SPINAL RESEARCH INSTITUTE

THE LANDSCAPE OF SPINAL CORD INJURY RESEARCH IN AUSTRALIA 2018-2023

Associate Professor Linda Barclay
Research and Knowledge Translation Lead, Spinal Research Institute; Associate Professor, Monash University

Dr Marnie Graco
Implementation Scientist, Institute for Breathing and Sleep, Austin Health; Senior Research Fellow, Department of Physiotherapy, University of Melbourne

Professor Marc Ruitenberg
Professor of Neurotrauma, The University of Queensland; Non-Executive Director, Spinal Research Institute

Contents

Clinking an item on the contents page will take you to that section.

Clicking the 'home' icon anywhere in this document will bring you back to this page.

Executive summary

Models that integrate pre-clinical, clinical and community-based research involving multidisciplinary teams, in consultation with SCI consumers, could reduce duplication and maximise recruitment participation rates.

Having a clear understanding of the current landscape for spinal cord injury research within Australia can inform and support efforts to minimise duplication of research, reduce financial waste, and help make strategic decisions around investment, thereby maximising the use of the limited resources available. By knowing what research is currently occurring, gaps and challenges can be identified, and opportunities addressed. Therefore, the Spinal Research Institute (SRI) sponsored this mapping project to obtain a comprehensive picture of the SCI research (January 2018 - May 2023) landscape in Australia.

Methods

Two systematic methods were used to identify the scope and breadth of SCI research in Australia. For the first approach, a comprehensive web-based search was completed to identify research currently in progress (commenced during or since 2018). In the second approach, a scoping literature review was performed to identify recently completed research that was published in the literature between January 2018 - May 2023.

Results

The total amount of overall funding identified through the web-based search was $48,662,255. New South Wales (NSW) received the most overall funding, followed by Victoria and Queensland. The majority of funding supported clinical research ($42,577,298). NSW had the highest level of clinical funding ($24,481,799), and Queensland had the highest level of pre-clinical funding ($4,597,067). While the state and federal governments provided large amounts, other funding sources were less clear due to lack of transparency by insurers and/or unknown amounts received from funders such as Wings for Life. The largest category of clinical research funded was Rehabilitation, followed by Secondary conditions. The largest category of pre-clinical research funded was Neuroprotection, followed by Discovery related projects.

The literature review included 196 eligible publications. NSW had the highest number of publications (n=78), followed by Victoria (n=64). Of the 196 publications included, the majority reported clinical research (n=171; 87.2%). Of the clinical publications, the most common study design was cross sectional (n=40; 23.4%), followed by qualitative inquiry (n=32; 18.7%).

In line with funding, Rehabilitation was the largest category of published research (n=51; 29.8%), followed by Secondary Conditions (n=45; 26.3%). In relation to the pre-clinical publications, there was an equal split between the categories of Discovery, Neuroprotection/Secondary damage, Regeneration and/or Neural Reconstruction, and Secondary Conditions (n=6 each; 24%), with one additional study categorised as Neuroplasticity. Of the 196 publications, only nine engaged people with lived experience of SCI ('consumers') other than as research participants.

Discussion

Multidisciplinary research centres with strong connections between universities and clinical services attracted the most funding, for example, Neuroscience Research Australia (NeuRA) and The John Walsh Centre for Rehabilitation Research in NSW. However, most clinical and pre-clinical research seems to predominantly occur in isolation. Research models that promote greater links between laboratory-based researchers and clinician-researchers could reduce duplication, maximise impact, increase recruitment participation rates, and also enable consumer advisory panels to be available for research projects across the continuum.

SCI research that has a primary care or community care perspective is extremely limited. The majority of clinical research is focused on acute care and early rehabilitation, with most conducted by clinician-researchers recruiting research participants from SCI units, thus maintaining the dependence on SCI units for knowledge creation and education.

Consumer involvement is almost non-existent in the recent published SCI research literature. While there is a shift in the Australian research landscape with government funded grants increasingly requiring consumers be included in project governance, this had yet to flow through to research outputs. Australian SCI consumer research priorities remain largely unknown.

Conclusions

While Australia is producing high-quality SCI research in a range of areas, this report identifies several opportunities for new approaches to advance the reach and impact of SCI research in Australia. Models that integrate pre-clinical, clinical and community-based research involving multidisciplinary teams, in consultation with SCI consumers and key stakeholders, could maximise impact and return on investment. In addition, stronger incentives for multi-state collaborative projects are needed from funding agencies.

Introduction and background

To maximise research outcomes for people with SCI, which may include finding potential cures, maximising function, and/or improving quality of life, a comprehensive understanding of the research landscape in Australia is needed. Having a clear understanding of the current research situation in Australia can inform and support efforts to minimise duplication of research, identify areas of strength, reduce financial waste and streamline investment, thereby maximising the use of the limited resources available. Such knowledge can potentially also support collaboration between research groups studying the same or similar phenomena, thereby maximising the ability to recruit participants into clinical trials or other studies, increasing their statistical power (if relevant), and ensuring the resulting outcomes are more impactful. Furthermore, this information can facilitate the development of a register or database for researchers and consumers to access. By knowing what research is currently occurring, priorities and gaps can be identified by funding bodies and the SCI research community, and these can then be addressed.

By knowing what research is currently occurring, priorities and gaps can be identified by funding bodies and the SCI research community, and these can then be addressed.

The need for a systematic approach to the undertaking of SCI-related research within Australia has been recognised for some time. In 2013, a coordinated approach to developing a research strategy roadmap for Australia and New Zealand was embarked on. Three published articles outline the process and the outcomes of this undertaking [1-3]. As part of this process, a one-day structured stakeholder dialogue was convened with the aim of establishing an Australian and New Zealand regional SCI research strategy [2]. Twenty-three stakeholders including researchers, clinicians, consumers, funders and government policy advisors participated in this dialogue. The outcomes of this process, resulted in a set of objectives for the proposed strategy, which were summarised under four themes:

1. Collaborative networks and strategic partnerships to increase efficiency and reduce duplication, build capacity and optimise research funding (collaboration)
2. Research priority setting and coordination to manage competing studies (co-ordination)
3. Mechanisms to create greater consumer engagement in research (consumer engagement)
4. Develop SCI data registries, evaluate research translation, and assess alignment of research strategies with stakeholder interests (resources).

It was concluded that coordinated collective action was needed to ensure research initiatives were directed to optimise outcomes for people with SCI. Recent years have seen the development

of promising neuroprotective, reparative and restorative strategies. This increases the pressure for early translation into human clinical trials, and the need for cross-disciplinary networks of basic science researchers and clinicians [2].

The Spinal Research Institute (SRI) was established in 2011. The aim of the SRI is to build research collaboration and consumer engagement to improve the lives of people with SCI. The activities and programs that the SRI conduct align closely with the four themes identified in the study by Middleton et al (2015) cited above. In particular, the SRI works to build international research collaborations and capacity of early-mid career researchers, in efforts to reduce duplication and increase the production of high-quality research. The SRI also has a consumer engagement program, which works to actively involve consumers in research to enhance its quality and direction. The SRI recognises that understanding the current SCI research landscape in Australia will help facilitate stakeholder dialogue regarding SCI research priorities for Australia, and how these priorities align with consumer perspectives (i.e. people with SCI, their families, carers, and health workers).

Since the evidence review and stakeholder dialogue work undertaken by Bragge et al in 2015, there has been limited progress toward a collective and coordinated approach to establishing SCI research priorities and streamlining funding in Australia. Overall health and medical research through the Medical Research Future Fund (MRFF) has grown from $61 million in 2016-17 to $650 million in 2022-23. This has resulted in some increased investment in clinical SCI research. However, the National Health and Medical Research Council's (NHMRC) highest research priorities include responding to emerging health threats (e.g. pandemics and climate change), Indigenous health, and preventing and managing multimorbidity and chronic conditions such as cancer, cardiovascular disease, dementia, diabetes, and mental health issues [4]. The limited government funding currently available for SCI research provides an imperative to maximise the resources that are available. Therefore, the SRI has sponsored this mapping report to obtain a comprehensive picture of the SCI research (2018 - May 2023) landscape in Australia.

Research team

The overall lead for the mapping project was Associate Professor Linda Barclay (LB), Research and Knowledge Translation Lead at the Spinal Research Institute, and Associate Professor at Monash University. Dr Barclay defined the parameters of the study in conjunction with the CEO of the SRI. She led all stages of the project, defined the methods, conducted the search for records, screened and analysed the data and wrote up the findings and report. Dr Marnie Graco (MG), Institute for Breathing and Sleep (IBAS), Austin Health, assisted with the methods, screened the clinical literature, assisted with analysing the data and writing the report. Professor Marc Ruitenberg (MR), Neurotrauma Research Group, The University of Queensland, assisted with the methods, screened the pre-clinical literature, assisted with analysing the data, and edited the report.

We thank Professor James St John (Griffith University) for input into defining the research categories. We also thank Ms Claire Backhouse (SRI) for assistance with data management and presenting this report.

Method

Evidence mapping describes the quantity, design and characteristics of research in broad topic areas. This helps identify evidence gaps, and may guide future research directions [5]. The aim of this mapping study was to identify the breadth and scope of recent and ongoing (2018 - mid 2023) SCI-related research in Australia. Two approaches were used to identify as much current and recent research as comprehensively as possible. These consisted of:

1. **Research in progress:** A systematic search of publicly available information posted on relevant websites to identify research in progress, and
2. **Research completed:** A scoping review to identify peer-reviewed research published between January 2018 - May 2023.

1. Research in progress

Excluding multi-state projects, a total of $46,112,255 known funding was allocated to SCI research between January 2018 and mid 2023.

Method

To identify research in progress, a systematic search of publicly available information posted on relevant websites was undertaken [6]. Between February 2023 - May 2023, LB independently searched for, identified, and collated publically available information about any research being funded or conducted within the SCI field in Australia, based on the inclusion criteria listed below.

Inclusion criteria

- *Setting:* Australia (participants located in Australia OR laboratory located in Australia OR Chief Investigator was based in Australia).
- *Original research related to SCI:* Including but not limited to: research related to cure for SCI; medical management of SCI; primary/community care related to SCI; SCI rehabilitation; social and other care following SCI; promotion of health and wellbeing following SCI; quality of life following SCI.
- *Participants:* majority (>50%) of participants must have SCI.
- *Timeframe:* the research was either funded, the clinical trial registered, or the description of the research was published on a website within the time period January 2018 - May 2023.

Exclusion criteria

- Research conducted in countries other than Australia.
- Research about staff working in the field of SCI.
- Research conducted with other disability groups, and that can be applied to and/or beyond SCI.

A manual online search of the following websites was completed:

- Advanced Google scholar search from May 2022 - May 2023 using the search terms: “spinal cord injury” and “org.au”
- Australian New Zealand Clinical Trials Registry (n=38)
- Relevant Australian federal and state-based government grant funding websites (January 2018 - May 2023) (n=19): Medical Research Future Fund (MRFF); National Health and Medical Research Council (NHMRC); Australian Research Council (ARC); National Disability Insurance Scheme (NDIS); National Disability Research Partnership

(NDRP); Transport Accident Commission (TAC), Victoria; Motor Accident Insurance Board (MAIB) Foundation, Tasmania; iCARE and State Insurance Regulatory Authority (SIRA), NSW; WorkSafe Victoria; Worksafe Qld; SafeWork NSW; National Injury Insurance Scheme Qld (NIISQ); Motor Accident Insurance Commission, Qld; Neurotrauma Research Programme - Insurance Commission of Western Australia grants; Lifetime Support SA; NSW Office for Health and Medical Research; Victorian Health Department; Queensland Office for Health and Medical Research; Western Australia Department of Health.

- Major universities (n=11): University of Melbourne; Australian National University; University of Sydney; University of Queensland; University of Western Australia; University of Adelaide; Monash University; University of NSW; Griffith University; University of Technology Sydney; Central Queensland University.
- Independent Research Institutes (n=2): IBAS, NeuRA
- Relevant SCI websites/SCI organisations/not for profit organisations (n=4): Spinal Cord Injuries Australia (SCIA); SpinalCure Australia; AQA; Wings for Life Spinal Cord Research Foundation.
- Relevant conference websites (n=2): ANZSCoS (Australia and New Zealand Spinal Cord Society), RMSANZ (Rehabilitation Medicine Society of Australia and New Zealand)
- Spinal Cord Injury Units (n=5) in Victoria, South Australia (SA), Western Australia (WA), New South Wales (NSW), Queensland.

Clinical trials registry

Clinical trials that were registered but had ceased were not included. For example, Preliminary evaluation of a return-to-work assessment and counselling service for injured job-seekers living in the community, registered in 2019 by The Paraplegic and Quadriplegic Association of SA (PQSA), ceased early due to participant recruitment difficulties. Effect of strong magnetic fields on the communication between brain and arm after spinal cord injury, registered in 2020 by Edith Cowan University, also ceased early due to participant recruitment difficulties.

Results

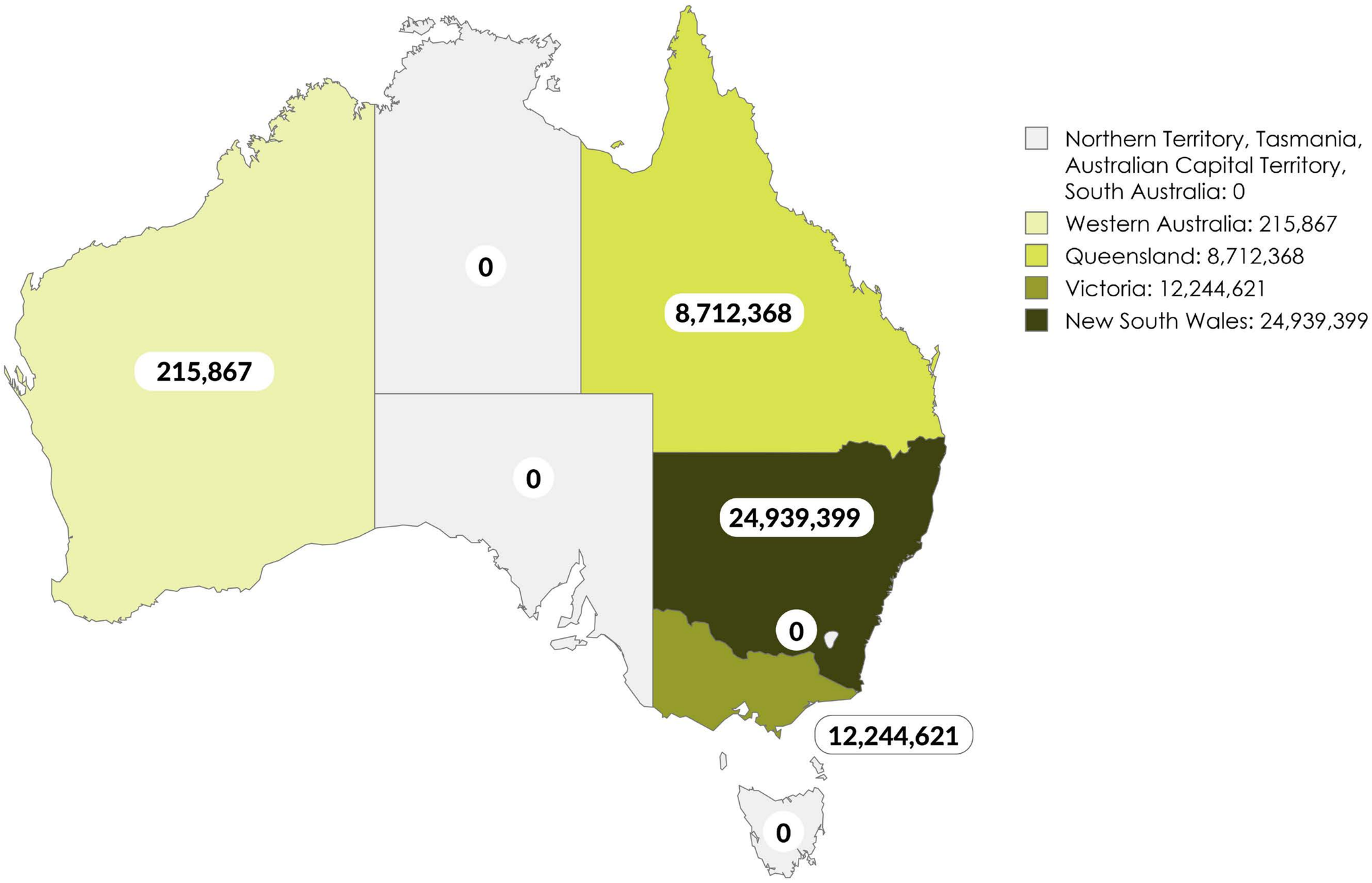
The identified research was extracted according to: Location (by state); Title of research and whether a clinical trial was registered (if known); Aim or description of research; Source of funding (if known); Amount funded (if known); Institute conducted (University/Independent Research Institute/Health Service); Category of SCI research (see Appendix D for categories); Primary Chief Investigator (or CIA). The categories of research were developed by the research team by adapting the existing Spinal Cord Injury Research Evidence (SCIRE) evidence modules for clinical research (scireproject.com); and by utilising the categories used by Wings for Life (wingsforlife.com/uk/research) for pre-clinical research. See Appendix A for a table providing the characteristics of research identified through online search.

Funding

By state

Excluding multi-state projects, a total of $46,112,255 known funding was allocated to SCI research between January 2018 - mid 2023. Over half of the total known funding ($24,939,399) went to NSW institutes. No funding amounts were identified for the ACT, SA, NT or Tasmania (Figure 1).

Figure 1 Overall funding by state ($)



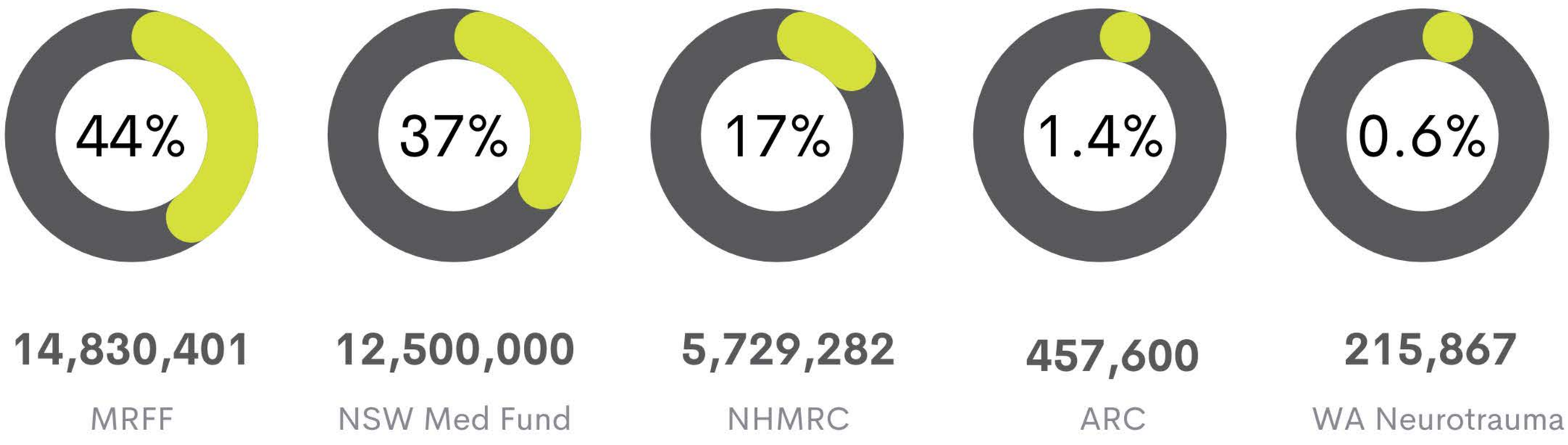
Clinical vs pre-clinical

Including multi-state projects, $42,577,298 was identified as allocated to clinical research, and $6,084,957 to pre-clinical research. Per state, NSW received the most funding for clinical research ($24,481,799), and Qld received the most funding for pre-clinical research ($4,597,067).

Government funding

Overall funding provided by government totalled $33,733,150. Of this, MRRF funded the most SCI research (44%), followed by the NSW Medical Research Fund (37%), and NHMRC (17%) (Figure 2).

Figure 2 Government funding ($)



Insurance companies

- Transport Accident Commission (Vic): $1,041,239 plus other unspecified amounts
- Queensland Motor Accident Insurance Commission: $2,000,000 plus other unspecified amounts
- Lifetime Support SA: 6 projects for unspecified amounts
- iCARE: 2 multi-state funded projects known but no amounts specified; no other projects listed
- National Injury Insurance Scheme Qld: $75,325

Other

- SpinalCure: $1,770,000 known amount, plus other unknown
- Wings for Life: $1,563,795 known amount, plus other unknown
- Perry Cross Spinal Research Foundation: $2,000,000
- ANZSCoS: $15,000
- Sam Bloom: $100,000
- Rebecca L Cooper Medical Foundation: $1,440,000
- Various other unspecified

Research lead by institute type

Overall, there were 82 funded projects identified, of which 65 (79%) were clinical, and 17 (21%) were pre-clinical. For clinical research, project lead by institute type was determined by which

organisation was listed as having received the funding, and registered the clinical trial. Of the funded clinical projects, the majority were awarded to universities (55%). For pre-clinical research, the project lead was determined by who received the funding. Pre-clinical research was exclusively led by universities run by well-established laboratories, consisting of multiple senior researchers and PhD students.

Excluding the two multi-state projects, NSW was awarded the most overall grants (n=36). Of these, 2 were pre-clinical with the remainder being clinical projects. Of the clinical projects (n=34), universities were awarded funding for 17 projects (50%) - 5 projects (15%) were led by the John Walsh Centre who are affiliated with the University of Sydney. The independent research centre NeuRA received funding for 9 projects (26%), and the remainder were led by health services (n=8; 24%).

Clinical trials

A total of 38 clinical trials were registered in Australia in the timeframe reviewed. Of these 22 were registered in NSW, 6 in Vic, 7 in Qld, 1 in WA, and 2 in SA.

