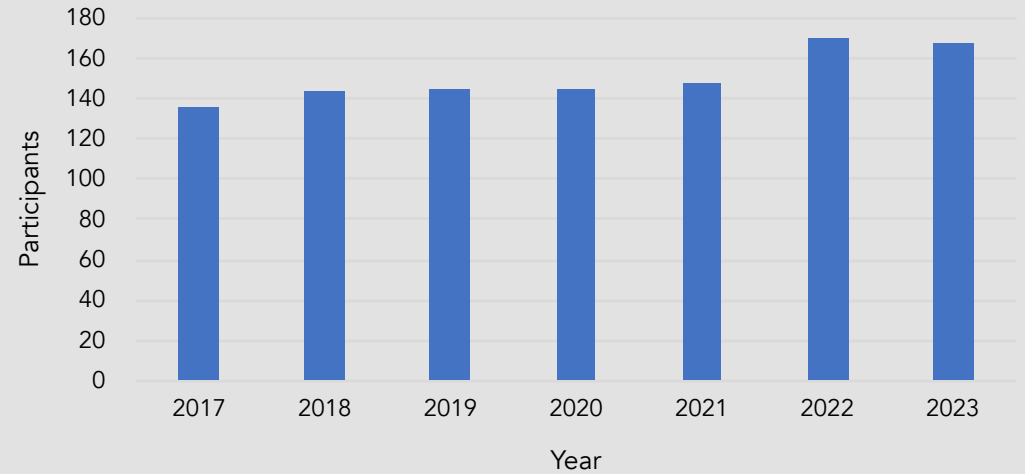


Table 1 shows the causes of tSCI sustained by those admitted to the spinal services in 2023.

Table 1: tSCI causes 2023 (n = 167)

| Fall | Transport | Other | Sports |
|------|-----------|-------|--------|
| 41% | 32% | 19% | 9% |
| n=68 | n=53 | n=31 | n=15 |

Fall – includes anything from a slip (on level ground) to a fall from a height.

Transport – any injury sustained while using a vehicle for transport (e.g. accident involving a motor vehicle, motor bike, electric scooter or commuter pushbike).

Other – includes assault, deterioration of function post-surgery, or other non-classified causes.

Sports – any sporting-related injury e.g. wheeled non-motor sports (e.g. cycling) water-related activities (e.g. accidents in the surf, pools or rivers), ice or snow sports, acrobatic sports, team ball sports (e.g. rugby), horse riding, power or aero sports.

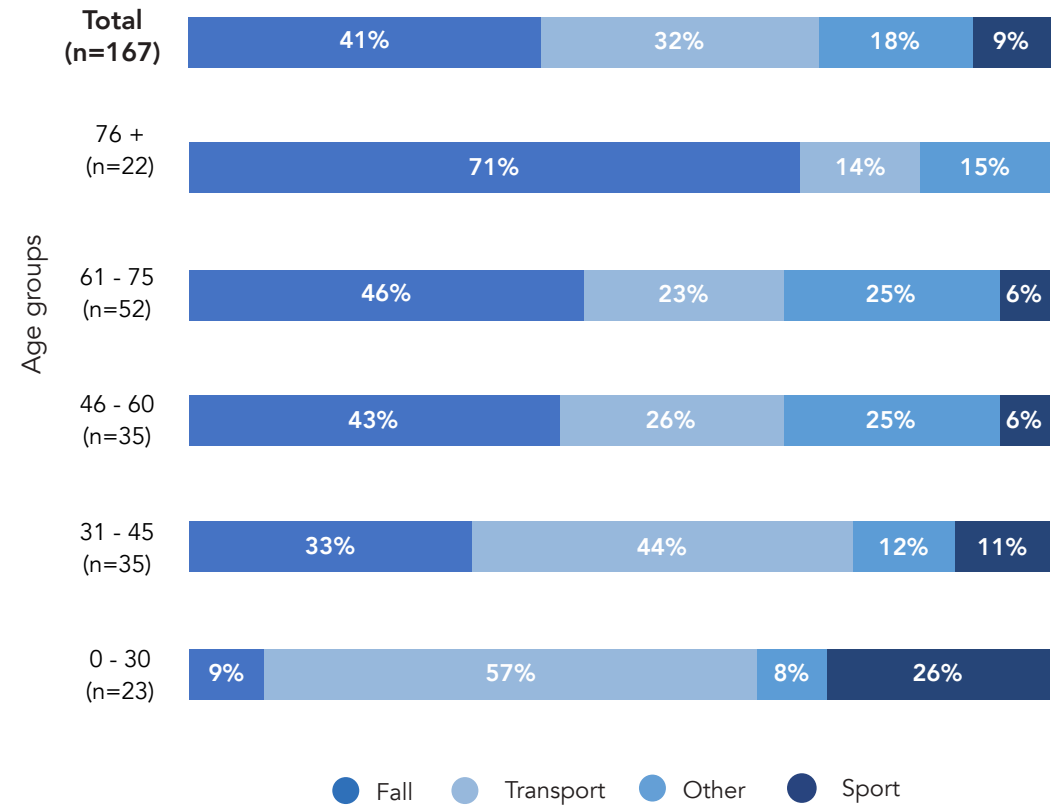


Traumatic SCI by age

Traumatic causes are shown by age in Figure 8. In 2023:

- Falls remain the leading cause of tSCI (41%), followed by transport related injuries (32%)
- Percentage of falls steadily increase with each age bracket
- Transport is the primary cause of tSCI in those under 45 years
- Sporting injuries are highest in those under 30 years
- In 2023, more people aged between 61-75 had a tSCI than any other age group
- The pattern of age and tSCI causes have remained consistent compared to previous years.

