



NZ Spinal Cord Injury Registry
In partnership with the Rick Hansen Institute

New Zealand Spinal Cord Injury Registry

First Annual Report August 2016 to July 2017

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.

Also many thanks to the Rick Hansen Institute team for their support and expertise in establishing NZSCIR and its reports.

And finally, thank you to the participants who enrolled in NZSCIR – those with a spinal cord injury (SCI) – for contributing their time and experiences to the registry.

NZSCIR is jointly funded by the Accident Compensation Corporation, Canterbury District Health Board (CDHB) and Counties Manukau Health (CMH), in partnership with the Rick Hansen Institute.

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NZSCIR looks at traumatic and non-traumatic spinal cord injury in New Zealand. The NZSCIR Annual Report 2016/17 is an overview of the data collected from 161 NZSCIR participants receiving services from CDHB or CMH between August 2016 and July 2017.

In this report you will find information about participant demographics, type of SCI and its causes, the participant journey pathway, length of hospital stay, functional outcomes and secondary complications after SCI. This is a small subset of the data that NZSCIR collects; other information includes first responders timing, surgery and other interventions, services provided to participants, functional outcome score breakdowns, bladder and bowel function and self-efficacy scales. The report's primary purpose is to serve as a descriptive account with no endorsement of, or recommendations about, policies or programmes. However, the data can 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 institutions.

We welcome feedback or questions on this report. Please contact us at NZSCIR@cdhb.health.nz or NZSCIR@middlemore.co.nz.

For more information about NZSCIR, please visit www.nzspinaltrust.org.nz/nzscir.

Certain terms are bolded throughout the report. For definitions, please refer to the glossary on page 13.

Spinal Cord Impairment Action Plan

A key objective of the New Zealand Spinal Cord Impairment Action Plan 2014-2019, published by the Accident Compensation Corporation and the Ministry of Health, is to improve information sharing between healthcare providers and researchers in order to answer critical questions about SCI that can help improve outcomes for people with SCI. Following a pilot of two international registries, New Zealand partnered with the Rick Hansen Institute, to establish NZSCIR. NZSCIR collects data for traumatic and non-traumatic SCI which can be used to inform quality improvement and research objectives to help improve outcomes for people with SCI.

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.

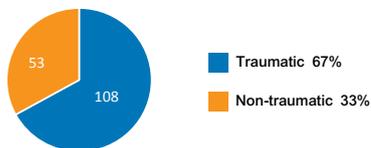
Spinal Cord Injury

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 traumatic SCI. An injury that occurs in other ways, such as from degeneration, infection or cancer, is referred to as non-traumatic SCI.

What are the causes of spinal cord injury?

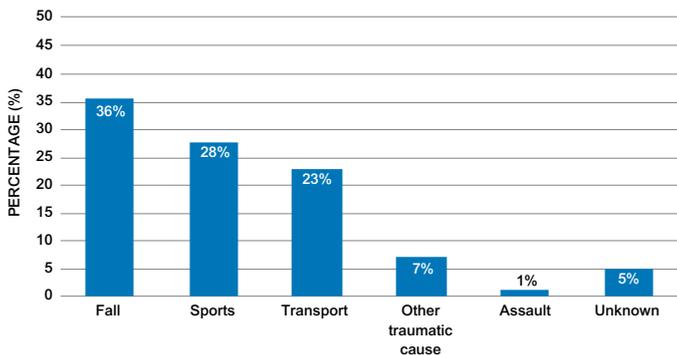
Prior to the establishment of NZSCIR, the New Zealand incidence of SCI was estimated at 30 per million, with approximately half related to a traumatic injury. According to NZSCIR data, 67% of spinal cord injuries are traumatic injuries.

