

Statewide adult brain injury rehabilitation health service plan 2016- 2026

System, Policy and Planning Division

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Statewide adult brain injury rehabilitation health service plan 2016–2026

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Foreword

“Dubito, ergo cogito, ergo sum” – Rene Descartes

“I doubt, therefore I think, therefore I am”, Descartes believed that doubting is the proof of existence of one’s own mind, the thinking entity, which in turn is the proof of our own very existence.

More than any other bodily organ, our brain, the “thinking entity” helps define our very self, its activities forming the bridge between our material existence and a life of meaning and import.

Injuries to the brain, more than injuries to other organs, affect one’s life most profoundly in all its dimensions.

As rehabilitation health professionals, we are privileged to be involved in the life journey of our fellow human beings at their most desperate and vulnerable, and none more so than those whose lives are affected by acquired brain injury, for whom a comprehensive network of rehabilitation services not only prolongs survival, but restores function, dignity and significance.

The *Statewide adult brain injury rehabilitation health service plan 2016-2026* is a major step towards that valuable goal.



Dr Benjamin Chen
Co-Chair, Statewide Rehabilitation Clinical Network

Summary

Acquired brain injury is an umbrella term referring to multiple disabilities arising from damage to the brain acquired after birth and throughout life, often due to trauma. The effects of an acquired brain injury vary depending on the parts of the brain damaged. It can be devastating for the individual, the family and carers because it can alter the person's cognitive, behavioural, communication and physical capacity and cause changes to personality and emotional wellbeing. Recovery from brain injury is complex and, as a result, many people require a network of specialised resources in order to maximise their independence.⁽¹⁾

In collaboration with Hospital and Health Services, the Department of Health has developed a health service plan for specialised, adult brain injury rehabilitation services in Queensland. Widespread consultation has indicated the need for important changes to these services in order to meet growing demand and improve the quality and experience of services for adults in Queensland. As a result, the *Statewide adult brain injury rehabilitation health service plan 2016-2026* introduces a new, networked, service model for specialised, adult brain injury rehabilitation.

As the tertiary Brain Injury Rehabilitation Service, the Princess Alexandra Hospital, Metro South Hospital and Health Service, will provide highly specialised services, across the care continuum, for Queensland adults with an acquired brain injury of the highest complexity. Admission to the tertiary service will be guided by prioritisation and admission criteria to enable equitable access regardless of where a person lives.

Two new, evidence-based, service components will be integrated into the existing brain injury care continuum:

- a formalised in-reach service providing early and intensive brain injury rehabilitation to acute patients at the Princess Alexandra Hospital and progressively, over the long-term, at specialised hub hospitals, to optimise the functional outcomes of Queensland patients
- a transitional rehabilitation service, providing specialised intensive rehabilitation in a contextually relevant environment (i.e. home or home-like setting) focussing on community integration, enhanced functional outcomes and a return to a meaningful and productive life.

In recognition of growing demand, developing capability and psychosocial benefits associated with treatment close to home, additional brain injury rehabilitation hub services will be developed at Townsville, Metro North, Sunshine Coast and Gold Coast Hospital and Health Services and networked with the tertiary service. Hubs will progressively replicate some components of the care continuum delivered by the Princess Alexandra Hospital as local demand and service sustainability dictates. This will improve access to, and the quality of, specialised brain injury rehabilitation for Queenslanders closer to home, closer to family support and closer to the communities within which they live.

Establishment of all proposed services will take time. It will rely upon incremental growth in workforce, service capability and upon support from the specialised tertiary service to enable the development of standardised high quality service provision. A successful service model will also require integration and collaboration with interrelated health services including general rehabilitation, mental health and other services delivered by non-government and private providers. Collaboration with other government agencies (such as disability and

housing), research organisations and brain injury information and support services will be critical to realising the statewide plan.

Hospital and Health Services, supported by the tertiary service, the Statewide Rehabilitation Clinical Network and a Clinical Advisory Group, will drive the changing service model and foster quality service provision. Successful implementation of this model has the potential to realise significant improvements to specialised services across Queensland and make a real difference to people with a brain injury by maximising each person's rehabilitation potential to return to an independent, fulfilling and productive life.



