



NZ Spinal Cord Injury Registry

Annual Report 2017

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Data prepared by:

Chris Frampton, Statistician

Suzanne Humphreys, Manager, Data Services Group, Praxis Spinal Cord Institute

Stuart Lawrence, Data Warehouse Architect, Praxis Spinal Cord Institute

Editors:

Dr Christine Howard-Brown, NZSCIR Governance Group Chairperson

Tracey Croot, NZSCIR Burwood Coordinator

Leah Young, NZSCIR Auckland Coordinator

Dr Richard Smaill, NZSCIR Governance Group member

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1 Introduction

This is the first full calendar year annual report of the NZ Spinal Cord Injury Registry (NZSCIR). Data collected for the registry is intended to provide nationally relevant and internationally comparable data which can be used to inform quality improvement and research objectives to help improve outcomes for people with spinal cord injury (SCI).

This report is publicly available and provides a high-level overview of the majority of data entered into NZSCIR in 2017. A short info-graphic summary of key aspects of the NZSCIR Annual Report will be available on the NZ Spinal Trust website: <https://nzspinaltrust.org.nz/nzscir/>. Further data may be obtained through the NZSCIR Coordinators in accordance with the Data Access Policy.

1.1 Background

1.1.1 The NZ Spinal Cord Impairment Action Plan

The New Zealand Spinal Cord Impairment Action Plan (2014-2019) (SCI Action Plan) provided the impetus to improve information sharing by establishing a national SCI registry. A pilot was implemented in 2014 to test two international registries which could be adopted for New Zealand (NZ) use.

Following the pilot, a partnership was established with the Canadian Rick Hansen Institute (RHI) that has enabled NZ to adopt and modify the Rick Hansen Spinal Cord Injury Registry (RHSCIR)¹. The NZSCIR is NZ's first adult SCI registry and commenced in August 2016.

1.1.2 Spinal cord injury services in New Zealand

A national model for the delivery of SCI services in NZ was developed through the implementation of the SCI Action Plan. Adult services are provided by two supra-regional services delivered by Canterbury District Health Board (CDHB) and Counties Manukau Health (CM Health). Both services provide comprehensive acute care, rehabilitation and follow-up services for people with SCI.

CDHB provides its services from Christchurch Hospital and Burwood Spinal Unit (BSU). CM Health provides its services at Middlemore Hospital and the Auckland Spinal Rehabilitation Unit (ASRU).

1.1.3 NZSCIR

NZSCIR is jointly funded by the Accident Compensation Corporation, CDHB and CM Health, in partnership with Praxis Spinal Cord Institute (PSCI). The NZSCIR governance group includes a consumer representative, clinicians, funders and research representatives.

¹ In 2019, RHI rebranded to become Praxis Spinal Cord Institute.

There are extensive policies and procedures which ensure the ethical collection and use of data that meets the NZ Code of Rights, privacy legislation and requirements for the security of information. Data is collected by clinicians and two NZSCIR Coordinators based at the SCI supra-regional services for people newly admitted with SCI. A minimum data set can be collected without consent, whereas a more comprehensive data set is collected with consent.

Data points for the collection of information are determined by *a priori* questions which were developed by the NZSCIR governance group. All data obtained for this report was collected through PSCI's Global Research Platform (GRP), on which the NZSCIR resides.

As part of the implementation of NZSCIR, historic data entry and opt-in participation by people with SCI who have previously been admitted (prior to NZSCIR implementation on 1 August 2016) to either SCI supra-regional service is occurring over a two-year period.

1.1.4 Inaugural report

The NZSCIR published an inaugural NZSCIR report for the period August 2016 – July 2017. This should be treated as a standalone report. Subsequent to the inaugural report further data cleansing has occurred which makes this report more accurate.

2 Data Covered in this Report

This report includes data collected from 200 participants who sustained a new SCI and were subsequently admitted to either supra-regional spinal service 1 January - 31 December 2017. This report includes information from 131 fully consented participants and 69 non-consented participants, for whom the minimal data set was collected. Participant data includes data collected up until 24 May 2019.

The data provided in this report includes:

1. Volume of SCI.
2. Participant demographics including gender, age at injury, ethnicity, employment, weight, smoking and alcohol use, mechanism of injury and neurology at discharge.
3. Participant facility visit information including time from injury to discharge, acute and rehabilitation length of stays and discharge destination.
4. Other variables such as mortality rates during inpatient stay, functional changes, and clinical health complications.

2.1 Limitations of the Report

Data relates to the two supra-regional SCI sites. This means people with a SCI who have not received specialist SCI services from the national service are not included in the data capture process.

The information contained in this report is a snapshot of certain data at a point in time and is expected to change. Data is inclusive of the calendar year. For those who are admitted in the calendar year, if their discharge date is not entered prior to data extraction, their data is not included.

Data has been cleansed prior to extraction for analysis. The “minimal data set” was expanded during 2017. Detailed non-traumatic SCI aetiology data was not collected until later in the year for participants who did not provide consent, therefore much of the data is classified as “missing”. It can be assumed those participants who had a malignant neoplasm had the minimal data set collected (due to poor prognosis), which is likely to result in under representation of malignancies as causes of non-traumatic SCI.

Only basic descriptive statistics have been performed on a limited set of NZSCIR data. This annual report's primary purpose is to serve as a descriptive account with no endorsement of, or recommendations about, policies or programmes. Data points of less than five are not reported.

A request can be made via one of the NZSCIR Coordinators if data from NZSCIR is needed to contribute to research. Data is released in accordance with the NZSCIR data access policy.

2.2 Disclaimer and copyright

Any modification of the information is a violation of our copyright and other proprietary rights. Any information in this report may be used if referenced. No representations, warranties or guarantees (express, implied, statutory or otherwise) are made regarding this data on which the information is based or the information itself, whether regarding quality, accuracy, fitness for any particular purpose, reliability, completeness or otherwise. Neither PSCI nor its licensors will have any liability (for direct or indirect damages or otherwise) relating to or arising from the use of, reliance on, or any errors or omissions in, such data or information.

2.3 Contact details

If you have additional questions about the data, please contact the NZSCIR Coordinators:

Tracey Croot	Leah Young
Canterbury DHB NZSCIR Coordinator	Counties Manukau Health NZSCIR Coordinator
Burwood Spinal Unit	Auckland Spinal Rehabilitation Unit
Christchurch	Auckland
Phone: 03 3837559 0211456300	Phone: 09 2709000 0211920377
NZSCIR@cdhb.health.nz	NZSCIR@middlemore.co.nz

2.4 Acknowledgements

Thank you to the dedicated spinal service clinicians and coordinators who collect and input data into NZSCIR. A special thank you to the PSCI team for their ongoing support and assistance with NZSCIR. The dedication and expertise that has been applied to this registry is much appreciated. The NZSCIR would also like to thank Chris Frampton, a NZ-based statistician, for assisting the NZSCIR.

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

The contributions of everyone involved are vital to improving the ability to provide care for people with SCI. The NZSCIR provides a platform that supports NZSCIR participants and others to maximise their potential and reach their fullest recovery possible.

2.5 How to cite this document

New Zealand Spinal Cord Injury Registry (2019). New Zealand Spinal Cord Injury Registry Annual Technical Report 2017. New Zealand.