Type of spinal cord injury (161 participants)



Falls were the most common cause of traumatic injury. An injury related to a fall can be caused by anything from a slip on a sidewalk to a fall from an apartment balcony. Falls were followed by sports and transportation as the most common cause of traumatic SCI. Mountain biking/cycling (6 participants)

Cause of traumatic injury (108 participants)

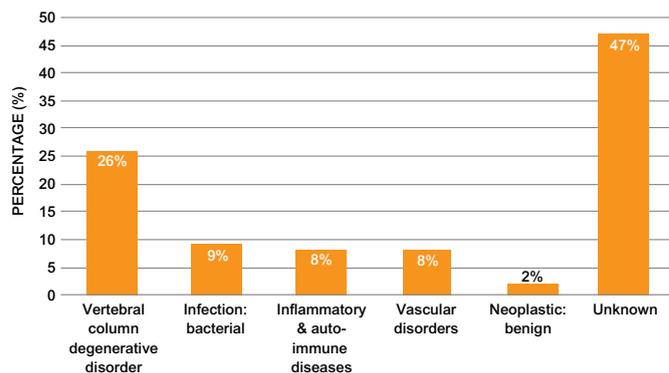


accounted for the highest number of sports injuries, followed by trampolining, aero sports and equestrian (less than 5 participants each). Most transportation injuries were caused by light transport vehicle accidents (9 participants) and motorbike accidents (5 participants).

Disorders relating to degeneration of the spine were the most common causes of non-traumatic injuries. 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.

A large portion of the non-traumatic cause of injury was missing due to changing data collection points for this population. It is likely that those with malignant tumours were not fully captured in this report. Changes made in late 2017 will improve data collection for the non-traumatic cause of injury.

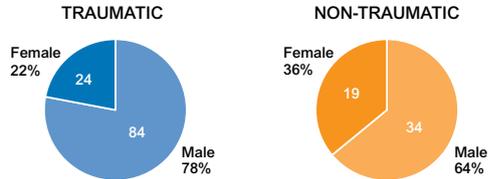
Cause of non-traumatic injury (53 participants)



What does the population look like?

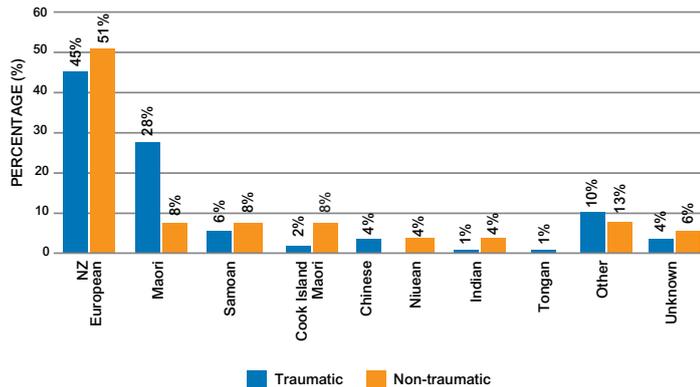
Males accounted for 73% of all SCI. Males were more likely to have a traumatic SCI than a non-traumatic SCI whereas females were more likely to have a non-traumatic SCI than a traumatic SCI.

Injury by gender (161 participants)



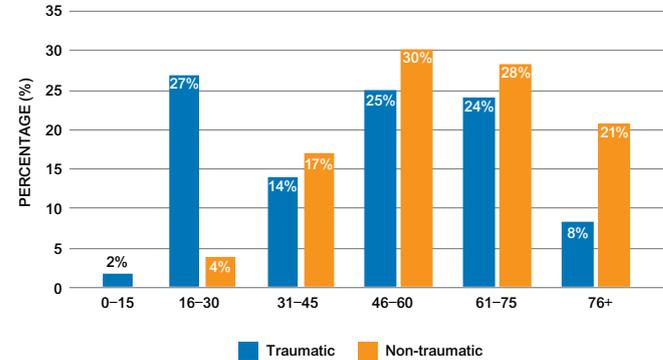
Compared to other ethnic groups, individuals of Maori descent had a much higher incidence of traumatic injuries than non-traumatic injuries.