Category of research

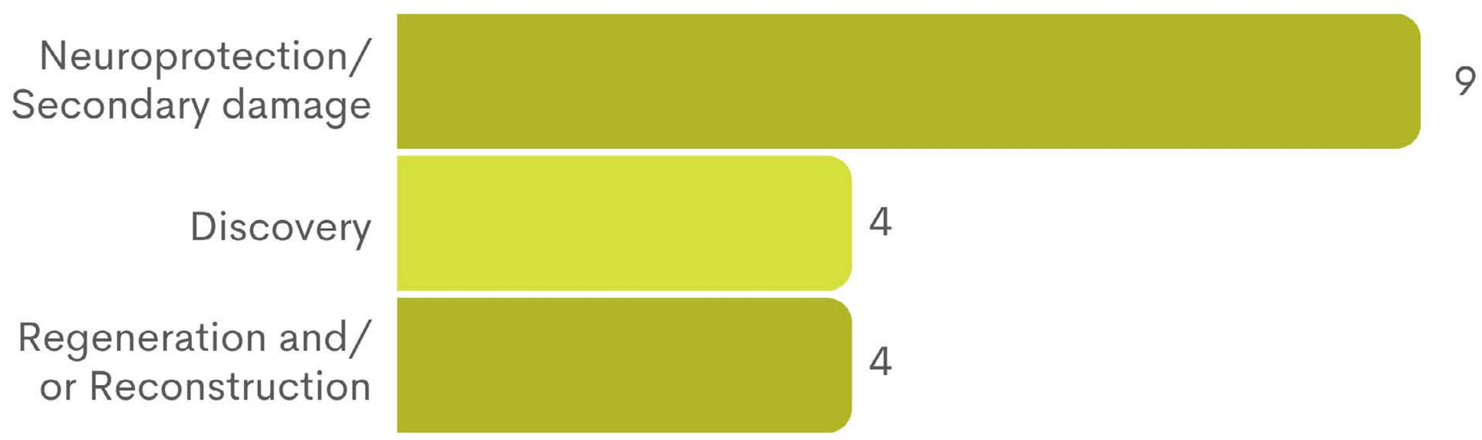
Pre-clinical research

Overall, there were a total of 17 pre-clinical projects found. By state these were:
Qld (n=9); WA (n=3); NSW (n=2); Vic (n=1); SA (n=1); ACT (n=1).

Of the pre-clinical projects by research category these were:

- Neuroprotection/Secondary damage: (n =9)
- Discovery: (n= 4)
- Regeneration and/or Reconstruction (n=4)

Figure 3 Categories of pre-clinical research



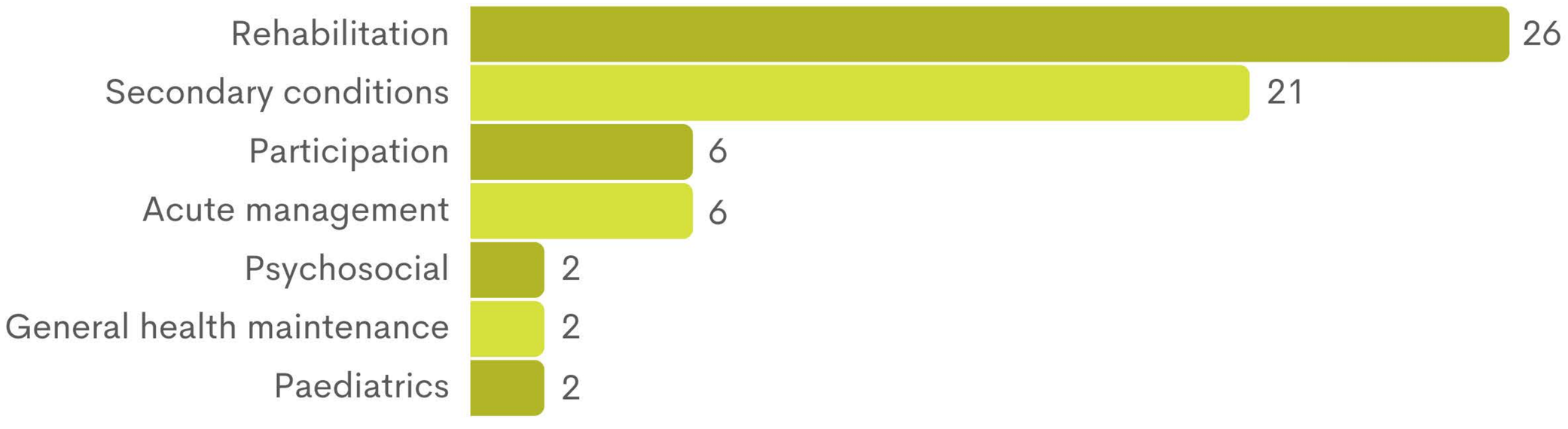
Clinical research

Overall, there were a total of 65 clinical projects found. By state these were: NSW (n=34); Vic (n=15); Qld (n=9); SA (n=4); WA (n=1); multi-state (n=2).

Of the clinical projects the number by overall research category were:

- Rehabilitation: (n =26)
- Secondary conditions: (n=21)
- Participation: (n= 6)
- Acute management: (n=6)
- Psychosocial: (n=2)
- General health maintenance: (n=2)
- Paediatrics: (n=2)

Figure 4 Categories of clinical research



Discussion

Despite limitations in the data collection methods, some interesting points can be drawn from this mapping of SCI research funding and activity in Australia.

Of the states, NSW was awarded the most funding, predominantly for clinical research ($24,481,799). The NSW Medical Research grants funded almost half of this ($12,500,000). There are no equivalent state government funding sources in any of the other states except for the Neurotrauma Research Programme in WA which funds pre-clinical work. In relation to clinical research, the research centre NeuRA was very successful in obtaining funding (26% of the projects funded in NSW). While independent, NeuRA is affiliated with the University of NSW. Their research interests range from dementia and mental health, to discoveries in chronic pain and falls prevention, and they have over 300 staff with specialities in varied areas.

The other successful clinical research group was the John Walsh Centre for Rehabilitation Research in NSW at Sydney University (15% of clinical projects funded in NSW). This is a multi-disciplinary research centre, consisting of researchers with a variety of clinical backgrounds, including medical, psychology, and physiotherapy. This centre utilises a model that includes at least some staff with dual academic and clinical roles.

Queensland institutes are conducting the most pre-clinical or laboratory-based research. Most of this work is being led by three groups. The first is the Neurotrauma Research Laboratory, led

by Professor Marc Ruitenberg at The University of Queensland. This group is focusing on the interface between the nervous and immune system, investigating the role of inflammation in complex neurological conditions such as SCI. They have collaborative ties to the second group, led by Professor Jean-Pierre Levesque, who investigate neurogenic heterotopic ossification. The third group is the Clem Jones Centre for Neurobiology and Stem Cell Research at Griffith University, headed by Professor James St John. The major focus of this Centre is to translate into the clinic a cell transplantation therapy to repair SCI.

Institutes in Victoria are predominantly undertaking clinical research, spread across a variety of research teams. The two most active clinical researchers are Professor David Berlowitz and Professor Mary Galea. Professor David Berlowitz, a physiotherapist, holds the University of Melbourne Chair in Physiotherapy at Austin Health. He leads a team of researchers working on causes and treatments of sleep and breathing disorders in neuromuscular disease, including SCI. Professor Mary Galea is a Professorial Fellow at the Department of Medicine at the University of Melbourne. She leads various research projects including investigating the effects of exercise after SCI, investigating the health of peripheral nerves after SCI, and transcutaneous electrical spinal cord neuromodulation.

Rehabilitation (40%) and secondary conditions (32%) were the categories of clinical research that received the most funding. Projects investigating the use of electrical stimulation (n=13) and the management of pain (n=4) had the highest number of projects funded. This aligns closely with a recently published scoping review that analysed the trends and features of recently finalised and ongoing clinical studies on the rehabilitation of individuals with spinal cord injury or dysfunction that were registered on the international ClinicalTrials.gov Website [7]. This study found that the most common purpose of registered studies was related to motor recovery (which closely equates to our category of rehabilitation) (43%), followed by management of secondary conditions (35%). In other sources, secondary health conditions including bowel, bladder and pain management are frequently reported as the top physical health concerns [8].

In relation to pre-clinical funding, the category that had the highest number of identified projects was neuroprotection (n = 9). Neuroprotection is one of the most promising areas of SCI research, with the potential to translate into strategies that can maximise motor, sensory, and autonomic function outcomes for newly injured people [9]. The most amount of funding was received, however, for pre-clinical research projects focused on regeneration and/or reconstruction of the injured spinal cord.

2. Research completed

The research question for this scoping study was: "What is the breadth and scope of spinal cord injury-related research conducted in Australia published within the last 5.5 years?"

Method

To identify research published in the peer reviewed literature between January 2018 - May 2023, the five stage process for conducting scoping reviews originally outlined by Arksey and O'Malley [10] with proposed revisions by Levac, Colquhoun [11], and Peters, Godfrey [12] was followed. Reporting was based on scoping review guidelines [13]. These are: 1) Identifying the research question; 2) Identifying relevant studies; 3) Study selection; 4) Charting the data; and 5) Collating, summarising, and reporting results.

Identifying the research question

The research question for this scoping study was: "What is the breadth and scope of spinal cord injury-related research conducted in Australia published within the last 5.5 years?"

Identifying relevant studies

To identify peer reviewed journal publications from January 2018 to May 2023, a systematic search of the following databases was completed: CINAHL plus (EBSCO); Ovid Medline; PLoS Medicine; PsychINFO; Scopus Elsevier; Web of Science; Embase by OVID. The search strategy was developed in conjunction with a university librarian. A deliberately broad set of terms were used to capture as many SCI-related research outputs as possible. The Medical Subject Headings (MeSH) "spinal cord injury," "paraplegia," "quadriplegia," and "tetraplegia," were searched for in the abstract field, with Australia searched for in 'Affiliation by country' field. Results were limited to English language articles only. Yield details of all database searches can be found in Appendix B. Each individual database yield was uploaded into EndNote resulting in 3209 records. EndNote was used to remove 1520 duplicates, leaving 1689 articles. These were then uploaded to the Covidence platform (© Covidence 2021). A further 264 duplicates were removed by Covidence and 3 manually, leaving 1422 articles for title and abstract screening.

Study selection

Utilising the Covidence platform, LB and MG screened 1422 articles by title and abstract against the inclusion and exclusion criteria. Conflicts were discussed among the reviewers until

consensus was reached. Full text review of the clinical studies was completed by LB and MG, and of the pre-clinical studies by LB and MR leaving 196 articles included in data extraction and analysis. Figure 5 provides the PRISMA-ScR for the study selection process.

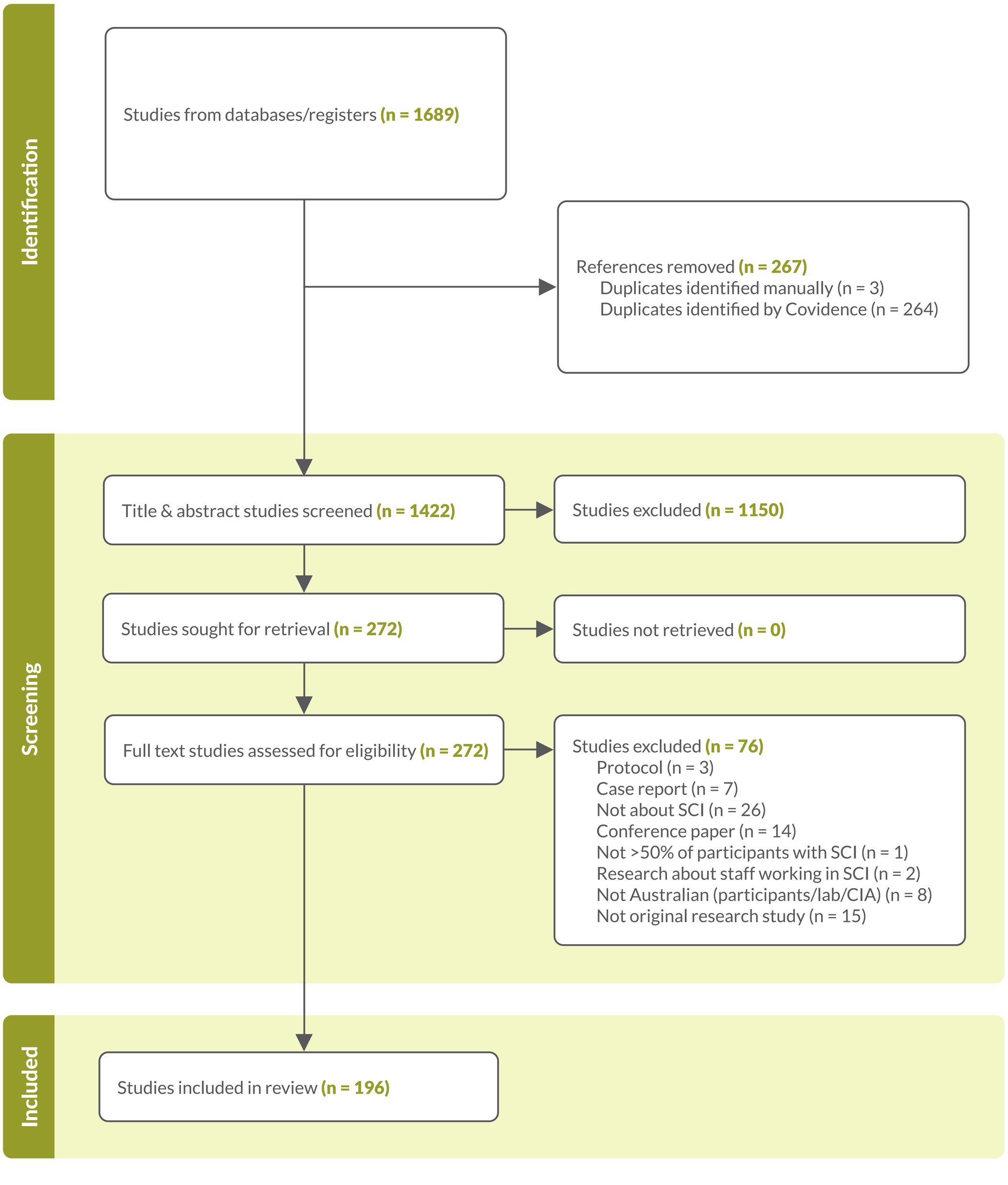
Inclusion criteria

- *Setting:* Majority of participants located in Australia (>50% must have SCI) (for clinical studies), OR laboratory located in Australia (for pre-clinical studies), OR first author, last author or corresponding author located in Australia.
- *Original research related to SCI:* Including but not limited to: research related to cure for SCI; medical management of SCI; community care related to SCI; SCI rehabilitation; social and other care following SCI; promotion of health and wellbeing following SCI; quality of life following SCI.

Exclusion criteria

- Literature reviews; commentaries or viewpoints; conference presentations; research conducted in countries other than Australia; book chapters; protocols; research about staff working in SCI except if it was about the clinical management of SCI; single case descriptions/reports; research that was conducted with other disability groups that may be relevant to SCI (e.g. assistive technology; leisure programs/support systems).

Figure 5 PRISMA-ScR



Charting the data

A data extraction table was developed by LB and MG. The table of extracted data for the included citations is available in Appendix E. The data extracted were: Publication citation; Study design; Topic and/or category of SCI research; Location of research (by Australian state); Organisation where research was conducted (University/Independent Research Institute/Health Service); Involvement of consumers; Multisite recruitment; and Study aim.

Location by state was determined by checking where ethics approval was obtained, if relevant, and where participant recruitment and/or the experiment was conducted. Organisation location was determined by location of first and last authors and cross checked against corresponding author. Involvement of consumers was determined by asking the question: “Were people with lived experience involved in the research process other than as research participants?” ‘Yes/No.’ Multi-site recruitment was extracted for clinical studies, as either ‘No multi-site recruitment’; ‘Recruitment with another institution within the same site’; ‘Recruitment with another state’; or ‘Recruitment with another country’.

Studies were divided into either clinical or pre-clinical research. The clinical studies were further categorised by study design as per the following categories: randomised controlled study, controlled clinical trial, cohort study, case control study, cross-sectional study, case series, retrospective audit, or qualitative inquiry (see Appendix C for definitions).

Clinical and pre-clinical studies were categorised by area of research. The clinical research categories were developed by adapting the existing Spinal Cord Injury Research Evidence (SCIRE) evidence modules for clinical research (**SCIRE Evidence**). For the pre-clinical research, the following category descriptors were used: Discovery; Neuroprotection/Secondary damage; Neuroplasticity; Regeneration and/or Neural Reconstruction; Secondary conditions. The complete data extraction table is available in Appendix E.

Collating, summarising and reporting

Results

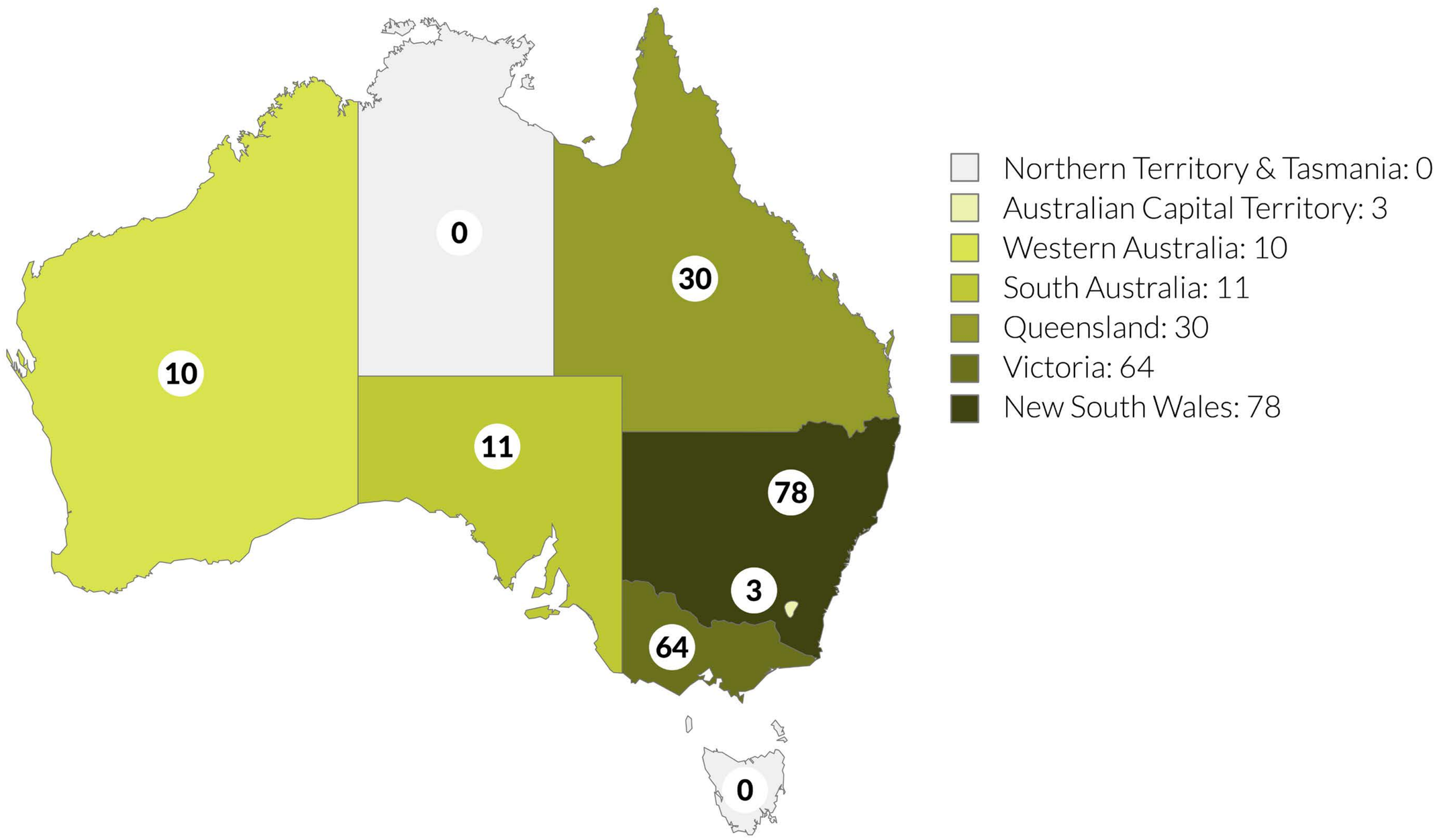
Location by state

New South Wales produced the most overall publications (n=78), followed by Victoria (n=64), Queensland (n=30), South Australia (n=11) and Western Australia (n=10) (Table 1/Figure 6). No SCI-related publications originated from the Northern Territory or Tasmania in this time period.

Table 1 Location by state

Australian state	Number of publications n=196 (%)	Number of clinical publications n=171	Number of pre-clinical publications n=25
NSW	78 (39.8)	73	5
VIC	64 (32.7)	61	3
QLD	30 (15.3)	21	9
SA	11 (5.6)	8	3
WA	10 (5.1)	6	4
ACT	3 (1.5)	2	1
TAS	0	0	0
NT	0	0	0

Figure 6 Location by state



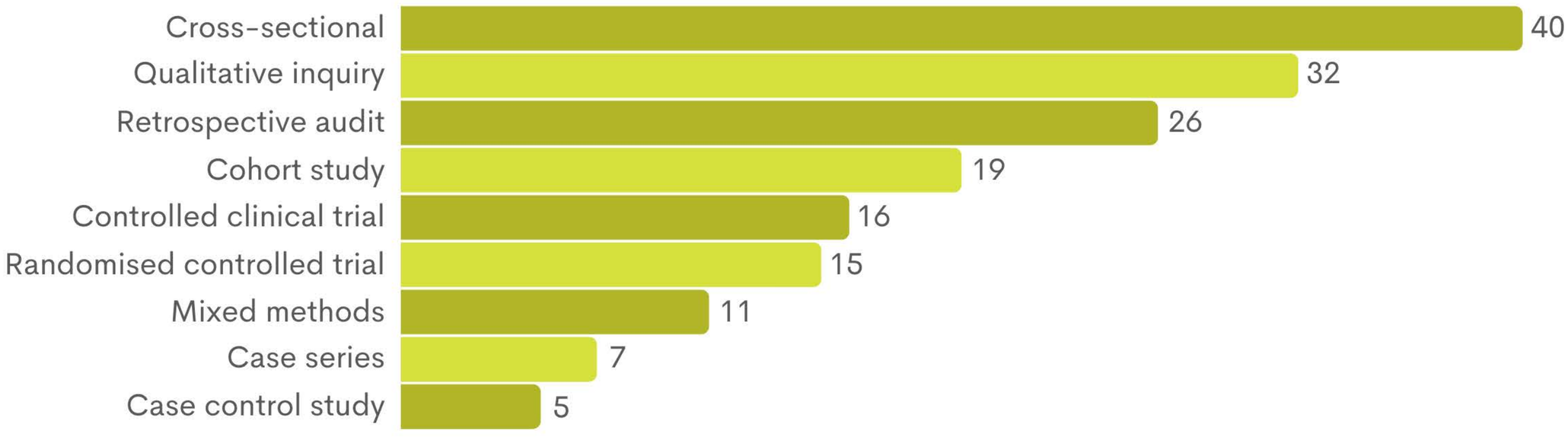
Overview of clinical SCI-related research

Of the 196 publications included, the majority reported clinical research (n=171; 87.2%). Of these clinical publications, the most common study design was cross-sectional (n=40; 23.4%), followed by qualitative inquiry (n=32; 18.7%). Retrospective audits were the third most common study design (n=26;15.2%), and predominantly undertaken by health services (n=16; 9.4%). Clinical trials of interventions made up 18.2% of publications.

