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Rehabilitation Engineering in Australia

Discussion Paper

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Introduction

Purpose

This paper is intended to promote a nationwide discussion among existing rehabilitation engineers by suggesting a definition and scope of practice for the field in the Australian context. It is hoped that this discussion will help to foster a national identity and to provide a means of establishing broader connections within the field.

Scope and Context

Rehabilitation engineering (RE) has emerged independently as a profession in multiple countries across the world. The current rollout of the National Disability Insurance Scheme (NDIS) represents a significant investment of resources and heightened awareness around the provision and support of Assistive Technology (AT). This increased focus on AT has generated an environment that provides an opportunity for the Rehabilitation Engineering community in Australia to become more firmly established.

The AT ecosystem is evolving continuously, so to ensure emerging opportunities and challenges can be identified and addressed, RE will need to establish a clear and accepted definition, a scope of practice and a set of specific competency standards.

RE in Australia has developed organically from funded services, connecting through networks and transfer of staff and now requires more targeted efforts in order to flourish.

Community acceptance of a clear definition and relevant areas of practice is essential to the evaluation of competencies and to the development of appropriate content where additional training requirements are identified. Initial identification of which areas of practice are in scope, starting with areas in which engineers are currently and clearly adding value, must be determined via appropriate consultation with relevant stakeholders. As the capacity of the discipline expands, so too will the scope of practice.

The current and projected AT ecosystem represents the best opportunity to generate the momentum and awareness necessary for RE to become a clearly established and recognised engineering discipline. However, the approach taken should be considered and collaborative.

Out of scope

Competency standards are contingent upon the acceptance of the definition and scope of practice and therefore are not considered in this paper. Once consensus has been achieved, the competencies can be clarified and developed, to provide a clearer roadmap for the future of the profession. EA recognises three occupational categories within the engineering team, which are based on qualifications: Professional Engineer, Engineering Technologist, and Engineering Associate. This discussion paper is focused on the occupational category of Professional Engineer, and lays a foundation for the possible regulatory protection of the title *Rehabilitation Engineer*.

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Defining the profession

Rehabilitation Engineering is recognised as a discipline, or sub-discipline, in many countries. An analysis of the professional RE associations and definitions are detailed in Appendix A. The analysis elicits the following common features:

- An *engineering qualification* relevant to the occupational category of Professional Engineer, Engineering Technologist, or Engineering Associate (i.e. Stage 1 Competencies),
- Knowledge of and training in health sciences relevant to practice;
- Applies professional (*including clinical*) knowledge and skills to the planning, development, evaluation, assessment, and provision of AT, and;
- Develops, assesses or applies Assistive Technology to improve the quality of life and functional capability of *people who use, or could benefit from, AT*.

Despite varied influences worldwide, the common features are broadly applicable to the contemporary Australian rehabilitation engineer. Using these features, the following definition is proposed for the Australian context:

A rehabilitation engineer is a professional engineer applying informed theory and practice, including specialised knowledge and application of technologies, to safeguard and improve the quality of life of people who use, or would benefit from, AT, often in collaboration with a multidisciplinary team.

Where the following meanings are intended:

- *Professional Engineer* – holding an Engineers Australia accredited or recognised four-year professional engineering degree (Stage 1 Competencies).
- *Informed theory and practice* – theory and practice that are current, relevant, and scientifically validated, this includes a requirement for formal training in the health sciences.
- *Technologies* – products and services which are well understood by the engineer and fit for purpose.
- *Safeguard* – through advocacy, oversight, risk analysis, assessment, testing, regulation, compliance, and validation.

The above definition allows consideration of the spectrum of activities in which a rehabilitation engineer might be engaged and retains the key characteristics that make the profession distinct. The proposed definition is intended to provide a basis to discuss concerns, affirmations and nuances to reach consensus on an appropriate definition for the Australian context.