Injury by ethnicity (161 participants)



The average (mean) age of NZSCIR participants was 51.2 years old. The non-traumatic SCI population was older (58.7 years) than the traumatic SCI population (47.5 years).

Injury by age group (161 participants)



What is the severity and level of injury?

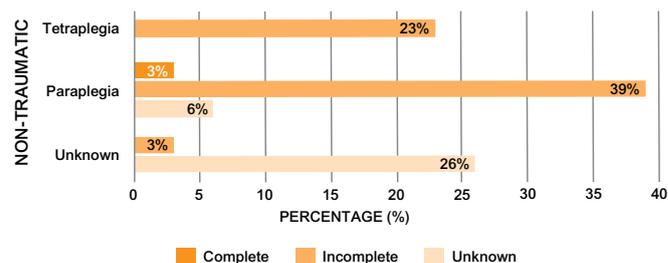
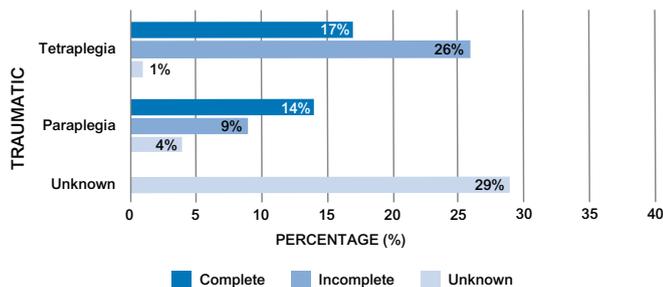
The spinal cord is divided into four regions, **cervical**, **thoracic**, **lumbar** and **sacral**. The level of injury identifies the lowest level of the spinal cord (from the head) that has normal movement and sensation. A person with a cervical (neck) injury will have decreased control or sensation in the arms, trunk and legs and those with a high cervical injury may not be able to breathe independently (**tetraplegia**). With a thoracic injury, the person may have mild difficulties with their hands, but would certainly be affected in the trunk and legs (**paraplegia**). A person with a lumbar or sacral (lower back) injury will have decreased control or sensation in the trunk and legs (**paraplegia**).

Injuries where some motor or sensory function is retained below the level of injury are referred to as **incomplete injuries**, whereas, injuries which have a total lack of sensory and motor function below the level of injury are referred to as **complete injuries**.

Traumatic causes result in more tetraplegic and complete injuries whereas non-traumatic causes result in more paraplegic and incomplete injuries. 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 assessed throughout their recovery. Traumatic SCI participants have a standardised assessment form, whilst it is not necessarily completed for non-traumatic SCI participants. This may contribute to the high level of missing data.

Admission neurology (101 participants)



Where do people with traumatic SCI get injured?

The map to the right shows the geographic locations where NZSCIR participants sustained their traumatic SCI. Geographic data were available for 60 of the 70 traumatic SCI participants who provided consent for collection of this information. Knowing where people are injured may assist us in identifying and understanding trends, such as high-risk transport, sporting or water areas.

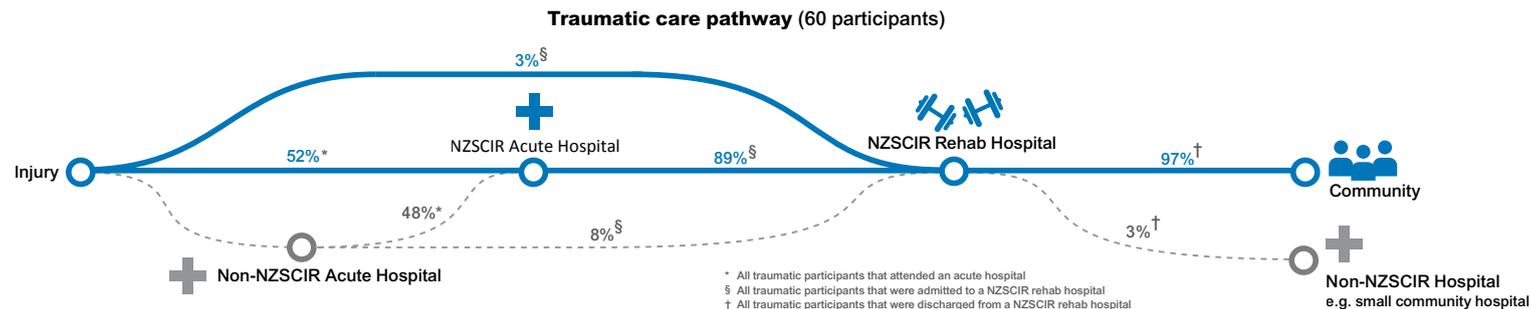
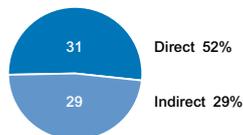