Table 2 Study design used for clinical publications

Study design	Number of publications (n=171)	Percentage (%)
Cross-sectional	40	23.4
Qualitative inquiry	32	18.7
Retrospective audit	26	15.2
Cohort study	19	11.1
Controlled clinical trial	16	9.4
Randomised controlled trial	15	8.8
Mixed methods	11	6.4
Case series	7	4.1
Case control study	5	2.9

Figure 7 Study designs for clinical publications



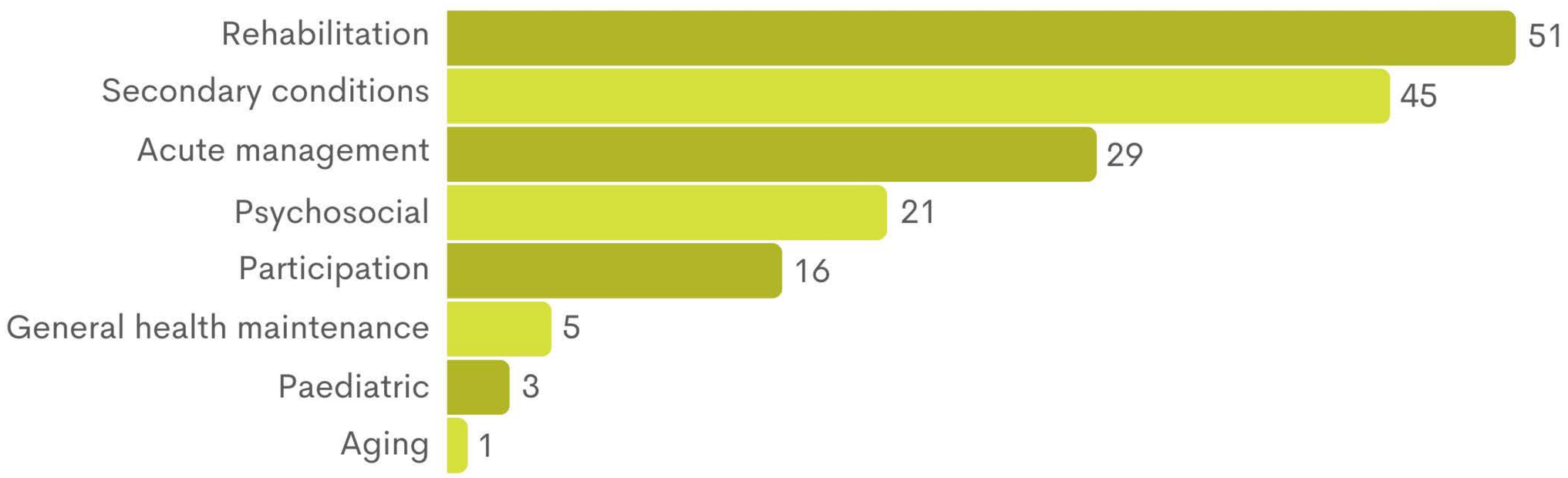
Rehabilitation was the largest category of reported research (n=51; 29.8%), followed by Secondary conditions (n=45; 26.3%) and Acute management (n=29; 16.9) (Table 3/Figure 8). Within the category Rehabilitation (n=51), 35 publications were of the sub-category “other”.

A breakdown of publications within each clinical research category can be found in Appendix F.

Table 3 Categories of clinical research publications

Category of research	Number of publications (n=171)	Percentage (%)
Rehabilitation	51	29.8
Secondary conditions	45	26.3
Acute management	29	16.9
Psychosocial	21	12.3
Participation	16	9.4
General health maintenance	5	2.9
Paediatric	3	1.8
Aging	1	0.6

Figure 8 Categories of clinical research publications



The majority of clinical studies did not recruit participants from any other institution, state, or country (n=117; 68.4%). Twenty-seven studies (15.8%) recruited participants from another institution in their own state, 15 (8.8%) collaborated with another state to recruit participants, and 12 studies (7%) collaborated with another country to recruit participants.

Overview of pre-clinical SCI-related research

Most pre-clinical studies (19 out of 25; 76%) were conducted in rodent models of SCI, with an approximate 60/40 split between the use of mice and rats, respectively. Other studies used either pigs (n=1) or zebrafish (n=3) as the animal model of choice. The remaining two pre-clinical studies were non-animal based and used human cadaveric spines for investigating the biomechanics of injury mechanisms in relation to spinal fractures. Based on their lead and/or senior author(s), these 25 papers originated from a total of 12 laboratories, 2 of which were based in Queensland (n=9), 5 in New South Wales (n=6), 1 in Western Australia (n=4), 2 in South Australia (n=3), 1 in Victoria (n=2), and 1 in the Australian Capital Territory (n=1).

Categories of pre-clinical research were equally split between the categories Discovery, Neuroprotection/Secondary damage, Regeneration and/or Neural Reconstruction, and Secondary Conditions (n=6 each; 24%); 1 study was categorised as Neuroplasticity. Studies around neuroprotection mostly focused on early inflammation and were all conducted in rodent spinal cord contusion injury models. For studies on spinal cord regeneration and/or neural reconstruction, rats and zebrafish (n=3 each) were the animal models of choice; all rat studies involved cell transplantation following contusion injury. Pre-clinical studies on secondary conditions were again all conducted in rodents, using either transection or contusion injury

models of SCI, and they mostly focused on understanding the pathological mechanisms that drive neurogenic heterotopic ossifications (n=5) or syringomyelia (n=1).

Table 4 Categories of pre-clinical research

Category of research	Number of publications (n=25)	Percentage (%)
Discovery	6	24.0
Neuroprotection	6	24.0
Regeneration and/or Neural Reconstruction	6	24.0
Secondary conditions	6	24.0
Neuroplasticity	1	4.0

Involvement of people with lived experience in the research process

Of the 196 publications, only nine (all clinical) included people with lived experience other than as research participants. Of these, two related to a participatory action research design, which aimed to trial a health care transition intervention for young people with SCI moving from paediatric services to adult services. Another involved a randomised controlled trial of a return-to-work resource, and for which an advisory group of consumers was involved in developing and testing the resource. The putative benefits of a Consumer Advisory Group for doctoral research was considered in a study by Rees et al. (2023), with consumer engagement occurring at each stage of the research cycle (that is, from developing a research question through to publication and/or dissemination of study outcomes). Lahkani et al. (2022) published a study on post-lockdown life for people with disabilities; the investigator team included peer-support workers with lived experience. There was no direct involvement of people with lived experience of SCI in any pre-clinical studies.

Discussion

New South Wales researchers published the most articles, followed by Victoria. This is proportional with the population of each state, with New South Wales having the highest population (8.16 million people) followed by Victoria (6.68 million people). Queensland (population 5.19 million) had the highest number of pre-clinical publications.

The most common clinical study designs in eligible research publications were cross-sectional (23.4%) and qualitative inquiries (18.7%). This is not surprising as these designs tend to be the easiest and quickest to conduct. Another advantage of qualitative studies, if conducted well, is that they also provide valuable information from the perspective of people with lived experience of SCI. Cross-sectional and qualitative studies tend to be explorative in nature, which can be useful to determine needs and research priorities, which can then inform future research stages. For example, gaining an understanding of perceived barriers to employment can lead to studies testing the design of interventions that may address and/or overcome these barriers [14].

Retrospective audits (15.2%) were predominantly completed by health networks. Clinical services have access to medical records and other documentation to report on commonly used interventions, medications and surgical techniques. This process can identify trends and potentially enable a comparison of outcomes, depending on what protocols are used. Eighteen

percent of the published studies involving human participants were clinical trials (including randomised controlled trials (RCT) and controlled clinical trials). These are the most complex, time-consuming and resource intensive forms of research, requiring high levels of expertise and long lead times [15].

Among the categories of clinical research published, rehabilitation had the highest number of publications. This could reflect the broad scope of this sub-category which included research that was not relevant to some of the other categories. However, it also aligns with findings from a published analysis of clinical studies registered on the ClinicalTrials.gov website which found the most common purpose of registered studies was related to motor recovery [7]. The relatively high volume of rehabilitation research could also be related to the type and amount of funding available for targeting rehabilitation. The next highest number of publications in our dataset related to secondary conditions. People with SCI experience a range of secondary conditions, including sleep disturbances, bowel, bladder and pain issues [16]. Research into interventions to manage these conditions can provide tangible improvements to the health and wellbeing of people with SCI, as well as reduced medical costs for the Australian community.

Less than one third of clinical studies recruited SCI participants from more than one site or institute, while only 15.8% recruited beyond their own state. SCI is a relatively rare condition, and achieving sufficient sample sizes to answer important clinical questions is often a challenge for SCI researchers. Multi-site recruitment and collaboration are often essential. Data from this review suggests there is enormous opportunity to improve recruitment to clinical research studies through collaboration with local and interstate institutes, and internationally. Lack of funding, insufficient time, and differences in healthcare systems have been identified by SCI researchers as common barriers to collaboration [17].

Pre-clinical studies only represented approximately 13% of all SCI-related papers analysed in this scoping review. Underfunding of basic research in Australia [18], the complexity and laborious nature of basic SCI research itself, often involving multiple experiments and complementary approaches (functional and post-mortem studies) within a single paper, along with lengthy

processes for obtaining ethical approval, are likely all factors of influence as to why fewer pre-clinical papers are published. Uncertainty around experimental outcomes and a tendency for negative (no effect) findings not to be reported may further contribute.

Very few publications included people with lived experience as part of the research cycle other than as research participants. Developing partnerships between researchers and research users may accelerate the time between discovery and use of research in practice [19]. The lived experience perspective can also provide practical information to strengthen the design and methods used [20]. One of the critical issues raised in the stakeholder engagement process undertaken by Bragge et al (2015b) was the importance of the inclusion of people with lived experience of SCI, their families and carers in setting research priorities to ensure that research is more likely to translate into practice and health and social policy [3]. Nearly a decade on, there is little evidence in the published literature of this having occurred or been actively implemented.

Overall Discussion

Analysis of the publications highlights the low levels of collaboration between research groups from different states.

This mapping study aimed to provide a comprehensive view of the SCI research landscape in Australia over the last 5.5 years. By utilising two methods to identify the scope and breadth of current and recent SCI research, barriers and opportunities have been identified that should be taken into consideration when planning the future of SCI research in Australia.

Some aspects of the current funding system in Australia act as disincentives to multi-state collaboration. For example, the NSW Medical Research Grant funds provided $12,500,000 worth of funding in the period analysed, significantly boosting the overall amount awarded to NSW-based researchers. However, this granting body only funds research led by NSW-based research teams. State-based insurers also provided significant research funding, although due to lack of transparency it was not always possible to report on the amounts. Insurance grant eligibility requires the CIA to be located within the state of the funder, and data collection was often restricted to, or at least encouraged to be from within the funding state, thereby discouraging collaboration with other states. While this supports local research, it may contribute to a higher number of smaller research projects that have less impact than those with larger sample sizes. Two recent multi-state research collaborations - the Australian arm of the International Spinal Cord Injury project (Aus-InSCI) (2018) and the Physiotherapy Clinical Practice Guidelines for People with Spinal Cord Injuries (2019) were included in the web search. These projects demonstrate that interstate collaboration is achievable for clinical research. The findings from these studies are currently being disseminated.

When considering the number of publications from each state, NSW had a slightly higher output than Victoria during the period examined. Analysis of the publications also highlights the low levels of collaboration between research groups from different states. However, it should be noted that publications are usually 2-5 years behind the conclusion of the research, therefore the most recent publication outputs do not necessarily align with the currently funded projects. As NSW had the highest level of clinical funding identified in the web search, it is anticipated that their publication outputs will increase over the next few years.

While universities continue to actively compete to lead federally-funded grants such as MRFF, NHMRC and ARC grants, increasingly, grant applications that have multi-state

collaborations and a mix of experts from particular fields, are more likely to be successful. It is evident from this mapping study that clinical research centres consisting of multidisciplinary teams, such as the John Walsh Centre for Rehabilitation Research and NeuRA, are more likely to be successful in receiving clinical grant funding. Multi-disciplinary teams made up of allied health, nursing and medical staff bring multiple and different capabilities and perspectives. For example, expertise in both quantitative and qualitative methods, and the ability to engage consumers in research. In addition, models that link universities with staff working clinically leads to greater scope and breadth of research. The John Walsh Centre is an excellent example of how this has worked well. The Hopkins Centre in Queensland is a more recent example of this approach. Through this centre, Griffith University offers fellowships to clinical staff to 'buy' out 1-2 days per week of their clinical time to work on research projects. This model exposes clinical staff to research, and builds research capacity.

In Australia currently, there is a distinct divide between pre-clinical and clinically based SCI research. This limits the scope, breadth, and impact of the research. Models used in other countries provide exemplars of how pre-clinical and clinical researchers can work together well. One such example is ICORD in British Columbia, Canada (**ICORD**). ICORD's research activities revolve around four strategic goals: 1) Prevention of SCI; 2) Acceleration of SCI cures/treatments; 3) Improving the quality of life for people with SCI; and 4) Supporting activities of their partners. Their centre consists of pre-clinical, clinical and community-based researchers, and they conduct extensive consultation with the SCI community.

Within Australia, other similar groups have established more collaborative models. For example, the Australian Motor Neurone Disease (MND) community has recently united to form the 'MND Research Collective'. This co-designed concept brings existing groups together from across Australia with a shared focus and vision, which is to facilitate collaborative research that enables better outcomes for people with MND. People with lived experience are at the centre of this model, which also includes discovery scientists and clinical researchers.

This landscape study found that most of the current clinical research is associated with hospital-based SCI units. There was no identified research from primary care or General Practice (GP).

GPs, primary care and community-based providers are responsible for managing the long-term secondary conditions for people with SCI living in the community, including their mental health. In other countries, SCI consumers consistently report that their care in the community and in non-specialised health services is compromised by lack of expertise among these providers. A recently published study from Sweden, which aimed to identify the top ten research priorities for people with SCI in 2021-22, identified the fourth highest priority as “Care and rehabilitation - How can the care services lacking specialist expertise in spinal cord injuries best respond to people with these injuries and meet their needs? (For example, local health centres and other primary care facilities, or the care services in other specialist areas)” [21]. More understanding of the care currently being provided to people with SCI in the Australian community is needed, and a stronger link between primary care, community-based research and SCI units is recommended.

In Australia currently, there is a distinct divide between pre-clinical and clinically based SCI research. This limits the scope, breadth, and impact of the research.

Consumer engagement in the research process is a relatively new area in Australia. By involving consumers as active partners throughout the research process, the outcomes of research will be more beneficial to people living with SCI [22]. This study found very few publications that reported involvement of SCI consumers in a meaningful way. Increasingly, people with SCI and their families in Australia have expectations to have authentic input into research that impacts their lives, as has occurred in other countries [21, 23]. Simultaneously, research funders have recognised the value of having consumers involved in the research process. MRFF, NHMRC and insurers are increasingly requiring researchers to outline how consumers will be involved in the governance of projects, while MRFF has introduced Consumer-Led Research grants. However, the research priorities of the SCI community in Australia are largely unknown. It is recommended that a large-scale investigation of consumer priorities for SCI research in Australia be undertaken.

Limitations

There are a number of study limitations that need to be considered when reading this report and its conclusions.

Regarding the Web search, while every effort was made to be as accurate and comprehensive as possible in locating current research, there are inherent limitations to this approach. In some instances, projects may be listed in multiple locations, thereby resulting in an over-representation of the breadth of some projects. It was beyond the scope of this project to follow-up with individual researchers to cross-check this information. Other projects were known to the authors but not found through website searches; this particularly applied to internal and

small projects. To minimise bias based on individual networks and partnerships, research was only included if information about it was publicly available. Some sites (for example Medical Research NSW) do not list projects funded as far back as 2018. Some organisations that funded previous research have changed (e.g. NDIS now outsources research, and has largely been replaced by the National Disability Research Partnership (NDRP) or funding governed through the Department of Social Services). Hence, some work funded longer ago may have been missed if there was also no publication output associated with it in more recent times. Some sites maintain limited information about funded research, for example the Victorian Health Department site only publishes recent initiatives on their website and have poor search functions. The Western Australia Department of Health had very few research grant recipients listed. Insurance companies do not consistently list the amount funded, or the Chief Investigator.

For the Literature review, when categorising the study designs, limits to the number of categories had to be set, therefore some research may be included in categories that were not always the most appropriate. Similarly, when categorising the study topic, the number of categories were limited, so in some instances the research category was not completely accurate (e.g. Panisset et al 2018 [24] was categorised under Nutrition but really it was about assessment of obesity after SCI).

Models that integrate pre-clinical, clinical and community-based research involving multidisciplinary teams, in consultation with SCI consumers, could reduce duplication, maximise impact, recruitment participation rates, and ensure that key stakeholders have the opportunity to provide their valuable input.

Conclusions

This study has identified challenges but also opportunities for new approaches to SCI research in Australia. Models that integrate pre-clinical, clinical and community-based research involving multi-disciplinary teams, in consultation with SCI consumers, can more effectively and efficiently address the research needs of the SCI community. Incentives for multi-state collaborative projects are needed. This will primarily occur if funding is available at a federal level, with built-in incentives for states to collaborate. Consumers, as the beneficiaries of SCI research, need to be actively involved in setting the research agenda as well as providing advice and input into research projects.

References

1. Bragge, P., et al., *Developing a spinal cord injury research strategy using a structured process of evidence review and stakeholder dialogue. Part II: Background to a research strategy*. Spinal Cord, 2015. **53**(10): p. 721-728.
2. Middleton, J.W., et al., *Developing a spinal cord injury research strategy using a structured process of evidence review and stakeholder dialogue. Part III: outcomes*. Spinal Cord, 2015. **53**(10): p. 729-737.
3. Bragge, P., et al., *Developing a spinal cord injury research strategy using a structured process of evidence review and stakeholder dialogue. Part I: rapid review of SCI prioritisation literature*. Spinal Cord, 2015. **53**(10): p. 714-720.
4. *National Health and Medical Research Council Annual Report 2022–23*, 2023, National Health and Medical Research Council: Canberra.
5. Bragge, P., et al., *The Global Evidence Mapping Initiative: Scoping research in broad topic areas*. BMC Medical Research Methodology, 2011. **11**(1): p. 92.
6. Hogan, C., et al., *Establishing the normative and comparative needs of assistive technology provision in Queensland from the agency and funding scheme perspective*. Brain Impairment, 2023: p. 1-15.
7. Furlan, J.C., D.T. Furlan, and C. Marquez-Chin, P*rogress Report on the Spinal Cord Rehabilitation Research Initiatives Based on Registered Clinical Studies From 2000 to 2022*. American Journal of Physical Medicine & Rehabilitation, 2023. **102**(9).
8. Spinal Injuries Association, *What matters report 2023*. 2023: United Kingdom.
9. Ulndreaj, A., A. Badner, and M.G. Fehlings, *Promising neuroprotective strategies for traumatic spinal cord injury with a focus on the differential effects among anatomical levels of injury*. F1000Res, 2017. **6**: p. 1907.
10. Arksey, H. and L. O'Malley, *Scoping studies: towards a methodological framework*. International Journal of Social Research Methodology, 2005. **8**(1): p. 19-32.
11. Levac, D., H. Colquhoun, and K.K. O'Brien, *Scoping studies: advancing the methodology.*(Debate). Implementation Science, 2010. **5**: p. 69.
12. Peters, M., et al., *Scoping Reviews (2020 version)*, in *Joanna Briggs Institute Reviewer's Manual*, A. E and M. Z, Editors. 2020.
13. Tricco, A.C., et al., *PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation*. Annals of internal medicine, 2018. **169**(7): p. 467.
14. Barclay, L., Vecchio, A., and Bould, E. *Investigating employers' attitudes and knowledge about employing someone with a spinal cord injury*. Disability and Rehabilitation, 2024.1–8.
15. McIntyre, A., et al. *A mapping review of randomised controlled trials in the spinal cord injury research literature*. Spinal Cord, 2018. **56**(8):p.725-32.
16. Richardson, A., et al., *Secondary health conditions and disability among people with spinal cord injury: A prospective cohort study*. The journal of spinal cord medicine, 2021. **44**(1): p. 19-28.
17. Noonan, V.K., et al., *Facilitators and Barriers to International Collaboration in Spinal Cord Injury: Results from a Survey of Clinicians and Researchers*. J Neurotrauma, 2018. **35**(3): p. 478-485.
18. Harrison, R.S., Barnard, R.T., Pregelj, L. *Restoring Australia's long-term innovation requires investment in basic research*. Microbiology Australia, 2023. **44**. p. 57-61.
19. Gainforth, H.L., et al., *Principles to guide spinal cord injury research partnerships: a Delphi consensus study*. Disabil Rehabil, 2022. **44**(23): p. 7269-7276.

20. Bochkezanian, V. and K.D. Anderson, *Comprehensive and person-centred approach in research: what is missing?* Spinal Cord, 2022. **60**(2): p. 187-189.
21. Melin, J., et al., *Research priorities to enhance life for people with spinal cord injury: a Swedish priority setting partnership*. Spinal Cord, 2023. **61**(10): p. 570-577.
22. Hendry, K.L. and A. Vecchio, *Involving people with lived experience of spinal cord injury in research: a policy for consumer remuneration*. Spinal Cord, 2023. **61**(5): p. 285-287.
23. van Middendorp, J.J., et al., *Top ten research priorities for spinal cord injury: the methodology and results of a British priority setting partnership*. Spinal Cord, 2016. **54**(5): p. 341-346.
24. Panisset, M.G., et al., *Bedside quantification of fat-free mass in acute spinal cord injury using bioelectrical impedance analysis: A psychometric study*. Spinal Cord, 2018. **56**(4): p. 355-365.