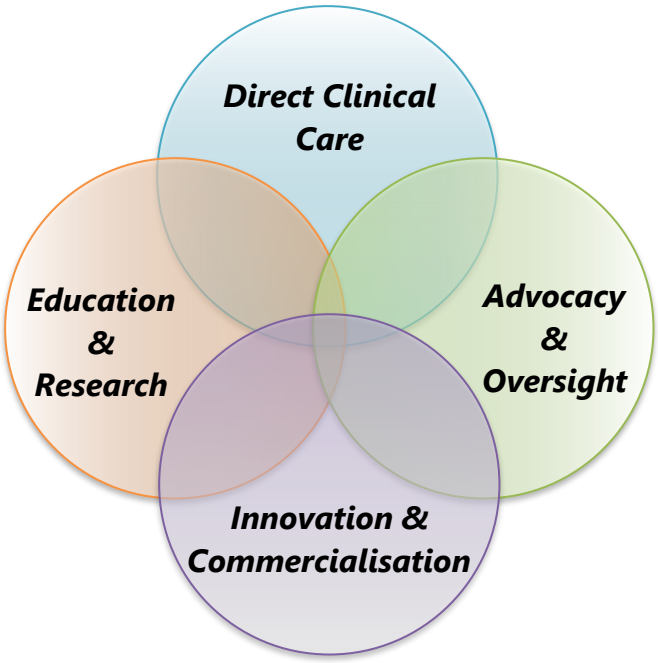
Identifying the scope of practice

Published scopes of practice from the surveyed professional associations, Appendix B, were sorted and categorised into eleven key areas of practice, each containing example activities that have been reported. These examples are indicative only, and not intended to be an exhaustive list. A review of current activity in Australia has determined that there is some level of activity across all 11 areas of practice, it is therefore suggested that all areas identified below should be seen as included within the RE scope of practice in Australia.

Table 1: Reported key areas of practice for RE

1. **Pressure, Posture and Mobility**
   - Wheelchair services
   - Design, modification and optimisation of specialised and custom seating and mobility systems
   - Postural management
   - Pressure management and custom pressure care AT
   - Manipulation and mobility aids
2. **Electronic Assistive Technology**
   - Specialist controls for powered mobility and alternative access to the computer and other technology
   - Brain computer interfaces
   - Creating integrated technology solutions (e.g. wheelchairs with complex seating, respiratory support and computer control)
   - Control by nerve or brain sensing systems
   - Functional Electrical Stimulation (FES)
3. **Assistive Technologies for Activities of Daily Living (ADL)**
   - Customisation, modification and integration of existing AT
   - Design and fabrication of custom ADL AT
   - AT to support children with life, learning and play
   - Equipment and supports relating to transferring (into and out of wheelchairs, commodes, beds and other equipment)
   - AT for persons with severe visual, auditory or tactile impairments
   - Speciality equipment, including for recreation
4. **Augmentative and Alternative Communication (AAC) and Environmental Controls (EC)**
   - Electronic communicators (such as speech synthesisers)
   - Adapted or specially programmed computers, telephones or other ICT (including sensory systems)
5. **Safety and Compliance**
   - Regional and International Standards
   - Public advocacy
   - Policy development and promotion
   - Conformance testing
   - Failure analysis
   - Commercialisation
6. **Clinical Movement Analysis**
   - Advanced kinematics
   - Analysis of human performance (incl. quantitative and qualitative tools)
   - Biomechanics of movement
   - Gait analysis
7. **Rehabilitation Robotics**
   - Robotic agents relating to aspects of rehabilitation and welfare management
   - Robotic aids used in the process of rehabilitation and welfare management
8. **Academic Activities**
   - Research relating to rehabilitation and welfare promotion through the application of engineering theory and practice
   - Research relating to the development, design, production and efficacy of AT
   - Education and training
9. **Prostheses and Orthoses**
   - Design and development of physical prostheses and orthoses
   - Design and development of sensory prostheses
   - Modification and optimisation of existing prostheses and orthoses
10. **Clinical and Community Services**
    - Rehabilitation & welfare engineering assessment in clinical and community environments
    - Technology support services
    - Knowledge base and support of AT
    - AT consultancy for modulation of organ function
    - AT consultancy for secondary disorder treatment
    - AT consultancy for cognition and sensory loss
    - Application of outcome measures throughout the AT service delivery process
    - Virtual rehabilitation,
    - Telehealth and telecare
11. **Accessibility and Home Modifications**
    - Vehicle accessibility
    - Home accessibility
    - Community access & transport solutions
    - Work site modifications
    - Assistance with job development

Role archetypes within RE



The eleven distinct areas of practice identified in the previous section provide a basis for discussion about the subject matters where rehabilitation engineers can add value. An alternative method of grouping rehabilitation engineers is by considering the focus and role that individual engineers adopt within their chosen area of practice:

- Direct Clinical Care
- Education & Research
- Advocacy & Oversight
- Innovation & Commercialisation

These role archetypes are proposed as a starting point for discussion. The divisions should be explored by the RE community as an exercise in better understanding the practice and interests of its own members. While there is some inherent overlap between different archetypes, rehabilitation engineers will typically tend to emphasise one role in their practice.