3 *A priori* questions for NZSCIR

A priori questions are developed to guide the collection of data. Over time, *a priori* questions are updated or replaced. As of December 2019, there are 14 *a priori* questions used to guide information collected for NZSCIR. This report is structured using the NZSCIR *a priori* questions. Community phase data is underway but not yet sufficient to report on. Canadian comparisons are to be investigated and will be reported separately to this document.

***A priori* questions for NZSCIR**

last updated March 2018

Facilities and length of stay

1. What does a person's journey with SCI look like, in terms of facilities and length of stay, in NZ?

Aetiology and demographics

2. What is the incidence, aetiology and demographics of SCI persons admitted to a specialist spinal centre in NZ?

Benchmarking

3. How does NZ SCIM outcomes compare within NZ and with Canada?

Complications

4. What is the incidence of clinical health complications e.g. pressure injuries, pain, secondary health complications, identified in the acute, rehabilitation and community phases of SCI in NZ?

Function

5. What percentage of patients in NZ discharge from a specialist spinal centre as community ambulators (defined as “Mobility Outdoors more than 100 metres”)?
6. What are the functional changes in SCIM between admission and discharge of a specialist spinal centre in NZ?

Psychological

7. What are patient self-efficacy levels on discharge from a specialist spinal centre in NZ, and do they change once in the community?

Respiratory

8. Does early tracheostomy reduce the time spent on a ventilator in people with SCI admitted to a specialist spinal centre in NZ?

Surgery

9. What are the timeframes from injury to decompression for someone admitted to a specialist spinal centre in NZ, and does this influence outcome?

Community

10. Have participants had difficulty accessing health services or activities in the community?
11. What are the functional, employment, quality of life and life satisfaction trends of participants 18 months, 5 years, 10 years+ post impairment?

Historical

12. What are the patient demographics of the NZ SCI population by year, for gender, age, ethnicity, and mechanism of injury?
13. Where were participants rehabilitated and what proportion required spinal surgery?
14. What were participants’ neurology at discharge from a rehab facility, their length of stay and discharge destination?

4 Data Source and Summary

4.1 Global Research Platform (GRP)

The GRP hosts the NZSCIR. This report reflects participant data entered into NZSCIR on the GRP prior to 24 May 2019 (the data extract date) and includes data cleansing completed prior to this date.

4.1.1 Sample selection criteria

This report only includes participants with complete inpatient records (both 'Admission' and 'Discharge to Community' Data Collection Points (DCP)) entered prior to the extraction date.

4.1.2 Risk adjustment disclaimer

Due to potential differences in participant population characteristics and some hospital procedures between the two NZSCIR sites, some summary values may not be directly comparable. A risk adjustment has not been performed in this report but differences suggesting data is not directly comparable have been indicated where this may be an issue.

4.2 Selected cohort data summary

4.2.1 Consent status

Persons with a new SCI, admitted to either supra-spinal service, are approached for consent to be involved with the NZSCIR. Participation is voluntary and consent is sought for full data set collection. Where consent is not obtained, a limited amount of data is collected (a 'Minimal Data Set', see Appendix) and is consistent with the ethical approval for collection of data by the NZSCIR. The Minimal Data Set is automatically collected on those who are non-NZ residents, have a poor prognosis or significant cognitive deficits, and where consent is deemed unsuitable. Other reasons for non-consent include those that decline participation, or have been discharged from hospital before being identified as eligible. Every effort is made to have a translator present for individuals who do not speak fluent English to allow explanation of the NZSCIR to an individual. For participants identified as minors (15 years and under), informed consent is sought from their legally authorised representative (i.e. parent/guardian).

5 Volume of SCI and Consent Status

Across both NZSCIR sites, 131 (65.5%) of the 200 participants who met the selection criteria (see section 6.1.1) provided consent to participate in NZSCIR, and 69 participants (34.5%) did not provide consent.

At CM Health sites, of the 115 participants who met the selection criteria (see section 6.1.1), 68 participants (59.1%) provided consent to participate in NZSCIR, and 47 participants (40.9%) did not provide consent for participation.

At the CDHB site, of the 85 participants who met the selection criteria (see section 6.1.1), 63 participants (74.1%) provided consent to participate in the NZSCIR, and 22 participants (25.9%) did not provide consent for participation.

5.1 Volume of SCI at both sites for all participants

Table 1: Volume by supra-regional SCI service and type of SCI

2017 Calendar Year	Facility enrolled at				Total	
	CM Health		CDHB			
	Count	%	Count	%	Count	%
Non-traumatic spinal cord dysfunction	40	34.8%	23	27.1%	63	31.5
Traumatic spinal cord injury	75	65.2%	62	72.9%	137	68.5%
All	115	100%	85	100%	200	100%

NB: If a participant was admitted to both sites, then this participant was counted twice, once for CM Health and once for CDHB. One participant was admitted to both services in 2017.

5.2 Participants with a “Consented data set” vs. a “Minimal data set”

Consent is obtained either from the participant, from a surrogate or with participant assent. If consent was not obtained, a minimal data set is collected. See Appendix for what the “Consented data set” and the “Minimal data set” contain.

Table 2: Consent status by supra-regional SCI service and type of SCI

SCI		Facility				Total	
		CM Health		CDHB			
		Count	%	Count	%	Count	%
Non-traumatic spinal cord dysfunction	Consent not obtained	18	45.0%	7	30.4%	25	39.7%
	Consent obtained	22	55.0%	16	69.6%	38	60.3%
	Total	40	100.0%	23	100.0%	63	100.0%
Traumatic spinal cord injury	Consent not obtained	29	38.7%	15	24.2%	44	32.1%
	Consent obtained	46	61.3%	47	75.8%	93	67.9%
	Total	75	100.0%	62	100.0%	137	100.0%
Total	Consent not obtained	47	40.9%	22	25.9%	69	34.5%
	Consent obtained	68	59.1%	63	74.1%	131	65.5%
	Total	115	100.0%	85	100.0%	200	100.0%

6 What is the incidence, aetiology and demographics of SCI persons admitted to a specialist spinal centre in NZ?

6.1 Gender

Males account for 72.5% of all SCI in 2017. Males are more likely to sustain a traumatic SCI (n=105; 76.6%) than females (n=32; 23.4%). Females have a higher percentage of non-traumatic SCI (n=23/55; 41.8%) compared to males (n=40/145; 27.5%).

CM Health have 115 participant enrolments versus CDHB enrolments of 85.

Table 3: Gender by supra-regional SCI service and type of SCI

SCI		Facility				Total	
		CM Health		CDHB			
		Count	%	Count	%	Count	%
Non-traumatic spinal cord dysfunction	Female	14	35.0%	9	39.1%	23	36.5%
	Male	26	65.0%	14	60.9%	40	63.5%
	Total	40	100.0%	23	100.0%	63	100.0%
Traumatic spinal cord injury	Female	21	28.0%	11	17.7%	32	23.4%
	Male	54	72.0%	51	82.3%	105	76.6%
	Total	75	100.0%	62	100.0%	137	100.0%
Total	Female	35	30.4%	20	23.5%	55	27.5%
	Male	80	69.6%	65	76.5%	145	72.5%
	Total	115	100.0%	85	100.0%	200	100.0%

6.2 Age at injury

The mean age of NZSCIR participants is 51.7 years. The age range for participants admitted to the CM Health & CDHB specialist service is 14-92 years. Participants with non-traumatic SCI tend to be older than those with traumatic SCI.