Appendices

Appendix A - Characteristics of research identified through online search

Location by state	Title Clinical trial registered if known	Aim/description of research	Source of funding	Amount funded $	Institute type (university, organisation, health service)	Category of research	Primary Chief Investigator
New South Wales (NSW)							
	Microglia and the inflammation spectrum – not just good or bad 2021-2023	Aim: Our project will characterise the inflammatory response at a single-cell level using the zebrafish spinal cord as a versatile experimental model. The project is expected to strongly contribute to the molecular understanding of the mechanisms underlying debris removal and will advance innovative technologies that facilitate intellectual progress in neuroscience.	ARC Discovery	457,600	Macquarie University	**Pre-clinical** **Discovery**	Assoc Prof Marco Morsch
	Spinal Cord Injury and Chronic Pain, exploring effects of cannabidiol on chronic pain following SCI (SCAN trial) Clinical trial registered 2022: A randomised, double-blind, placebo-controlled, cross-over, pilot trial exploring the effects of cannabidiol (CBD) on chronic pain following SCI.	Aim: To explore effects of cannabidiol (CBD) on chronic pain following SCI. If effective, this trial will provide gold-standard evidence to support the use of CBD for patients with neuropathic pain following SCI.	NSW Medical research Grant, University of Sydney, NeuRA, Lambert Initiative	1,700,000	University of Sydney, NeuRA	**Clinical** **Secondary conditions –** Pain management	Prof Iain McGregor
	The Effect of Abdominal Functional Electrical Stimulation on Bowel Function in Adults with a Spinal Cord Injury: A randomised controlled trial Clinical trial registered 2020 and 2021	Aim: To build the evidence needed to make neurostimulation a mainstream treatment for SCI. Neurostimulation uses gentle currents of electricity to restore some communication between brain and body via pathways in the spinal cord that survive the initial trauma.	Unknown SpinalCure SCIA	103520 Unknown Unknown	University of Sydney and the University of Technology Sydney (UTS), NeuRA	**Clinical** **Rehabilitation –** Upper limb and Lower limb and walking	Prof Simon Gandevia
	1.Electrical stimulation of the abdominal muscles 2020 2. Effectiveness of training on respiratory muscle strength, respiratory physiology and health outcomes.	Aims: 1.To evaluate whether electrical stimulation of the abdominal muscles can reduce the length of time people with SCI require the assistance of a mechanical ventilator, and whether this technology can reduce respiratory complications and improve bowel function. 2.To determine definitively the effectiveness of training on respiratory muscle strength, respiratory physiology and health outcomes. The project will provide critical new knowledge about the efficacy of a simple and inexpensive respiratory muscle training regime.	NSW Medical research Grant – Spinal Cord Injury Research Grant	2,400,000 million for projects listed in this section	NeuRA, Prince of Wales Hospital, Royal North Shore Hospital, Austin Health, Fiona Stanley Hospital and other countries including India, Scotland, New Zealand and Canada	**Clinical** **Secondary conditions –** Respiratory management	Dr Euan McCaughey
	Sleep apnoea	Aim: To identify the causes of sleep apnoea in people with SCI. To test the effectiveness of a novel therapeutic intervention for people with SCI and sleep apnoea	NHMRC	Unknown	NeuRA	**Clinical** **Secondary conditions –** Sleep	Prof Jane Butler

	Project SPARK Neurostimulation to improve walking after spinal cord injury 2023-2028	This randomised controlled trial (RCT) will determine if transcutaneous spinal electrical stimulation combined with locomotor training can restore walking ability in people with incomplete SCI from Sydney, Melbourne, and Perth. We will also examine the effects on neurological function, spasticity, neuropathic pain and quality of life.	MRFF – Clinical Sciences, Physiotherapy, Neurosciences Not Elsewhere Classified Sam Bloom SpinalCure	2994189 100,000 Unknown	University of New South Wales	**Clinical** **Rehabilitation –** Upper limb and Lower limb and walking	Prof Jane Butler
	New targets for therapy and to trial the use of abdominal muscle stimulation to reduce respiratory morbidity and mortality. 2018	Aim: To determine the contribution of impaired neural control to respiratory motor impairment with the aim to identify new targets for therapy and to trial the use of abdominal muscle stimulation to reduce respiratory morbidity and mortality in the ageing, chronic obstructive pulmonary disease and tetraplegia populations.	NHMRC	649,175	University of NSW	**Clinical** **Secondary conditions –** Respiratory	Prof Jane Butler
	Therapeutic intermittent hypoxia 2020	Aim: To examine the mechanisms of action of therapeutic acute intermittent hypoxia which has potential to restore function to muscles paralysed after SCI through 'neuroplasticity'. How to optimise the response in people with SCI and why some individuals with SCI do not respond to this treatment. It will also identify the best way to target, tailor and apply this treatment clinically for people with SCI.	Medical Research NSW	Unknown	University of New South Wales	**Clinical** **Rehabilitation –** Restoring function	Prof Jane Butler
	Get A Grip: Spinal stimulation for upper limb and respiratory function in complete tetraplegia Clinical trial registered 2023	Aim: To explore the efficacy, safety, and acceptability of Transcutaneous spinal cord neurostimulation combined with exercise training for chronic tetraplegia, targeting hand and respiratory function in a multi-centre community-based adaptive Bayesian Optimal Phase (BOP) II trial design across three Australian states.	Unknown	Unknown	NeuRA	**Clinical** **Rehabilitation –** Restoring function	Dr Terry Trinh
	The short-term effect of wearing an electrodress suit on physical function after spinal cord injury: a randomised placebo-controlled cross-over trial	Aim: To determine if receiving stimulation through wearing the Mollii suit for a single 60-minute session produces short-term improvements in function and spasticity in people with chronic spinal cord injury.	Unknown	Unknown	NeuRA	**Clinical** **Rehabilitation –** Restoring function	Dr Claire Boswell-ruys
	eWalk trial Clinical trial registered 2021	Aim: To determine definitively whether transcutaneous spinal stimulation is a practical therapy to enhance walking in people with chronic paraplegia (T2-T11). The main outcome is improvement in walking, but will also assess neurological function, spasticity, quality of life and potential mechanisms underlying any improvements.	SpinalCure CatWalk Trust SCIA	1,750,000 1,750,000 100,000	NeuRA The trial will mainly be conducted in Sydney, but with some participation in Chicago, Glasgow and Toledo.	**Clinical** **Rehabiliation –** Lower limb and walking	Prof Simon Gandevia
	Psychometric properties and clinical utility of sitting balance outcome measures in the acute or subacute spinal cord injury population. Clinical trial registered 2023	Aim: To test 3 assessments: 1. Function in Sitting Test for people with SCI (FIST-SCI); 2. The modified FIST (mFIST); 3. The Truck Control Test (TCT), and identify which are the most valid and reliable assessments for people with acute SCI.	Unknown	Unknown	NeuRA	**Clinical** **Rehabilitation –** Other	Dr Annie Palermo

	Eating practices during SCI rehabilitation	Aim: To investigate the impact of eating practices on health, in SCI rehabilitation. Food and nutrition extend beyond providing the fuel for recovery care.	Unknown	Unknown	University of Wollongong	**Clinical** **General health maintenance –** Nutrition	Ms Priya Iyer
	Association between diet quality, lipid profile and body weight in participants with SCI Clinical trial registered 2020	Aim: To determine if there is an association between diet quality, lipid profile and body weight in participants with SCI	Unknown	Unknown	Royal Rehab	**Clinical** **General health maintenance –** Nutrition	Ms Priya Iyer
	The Spinal cord injury, Mind and HeART or (SMART) study Clinical trial registered 2021	Aim: To determine if rhythmic breathing can help people with a disrupted nervous system as a result of SCI. It will assess whether the breathing and importantly, the feedback of heart function can improve the functioning of the nervous system	NSW Ministry of Health and the University of Sydney.	3,000,000	John Walsh Centre for Rehabilitation Research	**Clinical** **Secondary conditions –** Cardiovascular	Prof Ashley Craig
	Effectiveness of early and intensive physiotherapy on neurological recovery and function in people with recent SCI. 2021-2025 Clinical trial registered 2020	Aim: To assess the effectiveness of early and intensive physiotherapy on neurological recovery and function in people with a recent SCI. The treatment aims to help partially paralysed muscles work again through a range of specific exercises, with electrical stimulation.	Wings for Life NSW Medical Research University of Sydney	465,000 2,400,000 500,000	John Walsh Centre for Rehabilitation Research	**Clinical** **Rehabilitation –** Upper limb; Lower limb and walking	Prof Lisa Harvey
	Cognitive strategies to improve outcomes for children with spinal cord injuries or disease Clinical trial registered 2018	Aim: To explore the self-regulation and imagery ability of children with SCI. The information collected will help in the development of a program using self-regulation and imagery to enhance daily and school task performance in children with SCI or disease	Unknown	Unknown	Western Sydney University	**Clinical** **Paediatric**	Dr Caroline Mills
	StoPain: A randomised placebo-controlled trial to investigate the efficacy of an advanced interactive brain-computer interface neuromodulation treatment for spinal cord injury neuropathic pain 2021-2027 Clinical trial registered 2020	StoPain: A randomised placebo-controlled trial to investigate the efficacy of an advanced interactive brain-computer interface neuromodulation treatment for SCI neuropathic pain	MRFF Clinical Sciences -Rehabilitation & Therapy (Excl. Physiotherapy)	1,780,269	University of New South Wales	**Clinical** **Secondary conditions –** Pain management	Prof Sylvia Gustin
	RESTORE: A Pilot Single-arm Study of the Effect of Immersive Virtual Reality Treatment on Touch Perception in People with Discomplete Paraplegia 2022-2024 Clinical trial registered 2022	Aim: To develop & test a novel intervention that can provide touch restoration via the primary source of sensory perception: the brain. Develop a VR interface that simultaneously enhances surviving spinal somatosensory nerve fibres and touch signals in the brain in an effort to restore touch perception in people with discomplete SCI.	NSW Medical Research - Spinal Cord injury Research Grant – 2020	3,000,000	NeuRA; University of NSW; John Walsh Centre for Rehabilitation Research; University of Sydney; Virginia, USA	**Clinical** **Rehabilitation –** Restoring function	Prof Sylvia Gustin

	The Avatar programme: Spinal Cord Injury and Related Disorders: Discovery to Cure 2022-2026	Aim: To examine whether a 20-day course of 30-minute VRWalk intervention offers clinically meaningful restoration of touch perception in people with discomplete spinal cord injury	Rebecca L. Cooper Medical Foundation	1,440,000	NeuRA	**Clinical** **Rehabilitation –** Other	Prof Sylvia Gustin
	Combining Immersive Haptic Virtual Reality and Spinal Transcutaneous Electrical Stimulation to Restore Somatosensory Perception in Complete Spinal Cord Injury 2022-2025	Aim: To combine a novel sensorimotor virtual reality (VR) haptic training platform with spinal transcutaneous electrical stimulation (tES) to restore touch perception among individuals with disc-SCI.	Wings for Life	330,246	NeuRA	**Clinical** **Rehabilitation –** Other	Prof Sylvia Gustin
	Abdominal Functional Electrical Stimulation to Reduce Respiratory Complications in Spinal Cord Injury 2018 – 2021	Aim: To determine whether Abdominal FES reduces respiratory complications in acute induced– using a prospective, multi-centre, randomised placebo controlled trial	Wings for Life	Unknown	Prince of Wales Hospital, Royal North Shore Hospital; NueRA, also India, Scotland	**Clinical** **Secondary conditions –** Respiratory management	Dr Bon San Bonne Lee
	Metagenomics based diagnostics for control of urinary tract infections Clinical trial registered 2022: Metagenomics-based diagnostics for the prediction, prognosis and prevention of urinary tract infections in patients who use catheters for bladder management	Aim: To devise a simple, cheap, and fast way to predict and prevent UTIs in SCI community.	Unknown	Unknown	University of Technology Sydney	**Clinical** **Secondary conditions –** Bladder management	Dr Bon San Bonne Lee
	Robot-assisted game-based training for the arm and hand	Aim: To explore opinions and experiences of people with SCI from participating in a robot-assisted game-based training for the arm and hand	SpinalCure	20,000	University of Technology Sydney	**Clinical** **Rehabilitation –** Upper limb	Dr Camila Quel De Oliviera
	An examination of the cellular and inflammatory response in rats after SCI, and the effects of age, location and survival time	Aim: To comprehensively examine the cellular and inflammatory response in infant rats after SCI, in comparison with mature animals, with the goal of suggesting potential therapeutic interventions that may be applied.	PhD project	Unknown	University of Technology Sydney	**Pre-clinical** **Neuroprotection / Secondary damage**	Theresa C. Sutherland
	Physical activity of people with SCI	Aim: To investigate the current physical activity levels of persons with a SCI in a national-level survey. This survey will measure current physical activity volume and intensity while exploring what barriers individuals regularly face to participate in exercise and any motivators for physical activity.	SCIA	Unknown	University of Sydney; University of Technology Sydney	**Clinical** **Participation –** Physical activity	Paul Watson

	Gentamicin in urodynamics Clinical trial registered 2021: A double-blinded randomised controlled trial to assess the effect of intravesical gentamicin instillation during Urodynamics to on the rate of post procedure urinary tract infections in SCI patients	Aim: To assess the true effect of gentamicin used during urodynamics	Unknown	Unknown	Department of Urology, Royal North Shore Hospital	**Clinical** **Secondary conditions –** Bladder management	Dr Cameron James Parkin
	Current practice with reference to factors that influence prognostication and prevention of secondary neurological injury Clinical trial registered 2021: A retrospective observational clinical research of current practice in the acute assessment and intensive care management of SCI	Aim: To identify current practice with reference to factors that influence prognostication and prevention of secondary neurological injury. The primary objective of this study to describe current practice in the acute assessment and intensive care (ICU) management of SCI, with respect to timing and documentation of neurological status after injury, and acute blood pressure management in ICU.	Unknown	Unknown	Prince of Wales Hospital	**Clinical** **Acute management –** Other	Mr Trent Li
	The effect of a novel neuro-cardiac self-regulation therapy on autonomic and neural function after SCI Clinical trial registered 2021: The effect of a novel neuro-cardiac self-regulation therapy on autonomic and neural function after SCI: an RCT	Aim: To evaluate an approach that trains the person to restore physical function by learning how to self-regulate their autonomic nervous system activity which is central for a healthy life. The therapy involves heart rate variability feedback (HRV-F).	Medical Research NSW	Unknown	John Walsh Centre for Rehabilitation Research; Royal North Shore Hospital	**Clinical** **Rehabilitation –** Other	Dr Ilaria Pozzato/Prof Ashley Craig
	Electrical stimulation (ES) for increasing voluntary muscle strength Clinical trial registered 2021: ES combined with strength training to increase the strength of very weak muscles in people with recent SCI: a RCT	Aim: The aim is to compare the effectiveness of strength training combined with electrical stimulation (ES) and usual care, versus usual care alone for increasing voluntary strength in very weak muscles of people with recent SCI.	Unknown	Unknown	Spinal Injuries Unit, Royal North Shore Hospital	**Clinical** **Rehabilitation –** Neurostimulation	Ms Lydia Chen
	Heat evoked potentials to detect subclinical spinothalamic fibre preservation following SCI Clinical trial registered 2022: Neurophysiological assessment of residual thermonociceptive sensation following SCI – a pilot study	Aim: Determine whether contact heat evoked potentials (CHEPs) are able to detect subclinical spinothalamic fibre (STT) preservation following SCI. Secondary aim: To determine whether CHEPs taken from an area of pain (below the SCI) are more frequently observed when peripheral sensitisation with capsaicin and baseline temperatures up to 42°C are used in subjects with clinically complete spinal cord injuries and BLNP.	Unknown	Unknown	Pain Management Research Institute Royal North Shore Hospital	**Clinical** **Acute management –** Neuroprotection	Assoc Prof Paul Wrigley

	The Trans Anal Irrigation Study. Investigation of the use of colonic irrigation in adults with spinal cord disorders. Clinical trial registered 2021	Aim: To determine whether trans anal irrigation is quicker than standard bowel care for adults who have a spinal cord disorder. Another important outcome is to see whether trans anal irrigation can reduce the amount of bowel accidents and constipation that people with spinal cord disorder experience.	Unknown	Unknown	John Walsh Centre for Rehabilitation Research	**Clinical** **Secondary conditions –** Bowel management	Ms Louise Kelly
	Supporting the Transition of Children and Young People with a Spinal Cord Injury from Paediatric to Adult Healthcare Services 2021	Aim: To develop healthcare transition support resources and tools for young people with spinal cord injuries (SCI).	Unknown	Unknown	Western Sydney University	**Clinical** **Paediatrics**	Emily Bray
	Improving quality of life and resilience in adults with spinal cord injury who also have cognitive impairment. Clinical trial registered 2019	Aim: To determine presence and severity of cognitive impairment and factors that contribute to or predict cognitive impairment in people with SCI.	Unknown	Unknown	John Walsh Centre for Rehabilitation Research	**Clinical** **Secondary conditions –** Cognition	Dr Mohit Arora
	Virtual-reality as a treatment for pain in people with spinal cord injury Clinical trial registered 2018	Aims: 1.To determine whether a virtual reality (VR) application results in a significant reduction in pain in people with neuropathic pain following SCI, 2.To determine if the use of VR and changes in pain intensity or negative related perception of pain are associated with corresponding changes in electroencephalographic (EEG) patterns linked to the presence of neuropathic pain.	Unknown	Unknown	Greenwich Hospital	**Clinical** **Secondary conditions –** Pain	Unknown
	Preventing Osteoporosis in Patients with Spinal Cord Injury (SCI) Clinical trial registered 2018	Aim: To prevent Osteoporosis in Patients Following an Acute Traumatic Spinal Cord Injury (ASCI) Using Early Intervention with a Potent Anti-Resorptive Therapy, Zoledronic Acid.	Unknown	Unknown	Royal North Shore Hospital	**Clinical** **Secondary conditions –** Bone health/ Heterotopic ossification	Ms Liza Nery
	SIR HELLEN (Spinal Cord InjuRy in the Hunter's Exoskeleton for Lower Limb Exercise and Neurorehabilitation) Clinical trial registered 2018	Aim: To determine the effect on functional ability and quality of life of a lower limb robotic exoskeleton in patients with Spinal cord InjuRy (SIR HELLEN).	Unknown	Unknown	University of Newcastle	**Clinical** **Rehabilitation –** Lower limb and walking	Dr Jodie Marque
	Mechanisms underlying chronic pain following SCI	Aim: To extend the current understanding of the causes of SCI pain with a focus on changes of functioning of specialised brain cells (astrocytes) in causing the pain	Unknown	Unknown	University of Sydney	**Clinical** **Secondary conditions –** Pain	Prof Luke Henderson
				24,939,399			

Victoria (Vic)							
	Leading your best life: Optimising the wellbeing of young men living with Spinal Cord Injury 2022- 2023	Aim: To identify how to best engage with males under 35 years and understand how this cohort adapt to changed circumstances. The project will develop, implement and evaluate an intervention to build capacity of males under 35 years to self-manage their own health and wellbeing.	TAC AQA	575,840	Monash University - Behaviour Works Australia, AQA, Austin Health	**Clinical** **Psychosocial –** Mental health	Dr Denise Goodwin
	Evaluating the implementation of a new model for managing sleep disordered breathing in the Spina Injury Unit at Royal Rehab	Aim: To adapt and implement a model for managing sleep disordered breathing at Royal Rehab, which includes clear pathways for clinical practice.	ANZSCOS	15,000	Austin Health/IBAS	**Clinical** **Secondary conditions –** Sleep	Dr Marnie Graco
	Peer-led sleep apnoea awareness in tetraplegia.	Peer-led sleep apnoea awareness in tetraplegia.	TAC	49,600	Austin Health/IBAS	**Clinical** **Secondary conditions –** Sleep	Dr Marnie Graco
	Reversing peripheral nerve dysfunction using functional electrical stimulation after SCI Clinical trial registered 2018	Aim: To specifically investigate whether functional electrical stimulation (FES) reverses myelin abnormalities in peripheral nerves of people with SCI	TAC Wings for Life	Unknown Unknown	University of Melbourne/Austin Health	**Clinical** **Rehabilitation –** Restoring function	Prof Mary Galea
	Driving functional recovery after SCI using transcutaneous electrical spinal cord neuromodulation (TESCoN) 2022-2027 Clinical trial registered 2022: Efficacy and safety of transcutaneous electrical spinal cord neuromodulation (TESCoN) after SCI	Aim: To investigate whether a novel non-invasive method of spinal cord stimulation in early and late stages post-injury improves upper limb function.	MRFF Targeted competitive TAC	2,038,621 154,742	University of Melbourne	**Clinical** **Rehabilitation –** Upper limb	Prof Mary Galea
	Restoration of Respiratory and Upper Limb function after cervical spinal cord Injury (RRULI) 2023-2028 Clinical trial registered 2022	Aim: To restore arm hand and respiratory function with a combination of neurostimulation and acute intermittent hypoxia – stimulate the nervous system and improve muscle function	MRFF -Neurosciences Not Elsewhere Classified, Clinical Sciences, Physiotherapy	2,993,843	University of Melbourne	**Clinical** **Rehabilitation –** Upper limb	Prof David Berlowitz
	Precursor neurons on standby fast track neural repair. 2021	Aim: To use innovative regeneration models and screening approaches to identify how endogenous cells and molecules can be hoaxed to boost neural regeneration after injury or in disease. The work provides critical insight and hold keys to unlocking strategies for future restorative therapies in the brain or spinal cord	NHMRC – Basic Science – neurodevelopment	814,423	Monash University	**Pre-clinical** **Regeneration**	Dr Jan Kaslin
	Immediate Cooling followed by Emergency Decompression for the Treatment of Traumatic Cervical SCI. 2018-2020	Aim: To determine whether it is possible to cool patients with SCI resulting from neck trauma (cervical SCI) in the first hours after injury. This study will also determine whether it is feasible to operate on patients early after injury.	Wings for Life	Unknown	Monash University	**Clinical** **Acute –** Neuroprotection	Dr Peter Batchelor

	Endovascular Brain Computer Interface for Independent Communication 2020-2023	Aim: To use an implantable brain computer interface as a hands-free controller for personal computers and devices that restore lost function to patients with severe paralysis, due to SCI, stroke, motor neuron disease and muscular dystrophy	MRFF Targeted competitive	1,481,180	University of Melbourne	**Clinical** **Rehabilitation –** Other	Assoc Prof Thomas Oxley
	Stentrode with thought controlled digital switch	A first in human early feasibility study of the stentrode in participants with loss of motor function due to paralysis. The stentrode is an implanted endovascular stent recording electrode that records brain signals from the motor cortex. Through the use of computer algorithms, the device is intended to translate brain signals to a computer interface that enables patients with paralysis to directly control assistive technologies including computer software, robotic upper limb prostheses, and motorized wheelchairs.	NHMRC	443,109 plus other unknown amounts	University of Melbourne	**Clinical** **Rehabilitation –** Other	Assoc Prof Thomas Oxley
	Research to identify best-practice service delivery and care models for spinal community integration programs (National and international). 2018	Aim: To identify best-practice service delivery and models for spinal cord community integration programs, which focus on maximising independence, self-management, community integration, social and economic participation, and quality of life outcomes for program participants with SCI.	TAC	68,907	Monash University	**Clinical** **Participation**	Dr Linda Barclay
	Development of a framework integrating peer support activities at AQA. 2018	Aim: To develop a framework that would integrate and outline the range of innovative activities that are involved in the current SCI peer mentoring program at AQA.	TAC	58,000	Monash University	**Clinical** **Participation –** Leisure/ peer related	Dr Linda Barclay
	Empowering employers to hire people with spinal cord injuries. 2022	Aim: To explore the perceptions and understanding of employer groups regarding employing someone with a SCI. To co-design an evidence-based video explainer for employers.	Rehabilitation; Ageing; Independent Living Centre, Monash University	15,000	Monash University	**Clinical** **Participation –** Work/ employment	Dr Linda Barclay
	Assessing the effect of therapeutic acute intermittent hypoxia (HIA) protocols on upper limb and respiratory function in people with chronic SCI: a Bayesian Optimal Phase II Design trial Clinical trial registered 2022	Aim: To understand the mechanisms of action of this therapy in people with SCI so that we will be able to identify the best way forward to target, tailor and apply this treatment clinically for people with both chronic and acute SCI.	Unknown	Unknown	Austin Health	**Clinical** **Rehabilitation –** Restoring function	Dr Nicole Sheers
	A study of bone characteristics in paediatric spinal cord disorders (SCD) Clinical trial registered 2022	Aim: To improve our understanding of bone development following SCD using multiple imaging modalities, which will allow the development of consistent, evidence-based guidelines, thus improving future treatment of these patients.	NHMRC	755,528	Murdoch Children's Research Institute Neurodisability and Rehabilitation	**Clinical** **Secondary conditions –** Bone health/ Heterotopic ossification	Miss Jamie Ellis