Where do people with traumatic SCI go to receive care?

The traumatic care pathway is the journey an individual takes from the moment the injury is sustained until that individual returns to his or her community or a hospital closer to home. New Zealand's **National Destination Policy** aims to have people with traumatic SCI receive their acute care and rehabilitation from a **supra-regional spinal service**. In the absence of multi-trauma where the destination for the person is determined by a major trauma pathway, the policy aims for those with traumatic SCI to be transferred directly to a supra-regional spinal service.

Just over half of traumatic SCI admissions to a supra-regional spinal service were direct admissions from the scene of an accident. This suggests there are opportunities to improve the application of the National Destination Policy, although further data analysis is required.

Admission type
(60 traumatic participants only)



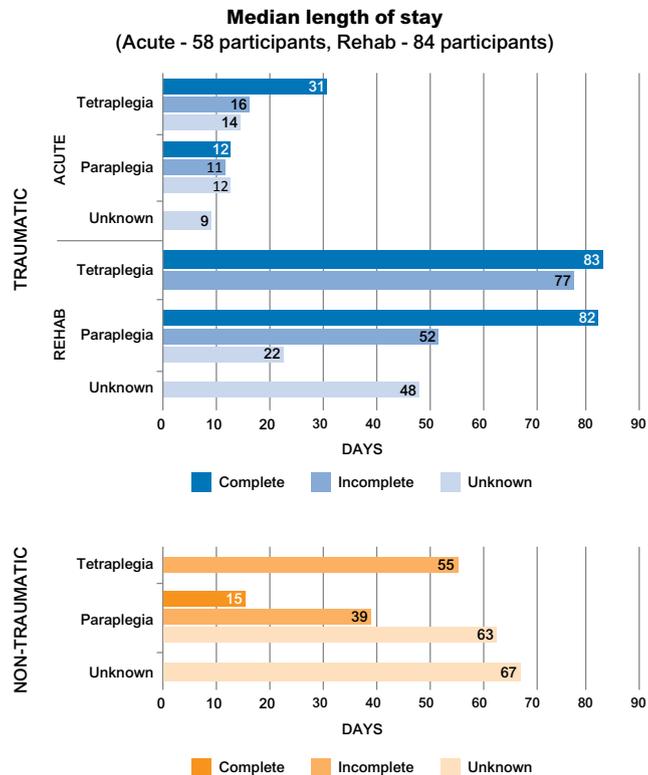
For traumatic SCI participants with complete records, 77% received surgery to decompress their spinal cord or surgically stabilise their vertebral column. Time to spinal cord decompression and time to first spinal surgery was collected for 20 and 27 participants respectively. Time to spinal cord decompression ranged from 5 hours to more than 9 days. Time to surgery occurred in an average (median) time of 22 hours which is consistent with good practice guidelines. Time to decompression and time to surgery are dependent on a range of clinical factors which impacts how quickly people receive services from the supra-regional spinal services. This information is valuable for improving timeliness of services.

89% of traumatic participants received their acute care from a SCI supra-regional acute service before moving to its rehabilitation service. The median number of days from injury to admission to a SCI supra-regional rehabilitation service was 16 days for traumatic SCI participants.