CDHB has an older population, with 69.4% aged over 45 years, whilst CM Health has 61.7% over 45 years. Participants aged over 76 years account for 14.5% of the NZSCIR population.

Note that the NZSCIR is an adult registry so does not include children under 15.

Table 4: Age when injured by supra-regional SCI service and type of SCI

SCI	Facility	Mean	Standard Deviation	Median	Minimum	Maximum	Count
Non-traumatic spinal cord dysfunction	CM Health	51.6	20.7	56	15	88	40
	CDHB	59.7	15.9	60	29	88	23
	Total	54.6	18.5	58	15	88	63
Traumatic spinal cord injury	CM Health	51.8	20.4	54	14	89	75
	CDHB	50.9	20.7	51.5	15	92	62
	Total	51.4	20.6	53	14	92	137
Total	CM Health	51.7	20.6	55	14	89	115
	CDHB	53.3	18.5	55	14	92	85
	Total	52.4	19.5	58	15	92	200

Table 5: Age group and type of SCI

SCI		Total	
		Count	%
Non-traumatic spinal cord dysfunction	15-30	8	12.7%
	31-45	11	17.5%
	46-60	14	22.2%
	61-75	21	33.3%
	>76	9	14.3%
	Total	63	100.0%
Traumatic spinal cord injury	15-30	31	22.7%
	31-45	20	14.6%
	46-60	34	24.8%
	61-75	32	23.4%
	>76	20	14.6%
	Total	137	100.0%
Total	15-30	39	19.5%
	31-45	31	15.5%
	46-60	48	24.0%
	61-75	53	26.5%
	>76	29	14.5%
	Total	200	100.0%

6.3 Ethnicity and Residency

49.5% of NZSCIR participants identified as NZ European. 17.5% identified as Māori, which is proportionately higher than the 2013 NZ Census 15%. Pacific peoples (Samoan, Cook Island Māori, Tongan, Niuean) accounted for 13% of NZSCIR participants, compared to 7% from the 2013 NZ Census data.

Ethnicity data are available for 199 participants across both sites. This data point was amended from NZSCIR commencement to permit participants to select multiple ethnicities which is consistent with NZ Census practices.

NZ residents have the full consented data set collected. Non-residents and non-consenting participants have the minimal data set collected. 14 (7%) participants were non-residents, from 10 different countries.

In the table below ‘Pacific people’ includes Samoan, Tongan, Niuean, Cook Island Māori; ‘Other’ includes Chinese, Indian, NZ European/other (including Māori & Chinese).

Table 6: Ethnicity by supra-regional SCI service and type of SCI

SCI		Facility				Total	
		CMH		CDHB			
		Count	%	Count	%	Count	%
Non-traumatic spinal cord dysfunction	Maori	6	15.0%	4	17.4%	10	15.9%
	NZ European	10	25.0%	17	73.9%	27	42.9%
	Pacific People	13	32.5%	1	4.3%	14	22.2%
	Other	11	27.5%	1	4.3%	12	19.0%
	Total	40	100.0%	23	100.0%	63	100.0%
Traumatic spinal cord injury	Maori	20	26.7%	5	8.1%	25	18.2%
	NZ European	31	41.3%	41	66.1%	72	52.6%
	Pacific People	11	5.3%	1	1.6%	12	3.6%
	Other	12	16.2%	15	24.2%	27	19.9%
	Total	74	100.0%	62	100.0%	136	100.0%
Total	Maori	26	22.6%	9	10.6%	35	17.5%
	NZ European	41	35.7%	58	68.2%	99	49.5%
	Pacific People	24	21.1%	2	2.4%	26	13.1%
	Other	23	20.2%	16	18.8%	39	19.6%
	Total	114	100.0%	85	100.0%	199	100.0%

Table 7: NZ Resident Status by supra-regional SCI service

SCI		Facility				Total	
		CM Health		CDHB			
		Count	%	Count	%	Count	%
Total non-traumatic and traumatic spinal cord injury	No	9	7.8%	5	5.9%	14	7.0%
	Yes	106	92.2%	80	94.1%	186	93.0%
	Total	115	100.0%	85	100.0%	200	100.0%

The 14 Non-residents resided in 10 different countries.

6.4 Mechanism of injury

6.4.1 Non-traumatic SCI

Non-traumatic SCI (31%) is the most prevalent cause of SCI admitted to either supra-regional spinal service for 2017. Of the 31%, the most common form of non-traumatic spinal cord dysfunction with 41.9% was due to vertebral column degenerative disorders (such as disc prolapse, ligamentum flavum hypertrophy, ossification of the posterior longitudinal ligament, spinal osteophytosis, spondylolisthesis, spondylosis, or spinal stenosis).

Bacterial infection accounted for 23.3%, followed by vascular disorders (such as haemorrhage, vascular malformations, ischaemia) with 18.6%, followed by inflammatory and auto-immune diseases (including transverse myelitis and rheumatoid arthritis) at 9.3%.

Causes of non-traumatic SCI were not initially collected for minimal data set participants. This means incidence of some causes will be under reported for this calendar year (only 43/63 have detailed aetiology for 2017).

6.4.2 Traumatic SCI

Because an injury event may be classified into more than one category, the following prioritisation has been established to determine aetiology (Biering-Sørensen et al, 2017): The first coding priority is given to 'Sports', then 'Assault²', then 'Transport' followed by 'Falls'. Finally, 'Other' covers all other causes including, but not limited to, SCI secondary to complications arising from surgical procedures. As an example, if a participant fell whilst mountain biking, the priority is given to sport, not transport or fall.

CM Health has a higher proportion of non-traumatic SCI than CDHB (33.9% vs 27.1%). Looking at traumatic causes only (n=137), falls account for 35.8% (n=49/137), followed by transport at 25.5% (n=35/137) and sport with 24.8% (n=34/137). "Other" causes, including perioperative

² Note that in the 2017 calendar year there were SCI's caused by assaults. As these are less than 5, these have been grouped in the "Other" category.

complications, account for 13.8% (n=19/137). Falls have a higher representation of all SCI in CM Health than CDHB (26.1% vs 22.4%), whilst sporting injuries are higher in CDHB than CM Health (27.1% vs 9.6%).

Ice or snow sports (skiing, snowboarding) and individual water sports/activities account for the most sporting injuries (20.6 each%). Wheeled non-motorsports (mountain bike, BMX and cycling) account for 17.6%. Wheeled motor sports (motor cross, car racing) accounted for 8.8%. Acrobatic sports (trampolining), aero sports (paraponting, paragliding, skydiving), and equestrian all had 5.9% of sporting injuries each.

Of the 51 falls the most common were 20 (37.8%) falling/stumbling/jumping/ pushed from height 1 metre or more, followed by 11 (24.4%) falling/stumbling by tripping on same level. Of the 35 transport injuries 18 (51.4%) involved light transport vehicles with four or more wheels, followed by 7 (20%) two-wheeled motor vehicle accidents.