	Study of Neck Injury Imaging in Children (SONIC): Improving the Diagnosis of Spinal Cord, Bone and Ligament Injuries Compared with Current Practice 2020-2025	Aim: To study neck injuries to validate existing international clinical decision rules for children presenting to the emergency department with suspected cervical spine injuries	MRFF	2,780,828	Murdoch Childrens Research Institute Also Gold Coast University Hospital	**Clinical** **Acute management –** Neuro-protection	Assoc Prof Shane George
				12,244,621			
Queensland (Qld)							
	Griffith University Spinal Cord Injury Project (GUSIP)	Aim: To develop a therapy for treating SCI that combines rehabilitation and cell transplantation to restore motor, sensory and autonomic function. Stage 1: 10-15 min online survey to identify potential themes/areas of interest within past and present SCI therapies. Stage 2: Will test intensive rehabilitation for people with SCI with aim to determine how people respond to a program of intensive long-term rehabilitation. This trial is an important precursor of a bigger future trial which involves the transplantation of cells to repair the injury site.	Perry Cross Spinal Research Foundation and MAIC	2,000,000	Griffith University. Clem Jones Centre for Neurobiology and Stem Cell Research	**Clinical** **Rehabilitation –** Other	Prof James St John
	Intensive prehabilitation for people living with chronic spinal cord injury: a feasibility trial GUSIPO2 Clinical trial registered 2022	Aim: To examine whether intensive prehabilitation therapy can be safely and effectively delivered to people living with chronic SCI in Australia and who have undertaken minimal rehabilitation in the last 2 years. This feasibility trial is a necessary next step toward the anticipated full cell transplantation	Unknown – part of above	Unknown – part of above	Gold Coast University Hospital And Griffith University	**Clinical** **Rehabilitation –** Other	Dr Dinesh Palipana and James St John
	A biological nerve bridge device for repairing spinal cord injury in humans 2022-2027	This project will optimise an activated cellular nerve bridge that can be transplanted to repair acute and chronic SCI. The activated nerve bridges are a modification of our award-winning resting state cellular nerve bridges that have already demonstrated efficacy in repairing SCI.	MRFF – Early to Mid-Career Researchers Biomedical Engineering	761,471	Griffith University	**Pre-clinical** **Regeneration**	Doctor Mo Chen
	Network-level decoding of touch and pain in the spinal cord 2023-2025	Aim: To decode network-level signalling of touch and pain in the spinal cord by studying activity in large nerve cell networks using imaging and complex systems analysis.	NHMRC Basic Science Research	751,142	University of Newcastle and Hunter Medical Research Institute	**Pre-clinical** **Discovery**	Prof Brett Graham
	Dissecting Inflammation and Spinal Cord Lesion Site Development at Single-Cell Resolution 2021-2024	Aim: To build a spatially resolved map of all the cell types and their interactions in the injured spinal cord across time. They will also use targeted manipulations to discover key genes and pathways that drive wound healing and repair, unlocking avenues for new and effective therapies to be developed.	Wings for Life	165,231	University of QLD	**Pre-clinical** **Neuroprotection/ Secondary damage**	Prof Marc Ruitenberg

	Understanding inflammation following spinal cord injury and its influence over recovery 2019-2022	Aim: To investigate treatments to address inflammation following spinal cord trauma	SpinalCure	Unknown	University of QLD	**Pre-clinical** **Neuroprotection/ Secondary damage**	Prof Marc Ruitenberg
	Defining the Influence of Lesion Level on Inflammation and Wound Healing 2022-2024	Aim: To build the first molecular “Google Maps” of experimental SCI, mapping cells in the injured spinal cord across time, space (location within the injured spinal cord) and different lesion levels. Immune and other native spinal cord cell types will be counted, profiled, and their behaviour and interactions predicted across time and space.	Wings for Life	198,318	University of QLD	**Pre-clinical** **Neuroprotection/ Secondary damage**	Laura Grice
	Towards IVIG Mimetics: Understanding the Interplay Between Complement and FC Receptor Signalling in Secondary Injury after SCI 2017-2019	Aim: To find the working mechanism how IVIG improves the neurological outcome from SCI, and to discover novel targets that could mimic its actions.	Wings for Life	405,000	University of QLD	**Pre-clinical** **Neuroprotection/ Secondary damage**	Prof Marc Ruitenberg
	Understanding the mechanism of action for intravenous immunoglobulin (IVIG) therapy in SCI. 2019-2021	Aim: To test a promising new therapy, intravenous immunoglobulin (IVIG), and in particular uncover what cells and molecules are targeted by it so that we can better treat individuals affected by SCI.	NHMRC	605,363	University of QLD	**Pre-clinical** **Neuroprotection/ Secondary damage**	Prof Marc Ruitenberg
	Understanding the role of UNC-71 in axonal regeneration. 2018	Aim: To understand the basic molecular mechanisms of axonal regeneration (a key step to develop effective treatments for neuronal injuries). We have identified a new class of molecules that promote axonal regeneration, and that can potentially be employed to promote axonal repair.	NHMRC	676,653	University of QLD	**Pre-clinical** **Discovery**	Assoc Prof Massimo Hilliard
	Discovering the mechanisms of neurogenic heterotopic ossifications following spinal cord injuries 2020-2023	Aim: To understand why heterotopic ossifications form in patients with SCI aiming to develop effective treatments.	NHMRC	1,033,889	University of QLD	**Pre-clinical** **Secondary conditions –** Bone health/ Heterotopic ossification	Prof Jean-Pierre Levesque
	High-intensity neuromuscular electrical stimulation (NMES) Clinical trial registered 2021 Electrical stimulation-eccentric muscle strength training in people with spinal cord injury	Aim: To investigate the effects of electrical stimulation of the thigh muscles using pads into improving the muscle size, muscle force, physical health, symptoms of spasms in the muscles and well-being in people who suffered from an accident and their legs are paralysed.	Unknown	Unknown	Central Queensland University	**Clinical** **Secondary conditions** – Spasticity	Dr Vanesa Bochkezanian
	Investigating the effect of Romosozumab on osteoporosis following spinal cord injury Clinical trial registered 2023	Aim: To compare romosozumab followed by the bisphosphonate, zoledronic acid versus zoledronic acid alone, administered early after acute SCI, for prevention of SCI-induced osteoporosis.	Unknown	Unknown	Princess Alexandra Hospital	**Clinical** **Secondary conditions –** Bone health/ Heterotopic ossification	Dr Emily Brooks

	BioSpine: effect of multimodal rehabilitation on symptom severity in individuals with complete chronic spinal cord injury 2019-2022 Clinical trial registered 2022	Aim : To assess the long-term effects of a new type of rehabilitation on motor and sensory function of people with complete SCI.	MAIC	2,000,000	Griffith University	**Clinical** **Rehabilitation –** Other	Dr Claudio Pizzolato
	Back2Work Early Intervention Vocational Rehabilitation Project – Evaluation 2016-2023 Clinical trial registered 2016	Aim: To evaluate Back2Work program and evaluate the effectiveness of early intervention vocational rehabilitation in promoting both employment and wellbeing after SCI	MAIC; Spinal Life Australia	115,301	Griffith University Menzies Health Institute And Gold Cost University Hospital	**Clinical** **Participation –** Work and employment	Dr Vanette McLennan
	Swelling in the hand in people with tetraplegia: exploring the experience and two treatment approaches Clinical trial registered 2019	Aim: To explore the effectiveness of each of the treatment methods in reducing oedema in the hands following tetraplegia.	Unknown	Unknown	Princess Alexandra Hospital	**Clinical** **Rehabilitation –** Upper limb	Soo Oh
	Singing Cords: Peer – led therapeutic group singing for people with spinal cord injury. Clinical trial registered 2019	Aim: To determine if this form of rehabilitation is of benefit and can be incorporated into the existing model of rehabilitation.	Unknown	Unknown	Princess Alexandra Hospital	**Clinical** **Participation –** Leisure	Unknown
	The experience of falls for persons with SCI	Aim: To gain an understanding of the experience of falls for persons who have had a spinal cord injury.	Unknown	Unknown	Princess Alexandra Hospital/Griffiths University	**Clinical** **Secondary conditions –** Falls prevention	Kathryn Marshall
				8,712,368			
Western Australia (WA)							
	Direct in vivo reprogramming of host astrocytes into functional neurons in the injured spinal cord. 2019	Aim: to reprogram cells that form scar tissue surrounding the SCI into neurons (nerve cells) that can then potentially form new circuits to bridge the gap and restore function.	Neurotrauma research programme/ Insurance Commission of WA	99,996	The University of Western Australia Penn State University Jinan University	**Pre-clinical** **Reconstruction**	Assoc Prof Stuart Hodgetts
	Photobiomodulation for spinal cord repair using wireless LED based devices implanted at the injury site. 2020-2021	Aim: Photobiomodulation for spinal cord repair using wireless LED based devices implanted at the injury site	Neurotrauma research programme/ Insurance Commission of WA	99,968	University of Western Australia	**Pre-clinical** **Neuro-protection**	Assoc Prof Stuart Hodgetts
	Effects of collapsing response mediator protein 2 (CRMP-2) gene therapy on the regeneration of corticospinal axons after SCI	Aim: To assess the effects of collapsing response mediator protein 2 (CRMP-2) gene therapy on the regeneration of corticospinal axons after SCI	Neurotrauma research programme/ Insurance Commission of WA	15,903	University of Western Australia	**Pre-clinical** **Regeneration**	Prof Alan Harvey

	Utility of neck MRI scans following normal CT and Xray Clinical trial registered 2019	Aim: To determine the incidence of additional findings on MRI imaging that were not previously detected on CT scan. It is crucial not to miss the diagnosis of cervical spine injuries in order to prevent SCI	Unknown	Unknown	Royal Perth Hospital	**Clinical** **Acute management –** Imaging	Dr Jean Ai Adeline Yap
				215,867			
South Australia (SA)							
	Evaluating a novel gait training technology to improve physical health after complex trauma injury 2022 Clinical trial registered 2023 The effect of a novel gait training technology on physical health and mobility.	Aim: To provide preliminary efficacy that body weight support treadmill training with mechanical assistance, augmented feedback and non-immersive VR can improve physical health outcomes of activity, mobility & QOL compared to traditional therapy in people with lower-limb amputation, TBI & SCI. 2.Provide evidence that body weight support treadmill training with mechanical assistance, augmented feedback and non-immersive virtual reality is feasible, acceptable, and safe in people with lower-limb amputation, TBI & SCI	Unclear	Unknown	University of South Australia	**Clinical** **Rehabilitation –** Upper limb and Lower limb and walking	Dr Brenton Hordacre
	Prevalence management and treatment of cognitive dysfunction after spinal cord injury: A new way to train the brain Mar-22	Aims: To assess the prevalence and type of chronic cognitive dysfunction (CCD) for individuals with SCI. To investigate resting and task-based neuronal activity, during performance of a reinforcement learning task in individuals with SCI. To assess whether a targeted 'serious games' based cognitive training (CT) paradigm can lead to improvements in cognitive function in individuals with SCI.	Lifetime Support Authority SA	Unknown	University of Adelaide	**Clinical** **Secondary conditions –** Cognitive function	Assoc Prof Lyndsey Collins-Praino
	Project discovery Neuroinflammation and PET-CT imaging as a diagnostic tool following spinal cord injury Clinical trial registered 2018	Aim: T**o** investigate whether PET imaging of [18F]GE-180 will serve as a robust biomarker to discriminate innate & adaptive inflammatory responses during acute and chronic phases of SCI respectively.	Lifetime Support Authority SA and private and corporate donors	Unknown	SAHMRI; Neil Sachse Centre for Spinal Cord Injury Research University of Adelaide; Royal Adelaide Hospital	**Clinical** **Acute management –** Imaging	Dr Ryan O'Hare-Doig
	Spinal Cord Injury Neurosexuality (SCIN) Project – Developing a biological understanding of sexual health following SCI using fMRI Clinical trial registered 2022 Using advanced neuroimaging techniques to measure sexual dysfunction following SCI	Aim: To perform detailed clinical assessment comparing the spared neurological and autonomic functions of men and women with complete SCIs with quantitative fMRI read-out of cord and brain activity. This will enable evaluation of human subjects in real-time and help us to elucidate the functional nature of psychogenic sexual response.	Lifetime Support Authority SA	Unknown	SAHMRI:Neil Sachse Centre For Spinal Cord Injury Research; University of Adelaide; Royal Adelaide Hospital	**Clinical** **Psychosocial –** Sexuality	Dr Ryan O'Hare-Doig
	Mind the gap: are intrathecal pressure and flow the missing links in SCI treatment?	Aim: To lay the foundation for evaluating emerging and new surgical and clinical interventions that will alter the clinical management of SCI and prognostication of injury outcome.	Lifetime Support Authority SA	Unknown	University of Adelaide	**Pre-Clinical** **Neuroprotection/ Secondary damage**	Dr Claire Jones
				Unknown			

Tasmania							
Australian Capital Territory (ACT)							
	Sensory processing in the spinal cord	Aim: This project will devise a method to measure the contribution of these different routes by which the spinal cord relays sensory information. This new method will then be used to assess regeneration following spinal cord injury treatments.	Unknown	Unknown	Australian National University; John Curtin School of Medical Research	**Pre-clinical** **Discovery**	Dr Jason Potas
Multi-state							
	Australian arm of the International Spinal Cord Injury project (Aus-InSCI) 2018	Aim: To describe the lived experience of people with SCI, within Australian, and corresponding health and social support systems, policies, services, and care. Consists of a survey for community-dwelling persons with SCI who have been discharged from a rehabilitation facility for at least 12 months.	iCARE NSW; The SRI, and Australasian SCI Network Ltd; Lifetime Support Authority SA; Princess Alexandra Hospital; Griffith University. TAC	Unknown	Coordinating Centre: John Walsh, University of Sydney; Queensland; South Australia and Victoria	**Clinical** **Rehabilitation**	Prof James Middleton, Prof Tim Geraghty, Prof Ruth Marshall, Dr Andrew Nunn
	Physiotherapy clinical practice guidelines for people with spinal cord injuries 2019	Aim: To produce the first clinical practice guidelines for the physiotherapy management of people with SCI.	iCARE NSW; Lifetime Support Authority, SA; TAC – Victoria; NIISQ.	2,550,000	Central Adelaide Local Health Network, Northern Sydney Local Health District and University of Sydney, Austin Health	**Clinical** **Rehabilitation –** Upper limb and Lower limb and walking	Dr Joanne Glinsky, Prof Lisa Harvey, Ms Sheelagh Donohoe, Miss Annie Illman, Ms Deanne Wilson, Dr Leanne Rees, Dr Marnie Graco
				2,550,000			

SAHMRI = South Australia Health and Medical Research Institute
NeuRA = Neuroscience Research Australia
iCARE = NSW Workers Compensation Insurance
ARC = Australian Research Council
MRFF = Medical Research Futures Fund
NHMRC= National Health and Medical Research Council
TAC = Transport Accident Committee
ANZSCOS= Australian and New Zealand Spinal Cord Society
NIISQ= National Injury Insurance Scheme, Qld
MAIC = Motor Accident Insurance Commission

Appendix B - Search yield via databases

OVID medline: 581
CINAHL: 334
Scopus Elsevier: 800
Embase by OVID: 726
Web of science (last 5 years): 431
PSYCHINFO: 102
PLOS Medicine: 235

Total: 3209

Appendix C - Study design definitions for clinical research

Controlled Clinical trial - A clinical study that includes a comparison (control) group. The comparison group receives a placebo, another treatment, or no treatment at all.

Randomised Controlled study - A controlled clinical trial in which the participants are divided by chance into separate groups that compare different treatments or other interventions. Using chance to divide people into groups means that the groups will be similar and that the effects of the treatments they receive can be compared more fairly. At the time of the trial, it is not known which treatment is best.

Cohort study - Cohort studies are usually large studies conducted over a long period of time. Researchers follow the cohort of participants in the study and observe the differences between those who have been exposed to a particular phenomenon and those who were not exposed.

Case control study - Case-control studies are used to study rare diseases or conditions. They are generally retrospective and start with a “case” who is then matched retrospectively to a “control” (someone without the condition). Differences in exposure to particular factors are then assessed to try and ascertain whether what is observed is different to that expected. Case-control studies are often used in cancer studies to examine exposure to particular substances or conditions. Case-control studies are retrospective and cases are selected based on disease. There are methodological challenges with case-control studies.

Cross-sectional study - Cross-sectional studies measure exposure and outcome at the same time. They are generally a ‘snapshot’ of a given population at a given time. Cross-sectional studies are especially useful for determining prevalence of a disease within a community and are useful in that they can be conducted relatively quickly, easily and cheaply. They are also able to provide prevalence estimates, and they can inform the development of a larger cohort study.

Case series study - this is a series of cases that are unusual or novel. They may appear in a cluster or over a short period of time. Cases may be highly relevant and in some circumstances are the best evidence available. The cases may or may not be related in time and space, such as an infectious disease outbreak. Case series studies are not generalisable to the wider population due to their small size; however, they may highlight a particular phenomenon or emerging new disease.

In addition to the above, retrospective audits were included as a separate study design due to the number of these that were identified.

Qualitative inquiry was defined according to the following definition: Qualitative inquiry is based on the assumption that posits that people utilise “what they see, hear, and feel” to make sense of social experiences. Qualitative inquiry permits researchers to ask questions, and to find answers, that can be difficult or impossible with the quantitative approach [22].

Appendix D - Categories of research

Pre-clinical (studies not involving humans)

Discovery

- Research aimed at expanding the knowledge base

Neuroprotection/Secondary damage (protection of intact cells and tissue)

- After a spinal cord injury, there is a massive breakdown of nerve and support cells (glial) in the vicinity of the injury site. The aim is to prevent this secondary damage and thus preserve and/or return more functions for the patient.

Plasticity (reorganising the nervous system by forming new neural connections)

- When a spinal cord is injured, substances are released around the injured nerve fibres that inhibit nerve regrowth. The aim is to find, analyse and eliminate these molecular growth inhibitors. In addition, factors and mechanisms are to be identified that control the reorganisation of nerve circuits, to compensate and achieve functional improvements.

Regeneration (promote cell regrowth)

- Mature cells in the central nervous system regenerate very slowly after injury. Projects here look for ‘switches’ that allow nerve fibres to regrow and regenerate.

Neural Reconstruction (replacement with new cells/biomaterial)

- Promising approaches pursue the goal of replacing destroyed tissue with stem cells and/or biomaterials, and in this way contribute to the repair of injured spinal cord tissue.

Remyelination (insulation of nerve fibres)

- Injured nerve fibres lose their protective layer (myelin). Similar to a power cable with a missing insulating layer, these ‘naked’ nerve fibres are then no longer properly conductive. The restoration of the protective layer (remyelination) is a crucial research area.

Imaging (visualising internal structures)

- There are many positive results from preclinical studies, e.g. improved nerve fibre growth. However, there is still a lack of imaging options for making these changes in the tissue of the spinal cord visible in vivo (in the living organism/patient). This complicates the causal assignment and the comparability of achieved results.

Clinical (studies involving human participants)

Acute management

- Neuroprotection
- Imaging
- Surgical interventions
- Respiratory management

Rehabilitation

- Research projects in this area are aimed at compensating for or improving lost functions,

and thus improving the quality of life of affected patients (e.g. bladder function, the treatment of neuropathic pain and new rehabilitation methods).
- Neurostimulation.
- Wheeled mobility and seating
- Upper limb
- Lower limb and walking
- Restoring function
- Other

Secondary conditions
- Autonomic dysreflexia
- Bladder management
- Bowel dysfunction and management
- Bone health/heterotopic ossification
- Cardiovascular (health, complications)
- Orthostatic hypotension
- Pain management
- Respiratory management
- Skin integrity and pressure injuries
- Sleep
- Spasticity
- Syringomyelia
- Venous thromboembolism
- Falls prevention

General health maintenance
- Nutrition
- Primary care
- Sexual and reproductive health

Participation
- Work and employment
- Physical activity (participation, psychosocial)
- Leisure/peer related

Psychosocial
- Mental health
- Sexuality

Aging

Paediatric

Excluded: economic evaluations, epidemiology, housing and attendant care, rehabilitation practices/services.