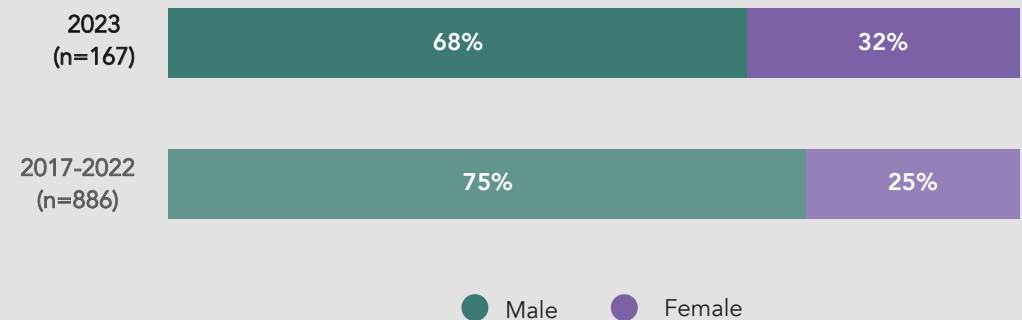
Figure 8: 2023 Comparison of age group with cause of tSCI (%)



Traumatic SCI by gender

Males remain two times more likely to have a tSCI than females, however this is the first time, since records began, that the percentage of females with tSCI in any one year is over 30%.

Figure 9: tSCI by gender (%)



Non-traumatic Spinal Cord Injury (ntSCI)

A ntSCI occurs when the spinal cord is affected by an illness or medical cause. This can be through deterioration of the spinal column, infection, cancer, or blood supply issues affecting the spinal cord. There was a noticeable increase in ntSCI (19 more than in 2022) admitted to the Auckland and Christchurch spinal services in 2023 as can be seen in Figure 10. These figures have prompted many discussions within the Registry team. Possible reasons for the increase in numbers will be considered in the comparisons section below.



Table 2 shows the causes of ntSCI acquired by those admitted to either spinal service.

Figure 10: Comparison of total ntSCI by year

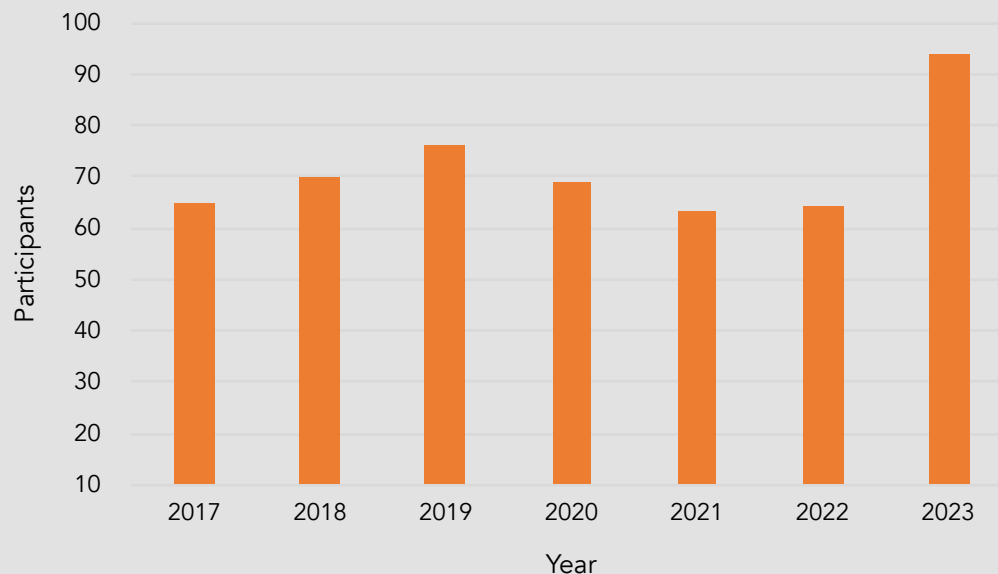


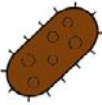



Table 2: tSCI causes 2023 (n = 94)

|  Vertebral column degenerative disorder |  Cancerous Tumour |  Bacterial infection |  Vascular disorders/Other |
|--|--|---|--|
| 41% | 26% | 19% | 14% |
| n=39 | n=24 | n=18 | n=13 |

Deterioration of the bony spinal column – Any deterioration of the spinal column which protects the spinal cord can lead to spinal cord damage. This can include disc, ligament, joint or bony damage.

Bacterial infection – such as discitis or abscess

Cancerous tumours - causing spinal cord compression

Vascular disorders – bleeds or lack of blood flow

Other – e.g. non-cancerous tumours, inflammatory/autoimmune disease, viral infection

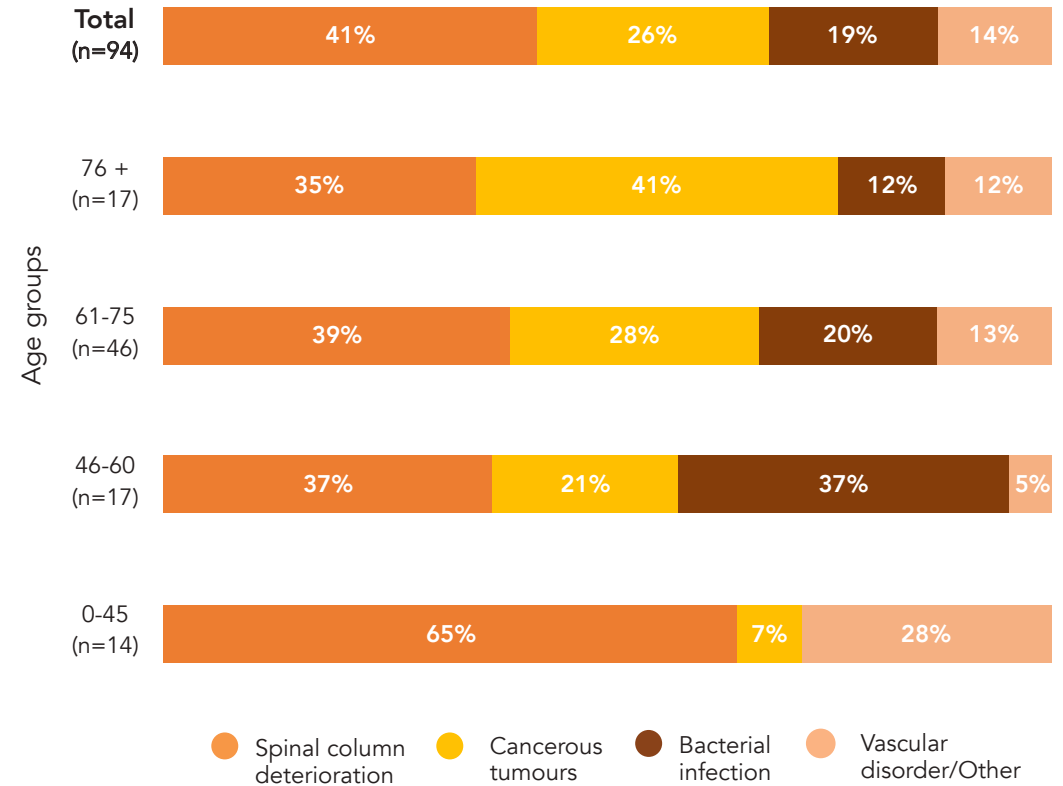


Non-traumatic SCI by age

NtSCI causes are shown by age in Figure 11. In 2023:

- Deterioration of the bony spinal column was the leading cause of ntSCI across most age groups. This has been the case for the last three years.
- There were no reported bacterial infections causing a ntSCI in those under the age of 45.
- In 2023, more people aged between 61-75 had a ntSCI than any other age group.