Brain Injury Rehabilitation

Queensland Snapshot



FUTURE PLAN



A network of specialised brain injury rehabilitation services comprising of a tertiary service and four hub services will provide care across Queensland. The specialised tertiary service at the Princess Alexandra Hospital will provide care to Queenslanders with complex needs and will lead standardisation, quality, resource development, research, monitoring, reporting and staff education.

CURRENT STATE

Specialised inpatient activity¹

(5 year average 2008-09 to 2012-13 specialised rehabilitation activity at the Princess Alexandra Hospital)

47%

Metro South residents receiving specialised care

16%

Metro North residents receiving specialised care

Less than 10%

proportion of residents receiving specialised care from each remaining Queensland HHS

18% INCREASE

Prevalence rates³

(2003)



2.5%

in people aged under 65



1.8%

in people aged under 65

Brain injury rehabilitation activity¹

(5 year average between 2008-09 to 2012-13)



53% Princess Alexandra Hospital

13% The Townsville Hospital

12% Royal Brisbane and Women's Hospital

9% Gold Coast University Hospital

Outreach services²

(5 year average between 2008-09 to 2012-13)

75%

of clients resided in South East Queensland

25%

of all other clients resided outside the South East Queensland corner



Sources:

1. Queensland Hospital Admitted Patient Data Collection, extracted June 2015
2. Acquired Brain Injury Outreach Service activity summary data 2008-2013
3. Australian Institute of Health and Welfare 2007. Disability in Australia: Acquired brain injury. Bulletin no. 55. Cat no. AUS 96. Canberra: AIHW.



1. Introduction

The Queensland Statewide Brain Injury Rehabilitation Service (BIRS), based at Princess Alexandra Hospital (PAH), has evolved over 25 years in response to clinical service demand and provision, independent of strategic health service planning. In 2013, Metro South Hospital and Health Service (Metro South HHS) undertook partial planning for the BIRS.^(2,3) Following a request from Metro South HHS, the Department of Health (the Department) undertook comprehensive planning in recognition of growing demand for adult specialised brain injury rehabilitation services and emerging evidence regarding quality approaches to brain injury rehabilitation.

The *Statewide brain injury rehabilitation health service plan 2016-2026* (the Plan) introduces a revised statewide service model to improve the quality of, and access to, brain injury rehabilitation services for adult Queenslanders across the continuum. Broadly the service model includes:

- Provision of highly specialised tertiary services across the care continuum (acute to community) for adults with an acquired brain injury (ABI) of the highest complexity at the PAH, Metro South HHS.
- Provision of specialised, post-acute inpatient and community services to adults with an ABI of moderate to high complexity at Townsville, Metro North, Sunshine Coast and Gold Coast Hospital and Health Services (HHS).

This service model provides the basis for future service development and, coupled with other recommended changes, will enable people to receive high quality care closer to home and closer to their usual support networks.

1.1 Planning principles

The Plan provides direction to enable HHS to plan and implement brain injury rehabilitation service modifications and enhancements over the next ten years. Ongoing engagement and collaboration with the full range of service providers, including those beyond the realms of health, will be necessary to enable the objectives of the Plan to be met. Consultation confirms that high quality brain injury rehabilitation services are provided:

- as early, intensively and holistically as possible
- through continuity of service provider across the patient journey and seamless transfer across facilities and services
- equitably to all Queenslanders
- in the hospital that will best meet the patient's clinical and psychosocial needs, but as close to home as possible
- in the community wherever possible, so that rehabilitation is relevant to the person's living arrangements
- using multidisciplinary teams with an interdisciplinary ethos
- ensuring integration of psychosocial and mental health care from admission, for both patient and family

- in recognition of the cultural beliefs and socio-economic circumstances of individuals and their families, and
- in recognition of the broad spectrum of severity and life-long needs.

1.2 Scope

The Plan applies to publically funded service provision of specialised brain injury rehabilitation health services for Queensland adults aged 16 to 70 years of age with an ABI. Adults from Northern New South Wales (NSW) with an ABI are also included as they may receive services as part of cross border arrangements for patient care.