Appendix E - Table of included studies

Study citation (authors, year)	Study design	Topic/category of research	Location by state	Primary affiliation of first author	Involvement of people with lived experience in the research process (not just as participant)	Multi-site recruitment
Adamson SR, Whitty S, Flood S, Neoh D, Nunn A, Clegg B, et al. Surgical management of pressure ulcers in spinal cord injury patients. ANZ journal of surgery. 2023;20.	Clinical - Retrospective	Clinical - Secondary conditions - Skin integrity and pressure injuries	VIC	Health service	No	No
Agostinello J, Battistuzzo CR, Batchelor PE. Early clinical predictors of pneumonia in critically ill spinal cord injured individuals: a retrospective cohort study. Spinal Cord. 2019;57(1):41-8.	Clinical - Retrospective audit	Clinical - Acute Management - Respiratory management	VIC	University	No	Yes, with another institution
Amsters D, Kendall M, Kuipers P. Rehabilitation for participation in life after spinal cord injury-Clinician responses to a preliminary conceptual framework. Disability and Rehabilitation: An International, Multidisciplinary Journal. 2021;43(18):2593-601.	Clinical - Qualitative inquiry	Clinical - Rehabilitation - Other	QLD	Health service	No	No
Amsters, Delena; Duncan, James; Field, Victoria; Smales, Alastair; Zillmann, Leanne; Kendall, Melissa; Kuipers, Pim. Determinants of participating in life after spinal cord injury - advice for health professionals arising from an examination of shared narratives. Disability and Rehabilitation. 2018; 40:25, 3030-3040.	Clinical - Qualitative inquiry	Clinical - Rehabilitation - Other	QLD	Health service	No	No
Alexander KA, Tseng HW, Fleming W, Jose B, Salga M, Kulina I, et al. Inhibition of JAK1/2 tyrosine kinases reduces neurogenic heterotopic ossification after spinal cord injury. Frontiers in Immunology. 2019;10(MAR).	Pre-clinical	Clinical - Secondary conditions - Bone health/heterotopic ossification	QLD	University	No	
Austin PD, Craig A, Middleton JW, Tran Y, Costa DSJ, Wrigley PJ, et al. The short-term effects of head-mounted virtual-reality on neuropathic pain intensity in people with spinal cord injury pain: a randomised cross-over pilot study. Spinal Cord. 2021;59(7):738-46.	Clinical - Randomised controlled trial	Clinical - Secondary conditions - Pain management	NSW	Health service	No	No
Asha SE, Curtis K, Healy G, Neuhaus L, Tzannes A, Wright K. Neurologic outcomes following the introduction of a policy for using soft cervical collars in suspected traumatic cervical spine injury: A retrospective chart review. Emergency Medicine Australasia. 2021;33(1):19-24.	Clinical - Retrospective audit	Clinical - Acute Management - Neuroprotection	NSW	Health service	No	Yes, with another institution
Baker, Felicity A.; Tamplin, Jeanette; Rickard, Nikki; Ponsford, Jennie; New, Peter W.; Lee, Young-Eun C. A therapeutic songwriting intervention to promote reconstruction of self-concept and enhance well-being following brain or spinal cord injury: Pilot randomized controlled trial. Clinical	Clinical - Controlled clinical trial	Clinical - Participation - Leisure/peer related	VIC	University	No	Yes, with another institution
Baker, F. A.; Tamplin, J.; Rickard, N.; New, P.; Ponsford, J.; Roddy, C.; Lee, Y. E. C. Meaning making process and recovery journeys explored through songwriting in early neurorehabilitation: Exploring the perspectives of participants of their self-composed songs through the interpretative phenomenological analysis.Frontiers in Psychology 2018 Vol. 9 Issue AUG.	Clinical - Qualitative inquiry	Clinical - Participation - Leisure/peer related	VIC	University	No	No
Barclay L, New PW, Morgan PE, Guilcher SJT. Satisfaction with life, health and well-being: comparison between non-traumatic spinal cord dysfunction, traumatic spinal cord injury and Australian norms. Spinal cord series and cases. 2019;5(1).	Clinical - Cross-sectional	Clinical - Psychosocial - Mental health	VIC	University	No	No
Barclay L, Lentin P, Bourke-Taylor H, McDonald R. The experiences of social and community participation of people with non-traumatic spinal cord injury. Australian Occupational Therapy Journal. 2019;66(1):61-7.	Clinical - Qualitative inquiry	Clinical - Participation - Work and employment	VIC	University	No	No
Barclay L, Lalor A, Migliorini C, Robins L. A comparative examination of models of service delivery intended to support community integration in the immediate period following inpatient rehabilitation for spinal cord injury. Spinal Cord. 2020;58(5):528-36.	Clinical - Qualitative inquiry	Clinical - Rehabilitation - Other	VIC	University	No	No

Barclay L, Lalor A. Investigating the Challenges and Benefits of Engaging in Peer Support via Videoconferencing for People with Spinal Cord Injury. Int J Environ Res Public Health. 2022;19(8):11.	Clinical - Cross-sectional	Clinical - Participation - Leisure/peer related	VIC	University	No	No
Batchelor P, Bernard S, Gantner D, Udy A, Board J, Fitzgerald M, et al. Immediate Cooling and Early Decompression for the Treatment of Cervical Spinal Cord Injury: A Safety and Feasibility Study. Therapeutic hypothermia and temperature management. 2023;13.	Clinical - Controlled clinical trial	Clinical - Acute Management - Other	VIC	Health service	No	No
Beck B, Cameron PA, Braaf S, Nunn A, Fitzgerald MC, Judson RT, et al. Traumatic spinal cord injury in Victoria, 2007-2016. Medical Journal of Australia. 2019;210(8):360-6.	Clinical - Retrospective audit	Clinical - Rehabilitation - Other	VIC	University	No	Yes, with another institution
Berlowitz DJ, Schembri R, Graco M, Ross JM, Ayas N, Gordon I, et al. Positive airway pressure for sleep-disordered breathing in acute quadriplegia: a randomised controlled trial. Thorax. 2019;74(3):282-90.	Clinical - Randomised controlled trial	Clinical - Secondary conditions - Sleep	VIC	University	No	Yes, with another country
Berliner J, Hemley S, Najafi E, Bilston L, Stoodley M, Lam M. Abnormalities in spinal cord ultrastructure in a rat model of post-traumatic syringomyelia. Fluids and Barriers of the CNS. 2020;17(1).	Pre-clinical	Clinical - Secondary conditions - Syringomyelia	NSW	University	No	
Bloom J, McLennan V, Dorsett P. Results from phase one of an early intervention vocational rehabilitation trial for people with spinal cord injury conducted in Queensland, Australia. Journal of Vocational Rehabilitation. 2022;57(3):237-47.	Clinical - Mixed methods	Clinical - Participation - Work and employment	QLD	University	No	No
Bochkezanian V, Blazevich AJ, Newton RU, Trajano GS. Effects of Neuromuscular Electrical Stimulation in People with Spinal Cord Injury. Medicine & Science in Sports & Exercise. 2018;50(9):1733-9.	Clinical - Controlled clinical trial	Clinical - Rehabilitation - Neurostimulation	QLD	University	No	No
Bochkezanian V, Newton RU, Trajano GS, Vieira A, Pulverenti TS, Blazevich AJ. Effect of tendon vibration during wide-pulse neuromuscular electrical stimulation (NMES) on muscle force production in people with spinal cord injury (SCI). BMC Neurol. 2018;18(1):17.	Clinical - Controlled clinical trial	Clinical - Rehabilitation - Neurostimulation	QLD	University	No	No
Bokhari AR, Sivakumar B, Sefton A, Lin JL, Smith MM, Gray R, et al. Morbidity and mortality in cervical spine injuries in the elderly. ANZ Journal of Surgery. 2019;89(4):412-7.	Clinical - Retrospective audit	Clinical - Acute Management - Surgical interventions	NSW	Independent research institute	No	No
Bolsterlee B, Bye EA, Eguchi J, Thom J, Herbert RD. MRI-based Measurement of Effects of Strength Training on Intramuscular Fat in People with and without Spinal Cord Injury. Medicine and Science in Sports and Exercise. 2021;53(6):1270-5.	Clinical - Case control study	Clinical - Rehabilitation - Other	NSW	Independent research institute	No	No
Borg SJ, Borg DN, Arora M, Middleton JW, Marshall R, Nunn A, et al. Factors Related to Engagement in Employment After Spinal Cord Injury in Australia: A Cross-sectional Study. Archives of Physical Medicine & Rehabilitation. 2022;103(12):2345-54.	Clinical - Cross-sectional	Clinical - Participation - Work and employment	NSW	University	No	Yes, with another state
Borg DN, Foster MM, Legg M, Jones R, Kendall E, Fleming J, et al. The Effect of Health Service Use, Unmet Need, and Service Obstacles on Quality of Life and Psychological Well-Being in the First Year After Discharge From Spinal Cord Injury Rehabilitation. Archives of Physical Medicine & Rehabilitation. 2020;101(7):1162-9.	Clinical - Cross-sectional	Clinical - Psychosocial - Mental health	NSW	University	No	No
Boswell-Ruys CL, Lewis CRH, Wijeysuriya NS, McBain RA, Lee BB, McKenzie DK, et al. Impact of respiratory muscle training on respiratory muscle strength, respiratory function and quality of life in individuals with tetraplegia: a randomised clinical trial. Thorax. 2020;75(3):279-88.	Clinical - Randomised controlled trial	Clinical - Acute Management - Respiratory management	NSW	Independent research institute	No	Yes, with another institution
Braaf SC, Lennox A, Nunn A, Gabbe BJ. Experiences of hospital readmission and receiving formal carer services following spinal cord injury: a qualitative study to identify needs. Disability & Rehabilitation. 2018;40(16):1893-9.	Clinical - Qualitative inquiry	Clinical - Rehabilitation - Other	VIC	University	No	No
Bray EA, Everett B, George A, Salamonson Y, Ramjan LM. Developing a Health Care Transition Intervention with Young People with Spinal Cord Injuries: Co-design Approach. JMIR Formative Research. 2022;6(7).	Clinical - Qualitative inquiry	Clinical - Paediatric	NSW	University	Yes	No
Bray EA, Salamonson Y, Everett B, George A, Chapman IA, Ramjan L. Transitioning between paediatric and adult healthcare services: a qualitative study of the experiences of young people with spinal cord injuries and parents/caregivers. BMJ open. 2022;12(11):e065718.	Clinical - Qualitative inquiry	Clinical - Paediatric	NSW	University	Yes	No

Brennan FH, Jogia T, Gillespie ER, Blomster LV, Li XX, Nowlan B, Williams GM, Jacobson E, Osborne GW, Meunier FA, Taylor SM, Campbell KE, MacDonald KP, Levesque JP, Woodruff TM, Ruitenberg MJ. Complement receptor C3aR1 controls neutrophil mobilization following spinal cord injury through physiological antagonism of CXCR2. JCI Insight. 2019;4(9):18.	Pre-clinical	Pre-clinical - Neuroprotection	QLD	Health service	No	
Bryant C, Aplin T, Setchell J. Sexuality Support After Spinal Cord Injury: What is Provided in Australian Practice Settings? Sexuality Support After Spinal Cord Injury. Sexuality and Disability. 2022;40(3):409-23.	Clinical - Cross-sectional	Clinical - Psychosocial - Sexuality	QLD	University	No	No
Bye EA, Harvey LA, Glinsky JV, Bolsterlee B, Herbert RD. Preliminary investigation of mechanisms by which short-term resistance training increases strength of partially paralysed muscles in people with spinal cord injury. Spinal Cord (2019); 57 (9):770-777.	Clinical - Controlled clinical trial	Clinical - Rehabilitation - Other	NSW	University	No	No
Bye E, Glinsky J, Yeomans J, Hungerford A, Patterson H, Chen L, et al. The inter-rater reliability of the 13-point manual muscle test in people with spinal cord injury. Physiotherapy Theory & Practice. 2021;37(10):1126-31.	Clinical - Controlled clinical trial	Clinical - Rehabilitation - Other	NSW	University	No	Yes, with another institution
Chen LW, Glinsky JV, Islam MS, Hossain M, Boswell-Ruys CL, Kataria C, et al. The effects of 10,000 voluntary contractions over 8 weeks on the strength of very weak muscles in people with spinal cord injury: a randomised controlled trial. Spinal Cord. 2020;58(8):857-64.	Clinical - Randomised controlled trial	Clinical - Rehabilitation - Other	NSW	University	No	Yes, with another country
Clarke D, Nguyen D, Overton K. Antimicrobial stewardship in spinal cord injury: A multidisciplinary approach. Journal of Spinal Cord Medicine. 2021;44(5):770-4.	Clinical - Cohort study	Clinical - Acute Management - Other	NSW	Health service	No	No
Clark JM, Marshall R. Utilising International Statistical Classification of Diseases and Related Health Conditions (ICD)-10 Australian Modification Classifications of “Health Conditions” to Achieve Population Health Surveillance in an Australian Spinal Cord Injury Cohort. Spinal Cord. 2022;60(8):746-56.	Clinical - Retrospective audit	Clinical - Rehabilitation - Other	SA	Health service	No	No
Clark JM, Bednarz JM, Batchelor PE, Skeers P, Freeman BJC. Prehospital Cardiovascular Autoregulatory Disturbances Correlate With the Functional Neuroanatomy of Acute Spinal Cord Injury. Spine. 2023;48(6):428-35.	Clinical - Retrospective audit	Clinical - Secondary conditions - Cardiovascular (health, complications)	SA	Health service	No	Yes, with another state
Clifton S, Llewellyn G, Shakespeare T. Faith, spirituality, and living the good life with quadriplegia. Psychology of Religion and Spirituality. 2020;12(3):356-65.	Clinical - Qualitative inquiry	Clinical - Psychosocial - Mental health	NSW	University	No	No
Clifton S, Llewellyn G, Shakespeare T. Quadriplegia, virtue theory, and flourishing: A qualitative study drawing on self-narratives. Disability & Society. 2018;33(1):20-38.	Clinical - Qualitative inquiry	Clinical - Psychosocial - Mental health	NSW	University	No	No
Costa DP, Harvey LA, Hossain MS, Islam MS, Rahman MA, Glinsky JV, et al. Incidence, severity and time course of pressure injuries over the first two years following discharge from hospital in people with spinal cord injuries in Bangladesh. Spinal Cord. 2022;60(4):348-53.	Clinical - Cohort study	Clinical - Secondary conditions - Skin integrity and pressure injuries	NSW	University	No	No
Craig A, Rodrigues D, Tran Y, Guest R, Middleton J. Daytime sleepiness and its relationships to fatigue and autonomic dysfunction in adults with spinal cord injury. Journal of Psychosomatic Research. 2018;112:90-8.	Clinical - Cross-sectional	Clinical - Secondary conditions - Sleep	NSW	University	No	No
Craig A, Tran Y, Guest R, Middleton J. Trajectories of Self-Efficacy and Depressed Mood and Their Relationship in the First 12 Months Following Spinal Cord Injury. Archives of Physical Medicine & Rehabilitation. 2019;100(3):441-7.	Clinical - Cohort study	Clinical - Secondary conditions - Sleep	NSW	University	No	Yes, with another institution
Craig A, Tran Y, Guest R, Middleton J. Excessive daytime sleepiness in adults with spinal cord injury and associations with pain catastrophizing and pain intensity. Spinal Cord. 2020;58(7):831-9.	Clinical - Cohort study	Clinical - Secondary conditions - Sleep	NSW	University	No	No
Craig A, Tran Y, Arora M, Pozzato I, Middleton JW. Investigating Dynamics of the Spinal Cord Injury Adjustment Model: Mediation Model Analysis. Journal of Clinical Medicine. 2022;11(15):19.	Clinical - Cross-sectional	Clinical - Psychosocial - Mental health	NSW	University	No	Yes, with another state
de Oliveira CQ, Middleton JW, Refshauge K, Davis GM. Activity-Based Therapy in a Community Setting for Independence, Mobility, and Sitting Balance for People With Spinal Cord Injuries. Journal of Central Nervous System Disease. 2019;11:9.	Clinical - Cohort study	Clinical - Rehabilitation - Lower limb and walking	NSW	University	No	Yes, with another institution

Dear BF, Nicholson Perry K, Siddall P, Middleton JW, Johnson J, Katte L, et al. The Pain Course: exploring the feasibility of an internet-delivered pain management programme for adults with spinal cord injury. Spinal Cord. 2018;56(10):931-9.	Clinical - Cohort study	Clinical - Secondary conditions - Pain management	NSW	University	No	Yes, with another institution
Debaud C, Tseng HW, Chedik M, Kulina I, Genet F, Ruitenberg MJ, Levesque JP. Local and Systemic Factors Drive Ectopic Osteogenesis in Regenerating Muscles of Spinal-Cord-Injured Mice in a Lesion-Level-Dependent Manner. Journal of neurotrauma. 2021. 38 (15).	Pre-clinical	Clinical - Secondary conditions - Bone health/heterotopic ossification	QLD	University	Yes	
Desneves KJ, Panisset MG, Galea MP, Kiss N, Daly RM, Ward LC. Comparison of segmental lean tissue mass in individuals with spinal cord injury measured by dual energy X-ray absorptiometry and predicted by bioimpedance spectroscopy. Spinal Cord. 2021;59(7):730-7.	Clinical - Cross-sectional	Clinical - Acute Management - Other	VIC	Health service	No	No
Desneves KJ, Panisset MG, Rafferty J, Rodi H, Ward LC, Nunn A, et al. Comparison of estimated energy requirements using predictive equations with total energy expenditure measured by the doubly labelled water method in acute spinal cord injury. Spinal Cord. 2019;57(7):562-70.	Clinical - Case control study	Clinical - Acute Management - Other	VIC	Health service	No	No
Donges SC, Boswell-Ruys CL, Butler JE, Taylor JL. The effect of paired corticospinal-motoneuronal stimulation on maximal voluntary elbow flexion in cervical spinal cord injury: an experimental study. Spinal Cord. 2019;57(9):796-804.	Clinical - Randomised controlled trial	Clinical - Rehabilitation - Other	NSW	Independent research institute	No	No
Dorsett P, McLennan V. Exploring the 'status quo' in vocational rehabilitation and employment outcomes following spinal cord injury. Journal of Vocational Rehabilitation. 2019;50(2):131-9.	Clinical - Mixed methods	Clinical - Participation - Work and employment	QLD	University	No	No
Dorstyn D, Roberts R, Murphy G, Craig A, Kneebone I, Stewart P, et al. Work and SCI: a pilot randomized controlled study of an online resource for job-seekers with spinal cord dysfunction. Spinal Cord. 2019;57(3):221-8.	Clinical - Randomised controlled trial	Clinical - Participation - Work and employment	SA	University	Yes	Yes, with another institution
Dorstyn D, Roberts R, Murphy G, Kneebone I, Craig A, Chur-Hansen A, et al. Can targeted job-information for adults with spinal cord dysfunction be effectively delivered online? A pilot study. Journal of Spinal Cord Medicine. 2019;42(1):94-101.	Clinical - Cross-sectional	Clinical - Participation - Work and employment	SA	University	No	No
Dorstyn DS, Chur-Hansen A, Mansell E, Murphy G, Roberts RM, Stewart P, et al. Facilitators and barriers to employment for persons with chronic spinal cord injury or disorder: A qualitative study framed by the person-environment-occupation model. Journal of Spinal Cord Medicine. 2023;46(2):246-55.	Clinical - Qualitative inquiry	Clinical - Participation - Work and employment	SA	University	No	No
Dwyer, R.; Ward, R.; Richardson, E.; Davidson, S. A.; Thetford, A.; Valentine, J. Traumatic spinal cord injuries: A retrospective cohort study of children seen in Western Australia between 1996 and 2016. Journal of Pediatric Rehabilitation Medicine. 2019;12(3):235-243.	Clinical - Retrospective audit	Clinical - Paediatric	WA	Health service	No	No
Eitivipart AC, Arora M, Quel de Oliveira C, Heard R, Middleton JW, Davis GM. Assessing physical activity and health-related quality of life in individuals with spinal cord injury: a national survey in Thailand. Disability and rehabilitation. 2022;44(23):7048-58.	Clinical - Cross-sectional	Clinical - Participation - Physical activity (participation, psychosocial)	NSW	University	No	Yes, with another country
Fadhil, M.; Wilson, P. J.; Reddy, R. Does Direct Surgical Decompression After Traumatic Spinal Cord Injury Influence Post-Traumatic Syringomyelia Rates? An 18-Year Single-Center Experience. World Neurosurgery. 2022; 161: e664-e673.	Clinical - Case control study	Clinical - Acute Management - Other	NSW	Health service	No	No
Fang X, Goh MY, O'Callaghan C, Berlowitz D. Relationship between autonomic cardiovascular control and obstructive sleep apnoea in persons with spinal cord injury: a retrospective study. Spinal cord series and cases. 2018;4(1).	Clinical - Case series	Clinical - Secondary conditions - Sleep	VIC	Independent research institute	No	No
Finn HT, Bogdanovski O, Hudson AL, McCaughey EJ, Crawford MR, Taylor JL, et al. The effect of acute intermittent hypoxia on human limb motoneurone output. Experimental Physiology. 2022;107(6):615-30.	Clinical - Controlled clinical trial	Clinical - Rehabilitation - Other	NSW	University	No	No
Fisher M, Pryor J, Pont L, Leong G. Current bowel care practices in spinal cord units in Australia and New Zealand: A prospective, cross-sectional survey. Journal of the Australasian Rehabilitation Nurses' Association (JARNA). 2018;21(3):6-13.	Clinical - Cross-sectional	Clinical - Secondary conditions - Bowel dysfunction and management	NSW	University	No	Yes, with another state
Forsyth P, Miller J, Pumpa K, Thompson KG, Jay O. Independent Influence of Spinal Cord Injury Level on Thermoregulation during Exercise. Medicine & Science in Sports & Exercise. 2019;51(8):1710-9.	Clinical - Controlled clinical trial	Clinical - Rehabilitation - Other	ACT	University	No	Yes, with another institution

Foster G, Russell B, Hibble B, Shaw K, Stella J. Magnetic resonance imaging cervical spine in trauma: A retrospective single-centre audit of patient outcomes. EMA - Emergency Medicine Australasia. 2022;34(1):65-72.	Clinical - Cross-sectional	Clinical - Acute Management - Imaging	VIC	Health service	No	No
Foster, V.; Saez, N.; Gillespie, E.; Jogia, T.; Reid, C.; Maljevic, S.; Jung, W.; Lao, H. W.; Ruitenberg, M. J.; King, G. Genetic or pharmacological ablation of ASIC1a is not neuroprotective in a mouse model of spinal cord injury. Journal of neurotrauma. 2024; 41 (9):1007–1019.	Pre-clinical	Pre-clinical - Neuroprotection	QLD	University	No	No
Galea MP, Dunlop SA, Geraghty T, Davis GM, Nunn A, Olenko L, et al. SCIPA Full-On: A Randomized Controlled Trial Comparing Intensive Whole-Body Exercise and Upper Body Exercise After Spinal Cord Injury. Neurorehabilitation & Neural Repair. 2018;32(6/7):557-67.	Clinical - Randomised controlled trial	Clinical - Rehabilitation - Other	VIC	University	No	Yes, with another country
Gayen CD, Bessen MA, Dorrian RM, Quarrington RD, Mulaibrahimovic A, Doig RLO, et al. Survival Model of Thoracic Contusion Spinal Cord Injury in the Domestic Pig. Journal of neurotrauma. 2023;40(9-10):965-80.	Pre-clinical	Pre-clinical - Discovery	SA	University	No	
Ghasem-Zadeh A, Galea MP, Nunn A, Panisset M, Wang XF, Iuliano S, et al. Heterogeneity in microstructural deterioration following spinal cord injury. Bone. 2021;142:115778.	Clinical - Case series	Clinical - Secondary conditions - Bone health/heterotopic ossification	VIC	Health service	No	No
Goh MY, Millard MS, Wong ECK, Berlowitz DJ, Graco M, Schembri RM, et al. Comparison of diurnal blood pressure and urine production between people with and without chronic spinal cord injury. Spinal Cord. 2018;56(9):847-55	Clinical - Case series	Clinical - Secondary conditions - Bladder management	VIC	University	No	No
Goldshmit Y, Tang JKKY, Siegel AL, Nguyen PD, Kaslin J, Currie PD, et al. Different Fgfs have distinct roles in regulating neurogenesis after spinal cord injury in zebrafish. Neural Development. 2018;13(1):24.	Pre-clinical	Pre-clinical - Regeneration	VIC	University	No	
Goodes LM, King GK, Goodwin DM, Watts A, Bardsley J, Middleton J, et al. Barriers and facilitators to optimising inpatient bladder management after spinal cord injury. Spinal Cord. 2020;58(12):1291-300.	Clinical - Qualitative inquiry	Clinical - Secondary conditions - Bladder management	WA	University	No	Yes, with another institution
Goodes LM, King GK, Rea A, Murray K, Boan P, Watts A, et al. Early urinary tract infection after spinal cord injury: a retrospective inpatient cohort study. Spinal Cord. 2020;58(1):25-34.	Clinical - Cross-sectional	Clinical - Secondary conditions - Bladder management	WA	University	No	No
Graco M, Arora M, Berlowitz DJ, Craig A, Middleton JW. The impact of sleep quality on health, participation and employment outcomes in people with spinal cord injury: Analyses from a large cross-sectional survey. Annals of Physical and Rehabilitation Medicine. 2023;66(5).	Clinical - Cross-sectional	Clinical - Secondary conditions - Sleep	VIC	Independent research institute	No	Yes, with another state
Graco M, Berlowitz DJ, Green SE. Understanding the clinical management of obstructive sleep apnoea in tetraplegia: a qualitative study using the theoretical domains framework. BMC Health Services Research. 2019;19(1):405.	Clinical - Qualitative inquiry	Clinical - Secondary conditions - Sleep	VIC	Independent research institute	No	Yes, with another country
Graco M, Gobets DF, O'Connell CM, Baumberger ME, Mueller G, Daniels B, et al. Management of sleep-disordered breathing in three spinal cord injury rehabilitation centres around the world: a mixed-methods study. Spinal Cord. 2022;60(5):414-21.	Clinical - Mixed methods	Clinical - Secondary conditions - Sleep	VIC	Independent research institute	No	Yes, with another country
Graco M, Green SE, Tolson J, Stevens B, Barnes M, Rigoni A, et al. Worth the effort? Weighing up the benefit and burden of continuous positive airway pressure therapy for the treatment of obstructive sleep apnoea in chronic tetraplegia. Spinal Cord. 2019;57(3):247-54.	Clinical - Mixed methods	Clinical - Secondary conditions - Sleep	VIC	Independent research institute	No	No
Graco M, Schembri R, Cross S, Thiyagarajan C, Shafazand S, Ayas NT, et al. Diagnostic accuracy of a two-stage model for detecting obstructive sleep apnoea in chronic tetraplegia. Thorax. 2018;73(9):864-71.	Clinical - Mixed methods	Clinical - Secondary conditions - Sleep	VIC	Independent research institute	No	Yes, with another country
Graco M, Schembri R, Ross J, Green SE, Booker L, Cistulli PA, et al. Continuous Positive Airway Pressure Use for Obstructive Sleep Apnea in Acute, Traumatic Tetraplegia. Archives of Physical Medicine and Rehabilitation. 2019;100(12):2276-82.	Clinical - Cross-sectional	Clinical - Secondary conditions - Sleep	VIC	Independent research institute	No	Yes, with another country
Gwee SSL, Radford RAW, Chow S, Syal MD, Morsch M, Formella I, et al. Aurora kinase B regulates axonal outgrowth and regeneration in the spinal motor neurons of developing zebrafish. Cellular and Molecular Life Sciences. 2018;75(23):4269-85.	Pre-clinical	Pre-clinical - Regeneration	NSW	University	No	