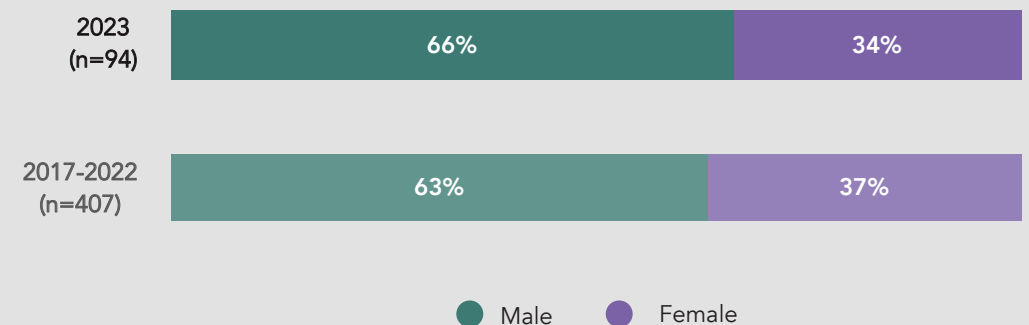
Figure 11: 2023 Comparison of age group with cause of ntSCI (%)



Non-traumatic SCI by gender

In 2023, 34% of those with ntSCI were female, slightly less than preceding years. Females usually show a slightly higher rate of ntSCI than tSCI. This year, females are represented similarly across both tSCI (32%) & ntSCI (34%) causes, the closest since data collection began in 2016.

Figure 12: ntSCI by gender (%)



tSCI and ntSCI comparisons across services

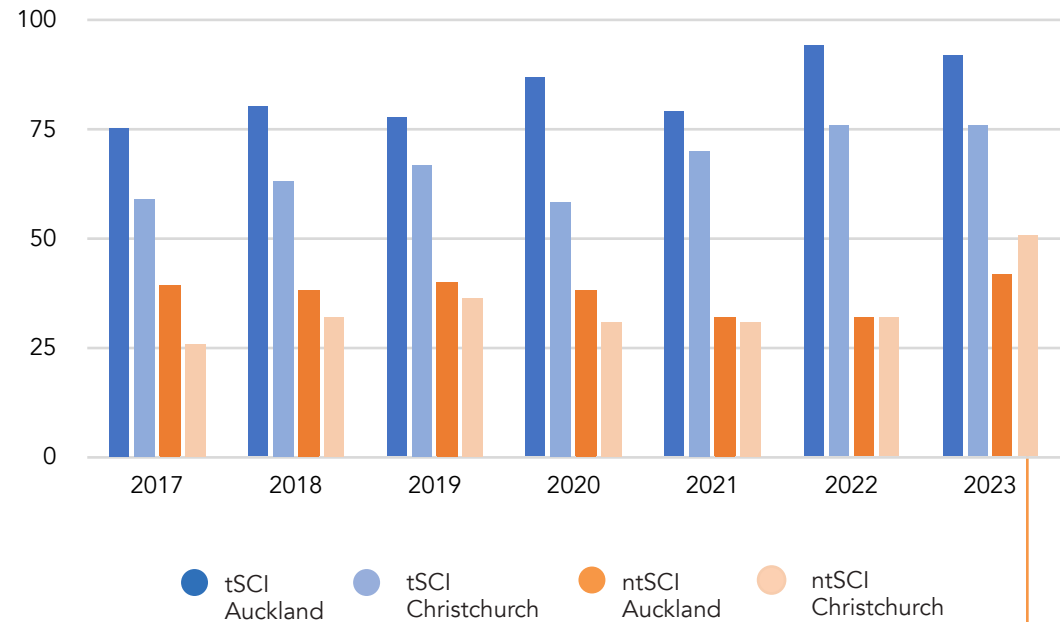
In 2023, there was an increase in the number of participants with ntSCI enrolled in the registry. Further investigation showed the greatest change occurred at the Christchurch spinal service (see Figure 13).

- Auckland spinal services usually enrol greater numbers of both tSCI and ntSCI participants. This has been the case each year since 2017
- The final 2023 bar shows there were 19 more ntSCI Christchurch participants in 2023 than in 2022 (increased by a third)
- Christchurch recorded more ntSCI than Auckland for the first time since 2017

The Christchurch increase was deemed notable enough to investigate further. Understanding why there was a large increase in ntSCI persons admitted to the Christchurch spinal services, the following were considered:

- 2023 was the first year Christchurch NZSCIR had full staffing (equivalent of one full time position). It is possible data collection was more comprehensive.
- Christchurch is the main tertiary centre servicing the South Island population (compared with three in the immediate Auckland region), therefore many non-traumatic spinal surgeries occur at Christchurch Hospital.
- Potential differences in admission criteria for ntSCI between the Christchurch and Auckland services.
- There was a reduced median length of stay at the BSU, allowing more admissions.
- There were potentially more non-traumatic injuries referred to and admitted to the Christchurch spinal service.

Figure 13: Comparison of tSCI & ntSCI numbers across services 2017-2023 (%)



Christchurch ntSCI increased by a third 2023 vs 2022.

Potentially due to:

- improved data collection
- ntSCI surgeries ▲
- differing admission criteria
- LOS ▼
- more ntSCI presenting in the Christchurch region

What is the severity and level of injury?