For the purposes of this Plan, ABI includes people who have:

- sustained a traumatic brain injury with motor and/or cognitive disorder secondary to brain trauma (e.g. motor vehicle accident, fall), or
- a non-traumatic brain injury caused by neoplasm including metastases (i.e. brain tumours), encephalitis or meningitis (i.e. infection), inflammation, anoxia/hypoxia (e.g. near drowning, drug overdoses), metabolic/other toxicity (build-up of harmful toxins in the brain due to disease/other e.g. alcohol) and severe intracerebral haemorrhage with a global (rather than focal) impact.

People with moderate to severe ABI are the primary focus of the Plan as this group typically benefits most from specialised services across the care continuum. However, two other cohorts—people with a mild traumatic brain injury (mTBI) and people with an extremely severe ABI are also accounted for in the Plan as they may benefit from specialised services at various points in their recovery.

Section 5 outlines services, across the care continuum, included in the scope of this Plan with additional detail about these services in Appendix 1. In summary, brain injury rehabilitation services include:

- specialised inpatient brain injury rehabilitation:
 - in-reach/early rehabilitation (acute patients in the acute setting)
 - specialised post-acute brain injury rehabilitation (sub-acute patients in a dedicated rehabilitation unit)
 - slow-to-recover rehabilitation (sub-acute patients in a long-term rehabilitation environment)
- specialised transitional rehabilitation (community rehabilitation in the home or home-like setting)
- specialised hospital ambulatory brain injury rehabilitation:
 - admitted day hospital (same day admission and discharge) rehabilitation service
 - specific outpatient consultation and rehabilitation service for people with an ABI
- specialised community rehabilitation:
 - services to facilitate community integration
 - training and consultancy for people with an ABI residing in the community, their families and carers and other service providers.

1.3 Scope exclusions

Due to the age parameters of the Plan, and care required, brain injury due to congenital or neonatal brain damage and degenerative or genetically predisposed conditions are excluded from the Plan. The Plan does not include rehabilitation for head injuries without injury to the brain.

The Plan does not address the specific issues associated with specialised brain injury rehabilitation services for:

- children (0 to 18 years of age)¹ which will be considered as part of planning for paediatric services for the state including the issue of transitioning adolescents from children to adult services.
- older adults (above 70 years of age) with an ABI which will be considered as part of statewide planning for older persons in which the general needs of older people in public health facilities will be addressed.
- patients with a dual diagnosis—mental health and ABI dual diagnosis unit planning is part of mental health planning although mental health services, integral to the specialised brain injury rehabilitation service system, are considered.
- acute services (including care in Intensive Care Units), general inpatient services, general community-based services, slow-to-recover rehabilitation (stand-alone units) and residential care referred to, or accessed by people with an ABI. However, the interrelationship with specialised services is articulated and considered.
- private and/or non-government, community, disability and housing services and primary health care services, although linkages with these services have been considered.

This is a high-level, strategic, health service plan. The development of specific tools including guidelines, clinical pathways, models of care, standards, procedures and protocols associated with brain injury rehabilitation will be developed as a part of implementation planning, undertaken by the relevant HHS.

1.4 Methodology and governance

A standardised methodology was used to develop the Plan including analysis and review of literature, service needs and issues (identified through consultation), data, service models and future service demand. This process resulted in several background papers, (reviewed by the Project Steering Committee (PSC), Clinical Advisory Group (CAG) and HHS planning representatives) which informed the development of a service model and a draft Plan endorsed by the PSC. A summary of information supporting the Plan including policy context, a review of current literature and an overview of the governance process is provided at Appendix 2. Current and projected future service activity for specialised brain injury rehabilitation services is detailed in Appendix 3. Background papers are available internally from the Department at: <http://qheps.health.qld.gov.au>.

¹ Children aged 15-18 are included in activity analysis associated with this plan

1.5 Consultation

Consulting with stakeholders was integral to the development of the Plan. Stakeholder engagement was undertaken:

- on an ongoing basis with key stakeholders as determined by the project team in line with project requirements, and
- more formally in a targeted consultation process to capture the views of stakeholders at key scheduled milestones.