Hasnan N, Saadon NSM, Hamzaid NA, Teoh MXH, Ahmadi S, Davis GM. Muscle oxygenation during hybrid arm and functional electrical stimulation-evoked leg cycling after spinal cord injury. Medicine (United States). 2018;97(43).	Clinical - Controlled clinical trial	Clinical - Rehabilitation - Other	NSW	University	No	No
Hassanpour Golakani M, Mohammad MG, Li H, Gamble J, Breit SN, Ruitenberg MJ, et al. MIC-1/GDF15 overexpression is associated with increased functional recovery in traumatic spinal cord injury. Journal of Neurotrauma. 2019;36(24):3410-21.	Pre-clinical	Pre-clinical - Neuroprotection	NSW	University	No	
Hatt A, Brown E, Berlowitz DJ, O'Donoghue F, Meaklim H, Connelly A, et al. Tetraplegic obstructive sleep apnoea patients dilate the airway similarly to able-bodied obstructive sleep apnoea patients. Journal of Spinal Cord Medicine. 2022;45(4):536-46.	Clinical - Cross-sectional	Clinical - Secondary conditions - Sleep	NSW	Independent research institute	No	Yes, with another institution
Hennessey D, Kinnear N, Maclellan L, Byrne C, Nunn A, Gani J. The effect of appropriate bladder management on the prevalence of urinary tract infections in patients with a new spinal cord injury. BJU International. 2019;123(Supplement 2):8-9.	Clinical - Cohort study	Clinical - Secondary conditions - Bladder management	VIC	Health service	No	No
Hilton G, Unsworth CA, Stuckey R, Murphy GC. The experience of seeking, gaining and maintaining employment after traumatic spinal cord injury and the vocational pathways involved. Work: Journal of Prevention, Assessment & Rehabilitation. 2018;59(1):67-84.	Clinical - Mixed methods	Clinical - Participation - Work and employment	VIC	University	No	No
Hodgetts SI, Lovett SJ, Baron-Heeris D, Fogliani A, Sturm M, Van den Heuvel C, et al. Effects of amyloid precursor protein peptide APP96-110, alone or with human mesenchymal stromal cells, on recovery after spinal cord injury. Neural Regeneration Research. 2022;17(6):1376-86.	Pre-clinical	Pre-clinical - Neuroprotection	WA	University	No	
Hodgetts SI, Yoon JH, Fogliani A, Akinpelu EA, Baron-Heeris D, Houwers IGJ, et al. Cortical AAV-CNTF Gene Therapy Combined with Intraspinal Mesenchymal Precursor Cell Transplantation Promotes Functional and Morphological Outcomes after Spinal Cord Injury in Adult Rats. Neural Plasticity. 2018;9828725.	Pre-clinical	Pre-clinical - Regeneration	WA	University	No	
Hogan C, Burridge L, Foster M, Kendall M, Pershouse K, Ungerer G, et al. The Impacts and Vulnerabilities for People Living with Spinal Cord Injury and Their Service Systems of the COVID-19 Pandemic in Queensland, Australia. Health & Social Care in the Community. 2023;7255395.	Clinical - Mixed methods	Clinical - Rehabilitation - Other	QLD	University	Yes	No
Hooper B, Verdonck M, Amsters D, Myburg M, Allan E. Smart-device environmental control systems: Experiences of people with cervical spinal cord injuries. Disability and Rehabilitation: Assistive Technology. 2018;13(8):724-30.	Clinical - Qualitative inquiry	Clinical - Rehabilitation - Other	QLD	University	No	Yes, with another institution
Houston V, Foster M, Borg DN, Nolan M, Seymour-Jones A. From hospital to home with NDIS funded support: Examining participant pathway timeframes against discharge expectations. Australian Social Work. 2020;73(2):175-90.	Clinical - Retrospective audit	Clinical - Rehabilitation - Other	QLD	Health service	No	Yes, with another institution
Hu D, Moalem-Taylor G, Potas JR. Red-light (670 nm) therapy reduces mechanical sensitivity and neuronal cell death, and alters glial responses after spinal cord injury in rats. Journal of neurotrauma. 2020;37(21):2244-60.	Pre-clinical	Pre-clinical - Neuroprotection	ACT	University	No	
Iyer P, Beck EJ, Walton KL. Exploring nutrition knowledge and dietary intake of adults with spinal cord injury in specialist rehabilitation. Spinal Cord. 2020;58(8):930-8.	Clinical - Cross-sectional	Clinical - General health maintenance - Nutrition	NSW	University	No	No
Jogia T, Lubstorf T, Jacobson E, Scriven E, Atresh S, Nguyen QH, et al. Prognostic value of early leukocyte fluctuations for recovery from traumatic spinal cord injury. Clinical and Translational Medicine. 2021;11(1):e272.	Clinical - Cross-sectional	Clinical - Acute Management - Neuroprotection	QLD	University	No	No
Johnston D, Middleton JW, Murphy G, Cameron I. Vocational counseling for Australian spinal cord injury inpatients-Defining vocational role expectations and behavior. Australian Journal of Rehabilitation Counselling. 2020;26(1):48-53.	Clinical - Qualitative inquiry	Clinical - Participation - Work and employment	NSW	University	No	Yes, with another institution
Jones KF, Dorsett P, Simpson G, Briggs L. Moving forward on the journey: Spirituality and family resilience after spinal cord injury. Rehabilitation Psychology. 2018;63(4):521-31.	Clinical - Qualitative inquiry	Clinical - Psychosocial - Mental health	NSW	University	No	No
Jones KF, Simpson G, Briggs L, Dorsett P, Anderson M. A study of whether individual and dyadic relations between spirituality and resilience contribute to psychological adjustment among individuals with spinal cord injuries and their family members. Clinical Rehabilitation. 2019;33(9):1503-14.	Clinical - Cross-sectional	Clinical - Psychosocial - Mental health	NSW	University	No	No

Karran EL, Fryer CE, Middleton JW, Moseley GL. Exploring the Social Determinants of Health Outcomes for Adults with Low Back Pain or Spinal Cord Injury and Persistent Pain: A Mixed Methods Study. Journal of Pain. 2022;23(9):1461-79.	Clinical - Cross-sectional	Clinical - Secondary conditions - Pain management	NSW	University	No	No
Karran EL, Fryer CE, Middleton JW, Moseley GL. Pain and pain management experiences following spinal cord injury – a mixed methods study of Australian community-dwelling adults. Disability & Rehabilitation. 2023;45(3):455-68.	Clinical - Mixed methods	Clinical - Secondary conditions - Pain management	SA	University	No	No
Kelly LC, Glinsky JV, Nier LM, Garrett G, Harvey LA. Are micro enemas administered with a squeeze tube and a 5 cm-long nozzle as good or better than micro enemas administered with a 10 cm-long catheter attached to a syringe in people with a recent spinal cord injury? A non-inferiority, crossover randomised controlled trial. Spinal Cord. 2022;60(12):1136-43.	Clinical - Randomised controlled trial	Clinical - Secondary conditions - Bowel dysfunction and management	NSW	Health service	No	Yes, with another institution
Kendall MB, Amsters D, Schuurs S, Borg DN, Pershouse K, Kuipers P. Longitudinal effects of time since injury and age at injury on outcomes of people with spinal cord injury in Queensland, Australia. Spinal Cord. 2022;60(12):1087-93.	Clinical - Cohort study	Clinical - Aging	QLD	University	No	No
Kendall M, Harre D, Schuurs S, Hinchy K, Booth S. Returning to rural communities following transitional rehabilitation after spinal cord injury. Australian Journal of Rural Health. 2021;29(4):572-7.	Clinical - Qualitative inquiry	Clinical - Rehabilitation - Other	QLD	Health service	No	No
Kifley A, Arora M, Nunn A, Marshall R, Geraghty T, Weber G, et al. Australian arm of the International Spinal Cord Injury (Aus-InSCI) Community Survey: 3. Drivers of quality of life in people with spinal cord injury. Spinal Cord. 2023;61(3):185-93.	Clinical - Cross-sectional	Clinical - Psychosocial - Mental health	NSW	University	No	Yes, with another state
King GK, Goodes LM, Hartshorn C, Thavaseelan J, Jonescu S, Watts A, et al. Intravesical hyaluronic acid with chondroitin sulphate to prevent urinary tract infection after spinal cord injury. Journal of Spinal Cord Medicine.2023; 46(5): 830–836.	Clinical - Controlled clinical trial	Clinical - Acute Management - Other	WA	University	No	Yes, with another institution
Kleemann S, Mosley I, Fitzgerald M. Mapping the continuum of care to surgery following traumatic spinal cord injury. Injury. 2018;49(8):1552-7.	Clinical - Retrospective audit	Clinical - Acute Management - Surgical interventions	VIC	Health service	No	No
Koong DP, Symes MJ, Sefton AK, Sivakumar BS, Ellis A. Management of lower limb fractures in patients with spinal cord injuries. ANZ Journal of Surgery. 2020;90(9):1743-9.	Clinical - Retrospective audit	Clinical - Secondary conditions - Bone health/heterotopic ossification	NSW	Health service	No	No
Lakhani A, Dema S, Hose J, Erdem N, Wollersheim D, Grimbeek P, et al. What happens post-lockdown for people with disability? Autonomy, quality of life, service access and health changes for people with spinal cord injury in Victoria, Australia after COVID-19 social distancing restrictions. Health & Social Care in the Community. 2022;30(6):e5366-e77.	Clinical - Cross-sectional	Clinical - Psychosocial - Mental health	VIC	University	Yes	No
Lakhani A, Martin K, Gray L, Mallison J, Grimbeek P, Hollins I, et al. What Is the Impact of Engaging With Natural Environments Delivered Via Virtual Reality on the Psycho-emotional Health of People With Spinal Cord Injury Receiving Rehabilitation in Hospital? Findings From a Pilot Randomized Controlled Trial. Archives of Physical Medicine & Rehabilitation. 2020;101(9):1532-40.	Clinical - Randomised controlled trial	Clinical - Psychosocial - Mental health	VIC	University	No	No
Lakhani, A.; Parekh, S.; Watling, D. P.; Grimbeek, P.; Duncan, R.; Charlifue, S.; Kendall, E. Access and engagement with places in the community, and the quality of life among people with spinal cord damage. Journal of Spinal Cord Medicine.2022 Jul;45(4):522-530.	Clinical - Cross-sectional	Clinical - Psychosocial - Mental health	VIC	University	Yes	No
Lennox A, Gabbe B, Nunn A, Braaf S. Experiences With Navigating and Managing Information in the Community Following Spinal Cord Injury. Topics in Spinal Cord Injury Rehabilitation. 2018;24(4):315-24.	Clinical - Qualitative inquiry	Clinical - General health maintenance - Primary care	VIC	University	No	No
Lee HQ, Kow CY, Ng JS, Chan P, Ton L, Etherington G, et al. Correlation of Anterior Interbody Graft Choice With Patient-Reported Outcomes in Cervical Spine Trauma. Global Spine Journal. 2019;9(7):735-42.	Clinical - Retrospective audit	Clinical - Acute Management - Surgical interventions	VIC	Health service	No	No
Luu, B. L.; Lewis, R. H. C.; Gandevia, S. C.; Boswell-Ruys, C. L.; Butler, J. E. The detection and sensory perception of inspiratory resistive loads in people with chronic tetraplegia. Journal of Applied Physiology. 2022; 133(5):1192-1201.	Clinical - Controlled clinical trial	Clinical - Secondary conditions - Sleep	NSW	Independent research institute	No	No

Mandwie M, Piper JA, Gorrie CA, Keay KA, Musumeci G, Al-Badri G, et al. Rapid GFAP and Iba1 expression changes in the female rat brain following spinal cord injury. Neural Regeneration Research. 2022;17(2):378-85.	Pre-clinical	Pre-clinical - Discovery	NSW	University	No	
Marshall K, Fleming J, Atresh S, Scott JR, Gustafsson L, Patterson F. Falls on an inpatient rehabilitation spinal injuries unit: the characteristics, circumstances, and consequences. Spinal Cord. 2023;61(1):57-64.	Clinical - Retrospective audit	Clinical - Secondary conditions - Falls prevention	QLD	University	No	No
Maloney PL, Pumpa KL, Miller J, Thompson KG, Jay O. Extended post-exercise hyperthermia in athletes with a spinal cord injury. Journal of Science & Medicine in Sport. 2021;24(8):831-6.	Clinical - Case control study	Clinical - Rehabilitation - Other	ACT	University	No	Yes, with another institution
Matuzelski E, Harvey TJ, Harkins D, Nguyen T, Ruitenberg MJ, Piper M. Expression of NFIA and NFIB within the murine spinal cord. Gene Expression Patterns. 2020;35.	Pre-clinical	Pre-clinical - Discovery	SA	University	No	
McDonald T, Stiller K. Inspiratory muscle training is feasible and safe for patients with acute spinal cord injury. Journal of Spinal Cord Medicine. 2019;42(2):220-7.	Clinical - Case series	Clinical - Acute Management - Respiratory management	SA	Health service	No	No
McNaughton, K. M. D.; Witherow, J. L.; Dupuche, C. B.; Peebles, K. C.; Elphick, T. G.; Hudson, A. L.; McCaughey, E. J.; Boswell-Ruys, C. L.; Butler, J. E. Inspiratory muscle reflex control after incomplete cervical spinal cord injury. Journal of Applied Physiology. 2022; 133 (6): 1318-1326.	Clinical - Controlled clinical trial	Clinical - Acute Management - Respiratory management	NSW	Independent research institute	No	No
Middleton JW, Arora M, Kifley A, Clark J, Borg SJ, Tran Y, et al. Australian arm of the International Spinal Cord Injury (Aus-InSCI) Community Survey: 2. Understanding the lived experience in people with spinal cord injury. Spinal Cord. 2022;60(12):1069-79.	Clinical - Cross-sectional	Clinical - Psychosocial - Mental health	NSW	University	No	Yes, with another state
Middleton JW, Arora M, Kifley A, Geraghty T, Borg SJ, Marshall R, et al. Australian arm of the International Spinal Cord Injury (Aus-InSCI) community survey: 1. population-based design, methodology and cohort profile. Spinal Cord. 2023;61(3):194-203.	Clinical - Cross-sectional	Clinical - Rehabilitation - Other	NSW	University	No	Yes, with another state
Mitchell R, Harvey L, Stanford R, Close J. Health outcomes and costs of acute traumatic spinal injury in New South Wales, Australia. Spine Journal: Official Journal of the North American Spine Society. 2018;18(7):1172-9.	Clinical - Retrospective audit	Clinical - Acute Management - Other	NSW	University	No	Yes, with another institution
Mooney A, Hewitt AE, Hahn J. Nothing to lose: a phenomenological study of upper limb nerve transfer surgery for individuals with tetraplegia. Disability & Rehabilitation. 2021;43(26):3748-56.	Clinical - Qualitative inquiry	Clinical - Rehabilitation - Upper limb	VIC	University	Yes	No
Moran K, Barclay L, Lannin NA. Experiences of people with non-traumatic spinal cord injuries returning home after inpatient rehabilitation. Disability and rehabilitation. 2023:1-7.	Clinical - Qualitative inquiry	Clinical - Rehabilitation - Other	NSW	University	No	No
Murphy AT, Kravtsov S, Sangeux M, Rawicki B, New PW. Utilizing three dimensional clinical gait analysis to optimize mobility outcomes in incomplete spinal cord damage. Gait and Posture. 2019;74:53-9.	Clinical - Cohort study	Clinical - Rehabilitation - Lower limb and walking	VIC	University	No	No
Nevin AN, Urquhart S, Atresh SS, Geraghty TJ, Walter E, Ryan EG, et al. A longitudinal analysis of resting energy expenditure and body composition in people with spinal cord injury undergoing surgical repair of pressure injuries: a pilot study. European Journal of Clinical Nutrition. 2023;77(3):386-92.	Clinical - Cohort study	Clinical - Secondary conditions - Skin integrity and pressure injuries	QLD	Health service	No	No
New PW. Sexual and Body Esteem in People with Spinal Cord Damage. Sexuality and Disability. 2019;37(1):3-14.	Clinical - Cross-sectional	Clinical - Psychosocial - Sexuality	VIC	Health service	No	No
New PW. Sexual abuse in people with spinal cord damage. Journal of Spinal Cord Medicine. 2020;43(5):586-93.	Clinical - Cross-sectional	Clinical - Psychosocial - Sexuality	VIC	Health service	No	No
New PW, Tate DG, Forchheimer MB, Greve JMD, Parashar D, Post MWM. Preliminary psychometric analyses of the International Spinal Cord Injury Quality of Life Basic Data Set. Spinal Cord. 2019;57(9):789-95.	Clinical - Cross-sectional	Clinical - Psychosocial - Mental health	VIC	Health service	No	Yes, with another country
Nguyen DAT, Lewis RHC, Boswell-Ruys CL, Hudson AL, Gandevia SC, Butler JE. Increased diaphragm motor unit discharge frequencies during quiet breathing in people with chronic tetraplegia. Journal of Physiology. 2020;598(11):2243-56.	Clinical - Cohort study	Clinical - Secondary conditions - Respiratory management	NSW	Independent research institute	No	No
Nguyen DAT, Boswell-Ruys CL, McCaughey EJ, Gandevia SC, Hudson AL, Butler JE. Absence of inspiratory premotor potentials during quiet breathing in cervical spinal cord injury. Journal of Applied Physiology. 2020;128(3):660-6.	Clinical - Controlled clinical trial	Clinical - Secondary conditions - Respiratory management	NSW	Independent research institute	No	No

Nunnerley JL, Glinsky JV, Dunn JA, Stavric VA, Haber A, Denis S, et al. Developing spinal cord injury physiotherapy clinical practice guidelines: a qualitative study to determine how physiotherapists and people living with spinal cord injury use evidence. Spinal Cord. 2023;61(2):160-8.	Clinical - Qualitative inquiry	Clinical - Rehabilitation - Other	NSW	University	No	Yes, with another country
O'Hare Doig RL, Santhakumar S, Fehily B, Raja S, Solomon T, Bartlett CA, et al. Acute Cellular and Functional Changes With a Combinatorial Treatment of Ion Channel Inhibitors Following Spinal Cord Injury. Frontiers in Molecular Neuroscience. 2020; 25:13:85.	Pre-clinical	Pre-clinical - Regeneration	WA	University	No	
Oh S, Gustafsson L, Eames S. Current practice trends of oedema management in the hands of people with tetraplegia in Australia. Spinal cord series and cases. 2019;5:71.	Clinical - Cross-sectional	Clinical - Rehabilitation - Upper limb	QLD	University	No	Yes, with another state
O'Donoghue FJ, Meaklim H, Bilston L, Hatt A, Connelly A, Jackson G, et al. Magnetic resonance imaging of the upper airway in patients with quadriplegia and obstructive sleep apnea. Journal of Sleep Research. 2018;27(4):1-9.	Clinical - Cohort study	Clinical - Secondary conditions - Sleep	VIC	University	No	Yes, with another state
Peters AEJ, van Silfhout L, Graco M, Schembri R, Thijssen D, Berlowitz DJ. Periodic limb movements in tetraplegia. Journal of Spinal Cord Medicine. 2018;41(3):318-25.	Clinical - Retrospective audit	Clinical - Secondary conditions - Sleep	VIC	Independent research institute	No	No
Pirpiris A, Hoag N, Clements R, Gani J. Urodynamic findings and urologic management of central cord syndrome. Journal of Clinical Urology. 2020;13(4):283-7.	Clinical - Retrospective audit	Clinical - Secondary conditions - Bladder management	VIC	University	No	No
Postol N, Spratt NJ, Bivard A, Marquez J. Physiotherapy using a free-standing robotic exoskeleton for patients with spinal cord injury: a feasibility study. Journal of NeuroEngineering and Rehabilitation. 2021;18(1):180.	Clinical - Cohort study	Clinical - Rehabilitation - Lower limb and walking	NSW	University	No	No
Panisset MG, Desneves K, Ward LC, Rafferty J, Rodi H, Roff G, et al. Bedside quantification of fat-free mass in acute spinal cord injury using bioelectrical impedance analysis: A psychometric study. Spinal Cord. 2018;56(4):355-65.	Clinical - Retrospective audit	Clinical - General health maintenance - Nutrition	VIC	Health service	No	No
Panisset MG, El-Ansary D, Dunlop SA, Marshall R, Clark J, Churilov L, et al. Factors influencing thigh muscle volume change with cycling exercises in acute spinal cord injury - a secondary analysis of a randomized controlled trial. Journal of Spinal Cord Medicine. 2022;45(4):510-21.	Clinical - Randomised controlled trial	Clinical - Rehabilitation - Other	VIC	Health service	No	Yes, with another country
Pelly FE, Broad EM, Stuart N, Holmes MA. Resting energy expenditure in male athletes with a spinal cord injury. Journal of Spinal Cord Medicine. 2018;41(2):208-15.	Clinical - Cross-sectional	Clinical - Acute Management - Other	QLD	Independent research institute	No	No
Postol N, Spratt NJ, Bivard A, Marquez J. Physiotherapy using a free-standing robotic exoskeleton for patients with spinal cord injury: a feasibility study. Journal of NeuroEngineering and Rehabilitation. 2021;18(1):180.	Clinical - Controlled clinical trial	Clinical - Rehabilitation - Lower limb and walking	NSW	University	No	No
Probert AC, McKinnon LS, Jiang E, Gray RJ, Sivakumar BS, Symes MJ. The impact of COVID-19 on spinal cord injuries and trauma at a tertiary referral centre in Sydney. Journal of Spine Surgery. 2022;8(4):418-25.	Clinical - Retrospective audit	Clinical - Rehabilitation - Other	NSW	Health service	No	No
Pryor J, Haylen D, Fisher M. Problems people with spinal cord injury experience accessing help with bowel care when hospitalised outside a specialist spinal injury service. Journal of clinical nursing. 2021;30(11-12):1633-44.	Clinical - Qualitative inquiry	Clinical - Secondary conditions - Bowel dysfunction and management	NSW	Health service	No	No
Pryor J, Haylen D, Fisher MJ. The usual bowel care regimes of people living in the community with spinal cord injury and factors important for integrating bowel care into everyday life. Disability & Rehabilitation. 2022;44(21):6401-7.	Clinical - Qualitative inquiry	Clinical - Secondary conditions - Bowel dysfunction and management	NSW	Health service	No	No
Pullin LH, McKenzie H. Lifetime Active Care: A qualitative study of long-term family carers of people with spinal cord injury in Australia. Health & social care in the community. 2020;28(5):1622-31.	Clinical - Qualitative inquiry	Clinical - Rehabilitation - Other	NSW	University	No	No
Quarrington RD, Costi JJ, Freeman BJC, Jones CF. Quantitative evaluation of facet deflection, stiffness, strain and failure load during simulated cervical spine trauma. Journal of Biomechanics. 2018;72:116-24.	Pre-clinical	Pre-clinical - Discovery	SA	University	No	
Quarrington RD, Costi JJ, Freeman BJC, Jones CF. Investigating the Effect of Axial Compression and Distraction on Cervical Facet Mechanics During Supraphysiologic Anterior Shear. Journal of Biomechanical Engineering. 2021;143(6):01.	Pre-clinical	Pre-clinical - Discovery	SA	University	No	No