Current practice in Australia

In Australia, rehabilitation engineers typically work in public health and disability services, in academia, or with private assistive technology suppliers and manufacturers. The largest cohort has historically been those who work in publicly funded RE centres, but commercial opportunities in the AT sector are growing and the proportion of rehabilitation engineers working in private enterprise is expected to rise.

Reviewing the key areas of practice outlined in Table 1, rehabilitation engineers in Australia currently have some level of engagement all of the identified areas, though only to a limited degree in some cases. It is expected that this discussion paper may help to uncover more existing RE activity than has yet been identified. In Australia, prosthetists and orthotists have evolved independently of the engineering field and are a separate, self-regulated profession. This discussion paper does not advocate for engineers to supplant existing practitioners in any area of practice but seeks to identify relevant areas in which rehabilitation engineers may offer value as members of multi-disciplinary teams.

Appendix C provides insight into RE engagement in Australia that the NCRE is aware of.

Future Points for Discussion

This paper is intended to begin a conversation among existing rehabilitation engineers in Australia and prepare for engaging with people interested in a future career as a rehabilitation engineer. While there have been many effective individuals working in the field over the past few decades, the connections between professional rehabilitation engineers have been limited to small groups representing only a subset of the broader array of these individuals. The evolving AT ecosystem, and the increase in publicly available resources associated with the provision of AT, present an opportunity for rehabilitation engineers to connect and galvanise the RE profession. This begins by connecting the community and reaching agreement regarding:

- A definition for the profession in Australia; and,
- The scope of practice that will be adopted.

Future work to be undertaken will include:

- Defining discipline-specific key competencies;
- Developing a growth strategy and complement of tactics;
- Establishing an appropriate communication platform for the RE community;
- Establishing Special Interest Groups around role archetypes;
- Establishing Communities of Practice;
- Developing a stakeholder map;
- Raising awareness in industry and government;
- Developing discipline-specific tertiary education modules; and,
- Reviewing and strengthening regulation of RE profession

Appendix A

Rehabilitation Engineering, as a profession, has emerged independently in multiple countries across the world. In each location where RE has emerged, the local scope of practice primarily reflects the circumstances and drivers that gave rise to the profession forming as a distinct discipline.

In the United States, RE emerged from the largely government funded response to meet the rehabilitation needs of injured veterans. In their early years there was a strong focus on research and developing appropriate Assistive Technologies (including wheelchairs and prostheses) for veterans who, due to their injuries, had reduced options for employment and community engagement[1,2]. The significant level of investment in the US created a critical mass of engineering professionals interested in the same problems and practices around rehabilitation. This area of practice was recognised as distinct from other engineering disciplines and became recognised as the separate discipline of Rehabilitation Engineering.

In Australia, the role of the rehabilitation engineer has been linked to service provision in the health and disability sectors, with practitioners working in clinical and technical capacities, often as members of multi-disciplinary teams. As the profession in Australia has emerged more gradually than in other regions (such as the United States) it did not have as clear a moment of inception, nor the initial critical mass leading to the establishment of clear identity and scope of practice in the Australian context.

Table 2 lists regions for which information could be found in English, though it is likely that other regions also have an equivalent discipline for which no English language information is readily available. This table also contains the various national and international professional associations to which the local rehabilitation engineers are connected. As other professional associations become known, they will be included in the table.

The first professional association of rehabilitation engineers, the Rehabilitation Engineering Society of North America (RESNA), was formed in 1979. RESNA subsequently changed its name to the Rehabilitation Engineering and Assistive Technology Society of North America in recognition of the broader multidisciplinary approach that is typically used in this space. Many of the RE professional associations have their own specific definition for the title rehabilitation engineer and a local Scope of Practice covering the range of activities which local professional rehabilitation engineers are engaged in. A range of these local definitions are included in Table 3, the local Scopes of Practice can be found in Appendix B - Table 4.