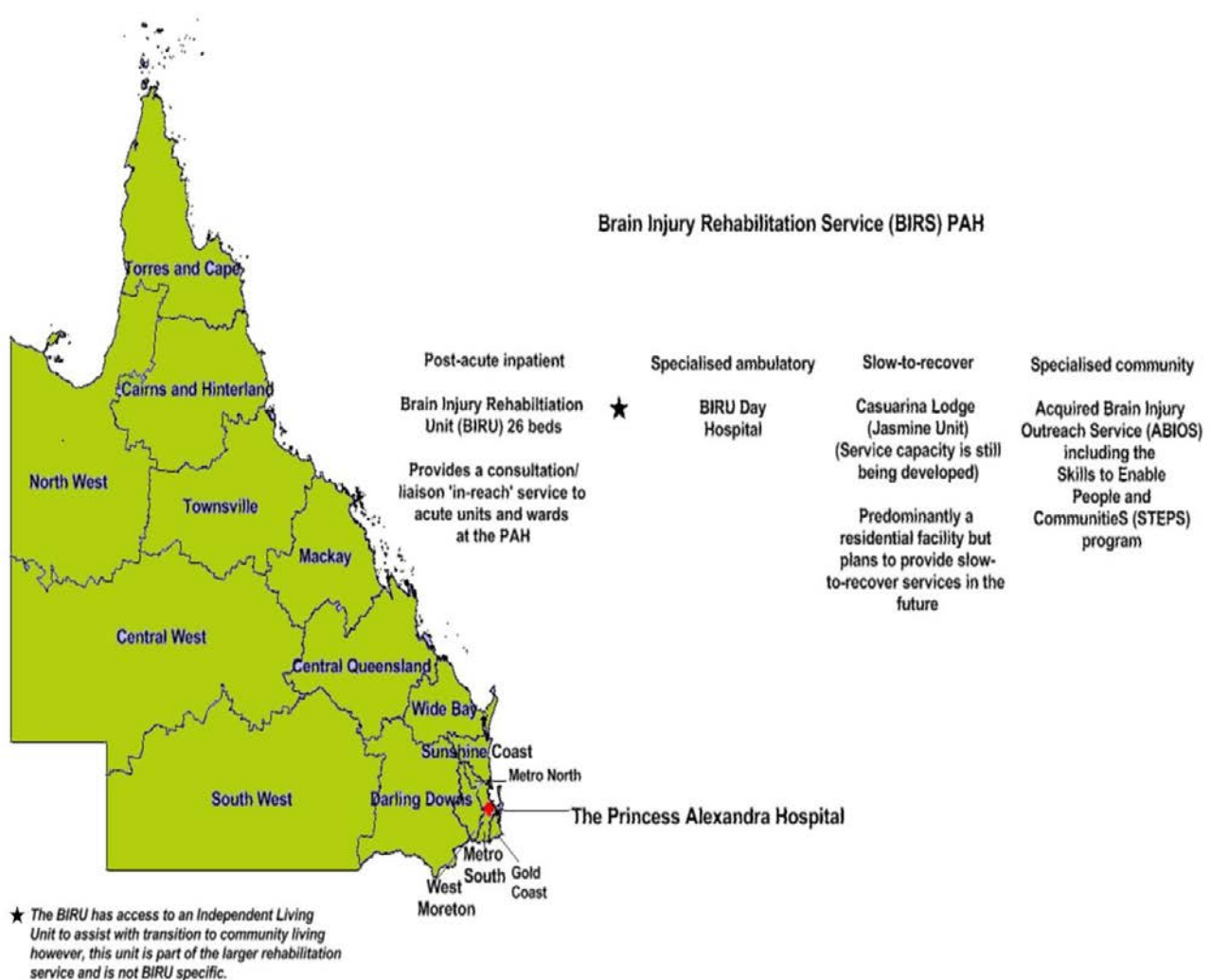
Consultation allowed key stakeholders to validate quantitative data collected during the planning process, confirm identified service needs and issues relating to the delivery of statewide brain injury rehabilitation services (Appendix 4) and review the options provided on the future configuration of services. Appendix 5 provides a list of stakeholders.

2. Current brain injury services in Queensland

2.1 Current services

In Queensland, specialised brain injury rehabilitation services across the continuum are provided by Queensland Health on a statewide basis through the BIRS at the PAH with governance provided by Metro South HHS (figure 1). Other HHS may provide brain injury rehabilitation in general, neuro-rehabilitation or multispecialty units. The provision of generalist services to patients with a brain injury and the role of these units within the new statewide model are described in section 6.