Quarrington RD, Jones CF, Tcherveniakov P, Clark JM, Sandler SJI, Lee YC, et al. Traumatic subaxial cervical facet subluxation and dislocation: epidemiology, radiographic analyses, and risk factors for spinal cord injury. Spine Journal: Official Journal of the North American Spine Society. 2018;18(3):387-98.	Clinical - Cohort study	Clinical - Acute Management - Surgical interventions	SA	University	No	No
Ramakrishnan K, Murphy G, Middleton J, Cameron I. Early vocational rehabilitation for patients with spinal injury: A qualitative research study of service providers. International Journal of Therapy and Rehabilitation. 2018;25(10):505-15.	Clinical - Qualitative inquiry	Clinical - Participation - Work and employment	NSW	University	No	Yes, with another institution
Rank MM, Galea MP, Callister R, Callister RJ. Is more always better? How different 'doses' of exercise after incomplete spinal cord injury affects the membrane properties of deep dorsal horn interneurons. Experimental Neurology. 2018;300:201-11.	Pre-clinical	Pre-clinical - Plasticity	VIC	University	No	
Rees L, Sherwood M, Shields N. Media portrayal of spinal cord injury and its impact on lived experiences: a phenomological study. Spinal Cord. 2021;59(5):504-11.	Clinical - Qualitative inquiry	Clinical - Psychosocial - Mental health	VIC	University	No	No
Rees L, Sherwood M, Shields N. Consumer engagement in doctoral research – what difference does it make? Spinal Cord. 2023;61(2):175-83.	Clinical - Qualitative inquiry	Clinical - Rehabilitation - Other	VIC	University	Yes	No
Rees, L.; Sherwood, M.; Shields, N.Tragedy or over-achievement: a media analysis of spinal cord injury in Australia. Media International Australia. 2021; 181(1).	Clinical - Mixed methods	Clinical - Psychosocial - Mental health	VIC	University	No	No
Roddy C, Rickard N, Tamplin J, Baker FA. Personal identity narratives of therapeutic songwriting participants following Spinal Cord Injury: A case series analysis. Journal of Spinal Cord Medicine. 2018;41(4):435-43.	Clinical - Case series	Clinical - Psychosocial - Mental health	VIC	University	No	No
Sandalic D, Tran Y, Craig A, Arora M, Pozzato I, Simpson G, et al. The Need for a Specialized Neurocognitive Screen and Consistent Cognitive Impairment Criteria in Spinal Cord Injury: Analysis of the Suitability of the Neuropsychiatry Unit Cognitive Assessment Tool. Journal of Clinical Medicine. 2022;11(12):3344.	Clinical - Cross-sectional	Clinical - Rehabilitation - Other	NSW	University	No	Yes, with another institution
Sandalic D, Tran Y, Arora M, Middleton J, McBain C, Myles D, et al. Improving Assessment of Cognitive Impairment after Spinal Cord Injury: Methods to Reduce the Risk of Reporting False Positives. Journal of Clinical Medicine. 2023;12(1):68.	Clinical - Cohort study	Clinical - Rehabilitation - Other	NSW	University	No	Yes, with another institution
Sharwood LN, Möller H, Young JT, Vaikuntam B, Ivers RQ, Driscoll T, et al. The Nature and Cost of Readmissions after Work-Related Traumatic Spinal Injuries in New South Wales, Australia. International Journal of Environmental Research and Public Health. 2019;16(9):1509.	Clinical - Cross-sectional	Clinical - Rehabilitation - Other	NSW	University	No	Yes, with another institution
Sharwood LN, Joseph A, Guo CC, Flower O, Ball J, Middleton JW. Heterogeneous emergency department management of published recommendation defined hypotension in patients with acute traumatic spinal cord injury: A multi-centre overview. Emergency Medicine Australasia. 2019;31(6):967-73.	Clinical - Cross-sectional	Clinical - Acute Management - Other	NSW	University	No	Yes, with another state
Sharwood LN, Whyatt D, Vaikuntam BP, Cheng CL, Noonan VK, Joseph AP, et al. A geospatial examination of specialist care accessibility and impact on health outcomes for patients with acute traumatic spinal cord injury in New South Wales, Australia: a population record linkage study. BMC Health Services Research. 2021;21(1):292.	Clinical - Cross-sectional	Clinical - Acute Management - Other	NSW	University	No	No
Sharwood LN, Wiseman T, Tseris E, Curtis K, Vaiktunim B, Craig A, Young J. Pre-existing mental disorder, clinical profile, inpatient services and costs in people hospitalised following traumatic spinal injury: a whole population record linkage study. Injury Prevention. 2021;27(3):238.	Clinical - Cross-sectional	Clinical - Psychosocial - Mental health	NSW	University	No	No
Sharwood LN, King V, Ball J, Varma D, Stanford RW, Middleton JW. The influence of initial spinal cord haematoma and cord compression on neurological grade improvement in acute traumatic spinal cord injury: A prospective observational study. Journal of the Neurological Sciences. 2022;443:120453.	Clinical - Cross-sectional	Clinical - Acute Management - Other	NSW	University	No	Yes, with another institution
Schembri R, Graco M, Spong J, Ruehland WR, Tolson J, Rochford PD, et al. Apnoea and hypopnoea scoring for people with spinal cord injury: new thresholds for sleep disordered breathing diagnosis and severity classification. Spinal Cord. 2019;57(5):372-9.	Clinical - Retrospective audit	Clinical - Secondary conditions - Sleep	VIC	University	No	Yes, with another country

Silberstein M, Nunn AK, Drummond PD, Wan DWL, Alexander J, Millard M, et al. A Human Sensory Pathway Connecting the Foot to Ipsilateral Face That Partially Bypasses the Spinal Cord. Frontiers in Neuroscience. 2019;13.	Clinical - Case control study	Clinical - Rehabilitation - Other	VIC	University	No	Yes, with another state
Sinnott Jerram KA, Dunn J, Smaill R, Middleton J. A Mixed Methods Approach as a Channel to Interpret Outcomes Research and Lived Experience Enquiry of Upper Extremity Elective Surgery for Tetraplegia. Journal of Personalized Medicine. 2023;13(3):394.	Clinical - Mixed methods	Clinical - Rehabilitation - Upper limb	NSW	University	No	No
Skeers P, Battistuzzo CR, Clark JM, Bernard S, Freeman BJC, Batchelor PE. Acute Thoracolumbar Spinal Cord Injury: Relationship of Cord Compression to Neurological Outcome. Journal of Bone & Joint Surgery - American Volume. 2018;100(4):305-15.	Clinical - Retrospective audit	Clinical - Acute Management - Surgical interventions	VIC	Health service	No	No
Seddon M, Warren N, New PW. 'I don't get a climax any more at all': Pleasure and non-traumatic spinal cord damage. Sexualities. 2018;21(3):287-302.	Clinical - Qualitative inquiry	Clinical - Psychosocial - Sexuality	VIC	University	No	No
Sewell MD, Vachhani K, Hockings J, Chan J, Alrawi A, Williams R. A Hemodynamic Safety Checklist Can Improve Blood Pressure Monitoring in Patients with Acute Spinal Cord Injury. World Neurosurgery. 2019;128:e225-e30.	Clinical - Cross-sectional	Clinical - Acute Management - Other	QLD	Health service	No	No
Stanley EA, Hill B, McKenzie DP, Chapuis P, Galea MP, van Zyl N. Predicting strength outcomes for upper limb nerve transfer surgery in tetraplegia. Journal of Hand Surgery: European Volume. 2022;47(11):1114-20.	Clinical - Cross-sectional	Clinical - Rehabilitation - Upper limb	VIC	Health service	No	No
Sturt R, Hill B, Holland A, New PW, Bevans C. Validation of a clinical prediction rule for ambulation outcome after non-traumatic spinal cord injury. Spinal Cord. 2020;58(5):609-15.	Clinical - Cohort study	Clinical - Rehabilitation - Lower limb and walking	VIC	Health service	No	No
Sutherland TC, Ricafrente A, Gomola K, O'Brien BA, Gorrie CA. Neonatal Rats Exhibit a Predominantly Anti-Inflammatory Response following Spinal Cord Injury. Developmental Neuroscience. 2021;43(1):18-26.	Pre-clinical	Pre-clinical - Discovery	NSW	University	No	
Swaine JM, Moe A, Breidahl W, Bader DL, Oomens CWJ, Lester L, et al. Adaptation of a MR imaging protocol into a real-time clinical biometric ultrasound protocol for persons with spinal cord injury at risk for deep tissue injury: A reliability study. Journal of Tissue Viability. 2018;27(1):32-41.	Clinical - Cohort study	Clinical - Secondary conditions - Skin integrity and pressure injuries	WA	University	No	No
Swaine JM, Breidahl W, O'Loughlin E, Stacey MC, Bader DL, Oomens CWJ, et al. Ultrasonography Detects Deep Tissue Injuries in the Subcutaneous Layers of the Buttocks Following Spinal Cord Injury. Topics in Spinal Cord Injury Rehabilitation. 2018;24(4):371-8.	Clinical - Cohort study	Clinical - Secondary conditions - Skin integrity and pressure injuries	WA	University	No	No
Tamplin J, Loveridge B, Clarke K, Li YH, Berlowitz DJ. Development and feasibility testing of an online virtual reality platform for delivering therapeutic group singing interventions for people living with spinal cord injury. Journal of Telemedicine and Telecare. 2020;26(6):365-75.	Clinical - Case series	Clinical - Participation - Leisure/peer related	VIC	University	No	No
Teo CP, Cheng K, New PW. Retrospective study of functional outcomes and disability after non-ischaemic vascular causes of spinal cord dysfunction. Journal of Spinal Cord Medicine. 2021;44(2):306-11.	Clinical - Retrospective audit	Clinical - Rehabilitation - Other	VIC	Health service	No	No
Thompson E, Nicholson M, Rowe S, Iyer P. Exploring nutrition screening practices in patients with traumatic brain injury and spinal cord injury in specialist rehabilitation: A qualitative study. Journal of the Australasian Rehabilitation Nurses' Association (JARNA). 2022;24(1):20-8.	Clinical - Qualitative inquiry	Clinical - General health maintenance - Nutrition	NSW	University	No	No
Todorovic M, Barton M, Bentley S, St John JA, Ekberg J. Designing accessible educational resources for people living with spinal cord injury. Journal of Spinal Cord Medicine. 2022;45(3):442-54.	Clinical - Mixed methods	Clinical - Rehabilitation - Other	QLD	University	No	No
Toh SL, Lee BB, Ryan S, Simpson JM, Clezy K, Bossa L, et al. Probiotics [LGG-BB12 or RC14-GR1] versus placebo as prophylaxis for urinary tract infection in persons with spinal cord injury [ProSCIUTTU]: a randomised controlled trial. Spinal Cord. 2019;57(7):550-61.	Clinical - Randomised controlled trial	Clinical - Secondary conditions - Bladder management	NSW	Health service	No	Yes, with another institution
Toh SL, Lee BB, Simpson JM, Rice SA, Kotsiou G, Marial O, et al. Effect of probiotics on multi-resistant organism colonisation in persons with spinal cord injury: secondary outcome of ProSCIUTTU, a randomised placebo-controlled trial. Spinal Cord. 2020;58(7):755-67.	Clinical - Randomised controlled trial	Clinical - Secondary conditions - Bladder management	NSW	Health service	No	Yes, with another institution

Tran Y, Austin P, Lo C, Craig A, Middleton JW, Wrigley PJ, et al. An Exploratory EEG Analysis on the Effects of Virtual Reality in People with Neuropathic Pain Following Spinal Cord Injury. Sensors. 2022;22(7):2629.	Clinical - Randomised controlled trial	Clinical - Secondary conditions - Pain management	NSW	University	No	No
Tseng HW, Kulina I, Girard D, Gueguen J, Vaquette C, Salga M, et al. Interleukin-1 Is Overexpressed in Injured Muscles Following Spinal Cord Injury and Promotes Neurogenic Heterotopic Ossification. Journal of Bone and Mineral Research. 2022;37(3):531-46.	Pre-clinical	Clinical - Secondary conditions - Bone health/heterotopic ossification	QLD	University	No	
Tseng H-W, Girard D, Alexander KA, Millard SM, Torossian F, Anginot A, et al. Spinal cord injury reprograms muscle fibroadipogenic progenitors to form heterotopic bones within muscles. Bone Research. 2022;10(1):22.	Pre-clinical	Clinical - Secondary conditions - Bone health/heterotopic ossification	QLD	University	No	
Tseng HW, Kulina I, Salga M, Fleming W, Vaquette C, Genêt F, et al. Neurogenic Heterotopic Ossifications Develop Independently of Granulocyte Colony-Stimulating Factor and Neutrophils. Journal of Bone and Mineral Research. 2020;35(11):2242-51.	Pre-clinical	Clinical - Secondary conditions - Bone health/heterotopic ossification	QLD	University	No	
Vaikuntam BP, Middleton JW, McElduff P, Connelly L, Pearse J, Stanford R, et al. Identifying Predictors of Higher Acute Care Costs for Patients With Traumatic Spinal Cord Injury and Modeling Acute Care Pathway Redesign: A Record Linkage Study. Spine. 2019;44(16):E974-E83.	Clinical - Retrospective audit	Clinical - Acute Management - Other	NSW	University	No	No
Vaikuntam BP, Middleton JW, McElduff P, Walsh J, Pearse J, Connelly L, et al. Gap in funding for specialist hospitals treating patients with traumatic spinal cord injury under an activity-based funding model in New South Wales, Australia. Australian Health Review. 2020;44(3):365-76.	Clinical - Retrospective audit	Clinical - Acute Management - Other	NSW	University	No	No
van Zyl N, Galea MP, Cooper C, Hahn J, Hill B. Transfer of the supinator nerve to the posterior interosseous nerve for hand opening in tetraplegia through an anterior approach. Journal of Hand Surgery: European Volume. 2021;46(7):717-24.	Clinical - Retrospective audit	Clinical - Rehabilitation - Upper limb	VIC	Health service	No	No
van Zyl N, Hill B, Cooper C, Hahn J, Galea MP. Expanding traditional tendon-based techniques with nerve transfers for the restoration of upper limb function in tetraplegia: a prospective case series. Lancet. 2019;394(10198):565-75.	Clinical - Case series	Clinical - Rehabilitation - Upper limb	VIC	University	No	No
Vandestadt C, Vanwalleghem GC, Khabooshan MA, Douek AM, Castillo HA, Li M, et al. RNA-induced inflammation and migration of precursor neurons initiates neuronal circuit regeneration in zebrafish. Developmental Cell. 2021;56(16):2364-80.e8.	Pre-clinical	Pre-clinical - Regeneration	VIC	University	No	
Wadsworth BM, Kruger PS, Hukins CA, Modderman GA, Brown D, Paratz JD. The feasibility of using mouthpiece ventilation in the intensive care unit for post-extubation breathing support after acute tetraplegia. Spinal Cord. 2023; 61(6):330-337.	Clinical - Cohort study	Clinical - Acute Management - Respiratory management	QLD	Health service	No	No
Wall LR, Nund RL, Ward EC, Cornwell PL, Amsters DI. Experiences of communication changes following spinal cord injury: A qualitative analysis. Disability and Rehabilitation: An International, Multidisciplinary Journal. 2020;42(16):2271-8.	Clinical - Qualitative inquiry	Clinical - Rehabilitation - Other	QLD	Health service	No	No
Warren N, Redpath C, New P. New Sexual Repertoires: Enhancing Sexual Satisfaction for Men Following Non-traumatic Spinal Cord Injury. Sexuality and Disability. 2018;36(1):19-32.	Clinical - Qualitative inquiry	Clinical - General health maintenance - Sexual and reproductive health	VIC	University	No	No
Warren N, Walford K, Susilo A, New PW. Emotional consequences of delays in spinal rehabilitation unit admission or discharge: A qualitative study on the importance of communication. Topics in Spinal Cord Injury Rehabilitation. 2018;24(1):54-62.	Clinical - Qualitative inquiry	Clinical - Rehabilitation - Other	VIC	Health service	No	No
Watling DP, Bishara JD, Zeeman H. Young people's safety beliefs after a spinal cord injury health promotion and awareness presentation. Health Education Journal. 2018;77(1):43-58.	Clinical - Cross-sectional	Clinical - Rehabilitation - Other	QLD	University	No	No
Watson PK, Arora M, Middleton JW, Quel de Oliveira C, Heard R, Nunn A, et al. Leisure-Time Physical Activity in People With Spinal Cord Injury—Predictors of Exercise Guideline Adherence. International Journal of Public Health. 2022;67.	Clinical - Retrospective audit	Clinical - Participation - Physical activity (participation, psychosocial)	NSW	University	No	Yes, with another state
Wijesuriya NS, Eckert DJ, Jordan AS, Schembri R, Lewis C, Meaklim H, et al. A randomised controlled trial of nasal decongestant to treat obstructive sleep apnoea in people with cervical spinal cord injury. Spinal Cord. 2019;57(7):579-85.	Clinical - Randomised controlled trial	Clinical - Secondary conditions - Sleep	NSW	Independent research institute	No	Yes, with another state

Wijesuriya NS, Gainche L, Jordan AS, Berlowitz DJ, LeGuen M, Rochford PD, et al. Genioglossus reflex responses to negative upper airway pressure are altered in people with tetraplegia and obstructive sleep apnoea. Journal of Physiology. 2018;596(14):2853-64.	Clinical - Controlled clinical trial	Clinical - Secondary conditions - Sleep	NSW	Independent research institute	No	Yes, with another state
Wilton A. Risk Factors for Postoperative Complications and In-Hospital Mortality Following Surgery for Cervical Spinal Cord Injury. Cureus. 2022;14(11):e31960.	Clinical - Retrospective audit	Clinical - Acute Management - Surgical interventions	NSW	Health service	No	No
Wiseman, T. M.; Baron-Heeris, D.; Houwers, I. G. J.; Keenan, R.; Williams, R. J.; Nisbet, D. R.; Harvey, A. R.; Hodgetts, S. I. Peptide Hydrogel Scaffold for Mesenchymal Precursor Cells Implanted to Injured Adult Rat Spinal Cord. Tissue engineering Part A. 202; 27(15-16):993-1007.	Pre-clinical	Pre-clinical - Neural reconstruction	WA	University	No	
Wrigley PJ, Siddall PJ, Gustin SM. New evidence for preserved somatosensory pathways in complete spinal cord injury: A fMRI study. Human Brain Mapping. 2018;39(1):588-98.	Clinical - Cross-sectional	Clinical - Acute Management - Imaging	QLD	University	No	No
Yates AG, Jogia T, Gillespie ER, Couch Y, Ruitenberg MJ, Anthony DC. Acute IL-1RA treatment suppresses the peripheral and central inflammatory response to spinal cord injury. Journal of Neuroinflammation. 2021;18(1):15.	Pre-clinical	Pre-clinical - Discovery	QLD	University	No	
Ziaziaris WA, Ahadi MS, Gill AJ, Ledgard JP. The Anatomy of Nerve Transfers Used in Tetraplegic Hand Reconstruction. Journal of Hand Surgery. 2022;47(11):1121.e1-.e6.	Clinical - Controlled clinical trial	Clinical - Rehabilitation - Upper limb	NSW	Health service	No	No
Zoghi M, Galea MP. EMG-triggered stimulation post spinal cord injury: A case report. Physiotherapy Theory & Practice. 2018;34(4):309-15.	Clinical - Randomised controlled trial	Clinical - Rehabilitation - Upper limb	VIC	University	No	No

Appendix F - Clinical studies category of research literature review

Category of research	Number of publications (n = 171)
Clinical - Acute Management - Imaging	2
Clinical - Acute Management - Neuroprotection	2
Clinical - Acute Management - Other	14
Clinical - Acute Management - Respiratory management	5
Clinical - Acute Management - Surgical interventions	6
Sub-total	**29**
Clinical - General health maintenance - Nutrition	3
Clinical - General health maintenance - Primary care	1
Clinical - General health maintenance - Sexual and reproductive health	1
Sub-total	**5**
Clinical - Participation - Leisure/peer related	4
Clinical - Participation - Physical activity (participation, psychosocial)	2
Clinical - Participation - Work and employment	10
Sub-total	**16**
Clinical - Psychosocial - Mental health	17
Clinical - Psychosocial - Sexuality	4
Sub-total	**21**
Clinical - Rehabilitation - Lower limb and walking	5
Clinical - Rehabilitation - Neurostimulation	2
Clinical - Rehabilitation - Other	36
Clinical - Rehabilitation - Upper limb	8
Sub-total	**51**
Clinical - Secondary conditions - Bladder management	7
Clinical - Secondary conditions - Bone health/heterotopic ossification	2
Clinical - Secondary conditions - Bowel dysfunction and management	4
Clinical - Secondary conditions - Cardiovascular (health, complications)	1
Clinical - Secondary conditions - Falls prevention	1
Clinical - Secondary conditions - Pain management	5
Clinical - Secondary conditions - Respiratory management	2
Clinical - Secondary conditions - Skin integrity and pressure injuries	5
Clinical - Secondary conditions - Sleep	18
Clinical - Secondary conditions - Syringomyelia	0
Sub-total	**45**
Clinical - Aging	1
Clinical - Paediatric	3
Sub-total	**4**

SPINAL
RESEARCH
INSTITUTE

thesri.org
info@thesri.org