Table 8: Aetiology by supra-regional SCI service and type of SCI

SCI	Facility				Total	
	CMH		CDHB		Count	%
	Count	%	Count	%		
Fall	30	26.1%	19	22.4%	49	24.5%
Other traumatic cause	10	8.7%	9	10.6%	19	9.5%
Sports	11	9.6%	23	27.1%	34	17%
Transport	24	20.9%	11	12.9%	35	17.5%
Non-traumatic	40	34.8%	23	27.1%	63	31.0%
Total	115	100.0%	85	100.0%	200	100.0%

Injury aetiology data are available for all 200 participants across both sites.

Table 9: Most common non-traumatic SCI aetiology

SCI	Total	
	Count	%
Infection	10	23.3%
Other	7	16.3%
Vascular disorders	8	18.6%
Vertebral column degenerative disorders	18	41.9%
Total	43	100.0%

‘Other’ non-traumatic causes include malignancy, inflammatory, auto-immune and other (not specified). Infection includes bacterial or viral.

Low numbers are reflected in the table above as causes of non-traumatic SCI were not included in the data collection until part way through 2017.

6.5 Neurology

Neurology assessments are collected for all NZSCIR participants (consented and non-consented) at the initial (acute phase), rehabilitation admission and rehabilitation discharge timeframes where available. This data is collected from the clinician-completed International Standards for Neurological Classification of Spinal Cord Injury (ISNCSCI) worksheets and classification of SCI is recorded as defined by the American Spinal Injury Association (ASIA).

ISNCSCI assessment is completed as standard of care for all individuals whom have a confirmed diagnosis of a SCI at participating sites in NZ. Some participants may not have had an ISNCSCI completed, at a particular collection point, for example, due to admission flow, cognitive or language barriers or poor prognosis. This may be a contributor to missing data.

If there were multiple neurology records for a participant, the last test performed was used as the discharge time point for analysis.

Table 10: Impairment grouping by supra-regional SCI service and type of SCI

SCI		Facility				Total	
		CM Health		CDHB			
		Count	%	Count	%	Count	%
Non-traumatic spinal cord dysfunction	Paraplegia	30	76.9%	12	54.5%	42	68.9%
	Tetraplegia	9	23.1%	10	45.5%	19	31.1%
	Total	39	100.0%	22	100.0%	61	100.0%
Traumatic spinal cord injury	Paraplegia	25	36.2%	23	37.7%	48	36.9%
	Tetraplegia	44	63.8%	38	62.3%	82	63.1%
	Total	69	100.0%	61	100.0%	130	100.0%
Total	Paraplegia	55	50.9%	35	42.2%	90	47.1%
	Tetraplegia	53	49.1%	48	57.8%	101	52.9%
	Total	108	100.0%	83	100.0%	191	100.0%

The following table represents AIS classification categories at discharge or nearing discharge from a supra-regional spinal service.

Table 11: AIS prior to discharge by supra-regional SCI service and type of SCI

SCI	AIS	%
Non-traumatic spinal cord dysfunction	A	4.8%
	B	3.2%
	C	15.9%
	D	73.0%
	E	0.0%
	Total	100.0%
Traumatic spinal cord injury	A	27.0%
	B	10.2%
	C	8.0%
	D	46.7%
	E	1.5%
	Total	100.0%
Total	A	20.0%
	B	8.0%
	C	10.5%
	D	55.0%
	E	1.0%
	Total	100.0%

*Count not provided due to numbers less than five

The following table represents those with a clinical classification of Cauda Equina on the ISNCSCI worksheet. These numbers are indicative and may be under reported. Clinicians select a tick box to register participants as cauda equina. If this is not selected they are registered as non-cauda equina. Data collection processes may attribute to reported differences between groups, however this may change as processes improve.

Table 12: Cauda Equina by type of SCI

SCI		Total	
		Count	%
Non-traumatic spinal cord dysfunction	No	39	69.6%
	Yes	17	30.4%
	Total	56	100.0%
Traumatic spinal cord injury	No	102	90.3%
	Yes	11	9.7%
	Total	113	100.0%
Total	No	141	83.4%
	Yes	28	16.6%
	Total	169	100.0%

6.6 Employment

43.2% of consenting participants report being unemployed. Of this number, 52.9% identify as retired.

Table 13: Employment status (consented participants) by supra-regional SCI service and type of SCI

SCI		Facility				Total	
		CM Health		CDHB			
		Count	%	Count	%	Count	%
Non-traumatic spinal cord dysfunction	No	7	50.0%	9	56.3%	16	53.3%
	Yes	7	50.0%	7	43.8%	14	46.7%
	Total	14	100.0%	16	100.0%	30	100.0%
Traumatic spinal cord injury	No	15	36.6%	20	42.6%	35	39.8%
	Yes	26	63.4%	27	57.4%	53	60.2%
	Total	41	100.0%	47	100.0%	88	100.0%
Total	No	22	40.0%	29	46.0%	51	43.2%
	Yes	33	60.0%	34	54.0%	67	56.8%
	Total	55	100.0%	63	100.0%	118	100.0%

Table 14: Non-employed status (consented participants)

SCI		Total	
		Count	%
Total	Other	7	13.7%
	Retired	27	52.9%
	Student	7	13.7%
	Unemployed	10	19.6%
	Total	51	100.0%

6.7 Weight/BMI

Data on participant weight and BMI was not reported in the inaugural technical report. The supra-regional spinal services have identified weight data as being an important metric for NZSCIR to report on to inform the need for bariatric equipment and additional staff resourcing. Initial weight is self-reported by the participant as the weight they were “at the time of their injury”. Final weight is also self-reported, however most commonly associated with a recent objective assessment during the participants inpatient stay.

Data indicates that supra-regional spinal services can anticipate that approximately 9% of participants will be over 120 kg.

Table 15: Participant self-reported weight on admission

SCI		Total	
		Count	%
Total non-traumatic and traumatic SCI	<120kg	92	91.1%
	>120kg	9	8.9%
	Total	101	100.0%

Table 16: Participant self-reported weight on discharge

SCI		Total	
		Count	%
Total	<120kg	92	94.8%
	>120kg	5	5.2%
	Total	97	100.0%

Body Mass Index (BMI) is a measure indicating nutritional status in adults over 20 years. It is defined as weight (kg) divided by the square of height in metres (m²). Classification is based on the World Health Organisation (WHO, 2019) guideline: Underweight (<18), normal weight

(18.5-24.9), pre-obesity (25.0-29.9), obesity class I (30.0-34.9), obesity class II (35.0-39.9), obesity class III (>40). Due to low numbers <18.5 is grouped with 18.5-24.9 and >=40 is grouped with 35-39.9.

Table 17: BMI on admission

SCI		Total	
		Count	%
Total	<18.5-24.9	26	27.9%
	25-29.9	39	41.9%
	30-34.9	17	18.3%
	> 35-40	11	11.8%
	Total	93	100.0%

Table 18: BMI on discharge

SCI		Total	
		Count	%
Total	<18.5	5	6.1%
	18.5-24.9	38	46.3%
	25-29.9	24	29.3%
	30-34.9	8	9.8%
	35-40	7	8.5%
	Total	82	100.0%

6.8 Smoking history/use

14.4% of participants are current smokers which appears comparable with 2016/17 Ministry of Health data, where 15.7% of New Zealanders are reported to smoke. 39.8% were ex-smokers, whilst 45.8% have never smoked.