Figure 1 Current specialised brain injury rehabilitation service care continuum



2.2 Summary of needs and issues in the current provision of BIR services

Broad consultation, activity analysis and evidence reviews identified a number of key issues confirming constraints in the current service model which were summarised through thematic analysis and outlined below:

System, communication and coordination issues

- Need for overarching system governance.
- Need for improved coordination, communication and collaboration between service providers.
- Need for increased information sharing, both patient-related and knowledge-based.
- Limited standardised systems and processes, including coding of activity and data collection.
- Confusion regarding funding models and mechanisms.

Access

- Limited access due to centralised inpatient service, growing demand and limited specialist services at all stages of the care continuum.
- Limited reach of specialised community services for long-term support, especially case management.
- Specific access issues around cultural and minority groups, dual diagnosis (e.g. people with a spinal injury and ABI or mental illness and ABI), adolescents transitioning from paediatric to adult services and difficulties accessing adequate mental health services.
- Issues with respect to the provision of services to older people who may benefit from intensive rehabilitation.

Clinical

- Need to improve early intervention and early transfer to specialised services.
- A need to realise the commitment to holistic care by increasing attention to psychosocial, cognitive and behavioural issues as well as improving physical function.
- Gaps in service provision at each end of the brain injury severity spectrum i.e. for mTBI and for those people requiring prolonged intensive rehabilitation.
- Need to improve life-long rehabilitation and community support.
- Need for clear admission criteria for complex patients.

Transition and Community

- No formal transitional rehabilitation program to support early discharge, assist people with psychosocial adjustment and increase the chance of successful community reintegration.
- Minimal community rehabilitation including support for independent living and for accessing driving and vocational and training opportunities.
- Difficulties accessing appropriate accommodation inhibiting discharge or leading to inappropriate placement (e.g. in aged care).

- Limited, skilled health care practitioners to provide community and primary care based ongoing rehabilitation and support, especially in regional, rural and remote.
- A need to improve availability of technology to overcome lack of access in rural and remote areas via telehealth options.

3. Service Directions

The following four service directions provide a common vision for the future provision of specialised brain injury rehabilitation services. They build upon current successes to develop a coordinated, integrated system between the tertiary BIRS and specialised hub services, seeking continuous improvement in access and equity of services, quality service delivery and capability.

3.1 Service Direction 1 Coordination

Develop and promote integrated and coordinated specialised brain injury rehabilitation services across the care continuum.

Services will be efficiently and effectively integrated, both within and external to Queensland Health, across the care continuum. Tools, processes and resources will be developed to support the formal networking of services. System governance arrangements will be developed to oversee and guide the development of brain injury rehabilitation services in Queensland.

3.2 Service Direction 2 Access

Improve access to specialised brain injury rehabilitation services across the care continuum to increase equity for all Queensland adults no matter where they live.

A network of specialised hub services and the tertiary BIRS will explore opportunities to improve access to specialised brain injury rehabilitation services, taking into consideration the diverse cultural needs of individuals and their families and carers across the continuum. Special consideration will be given to increase service access and equity to rural, remote and regional communities.

3.3 Service Direction 3 Quality

Deliver quality specialised brain injury rehabilitation services underpinned by evidence-based systems and processes to deliver measurable outcomes.

The tertiary BIRS will establish minimum standards for the way specialised brain injury rehabilitation care is delivered across Queensland within specialised services and for adults with an ABI using general rehabilitation services. There will also be a responsibility to monitor new and emerging evidence and lead the development of a consistent data system to deliver a new level of accountability that can monitor performance over time.

3.4 Service Direction 4 Capability

Grow health service capacity and capability including essential infrastructure, workforce and data systems while growing the knowledge capability of people with an ABI and the broader community.

The tertiary BIRS will provide consultation and liaison services and continue to develop and promote educational resources to assist individuals and their families/carers, HHS staff and other health care providers (where appropriate). Innovative training methods will encourage continual skills improvement in the management of people with an ABI and include staff rotations, telehealth/videoconferencing in addition to formal training opportunities.

4. Overview of future service model

The future brain injury rehabilitation service model is designed to achieve maximum recovery, function and community re-integration for people across Queensland, as close to home as possible, through an integrated service system (figures 2 and 3). Table 1 details the range of services provided by each HHS. The timing of service growth and development for each HHS will be largely dictated by future service demand and service sustainability. Ongoing evaluation of service activity, capability and resourcing will be necessary to ensure services are sustainable. Section 5 details the specific care continuum components of the service model. The role of interrelated services is in section 6.