The spinal cord has four regions: **cervical**, **thoracic**, **lumbar** and **sacral**. The level of injury identifies the lowest level of the spinal cord (from the head) that has normal movement and sensation. Figure 14 shows people grouped into those with tetraplegia and those with paraplegia (including cauda equina), based on their level of injury. Someone with **tetraplegia** has their arms, breathing muscles, body and legs affected as a result of a neck injury. Someone with **paraplegia** has their body and/or legs affected from an injury to their spinal cord below the neck region (thoracic, lumbar or sacral). All people with a SCI will likely have bowel, bladder and sexual function affected. People with **incomplete** injuries at any level may be able to stand or walk, depending on how their spinal cord was affected (see grades below).

In 2023, participants with a tSCI were more likely to have tetraplegia, whilst those with a ntSCI were more likely to have paraplegia/cauda equina (Figure 14). This trend has been consistent since NZSCIR records began in 2016. Please note, data from 13 participants has been excluded as the level of injury was not able to be assessed.

A participant's severity and level of injury are routinely assessed throughout their recovery, using the American Spinal Injury Association Impairment Scale (AIS) standardised assessment. The extent of the severity of the injury is defined below:

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 people to achieve independent mobility one-year post-SCI.⁵ Please note, 11 participant's data have been excluded from Figure 15 as the assessment was not able to be completed.

Figure 14: Last known level of SCI (%)

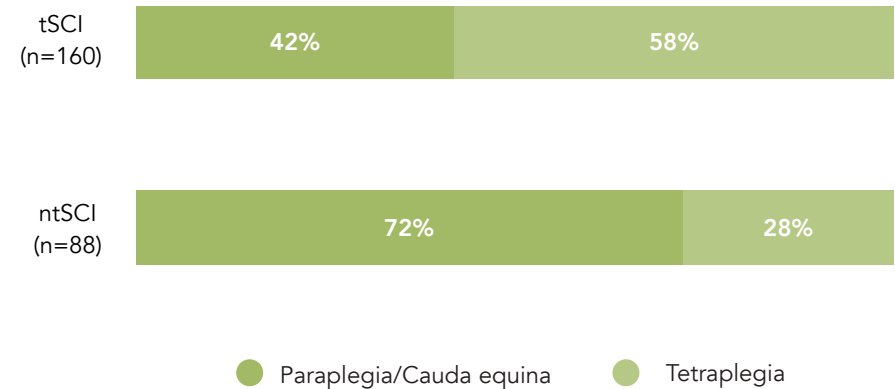
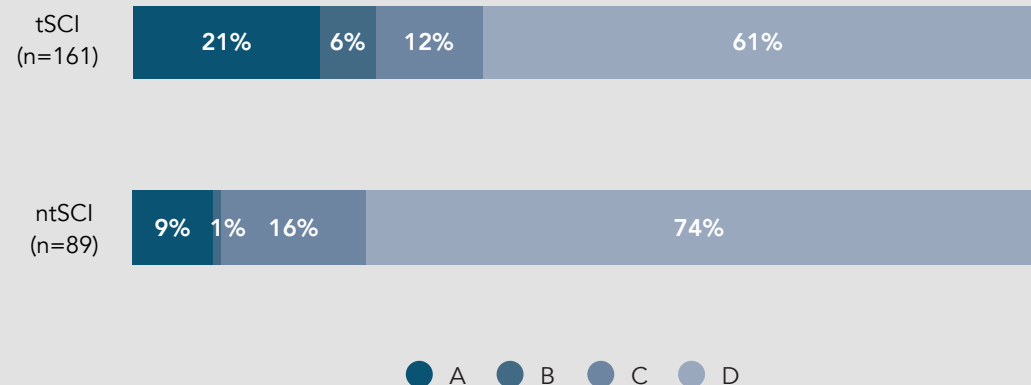


Figure 15: Last known severity of SCI (%)



What are the length of hospital stays?

NZSCIR captures the length of stay (LOS) in acute and rehabilitation settings. Table 3 shows the median LOS at each spinal service in 2023, compared with 2022.

Table 3: Comparison of 2023 median LOS with 2022 (days)

| | Paraplegia | | Tetraplegia | |
|---------------------|-------------|--------|-------------|--------|
| | 2023 median | Change | 2023 median | Change |
| Auckland | 76 | | 102 | |
| Acute | 25 | ▲ 2 | 26 | ▲ 8 |
| Rehab | 51 | ▼ 3 | 76 | ▲ 1 |
| Christchurch | 79 | | 58 | |
| Acute | 16 | ▼ 1 | 15 | ▼ 1 |
| Rehab | 63 | ▼ 12 | 44 | ▼ 34 |

There continues to be a noticeable difference between sites for LOS.

- In Auckland, participants stayed longer in the acute hospital. Acute stays in Christchurch are shorter, possibly due to BSU accommodating those with higher acute needs earlier.
- Auckland LOS was consistent between 2022 and 2023.
- There was a noticeable decrease in the rehab median LOS for Christchurch for both paraplegia and tetraplegia. This is a change from previous years where the median LOS in rehab is usually longer in Christchurch than in Auckland.
- Comparison between sites is difficult. Many factors are at play including length of waitlists, differing admission criteria, and bed numbers (ASRU 20, BSU 30). Investigation into these changes is warranted but beyond the scope of this report. However, this could help explain the increased number of ntSCI admitted to the Christchurch services (reduced LOS = more bed availability).

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

Figure 16: ASRU Acute 2023 LOS (days)

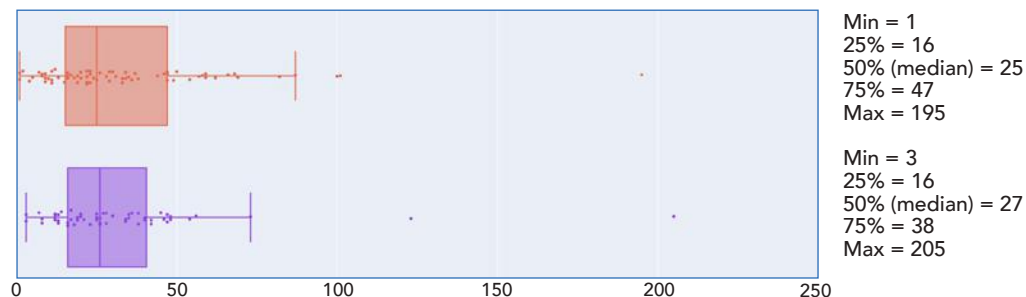


Figure 17: BSU Acute 2023 LOS (days)