Table 19: Smoking status by supra-regional SCI service

SCI		Facility				Total	
		CM Health		CDHB			
		Count	%	Count	%	Count	%
Total	Current	7	12.5%	10	16.1%	17	14.4%
	Former	21	37.5%	26	41.9%	47	39.8%
	Never	28	50.0%	26	41.9%	54	45.8%
	Total	56	100.0%	62	100.0%	118	100.0%

6.9 Alcohol use

79.2% of participants reported they drank alcohol. This varied from less than monthly to 4 or more times a week.

Table 20: Alcohol consumption by supra-regional SCI service

SCI		Facility				Total	
		CM Health		CDHB			
		Count	%	Count	%	Count	%
Total	4 or more times/ week	7	14.0%	14	23.0%	21	18.9%
	2-3 times/ week	8	16.0%	13	21.3%	21	18.9%
	2-4 times/ month	9	18.0%	9	14.8%	18	16.2%
	Monthly or less	16	32.0%	12	19.7%	28	25.2%
	Never	10	20.0%	13	21.3%	23	20.7%
	Total	50	100.0%	61	100.0%	111	100.0%

6.10 Drug use

21.8% of participants reported using prescribed medications or street drugs for non-medical reasons in the 12 months prior to their SCI. This is higher than the MOH Health Survey 2016/17 calculation of 11.6%. Marijuana was noted to be the most commonly reported drug used.

Table 21: Drug use by supra-regional SCI service

SCI		Facility				Total	
		CM Health		CDHB			
		Count	%	Count	%	Count	%
Total	No	35	71.4%	51	83.6%	86	78.2%
	Yes	14	28.6%	10	16.4%	24	21.8%
	Total	49	100.0%	61	100.0%	110	100.0%

7 What does a person’s journey with SCI look like, in terms of facilities and length of stay, in NZ?

7.1 Length of stay (LOS)

7.1.1 Total length of stay from day of injury to day of rehabilitation discharge for traumatic SCI participants

Table 22: Time (days) from date of injury to rehabilitation discharge (tSCI only)

SCI		Count	Mean	Median	sd	Min	Max
Traumatic spinal cord injury	CM Health	74	79.69	74.0	53.82	3	338
	CDHB	61	89.34	73.0	72.28	3	332
	Total	135	84.05	74.0	62.77	3	338

7.1.2 Acute and rehab length of stay grouped by participants with paraplegia/tetraplegia

Acute spinal-specialist services are provided at Christchurch Hospital, Burwood Spinal Unit (CDHB) and Middlemore Hospital (CM Health).

CDHB provides its specialist spinal rehabilitation services from the Burwood Spinal Unit , whilst CM Health provides its services through the Auckland Spinal Rehabilitation Unit.

Table 23: Acute and rehabilitation length of stay by impairment groupings

SCI			Count	Mean	Median	sd	Min	Max
Persons with paraplegia	CM Health	Acute	31	34.55	18.0	49.28	4	266
		Rehab	31	53.65	50.0	26.57	3	113
	CDHB	Acute	23	19.00	14.0	15.22	5	70
		Rehab	23	70.04	64.0	44.55	21	178
	Total	Acute	54	27.93	15.5	39.13	4	266
		Rehab	54	60.63	55.5	35.92	3	178
Persons with tetraplegia	CM Health	Acute	33	25.85	17.0	22.69	8	116
		Rehab	33	69.21	79.0	35.15	1	150
	CDHB	Acute	38	26.68	17.0	24.66	4	130
		Rehab	38	82.58	69.0	58.08	9	227
	Total	Acute	71	26.30	17.0	23.60	4	130
		Rehab	71	76.37	76.0	48.91	1	227

7.1.3 Acute and Rehab Length of stay by neurological completeness

Complete SCI is classed as AIS A, whilst incomplete is AIS B-E inclusively.

Table 24: Acute and rehab length of stay according to neurological completeness

SCI	ASIA Group			Count	Mean	Median	sd	Min	Max
Total non-traumatic and traumatic SCI	Complete	CM Health	Acute	18	23.50	14.0	19.50	8	69
			Rehab	18	75.50	78.5	24.75	32	126
		CDHB	Acute	10	36.80	34.5	16.63	12	66
			Rehab	10	125.60	116.0	41.69	69	200
		Total	Acute	28	28.25	23.0	19.33	8	69
			Rehab	28	93.39	88.0	39.53	32	200
	Incomplete	CM Health	Acute	46	32.63	18.0	42.95	4	266
			Rehab	46	56.26	49.0	33.13	1	150
		CDHB	Acute	51	21.24	14.0	21.87	4	130
			Rehab	51	68.49	57.0	50.56	9	227
		Total	Acute	97	26.64	16.0	33.86	4	266
			Rehab	97	62.69	53.0	43.40	1	227

7.1.4 Number of transfers to acute facility during rehabilitation

The table below indicates how many participants were transferred to an acute facility during their rehabilitation stay.

Table 25: Transfers to an acute facility during rehab stay by type of SCI

SCI		Total	
		Count	%
Non-traumatic spinal cord dysfunction	No	26	72.2%
	Yes	10	27.8%
	Total	36	100.0%
Traumatic spinal cord injury	No	70	75.3%
	Yes	23	24.7%
	Total	93	100.0%
Total	No	96	74.4%
	Yes	33	25.6%
	Total	129	100.0%

7.1.5 Discharge destination

Discharge destination is recorded when discharged from the supra-spinal rehabilitation facility. Therefore, if a participant is discharged to an alternative facility for ongoing treatment, this will be recorded as “hospital”, and no further information is collected on these visits. If a participant was admitted to a facility more than once, then discharge destination was obtained from their last visit.

Table 26: Discharge destination

SCI		Total	
		Count	%
Total non-traumatic and traumatic SCI	Hospital	30	15.08%
	Morgue	9	4.52%
	Nursing home/Long-term care - hospital setting	18	9.05%
	Other	11	5.53%
	Private residence	131	65.83%
	Total	199	100.0%

7.2 Mortality rates during inpatient stay

Of the 200 participants with complete records across both NZSCIR sites, 9 (4.5%) died during their inpatient stay (including both acute and rehabilitation care). All deaths occurred at CM Health during their inpatient stay. Due to potential differences in participant population characteristics between the two sites, mortality rates may not be directly comparable.

Table 27: Mortality rates by supra-regional SCI service

SCI		Facility				Total	
		CM Health		CDHB			
		Count	%	Count	%	Count	%
Total	No	106	92.2%	85	100.0%	191	95.5%
	Yes	9	7.8%	0	0.0%	9	4.5%
	Total	115	100.0%	85	100.0%	200	100.0%

8 Does early tracheostomy reduce the time spent on a ventilator in people with SCI admitted to a specialist spinal centre in NZ?

This calendar year participant ventilation times are not being reported. Due to the low numbers of consented, tracheostomised and/or ventilated participants, conclusions cannot be drawn from such a small sample size. This will be reported on in future as further data allows. The table below indicates the number of tracheostomies performed for consenting participants.

8.1 Tracheostomy performed

Of 93 traumatic SCI consented participants, 10 had tracheostomies at some point during their inpatient stay. Due to small numbers non-traumatic SCI tracheostomy figures are not provided in this report.