Figure 2 Future statewide brain injury rehabilitation service model



Key

PAH	Catchment 1: Statewide catchment	Catchment 2: Local resident catchment: Metro South, South West, West Moreton, Darling Downs residents.
TTH	Local resident catchment: Torres and Cape, Cairns and Hinterland, Townsville, North West, Mackay and Central West residents	
RBWH	Local resident catchment: Central Queensland and Metro North residents however: <ul style="list-style-type: none"> – in the short-term this may include Sunshine Coast and Wide Bay residents until capability is developed at the SCUH – PAH local residents with less complex needs may be referred to the RBWH (once capability is established) if demand for high complex statewide services affects bed availability at the PAH. 	
SCUH	Local resident catchment: Sunshine Coast and Wide Bay residents	
GCUH	Local resident catchment: Gold Coast & Northern NSW residents (post-acute services)	

Figure 3 Brain injury rehabilitation services and resident catchments

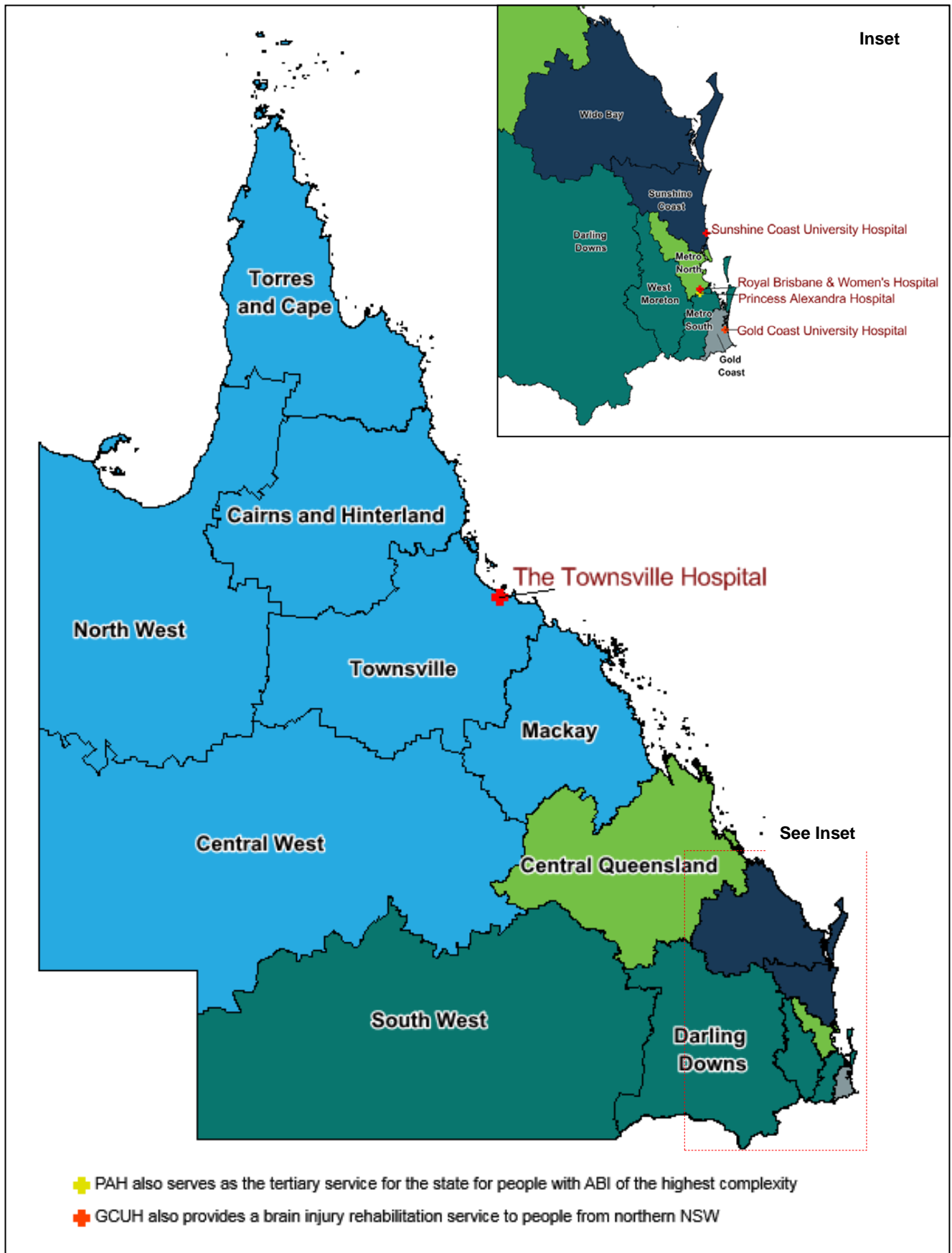


Table 1 New model service characteristics, roles and catchments

System oversight		
Clinical and system governance across multiple HHS, is challenging within the context of HHS as independent statutory bodies. The success of the new model is largely dependent on statewide collaboration and coordination to drive quality improvements and enable consistency, effectiveness and efficiency. While the tertiary service will be responsible for developing supportive documentation (e.g. clinical pathways, policies) and each HHS will be responsible for local clinical governance, it is recommended that a Clinical Advisory Group (CAG) be established, acting as a sub-group of the Statewide Rehabilitation Clinical Network (SRbCN). This group may operate in a similar manner to the NSW Brain Injury Rehabilitation Directorate (BIRD) but will need to develop Terms of Reference in consultation with specialised service providers and the SRbCN.		
Rehabilitation service characteristics	Service role	Service catchment
Tertiary service: Princess Alexandra Hospital, Metro South Hospital and Health Service		
<ul style="list-style-type: none"> • in-reach (acute) • post-acute • specialised transitional • specialised ambulatory (including complex multidisciplinary day-only treatment, subspecialist outpatient clinics and specialist community programs) • specialised community. 	