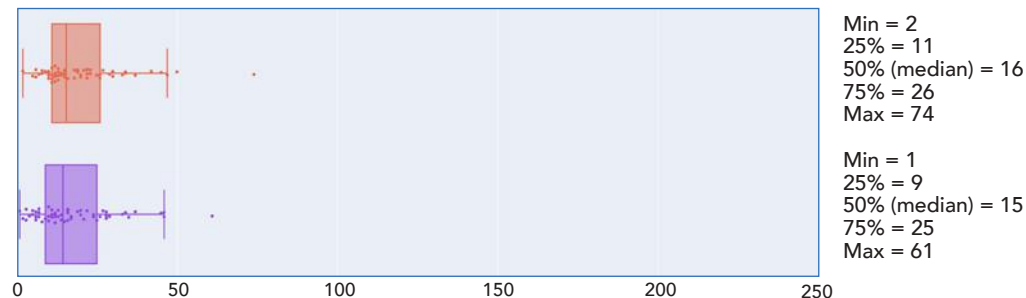


Figure 18: ASRU Rehab 2023 LOS (days)

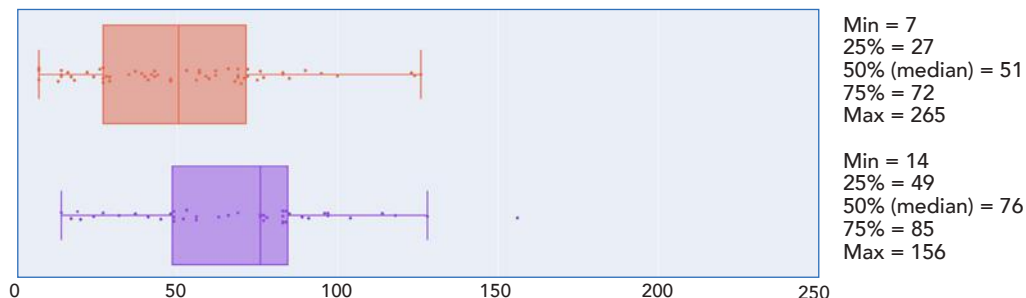
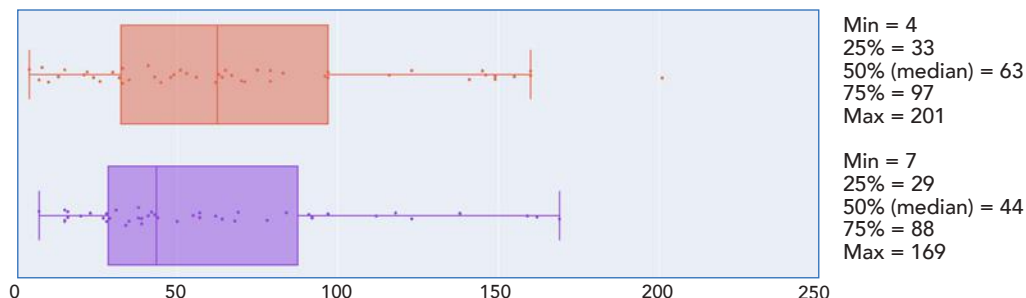


Figure 19: BSU Rehab 2023 LOS (days)



● Paraplegia ● Tetraplegia

Where do people go after discharge from hospital?

Where participants went on discharge from the spinal service is shown in Figure 20. NZSCIR captures the immediate discharge destination when participants are discharged from the spinal service but does not report on whether this is a temporary or final discharge destination.

The discharge destination options are:

Private residence – owned or rented house, flat, or apartment.

Hospital - ongoing rehabilitation and discharge planning at a regional hospital. As data collection stops on discharge from either spinal service, the NZSCIR does not collect the participants' discharge destination post-regional hospital discharge.

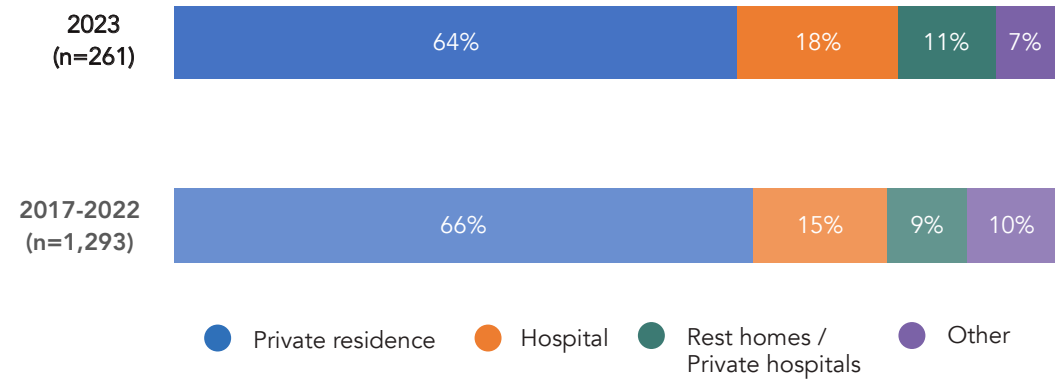
Residential care homes (RCH)/assisted living residence (ALR)/private hospital (PH) – includes nursing homes/rest homes (i.e. home where care is provided for those who require it) or private hospitals for long term hospital level care.

Other – includes groups with numbers too small to report on, such as those discharged to a hotel/motel or a correctional institute, those with no permanent discharge destination and those participants who died during spinal service admission.

In 2023:

- Participants discharged to a private residence in the community remained the most common discharge location since registry records began in 2016.
- Participants discharged from the Christchurch spinal service were nearly three times as likely to go to their regional hospital on discharge for ongoing rehabilitation or discharge planning, compared to those in Auckland.
- Admission to a residential care home on discharge was twice as likely in Auckland.

Figure 20: Discharge Destinations (%)



How many people have surgery?

Surgery can be performed to decompress the spinal cord and stabilise the bony spine. Surgical rates for 2023 are shown in Figure 21 and 22.

- The overall ratio for surgery versus non-surgical management is 3:1
- Those with a tSCI were slightly more likely to have surgery than those with a ntSCI.
- Those having surgical intervention for management of their SCI was slightly lower compared to 2022.
- Auckland participants had a higher surgical rate than in Christchurch.
- Auckland's surgical rates remained similar to 2022 with 79% of people with a tSCI and ntSCI having had surgery. Christchurch showed a 13% decrease when compared with 2022.