Table 28: Tracheostomy rates and traumatic SCI

SCI		Total	
		Count	%
Traumatic spinal cord injury	No	83	89.2%
	Yes	10	10.8%
	Total	93	100.0%

9 What are the functional changes in SCIM between admission and discharge of a specialist spinal centre in NZ?

9.1 SCIM outcomes from admission to discharge

The Spinal Cord Independence Measure (SCIM) is an outcome measure that assesses various activities of daily living. It has been specifically designed for the SCI population. Composed of 19 items, SCIM assess three domains: Self-care, Respiration and sphincter management; and Mobility. Clinicians (nurses, occupational therapists and physiotherapists) complete relevant sections for each participant at rehab admission and rehab discharge. An improvement of at least four points of the total SCIM is needed to obtain a small significant improvement and of 10 points to obtain a substantial clinical improvement (Scivoletto, 2013).

Change in total scores from rehab admission to rehab discharge was available for 102 of a potential 131 consented participants. Mean score change was 29.99, with a median score change of 27, indicating substantial clinical improvements.

The SCIM score breakdowns for the three domains, as well as SCIM totals are displayed below.

9.1.1 SCIM Self-care domain

Self-care covers feeding, bathing, dressing and grooming data points and has a total sub-score range of 0-20.

Table 29: Self-care scores by supra-regional SCI service and type of SCI

Self-Care Admission 2017							
SCI		Count	Mean	Median	sd	Min	Max
Non-traumatic spinal cord dysfunction	CM Health	18	10.83	8.5	6.15	3	20
	CDHB	17	7.82	8.0	4.84	0	14
	Total	35	9.37	8.0	5.68	0	20
Traumatic spinal cord injury	CM Health	46	4.22	2.5	4.88	0	17
	CDHB	46	5.87	5.0	5.64	0	18
	Total	92	5.04	3.5	5.31	0	18
Total	CM Health	64	6.08	5.0	6.02	0	20
	CDHB	63	6.40	7.0	5.47	0	18
	Total	127	6.24	6.0	5.73	0	20
Self-Care Discharge 2017							
SCI		Count	Mean	Median	sd	Min	Max
Non-traumatic spinal cord dysfunction	CM Health	18	15.83	16.5	4.74	5	20
	CDHB	17	13.41	16.0	4.87	4	19
	Total	35	14.66	16.0	4.89	4	20
Traumatic spinal cord injury	CM Health	43	10.84	12.0	7.00	0	20
	CDHB	45	14.31	16.0	6.51	0	20
	Total	88	12.61	15.0	6.94	0	20
Total	CM Health	61	12.31	15.0	6.78	0	20
	CDHB	62	14.06	16.0	6.08	0	20
	Total	123	13.20	15.0	6.47	0	20
Self-Care Change 2017							
SCI		Count	Mean	Median	sd	Min	Max
Non-traumatic spinal cord dysfunction	CM Health	18	5.00	4.0	4.24	0	13
	CDHB	17	5.59	4.0	3.92	0	15
	Total	35	5.29	4.0	4.04	0	15
Traumatic spinal cord injury	CM Health	43	6.91	7.0	4.70	0	18
	CDHB	45	8.31	7.0	5.46	0	18
	Total	88	7.63	7.0	5.13	0	18
Total	CM Health	61	6.34	7.0	4.62	0	18
	CDHB	62	7.56	6.5	5.20	0	18
	Total	123	6.96	7.0	4.94	0	18

9.1.2 SCIM Respiratory and Sphincter Management domain

SCIM respiratory and sphincter section covers respiration, use of toilet, bladder and bowel management. It has a total sub-score range of 0-40.

Table 30: Respiratory & Sphincter management by supra-regional SCI service and type of SCI

Respiratory & Sphincter Management Admission 2017							
SCI		Count	Mean	Median	sd	Min	Max
Non-traumatic spinal cord dysfunction	CM Health	18	16.72	15.0	7.04	8	34
	CDHB	16	13.88	14.0	4.54	8	27
	Total	34	15.38	15.0	6.09	8	34
Traumatic spinal cord injury	CM Health	42	12.71	11.0	4.87	6	30
	CDHB	42	13.33	11.5	8.18	0	39
	Total	84	13.02	11.0	6.70	0	39
Total	CM Health	60	13.92	13.0	5.85	6	34
	CDHB	58	13.48	12.0	7.32	0	39
	Total	118	13.70	13.0	6.59	0	39
Respiratory & Sphincter Management Discharge 2017							
SCI		Count	Mean	Median	sd	Min	Max
Non-traumatic spinal cord dysfunction	CM Health	18	26.50	30.0	10.08	13	40
	CDHB	16	27.50	32.5	10.78	11	39
	Total	34	26.97	31.0	10.27	11	40
Traumatic spinal cord injury	CM Health	43	21.12	16.0	9.48	8	40
	CDHB	42	28.40	33.0	11.72	8	40
	Total	85	24.72	22.0	11.20	8	40
Total	CM Health	61	22.70	19.0	9.89	8	40
	CDHB	58	28.16	32.5	11.38	8	40
	Total	119	25.36	24.0	10.95	8	40
Respiratory & Sphincter Management Change 2017							
SCI		Count	Mean	Median	sd	Min	Max
Non-traumatic spinal cord dysfunction	CM Health	18	9.78	7.5	9.72	0	29
	CDHB	15	13.00	12.0	9.74	-4	29
	Total	33	11.24	9.0	9.71	-4	29
Traumatic spinal cord injury	CM Health	40	7.78	5.0	8.73	-3	28
	CDHB	40	14.65	16.0	10.20	0	31
	Total	80	11.21	7.5	10.05	-3	31
Total	CM Health	58	8.40	5.0	9.01	-3	29
	CDHB	55	14.20	14.0	10.01	-4	31
	Total	113	11.22	8.0	9.91	-4	31

9.1.3 SCIM Mobility domain

SCIM mobility section covers pressure relief, mobility indoors, outdoors, stairs, and transfers (bed to chair, chair to toilet chair, from chair to car, from ground). It has a total sub-score range of 0-40.

Table 31: Mobility by supra-regional SCI service and type of SCI

Mobility Admission 2017							
SCI		Count	Mean	Median	sd	Min	Max
Non-traumatic spinal cord dysfunction	CM Health	15	11.73	5.0	14.24	0	40
	CDHB	15	7.00	5.0	6.26	0	18
	Total	30	9.37	5.0	11.07	0	40
Traumatic spinal cord injury	CM Health	44	3.48	0.0	5.80	0	26
	CDHB	37	5.81	3.0	9.06	0	40
	Total	81	4.54	0.0	7.51	0	40
Total	CM Health	59	5.58	0.0	9.33	0	40
	CDHB	52	6.15	3.0	8.30	0	40
	Total	111	5.85	3.0	8.83	0	40
Mobility Discharge 2017							
SCI		Count	Mean	Median	sd	Min	Max
Non-traumatic spinal cord dysfunction	CM Health	15	20.40	19.0	11.87	3	40
	CDHB	15	19.67	20.0	11.61	3	40
	Total	30	20.03	20.0	11.54	3	40
Traumatic spinal cord injury	CM Health	41	14.00	13.0	10.68	0	40
	CDHB	42	24.36	27.0	14.23	0	40
	Total	83	19.24	17.0	13.57	0	40
Total	CM Health	56	15.71	14.0	11.27	0	40
	CDHB	57	23.12	27.0	13.65	0	40
	Total	113	19.45	19.0	13.02	0	40
Mobility Change 2017							
SCI		Count	Mean	Median	sd	Min	Max
Non-traumatic spinal cord dysfunction	CM Health	15	8.67	9.0	7.09	0	26
	CDHB	14	11.79	11.0	8.67	0	28
	Total	29	10.17	9.0	7.91	0	28
Traumatic spinal cord injury	CM Health	39	10.13	7.0	7.55	0	29
	CDHB	35	17.26	15.0	12.59	0	40
	Total	74	13.50	13.0	10.79	0	40
Total	CM Health	54	9.72	8.0	7.39	0	29
	CDHB	49	15.69	14.0	11.79	0	40
	Total	103	12.56	11.0	10.13	0	40