Overall, the median time from injury to discharge for traumatic SCI participants was 86 days, but varied significantly based on neurological impairment.

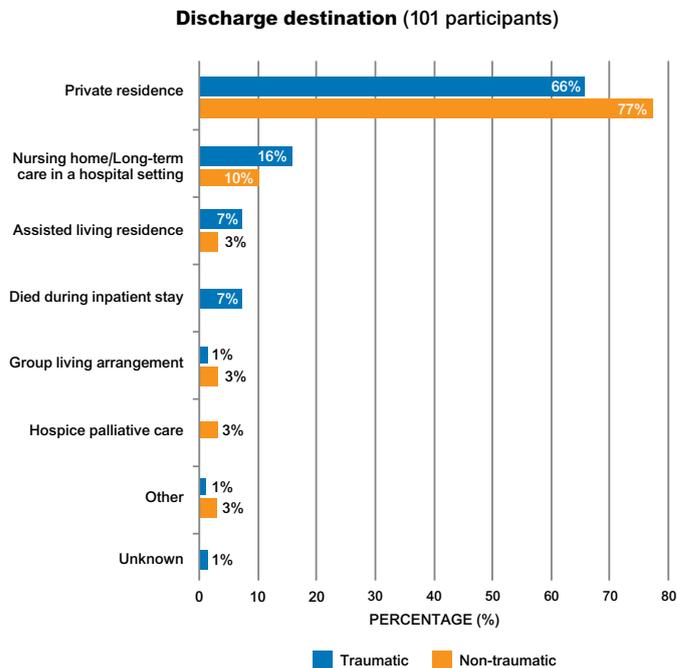
What is the duration of the hospital stay?

NZSCIR captures length of stay in acute and rehabilitation settings. The median length of stay in a SCI rehabilitation service was 77 days for traumatic SCI participants and 46 days for non-traumatic SCI participants. Acute length of stay is not shown for non-traumatic SCI participants as they may not have received acute care at a supra-regional spinal service.



Where do people go after discharge from hospital?

A private residence in the community was the most common location for discharged participants. Further refinement of discharge destination data is required to indicate if the move is to temporary or permanent accommodation.



How often do secondary complications occur?

Pain upon discharge to the community was a commonly reported **secondary complication**, occurring in 63% of cases based on the records of participants with complete complications data.

Urinary tract infections had a 31% incidence rate occurring during rehabilitation (32% in traumatic SCI; 29% in non-traumatic SCI).

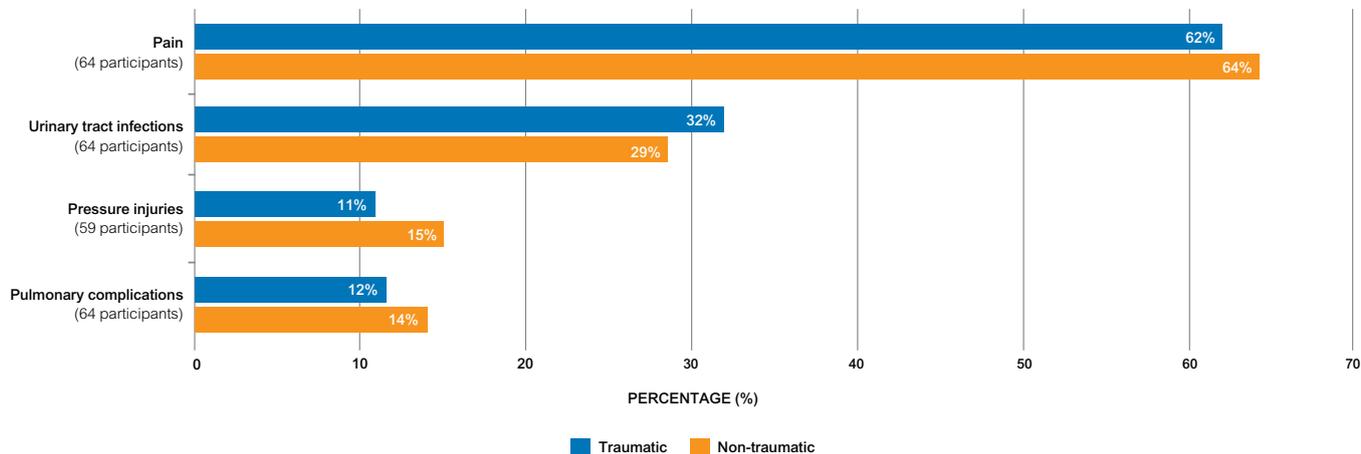
11% of participants with traumatic SCI and 15% with non-traumatic SCI developed pressure injuries during rehabilitation, both of which are low rates and may be due to missing data. Future reporting will include acute care complications.