[1] Reswick, J. B. (2002). **How and when did the rehabilitation engineering center program come into being?** J Rehabil Res Dev, 39(6, supplement), 11–16.

[2] Hobson, D. A. (2002). **Reflections on rehabilitation engineering history: Are there lessons to be learned?** J Rehabil Res Dev, 39(6, supplement), 17–22.

Table 2: Professional RE Associations from around the world

Locality	Discipline	Professional Associations
Australia	Rehabilitation Engineer	NCRE[3], ARATA (1993)[4]
United States of America	Rehabilitation Engineer	RESNA (1979)[5]
United Kingdom	Clinical Technologist: Rehabilitation Engineer	IPEM[6], RCT (2000)[7]
Japan	Rehabilitation Engineer	RESJA (1986)[8]
Korea	Rehabilitation Engineer	RESKO (2007)[9]
Hong Kong	Rehabilitation Engineer	JCREC[10]
Taiwan	Rehabilitation Engineer	TREATS (2011)[11]
Portugal	Engenharia de Reabilitação (Rehabilitation Engineer)	SUPERA (2006)[12]
Europe	Clinical Engineer: Rehabilitation Engineer	AAATE (1990)[13]
Internationally	Clinical Engineer: Rehabilitation Engineer	IFMBE[14], IEEE[15]

[3] https://www.engineersaustralia.org.au/Communities-And-Groups/National-Committees-And-Panels/Rehabilitation-Engineering (last accessed 20/09/19)
[4] https://www.arata.org.au/about-ARATA/history/ (last accessed 20/09/19)
[5] https://www.resna.org/about/history (last accessed (20/09/19)
[6] https://www.ipem.ac.uk/CareersJobs/WhatdoourmembersdoRehabilitationEngineeringandBiomechanics.aspx (last accessed 20/09/19)
[7] http://therct.org.uk/ (last accessed 20/09/19)
[8] https://www.resja.or.jp/english/index.html (last accessed 20/09/19)
[9] https://resko.jams.or.kr/co/locale.kci?lang=en_US (last accessed 20/09/19)
[10] https://www.polyu.edu.hk/bme/services/jockey-club-rehabilitation-engineering-clinic/ (last accessed 20/09/19)
[11] http://www.treats.org.tw/Intro.php?ID=59&Lang=2 (last accessed 20/09/19)
[12] http://supera.org.pt/ (last accessed 20/09/19)
[13] https://aaate.net/ (last accessed 20/09/19)
[14] International Federation of Medical and Biological Engineering: Clinical Engineering Division. http://cedglobal.org/definitions/ (last accessed 20/09/19)
[15] https://www.embs.org/about-biomedical-engineering/our-areas-of-research/rehabilitation-engineering/ (last accessed 20/09/19)

Table 3: Definitions of the Rehabilitation Engineer used by different professional associations from around the world.

Professional Association	Working definitions or descriptions
IFMBE: Clinical Engineering Division	A professional who ***is qualified by education and/or registration to practice engineering in the health care environment*** where technology is created, deployed, taught, regulated, managed or maintained ***related to health services***.[14]
RESNA	RE is the ***application of science and technology*** to ***improve the quality of life*** and ***increase independence*** for individuals with ***disabilities***. A rehabilitation engineer uses the ***innovative and methodical application of scientific knowledge and technology*** to ***design and develop*** a device, system or process, which is intended to satisfy the human ***needs of an individual with a disability***.[16]
RESJA	RE ***promotes the rehabilitation of persons with disabilities*** by examining problems ***related to engineering and technology*** useful in the field and ***cooperating with each other (collaborative)***.[17]
IEEE Engineering in Medicine and Biology Society.	RE is the ***application of science and technology to improve the quality of life for people with disabilities***.[15]
National Institutes of Health (USA)	Rehabilitation engineers ***design and build devices*** and systems to meet a wide range of needs that can ***assist individuals with mobility, communication, hearing, vision and cognition***. These tools help people with day-to-day activities related to employment, independent living and education. RE is the ***use of engineering principles*** to: 1) ***develop technological solutions*** and devices to ***assist individuals with disabilities*** and 2) ***aid the recovery of physical and cognitive functions*** lost because of disease or injury. [18]
Institute of Physics and Engineering in Medicine (UK)	RE is the ***clinical application of engineering*** to provide ***services, research, and development to assist people with disabilities***. In general, assistive devices are used as aids to mobility and communication.[6]
N.B.: Highlighted terms have been marked for this discussion paper, to indicate common features.	