Figure 21: tSCI v ntSCI surgery rates (%)

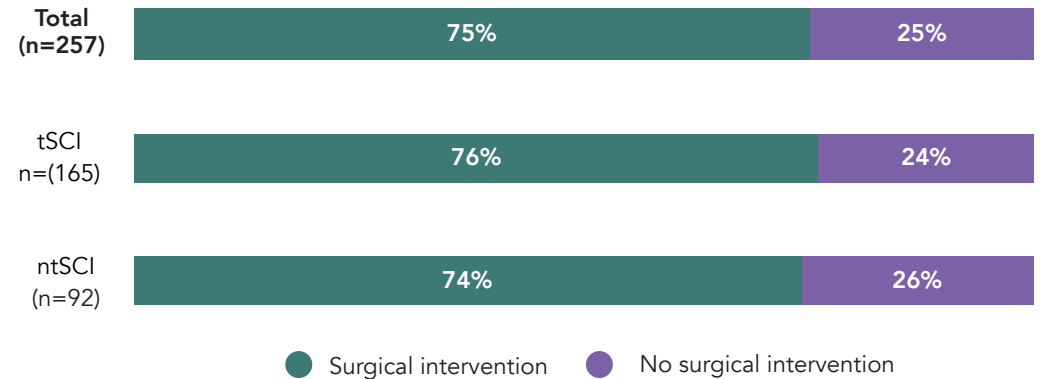
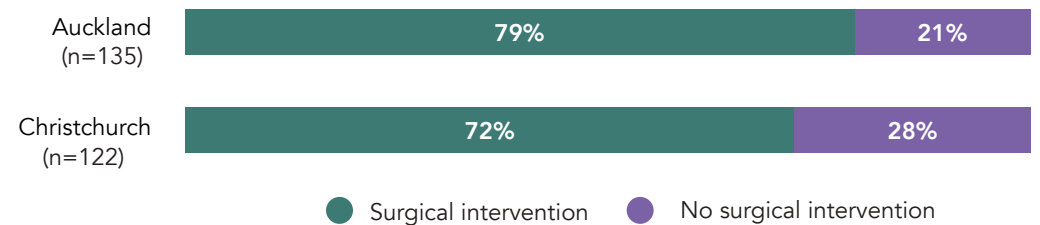


Figure 22: Auckland v Christchurch surgery rates



How many people walk on discharge?

On discharge, someone who can walk 100m outdoors unsupervised, with or without a mobility aid, is recorded as an independent walker.

Based on records of 160 participants (combined tSCI and ntSCI), 32% were independently walking on rehabilitation discharge. Those with traumatic SCI had a slightly higher rate of independent walking compared to those with non-traumatic SCI. Rates are similar to 2022.

Figure 23: ntSCI mobility on rehab discharge (%)

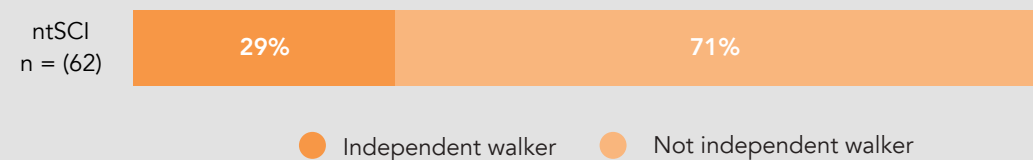
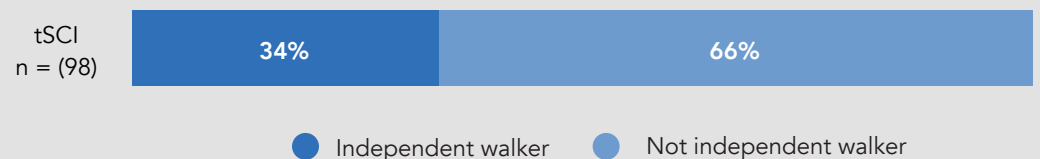


Figure 24: tSCI mobility on rehab discharge (%)



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

Urinary tract infections (UTI) as a complication, increased during acute stays but decreased slightly during rehabilitation, compared with 2022.

Acute **respiratory complications** were twice as likely in the tSCI population compared with the ntSCI population. This has been the case since the registry began. Pneumonia accounted for two thirds of acute respiratory complications. Rehabilitation respiratory complications reported included; obstructive sleep apnea, deep vein thrombosis/pulmonary emboli, and COVID. Rehabilitation pneumonia rates in those with a tSCI decreased compared with 2022.

Pressure injuries occurred during acute care for 6% of participants, which is the same as 2022. In the rehabilitation phase, pressure injuries occurred for 16% of participants, which was up slightly from 14% in 2022.

Pain on rehabilitation discharge remains the most commonly reported secondary complication. However, pain rates were decreased for both tSCI and ntSCI compared to 2022.