<ul style="list-style-type: none"> • specialised brain injury rehabilitation services across the continuum to all Queensland adults with the highest complexity physical, cognitive and behavioural needs where clinicians determine patient need is best met by the tertiary service. • specialised brain injury rehabilitation services, across the continuum, to adults within the local resident catchment with moderate to high complex needs. • designated secure brain injury rehabilitation unit with dedicated multidisciplinary team aligning with Australasian Faculty of Rehabilitation Medicine (AFRM) standards for Traumatic Brain Injury (TBI).^(4, 5) • statewide lead: <ul style="list-style-type: none"> – in standardisation including data collection, care pathways, guidelines, resource development, monitoring, reporting and staff education/training and – for consultation, liaison and training and the development of standardised resources for specialised community rehabilitation services. 	<p>Statewide catchment <i>and</i> Local resident catchment:</p> <ul style="list-style-type: none"> • Metro South • South West • West Moreton • Darling Downs.
Hub services: Townsville, Metro North, Sunshine Coast and Gold Coast HHS		
<ul style="list-style-type: none"> • specialised post-acute and community services. 	<ul style="list-style-type: none"> • specialised, post-acute inpatient brain injury rehabilitation for adults with moderate to high complex needs including people with a prolonged recovery. • multidisciplinary team with advanced knowledge and skills in the delivery of brain injury rehabilitation including allied health numbers aligning with the AFRM standards for rehabilitation for TBI.⁽⁴⁾ • a step-down service from the tertiary service. • specialised community rehabilitation. • future infrastructure that is developed should be secure. 	<p>Townsville HHS (Torres and Cape, Cairns and Hinterland, Townsville, North West, Mackay and Central West).</p> <p>Metro North HHS (Central Queensland and Metro North).</p> <p>Sunshine Coast HHS (Sunshine Coast and Wide Bay).</p> <p>Gold Coast HHS (Gold Coast and Northern NSW).</p>

5. Specialised brain injury rehabilitation care continuum

Standard elements across the care continuum including in-reach, post-acute in-patient, transitional, ambulatory and community rehabilitation are supported by stakeholder feedback and peer-reviewed literature. Adults with an ABI may use one, several or all services listed below at different points in their recovery. Each service will need to identify mechanisms to facilitate patient transition across services and settings to provide one seamless service.