[16] DiGiovine, C. et Al. (2015), "Rehabilitation engineers, Technologists, and Technicians: Vital Members of the Assistive Technology Team", *RESNA 2015 Annual Conference.* https://www.resna.org/sites/default/files/conference/2015/pdf_versions/public_policy/147.pdf (last accessed 20/09/19)

[17] https://www.resja.or.jp/english/index.html (last accessed 20/09/19)

[18] https://www.nibib.nih.gov/science-education/science-topics/rehabilitation-engineering (last accessed 20/09/19)

Appendix B

Several of the Professional Associations representing rehabilitation engineers in different locations have published the Scopes of Practice covering the activities of their members.

Table 4, below, provides a sample of published scopes of practice which could be found (some are translated from their original languages; where the direct translation was not clear the intention has been inferred from context).

Reviewing tables 4 and 5 it can be seen that there are regional differences relating to which key areas of practice are 'in-scope' for the discipline of RE. The table below indicates the regions for which each of the key areas of practice are explicitly indicated as being 'in-scope' as based on the referenced published information.

Table 4: Example scopes of practice for RE as published by professional associations from around the workd.

Source	Example scopes of practice for RE (within jurisdiction). (1 of 3)
IPEM Policy Statement: The Role of the Healthcare Professional in RE Services (UK) (2018)[19]	o Posture and Mobility (P&M) e.g. Wheelchair Services, Custom Seating and Postural Management o Electronic Assistive Technology (EAT) e.g. Specialist controls for powered mobility and alternative access to the computer and other technology o Augmentative and Alternative Communication (AAC) and Environmental Controls (EC) o Activities of Daily Living (ADL) o Functional Electrical Stimulation (FES) o Prosthetics and Orthotics (P&O) o Clinical Movement Analysis (CMA) o Telehealth and Telecare
NHS Health Careers Website (UK)[20]	o Special seating o Wheelchairs o Artificial limbs o Electronic communicators (such as speech synthesisers) o Robotic aids
NIH: National Institute of Biomedical Imaging and Bioengineering Website (USA)[21]	o Rehabilitation robotics o Virtual rehabilitation o Physical prosthetics o Advanced kinematics o Sensory prosthetics o Brain computer interfaces o Modulation of organ function o Secondary disorder treatment
Taiwan RE and Assistive Technology Society (Taiwan)[22]	o Information and Communication o Production and Government Cooperation o Clinical Services and Outreach o Academic education o Policy Promotion

19 https://www.ipem.ac.uk/Portals/0/Documents/Publications/Policy%20Statements/Rehabilitation%20Engineering%20Services%20The%20Role%20of%20the%20Healthcare%20Scientist%20in.pdf?ver=2018-02-13-112950-143 (last accessed 23/09/19)

20 https://www.healthcareers.nhs.uk/explore-roles/healthcare-science/roles-healthcare-science/physical-sciences-and-biomedical-engineering/rehabilitation-engineering (last accessed 23/09/19)

21 https://www.nibib.nih.gov/science-education/science-topics/rehabilitation-engineering (last accessed 23/09/19)

22 http://www.treats.org.tw/Intro_News.php?BID=7 (last accessed 24/09/19)

Source	Example scopes of practice for RE (within jurisdiction). (2 of 3)
RESNA RE Profession White Paper 2017 (USA)[23]	Activities including: o Customisation and integration of existing AT and rehabilitation technology o Research, development, design and production of devices o Analysis of human performance (including the application of quantitative and qualitative tools) o Education and training o Application of outcome measures throughout the AT service delivery process o Project management Within the following areas: ❖ Access and Communication Technology ❖ Cognition and sensory loss ❖ Emerging technologies ❖ Paediatrics ❖ Wheeled Mobility and Seating
RE and Assistive Technology (USA, from Szeto (2005))[24]	o Prosthetics and Orthotics o Assistive devices for persons with severe visual impairments o Assistive devices for persons with severe auditory impairments o Assistive devices for tactile impairments o Alternative and augmentative communication devices o Manipulation and mobility aids o Recreational assistive devices
Therapy Choices Website (Australia)[25]	o Biomechanics of movement o Design of specialised seating and mobility systems o Creating integrated technology solutions (e.g. wheelchairs with complex seating, respiratory support and computer control) o Transport solutions o Adapted or specially programmed computers, telephones or other ICT (including sensory systems) o Control by nerve or brain sensing systems o Speciality equipment, including for recreation (e.g. snow or water skis) o Technology standards o Researching, testing and helping commercialise new assistive technologies o Investigating when technology fails
Portuguese Society of RE, Assistive Technology and Accessibility (Portugal)[26]	o Accessibility o Support Technology Services o Research and Education o Healthcare