12% of participants with traumatic SCI and 14% of participants with non-traumatic SCI experienced a **pulmonary complication** during rehabilitation.

The data from the Rick Hansen Spinal Cord Injury Registry (RHSCIR) 2016 report in Canada found that 58% of registry participants reported the occurrence of at least one secondary complication during their acute or rehabilitation stay. Note that the RHSCIR does not currently include non-traumatic SCI data.

More pre-injury co-morbidities were reported by traumatic SCI participants than non-traumatic SCI participants, although this may be due to more complete data collection. The most common co-morbidities were hypertension, followed by diabetes and asthma.

Complications during rehab



What does the NZSCIR annual report 2016/17 tell us?

NZSCIR PROVIDES IMPORTANT INFORMATION

The registry is providing information that will help support improvements in how SCI is managed in New Zealand. We are also learning more about the incidence of SCI, how injuries occur and how we might use this information to prevent future SCIs. Moving forward, we will be able to benchmark our results year on year and compare with RHSCIR in Canada. This means that New Zealand is not only using the data for its own purposes, but is contributing to what is known about SCI internationally.

NZSCIR IS EVOLVING IN ORDER TO PROVIDE ROBUST DATA ON SCI IN NEW ZEALAND

This is the first full year of data collected in NZSCIR. Refinements will be made to the data sets and collection methods to gather more complete data moving forward. Community follow-up data collection is now underway as well as plans to enable more people with existing SCI to participate in the registry.

NZSCIR CAN BE USED TO ASSESS THE EFFECTIVENESS OF THE NATIONAL DESTINATION POLICY

Monitoring the effectiveness of the National Destination Policy will ensure people with SCI get to the right place at the right time.

NZSCIR data provides insights to improve care

NZSCIR will continue to 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.

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

Note: NZSCIR collects an expanded data set for participants who consented (71.4%) and a minimal data set for those who were not consented (28.6%). Participants were deemed to have complete data if key expected data had been entered into the database. The NZSCIR data used for this report was extracted on October 10, 2017.

Data collected (number of new injuries between August 1, 2016 and July 31, 2017)

161 (101 participants with complete data)

Number of participants represented in each data summary:

Type of Spinal Cord Injury: 161

Mechanism and Aetiology of Injury: 161

Gender: 161

Ethnicity: 161

Age: 161

Severity and Level of Injury: 101

Traumatic SCI Geographic Injury Location: 60

Traumatic SCI Care Pathway: 60

Traumatic SCI Acute Length of Stay: 58

Rehab Length of Stay: 84

Discharge Destination: 101

Complications During Rehab:

Pain: 64

UTI: 64

Pressure Injuries: 59

Pulmonary Complications: 64

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 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 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.

National Destination Policy — New Zealand Government's policy that aims to have people with traumatic SCI receive their acute care and rehabilitation from one of two supra-regional spinal services.

Non-traumatic spinal cord injury (non-traumatic SCI) — 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.

Pressure injury — Tissue injured by pressure and/or shear.

Pulmonary complication — 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.

Secondary complication — A secondary disease or condition that develops in the course of a primary disease or condition and arises either as a result of it or from independent causes.

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 (traumatic SCI) — 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.

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

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