9.1.4 SCIM Total scores

Participant SCIM total score change from baseline data are available for 102 consented participants across both NZSCIR sites. Total SCIM scores are combined self-care, respiratory/sphincter management, and mobility sections. Total scores can range from 0 to 100. Changes from rehabilitation admission to rehab discharge (for consented participants with complete records) are shown below.

Table 32: SCIM Scores by supra-regional SCI service and type of SCI

SCIM total Admission 2017							
SCI		Count	Mean	Median	sd	Min	Max
Non-traumatic spinal cord dysfunction	CM Health	15	37.87	25.0	25.20	14	80
	CDHB	15	27.40	25.0	11.33	13	47
	Total	30	32.63	25.0	19.92	13	80
Traumatic spinal cord injury	CM Health	41	19.02	14.0	12.33	6	64
	CDHB	37	23.51	18.0	19.62	0	88
	Total	78	21.15	15.0	16.25	0	88
Total	CM Health	56	24.07	16.0	18.53	6	80
	CDHB	52	24.63	21.0	17.61	0	88
	Total	108	24.34	19.0	18.01	0	88
SCIM total Discharge 2017							
SCI		Count	Mean	Median	sd	Min	Max
Non-traumatic spinal cord dysfunction	CM Health	15	61.33	76.0	25.18	22	94
	CDHB	15	60.20	70.0	25.20	18	91
	Total	30	60.77	71.5	24.76	18	94
Traumatic spinal cord injury	CM Health	41	46.15	40.0	25.16	11	92
	CDHB	42	66.93	78.0	30.77	8	100
	Total	83	56.66	61.0	29.86	8	100
Total	CM Health	56	50.21	48.0	25.84	11	94
	CDHB	57	65.16	73.0	29.34	8	100
	Total	113	57.75	61.0	28.54	8	100

SCIM total Change 2017							
SCI							
		Count	Mean	Median	sd	Min	Max
Non-traumatic spinal cord dysfunction							
Non-traumatic spinal cord dysfunction	CM Health	15	23.47	21.0	17.35	3	61
	CDHB	14	30.64	31.5	17.40	0	61
	Total	29	26.93	26.0	17.45	0	61
Traumatic spinal cord injury	CM Health	38	24.66	20.0	18.68	1	59
	CDHB	35	39.74	38.0	24.86	2	85
	Total	73	31.89	30.0	22.99	1	85
Total	CM Health	53	24.32	20.0	18.16	1	61
	CDHB	49	37.14	35.0	23.17	0	85
	Total	102	30.48	27.0	21.60	0	85

10 What percentage of patients in NZ discharge from a specialist spinal centre as community ambulators (defined as “mobility outdoors more than 100 metres”)?

10.1 SCIM mobility section

Community ambulators are defined as those who can mobilise independently (with or without walking aids) for more than 100m outdoors. If supervision is required, participants are classified as “not community ambulators”. 40.2% of participants discharged as independent community ambulators. The proportion of community ambulators is higher at CDHB (55.9% compared with CM Health’s 24.5%) and may be reflective of the patient population variations at each site. It is noted CDHB has a higher proportion of participants with AIS D (66.3%) compared with CM Health (53.3%). Rehabilitation for this patient cohort is likely to influence length of stay.

Table 33: Independent outdoor mobility (>100m) by supra-regional SCI service and type of SCI

Mobility Outdoors more than 100m on discharge (Y/N) 2017							
SCI		Facility				Total	
		CM Health		CDHB			
		Count	%	Count	%	Count	%
Non-traumatic spinal cord dysfunction	No	11	61.1%	8	50.0%	19	55.9%
	Yes	7	38.9%	8	50.0%	15	44.1%
	Total	18	100.0%	16	100.0%	34	100.0%
Traumatic spinal cord injury	No	36	80.0%	18	41.9%	54	61.4%
	Yes	9	20.0%	25	58.1%	34	38.6%
	Total	45	100.0%	43	100.0%	88	100.0%
Total	No	47	74.6%	26	44.1%	73	59.8%
	Yes	16	25.4%	33	55.9%	49	40.2%
	Total	63	100.0%	59	100.0%	122	100.0%

11 What is the incidence of clinical health complications e.g. pressure injuries, pain, secondary health complications, identified in the acute, rehabilitation and community phases of SCI in NZ?

11.1 Complications

Complication data currently collected in the acute and rehab phases include pressure injuries, urinary tract infections, delirium, respiratory complications and pain.

11.1.1 Pressure injury (PI) data

Pressure injury data collection occurs in the rehabilitation sites, but covers the entire participant journey (acute to rehab discharge). Data collected ranges from dates of assessment, date of appearance, site of PI, stage of PI, and treatment undertaken.

These tables report on the number of pressure injuries, not number of participants. For example, one individual participant may have more than one pressure injury. It is beyond the scope of this report to identify the unique number of participants with more than one PI.

Table 34: Any pressure injuries throughout entire stay by type of SCI

SCI		Total	
		Count	%
Non-traumatic spinal cord dysfunction	No	28	77.8%
	Yes	8	22.2%
	Total	36	100.0%
Traumatic spinal cord injury	No	69	74.2%
	Yes	24	25.8%
	Total	93	100.0%
Total	No	97	75.0%
	Yes	32	25.0%
	Total	129	100.0%

Table 35: Pressure injuries on admission to rehab facility by supra-regional SCI service

		Facility				Total			
		CM Health		CDHB		Count		%	
		Count	%	Count	%				
Total non-traumatic and traumatic SCI	No	58	87.9%	58	92.1%	116	89.9%		
	Yes	8	12.1%	5	7.9%	13	10.1%		
	Total	66	100.0%	63	100.0%	129	100.0%		

Table 36: Any pressure injuries occurring during rehabilitation stay by supra-regional SCI

SCI		Facility				Total			
		CM Health		CDHB		Count		%	
		Count	%	Count	%				
Total non-traumatic and traumatic SCI	No	51	77.3%	55	87.3%	106	82.2%		
	Yes	15	22.7%	8	12.7%	23	17.8%		
	Total	66	100.0%	63	100.0%	129	100.0%		

11.1.2 Urinary tract infection (UTI)

UTI incidence (defined as a UTI treated with antibiotics) during acute or rehab is presented in the following tables.