[23] https://www.resna.org/knowledge-center/position-papers-white-papers-and-provision-guides (last accessed 23/09/19)
[24] Szeto, A. Y. J. (2005), Rehabilitation engineering and Assistive Technology. Conference Proceedings
[25] https://web.archive.org/web/20190304182859/http://therapychoices.org.au/pages/rehabilitation-engineers.html (last accessed 24/09/19 - original website closed ~04/03/2019)
[26] http://supera.org.pt/grupos/ (last accessed 24/09/19)

Source	Example scopes of practice for RE (within jurisdiction). (3 of 3)
RE and Assistive Technology (USA, from Szeto (2005))[27]	o Prosthetics and Orthotics o Assistive devices for persons with severe visual impairments o Assistive devices for persons with severe auditory impairments o Assistive devices for tactile impairments o Alternative and augmentative communication devices o Manipulation and mobility aids o Recreational assistive devices
Engineers Australia: RE Brochure (2006) (Australia)[28]	o Research for the development and optimisation of technology o Suggesting commercially available devices o Modification of existing devices o Fabrication of a custom device or design a modification o Testing equipment for safety and compliance to Australian and International Standards o Assistance with job development o Suggesting work site modifications
RE Society of Korea (South Korea)[29]	o Standards o Research relating to rehabilitation and welfare engineering o Academic training o Rehabilitation welfare engineering

Table 5: Reported local RE activity in surveyed locations

Key areas of practice	UK	USA	Japan	S Korea	Taiwan	Portugal	Australia
Pressure, Posture and Mobility	✓	✓	✓		✓		✓
Electronic Assistive Technology	✓	✓					✓
Assistive Technologies for Activities of Daily Living (ADL)	✓	✓	✓	✓	✓	✓	✓
Clinical and Community Services	✓	✓	✓	✓	✓	✓	✓
Rehabilitation Robotics	✓	✓	✓				✓
Clinical Movement Analysis	✓	✓					✓
Augmentative and Alternative Communication (AAC) and Environmental Controls (EC)	✓	✓	✓		✓		✓
Accessibility and Home Modifications		✓	✓			✓	✓
Safety and Compliance		✓		✓	✓		✓
Academic Activities	✓	✓	✓	✓	✓	✓	✓
Prostheses and Orthoses	✓	✓	✓				✓

*"✓" indicates that an explicit reference for RE activity in each Key Area of Practice has been found for that region, the absence of a "✓" indicates that no such reference was found, not that the Area is deemed 'out-of-scope'.

[27] Szeto, A. Y. J. (2005), Rehabilitation engineering and Assistive Technology. Conference Proceedings

[28] https://www.engineersaustralia.org.au/sites/default/files/Learned%20Society/Rehabilitation%20Engineering%20Brochure.pdf (last accessed 24/09/19)

[29] https://resko.jams.or.kr/co/main/jmMain.kci (last accessed 24/09/19)

Appendix C

The table below provides a synopsis of current connected RE activity in Australia (this list does not include rehabilitation engineers working for equipment suppliers or in start-up companies):