Figure 25: Acute complications

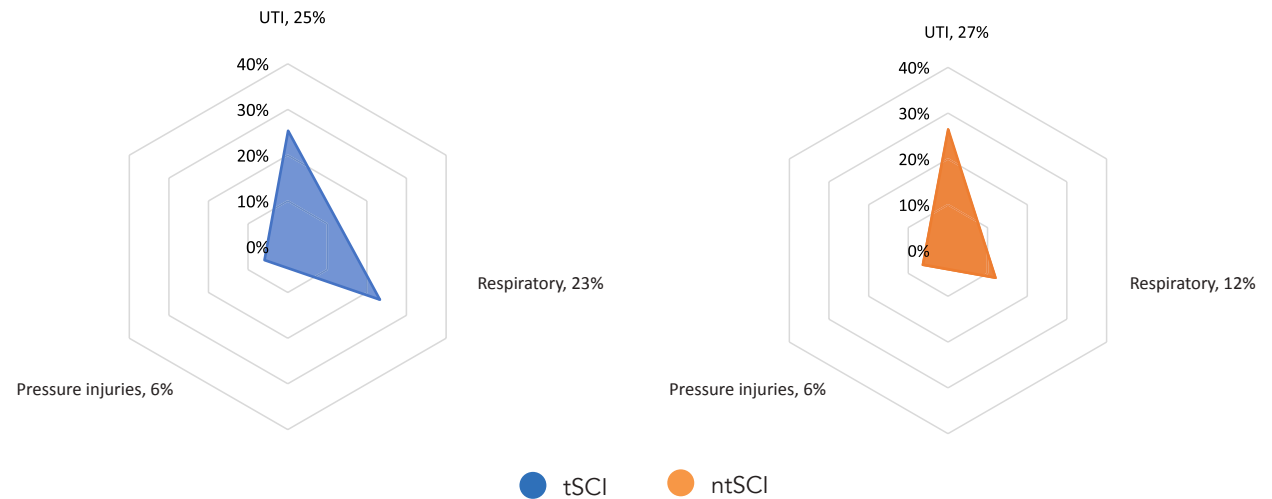
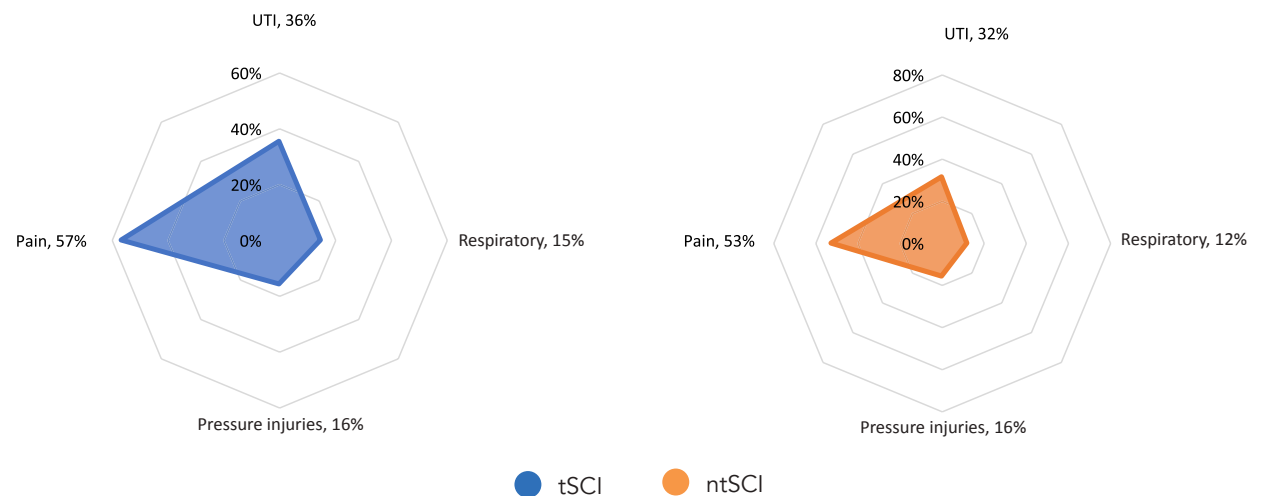


Figure 26: Rehab complications



What does the NZSCIR Annual report tell us?

2023 at a glance (page 5) gives a summary of the 'take home' messages from the 2023 Annual Report. Please refer back to this.

NZSCIR Data use

NZSCIR data is regularly and routinely used by both spinal services. Data is provided to clinicians and service managers to review and audit the spinal services. In 2023 NZSCIR data confirmed anecdotal evidence of an increase in clinical UTIs in Middlemore Hospital. The service was able to investigate further and make changes

In the past year, academic papers have investigated pain for those with SCI, and whether pressure injuries affects length of stay.

Data currently under investigation includes an interest in how participants manage their bladder on discharge and the rates of urinary tract infections, a comparison paper with Canada's Rick Hansen SCI Registry, and the difference in functional outcomes between tSCI sustained in sporting activities, compared with those sustained through another traumatic mechanism.

Data is currently being compiled for a one-off ACC data share for big machine analysis. This deidentified data set will be used to assess NZ's Spinal Destination Policy, designed to ensure those with a new traumatic SCI reach a spinal specialist service as soon as possible. Data will be used to assess timings, surgery, acute and rehabilitation outcomes, with a look to improve SCI services and outcomes across the country/motu.

Data has been used for multiple presentations including education in-services (in and outside of the service), orthopaedic conferences and presented at the Australia and New Zealand Spinal Cord Society (ANZSCOS) conference in Adelaide, Australia.

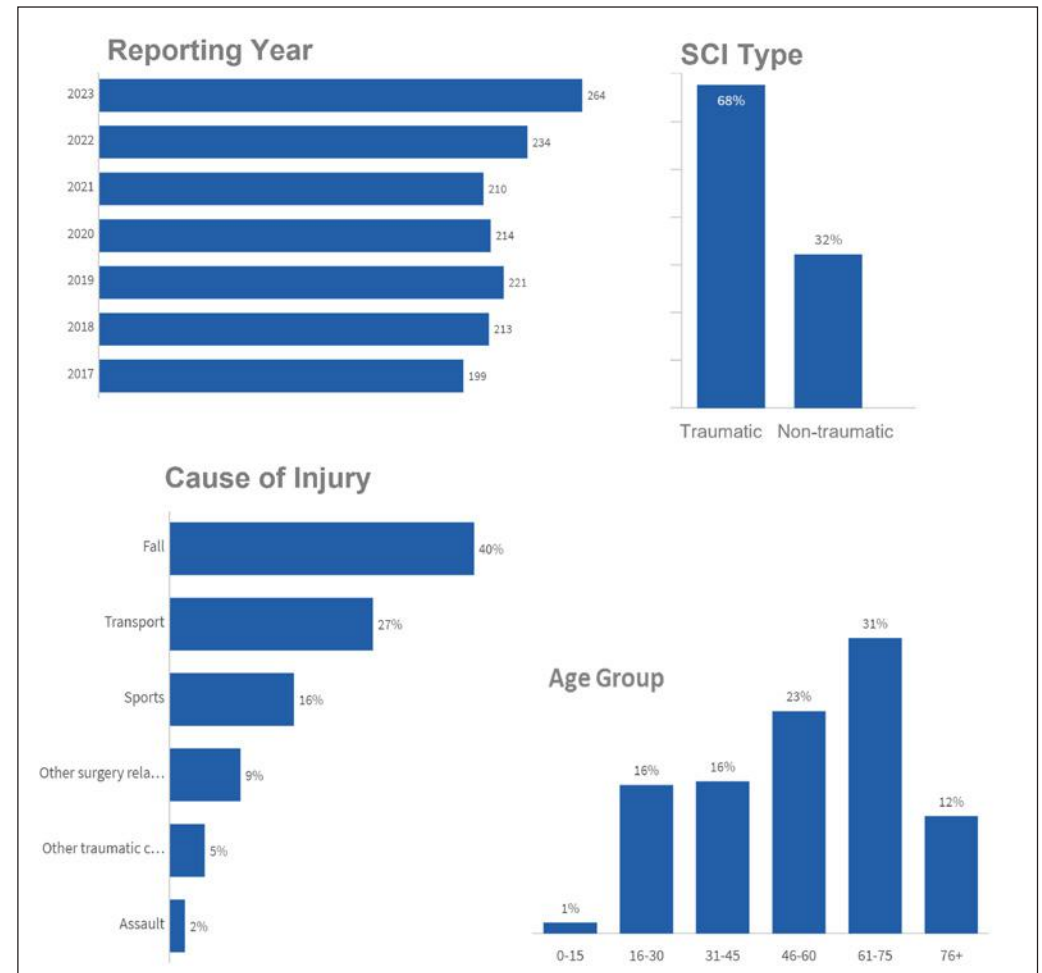
Limitations and future direction of NZSCIR