Table 37: Urinary Tract Infections throughout acute stay by supra-regional SCI service

SCI		Facility				Total	
		CM Health		CDHB			
		Count	%	Count	%	Count	%
Total non-traumatic and traumatic SCI	No	55	87.3%	47	82.5%	102	85.0%
	Yes	8	12.7%	10	17.5%	18	15.0%
	Total	63	100.0%	57	100.0%	120	100.0%

Table 38: Urinary Tract Infections throughout rehab stay by supra-regional SCI service and type of SCI

SCI		Facility				Total	
		CM Health		CDHB			
		Count	%	Count	%	Count	%
Non-traumatic spinal cord dysfunction	No	13	65.0%	9	64.3%	22	64.7%
	Yes	7	35.0%	5	35.7%	12	35.3%
	Total	20	100.0%	14	100.0%	34	100.0%
Traumatic spinal cord injury	No	23	50.0%	33	71.7%	56	60.9%
	Yes	23	50.0%	13	28.3%	36	39.1%
	Total	46	100.0%	46	100.0%	92	100.0%
Total	No	36	54.5%	42	70.0%	78	61.9%
	Yes	30	45.5%	18	30.0%	48	38.1%
	Total	66	100.0%	60	100.0%	126	100.0%

11.1.3 Delirium

Delirium incidence at acute and rehab stays is collected. However, delirium during rehabilitation stay cannot be reported due to low numbers.

Table 39: Delirium during acute stay by supra-regional SCI service and type of SCI

SCI		Facility				Total	
		CM Health		CDHB			
		Count	%	Count	%	Count	%
Total non-traumatic and traumatic SCI	No	58	93.5%	53	93.0%	111	93.3%
	Yes	4	6.5%	4	7.0%	8	6.7%
	Total	62	100.0%	57	100.0%	119	100.0%

11.1.4 Pulmonary complications and conditions

The presence of a pulmonary complication/condition in the acute or rehabilitation phase is displayed in the following tables. Pulmonary complications and conditions include: pneumonia (if treated with antibiotics), veno-thromboembolic events (including pulmonary embolus and DVT), obstructive sleep apnoea and other respiratory conditions.

Table 40: Pulmonary complications during acute stay by supra-regional SCI service and SCI type

SCI		Facility				Total	
		CM Health		CDHB			
		Count	%	Count	%	Count	%
Total non-traumatic and traumatic SCI	No	51	76.1%	40	63.5%	91	70.0%
	Yes	16	23.9%	23	36.5%	39	30%
	Total	67	100.0%	63	100.0%	130	100.0%

Table 41: Pulmonary complications during rehabilitation stay by supra-regional SCI service

SCI		Facility				Total	
		CM Health		CDHB			
		Count	%	Count	%	Count	%
Total	No	58	87.9%	49	77.8%	107	82.9%
	Yes	8	12.1	14	22.2%	22	17.1%
	Total	66	100.0%	63	100.0%	129	100.0%

11.1.5 Pain

Treatment for pain at discharge to community is shown in the following table.

Table 42: Treatment for pain by supra-regional SCI service and type of SCI

SCI		Facility				Total	
		CM Health		CDHB			
		Count	%	Count	%	Count	%
Non-traumatic spinal cord dysfunction	No	5	33.3%	5	31.3%	10	32.3%
	Yes	10	66.7%	11	68.8%	21	67.7%
	Total	15	100.0%	16	100.0%	31	100.0%
Traumatic spinal cord injury	No	6	15.8%	9	21.4%	15	18.8%
	Yes	32	84.2%	33	78.6%	65	81.3%
	Total	38	100.0%	42	100.0%	80	100.0%
Total	No	11	20.8%	14	24.1%	25	22.5%
	Yes	42	79.2%	44	75.9%	86	77.5%
	Total	53	100.0%	58	100.0%	111	100.0%

Participants are asked on rehabilitation discharge if they are experiencing or being treated for neuropathic pain. The results are presented below.

Table 43: Neuropathic pain by supra-regional SCI service and type of SCI

SCI		Facility				Total	
		CM Health		CDHB			
		Count	%	Count	%	Count	%
Non-traumatic spinal cord dysfunction	No	5	41.7%	7	43.8%	12	42.9%
	Yes	7	58.3%	9	56.3%	16	57.1%
	Total	12	100.0%	16	100.0%	28	100.0%
Traumatic spinal cord injury	No	8	21.6%	12	30.0%	20	26.0%
	Yes	29	78.4%	28	70.0%	57	74.0%
	Total	37	100.0%	40	100.0%	77	100.0%
Total	No	13	26.5%	19	33.9%	32	30.5%
	Yes	36	73.5%	37	66.1%	73	69.5%
	Total	49	100.0%	56	100.0%	105	100.0%

Appendix 1: Glossary

Terms

Specialist supra-regional spinal facility

Data is collected for an eligible participant when they are admitted to a specialist supra-regional spinal facility (Middlemore Hospital, Auckland Spinal Rehabilitation Unit, Christchurch Hospital, Burwood Spinal Unit) whether they have come from one or more other non-specialist facilities or not.

Admission

Reflects data collected at the first specialist supra-regional spinal facility the participant is admitted to, regardless of level of care provided.

Discharge

Reflects data collected at the last specialist supra-regional spinal facility the participant is admitted to regardless of level of care provided.

Missing data

Throughout the report, when data is not available, when it has been classified as not collected (data was not collected as per the consent status of the participant or the level of care) or is missing (the data were expected but have not been provided).

Phase definitions

Emergency phase

Early recognition and treatment usually provided by first responder paramedics at an accident scene and on-route to a hospital (preferably to a supra-regional spinal facility unless the person is a multi-trauma patient).

Acute phase

In hospital emergency, intensive care, surgical management ensuring the person is stable ready to actively participate in a rehabilitation programme.

Rehabilitation phase

Rehabilitation provided in a specialist spinal centre as an inpatient, once participant is clinically and surgically stable.

Data collection points

A data collection point refers to a defined scope of data that is collected by a discipline at an identified time interval for a given period. Data collection points reflect the movement of the individual through the health care system from the time of injury until return to community living. Data collection points allow for organised collection of data by specifying: what data to collect, from which period of time, and when it should be collected.

A fully consented participant will have the data collected across their journey:

- Enrollment - Coordinator
- Consent Status - Coordinator
- Acute - Coordinator
- Acute - Medical Team
- Acute - Trauma Nurse
- Acute - Physiotherapist
- Acute - Surgeon
- Rehab - Medical Team
- Rehab - Nursing
- Rehab - Occupational Therapist
- Rehab - Physiotherapist
- Rehab - Coordinator
- Community Follow-Up - Coordinator/Participant

If a participant does not provide consent or is not identified as eligible for the NZSCIR during their inpatient stay; is a non-resident; or has a terminal diagnosis with a poor prognosis; or significant cognitive limitations, the following data collection points are collected, during the acute and rehab phases only:

- Minimal Data Set - Medical Team & Coordinator
 - Age
 - Gender
 - Country of residence
 - Ethnicity
 - Facility admission and discharge dates
 - Date/time of tSCI
 - SCI aetiology
 - Vertebral injury level
 - Associated injury (Y/N)
 - Spinal surgery performed (Y/N); decompression date/time
 - Ventilation status
 - Discharge destination
 - Neurological assessment (available ASIA Impairment Scales at initial, rehab admission and rehab discharge)

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