Known RE Roles	Description of scope of practice for RE Roles
RE Centre: Royal Brisbane & Women's Hospital (Qld)[30,31]	o The provision of services in the identification of technology requirements of people with complex equipment needs o Development, design, manufacture, modification and/or customisation of AT solutions for clients with complex needs. o The provision of independent advice on rehabilitation tech solutions o The provision of education related to rehabilitation technology solutions o Participation in research and development in rehabilitation technology o Clinical pressure care assessment and custom pressure care cushions for at-risk clients o Advise on: ❖ Assistive Technology (AT) options ❖ Wheelchair prescription relating to clients with complex needs ❖ Wheelchair transportation and transportation safety for persons with a disability o Interpretation and application of Australian and international standards related to assistive technology o Inspection and evaluation services for Assistive Technologies (AT) o Engineering Assessment of AT
Medical Aid Subsidy Scheme (Qld)[32]	o High-level professional engineering services, o Authoritative advice relating to the equipment standards, repairs, maintenance, purchase and disposal of MASS equipment o Clinical, product and protocol/process expertise predominantly in the area of Equipment Services o Logistical direction and support associated with storage and supply of AT equipment o Advise on the impact of engineering factors on client outcomes to health practitioners over a range of disciplines state-wide, including the provision and facilitation of education, research and undertaking projects in accordance with MASS goals. o Monitor and report on clinical practices and outcomes within the clinical service area and actively participate in initiating, developing, implementing and leading as required quality and service improvement activities related to RE tasks that enhance the delivery of services by MASS. o Engineering Assessment of AT o AT Standards development
Flinders University: Assistive Technology & RE (SA)[33]	o Research and development of technologies to assist people with physical and cognitive disabilities, or social disadvantage. (Ranging from traditional assistive technologies to virtual reality assistive applications.)

[30] Position Description: Rehabilitation engineering – Team Lead (HP5) – Metro North Hospital and Health Service (QLD Health)
[31] https://metronorth.citizenspace.com/rbwh-rehab-engineering/rec-feedback/supporting_documents/REC%20Flyer.pdf (last accessed 24/09/19)
[32] Position Description: Medical Aids Subsidy Scheme (MASS) –Senior Engineer – Metro South Health Service (QLD Health)
[33] https://www.flinders.edu.au/medical-device-research-institute.html (last accessed 24/09/19)

Assistive Technology & Seating (NSW)[34]	o Clinical assessment and intervention for eligible clients in the areas of: ❖ Pressure management ❖ Postural support and control ❖ Comfort ❖ Functional capability o Wheelchair / mobility issues where: ❖ Clients fall or are at risk of falls from the chair & other safety issues ❖ Clients have problems operating or controlling the chair ❖ Seating or mobility equipment requires replacement ❖ Ventilation equipment will need to be attached to a wheelchair o Design, development and fabrication of custom AT to meet daily needs where no appropriate commercial solution exists o Temporary loan and maintenance of pressure management, seating and mobility equipment services o Engineering Assessment of AT
Rehabilitation Technology Unit (WA)[35,36]	o Patient assessment, prescription, design, manufacturing and service delivery in the areas of: ❖ wheelchair mobility (manual and electric) ❖ specialised control systems including integrated control, ❖ custom seating to assist posture and function ❖ postural seating and pressure management services ❖ Alternative and Augmentative communication ❖ Environmental Controls o Adaptation and provision of custom & commercially available equipment o Loan and maintenance of pressure management, seating and mobility equipment services to facilitate hospital discharge o Orthotic and prosthetic services o Design and development of custom AT o Engineering Assessment of AT o AT Standards development
NovitaTech (SA)[37]	o Engineering assessment, advice, prescription support and information regarding different types of assistive technology o Clinics where individuals can come along to be assessed and try out a large range of equipment from various suppliers rarely all found together in the same place. o Training and support using different types of assistive technology. o Access and Communication Technology Service (ACTS): specialised AT prescription support to therapists working with kids and adults. o Seating and Mobility: assessment, design and fabrication of custom solutions for clients with complex AT needs. o Orthotics: fabrication of a broad range of orthotic devices made to meet individual needs and maximize support and function. o NATA accredited Test Lab specialising in the testing of AT Equipment o AT Standards development
University of Wollongong: Biomedical Engineering (NSW)[38]	o Education and research in areas related to human movement biomechanics, rehabilitation robotics, assistive technologies for ADL, prosthetic and orthotic designs

[34] https://www.aci.health.nsw.gov.au/__data/assets/pdf_file/0003/312798/RD12.1_NSW_Spinal_Seating_Services.pdf (last accessed 24/09/19)
[35] https://emhs.health.wa.gov.au/Hospitals-and-Services/Services/HTMU/RTU (last accessed 24/09/19)
[36] http://spinalwa.org/well/fiona-stanley-hospital/ (last accessed 24/20/19)
[37] https://novitatech.com.au/equipment/assistive-technology-service-ats/ (last accessed 24/09/19)
[38] https://www.uow.edu.au/engineering-information-sciences/research/manufacturing/applied-mechatronics-biomedical-engineering/

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