NZSCIR data is obtained only from those patients with a SCI that are admitted to either spinal service. NZ's two spinal service rehabilitation facilities are limited to 50 beds (20 beds in ASRU and 30 beds in BSU). Therefore, strict admission criteria apply and waiting lists are in place for referrals received.

Some persons may, due to long waitlists, be treated in the regional hospitals (with support from the spinal service clinical staff as required) meaning they don't fit the inclusion criteria for the Registry. If a person's SCI injury is mild, inpatient specialist

treatment may not be indicated and rehabilitation may be provided either as an outpatient (through outpatient/outreach spinal service clinics) or spinal service consultation with treating clinicians). When NZSCIR Coordinators reviewed referral data, it showed those not admitted to the spinal rehabilitation units were more likely to have had a ntSCI.

The Registry is keen to look at whether improvements can be made by collecting data from patients who are referred and accepted by the spinal service but not admitted to the specialist units. This will give us a fuller picture of the incidence of SCI in NZ, especially those with ntSCI.



Denominators for report summaries

Note: NZSCIR collects a full data set for participants who were consented (n=178) and a minimal data set for those who were not consented (n=83). NZSCIR data used for this report was extracted on 4th June 2024.



Data collected from 261 new injuries between 1 January and 31 December 2023 (or ntSCI admission to rehabilitation between these dates).

Number of participants represented in each data summary:

Traumatic and non-traumatic SCI: 261

Mechanism and cause of injury: 261

Gender/Ethnicity/Age: 261

Pre-existing conditions: 261

Severity and level of injury: AIS 248 and level of injury 250

Surgical intervention rates: 257 (Auckland n=135; Christchurch n=122)

Walking in the community: 160

Length of stay: 261

Discharge destination: 261

Complications during acute care:

UTI: 170

Respiratory: 177

Pressure injuries: 162

Complications during rehabilitation:

Pain: 154

UTI: 162

Respiratory: 165

Pressure Injuries: 162

Glossary

Cauda equina injury (CEI) – an injury or compression of nerve roots exiting the lumbar spine at the bottom of the spinal cord. Whilst not officially a spinal cord injury, this nerve injury does impact on bowel, bladder, sexual function and/or leg sensation and strength.

Cervical spine - The upper seven vertebrae located in the neck (C1 - C7). The nerves from 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).

Lumbar spine - The five vertebrae in the lower back (L1 - L5). Injury to this area damages the very lower-most 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 injury/dysfunction (ntSCI) - A spinal cord injury that occurs as a result of a medical cause or illness such as vertebral 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. Can affect breathing muscles. It is caused by an injury to the spinal cord in the thoracic (trunk) region or below including cauda equina. May have bowel, bladder and sexual function affected.

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

Respiratory complications - Includes pneumonia, venothromboembolic events (including pulmonary embolus [PE] and deep vein thrombosis [DVT]), obstructive sleep apnea and other respiratory complications.

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

Spinal cord injury/impairment (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. Usually affects breathing muscles. May have bowel bladder and sexual function affected. 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 from 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 fall, a motor vehicle crash, or a sporting accident.

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



References

1. World Health Organisation, 19 November 2013, Spinal cord injury, www.who.int/news-room/fact-sheets/detail/spinal-cord-injury. Retrieved November 2021.
2. StatsNZ, 16 November 2023, National populations estimates: At 30 September 2023, National population estimates: At 30 September 2023 | Stats NZ, Retrieved August 2024.
3. World Health Organisation, 16 April 2024, Spinal Cord Injury, www.who.int/news-room/fact-sheets/detail/spinal-cord-injury, Retrieved August 2024.
4. Ministry of Health HISO 10001:2017 Ethnicity Data Protocols. September 2017. Ministry of Health. www.health.govt.nz/publication/hiso-100012017-ethnicity-data-protocols. Retrieved May 2021.
5. StatsNZ, 2023 Census maps and data, Change in population by ethnic group by regional council, 2023 Census population change by ethnic group | 2023 Census maps and data (arcgis.com) , Retrieved August 2024
6. Roberts, T. T., Leonard, G. R., & Cepela, D. J. (2017). Classifications In Brief: American Spinal Injury Association (ASIA) Impairment Scale. Clinical orthopaedics and related research, 475(5), 1499–1504. [www.doi.org/10.1007/s11999-016-5133-4](https://doi.org/10.1007/s11999-016-5133-4)



NZSCIR is sponsored by the Accident Compensation Corporation and Health New Zealand | Te Whatu Ora.

Tracey Croot

Waitaha Canterbury NZSCIR Coordinator
Burwood Spinal Unit, Christchurch
Phone: 03 383 7559
Mobile: 021 594 291
NZSCIR@cdhb.health.nz

Alana Lash

Waitaha Canterbury NZSCIR Coordinator
Burwood Spinal Unit, Christchurch
Phone: 03 383 7559
Mobile: 021 594 291
alana.lash@cdhb.health.nz

Greta Minty

Counties Manukau NZSCIR Coordinator
Auckland Spinal Rehabilitation Unit
Mobile: 021 192 0377
NZSCIR@middlemore.co.nz

Christine Mangold

Counties Manukau NZSCIR Coordinator
Auckland Spinal Rehabilitation Unit
Mobile: 021 678 106
christine.mangold@middlemore.co.nz



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