5.1 Post-acute specialised services

In-reach (early) rehabilitation

Definition/rationale: In-reach or early rehabilitation occurs prior to specialised (post-acute) inpatient rehabilitation in the acute setting.

International studies support early brain injury rehabilitation in the acute phase following severe traumatic brain injury to optimise patient outcomes.^(6,7,8,9) Studies indicate that early (acute) rehabilitation may also speed up the recovery process, leading to shorter hospital lengths of stay.⁽⁶⁾



Current service: Consultation/liaison is provided to clinicians in acute units/wards to provide early rehabilitation interventions to acute patients to help reduce impairments and prevent secondary complications.

Future service:

Tertiary Service: Over time, the tertiary service PAH will develop a multidisciplinary, rehabilitation, in-reach service to acute patients with an ABI at the PAH^b to commence specialised rehabilitation as early as possible, in consultation with the acute treating team. The tertiary service will develop evidence-based guidelines for the provision of early rehabilitation to ensure alignment with best practice.

The PAH will progressively provide a consultation/liaison in-reach service, including via remote mechanisms where appropriate (i.e. telerehabilitation), to smaller hospitals within the local brain injury rehabilitation catchment.

Hub services: Beyond the timeframe of the Plan, the specialised hubs will progressively replicate the in-reach service provided at the PAH, including a consultation/liaison service to smaller hospitals within their respective brain injury catchments, as local services and workforce capacity allow. All networked hospitals will need to develop clear guidelines and lines of communication with respect to in-reach service utilisation.

^b As deemed clinically appropriate by treating clinicians.

Specialised (post-acute) inpatient rehabilitation

Definition/rationale: Post-acute rehabilitation is provided by a specialised multidisciplinary team in a dedicated unit or area, focussed on recovery of basic functions such as mobility, communication, cognition and activities of daily living.⁽¹⁰⁾ Rehabilitation delivered by a specialised multidisciplinary team can result in decreased length of stay in hospital, greater functional outcomes, higher rates of survival and higher likelihood of returning to work.^(11,12)



The AFRM guidelines⁽⁴⁾ recommend rehabilitation occur for a minimum three hours a day, five days per week, recognising that some patients may be unable to tolerate this level of rehabilitation and/or have limited capacity to participate.

Current service: The PAH is the only Queensland hospital providing inpatient, post-acute brain injury rehabilitation in a specialised, dedicated unit, although data shows capability is developing in other HHS to meet local demand.

The Jacana ABI Service, located within Metro North Hospital and Health Service (Metro North HHS) has approximately nine beds designated for specialised post-acute, multidisciplinary, goal-focussed and time-limited services to people with an ABI. These services are typically provided to patients who are slow-to-recover, in what was historically a residential care facility.^c

Future service:

Tertiary service: BIRU, PAH will remain the statewide specialised rehabilitation inpatient unit for Queensland. This service will have two catchments including:

- a statewide catchment for adults with ABI of the highest complexity (physical, cognitive and behavioural), and
- a local resident catchment for patients with a moderate/high complex ABI requiring specialised rehabilitation.

To guide and expedite timely admission to BIRU, the tertiary service will develop:

- a central, statewide, intake register, accessible to all Queensland hospitals, with relevant information (e.g. bed availability, current wait list and expected wait time) to inform referring clinicians and decisions regarding alternate pathways, and
- admission and prioritisation criteria to underpin referrals to the tertiary service.

The tertiary service (BIRU) will provide a post-acute consultation/liaison service to hub hospitals particularly as hub capability is developed.

^cJacana ABI Unit is a 36 bed unit, predominantly providing maintenance/residential care services for people with an ABI.

Hub services: Specialised hub services at the Townsville, Metro North, Sunshine Coast University and Gold Coast University hospitals will develop multidisciplinary team capability to provide specialised, post-acute, inpatient rehabilitation to residents with a moderate to high complex ABI. Activity growth will be incremental as hub capability is developed, recognising that significant capability already exists.

Hub hospitals will also provide a step-down service (from the tertiary service) to provide rehabilitation closer to home and closer to usual support networks. Beyond the remit of the plan, Jacana ABI Unit will need to undertake local planning to determine the future service model.

To guide inpatient referral to hub hospitals, clear admission criteria and guiding principles will be developed in consultation with the tertiary service. However, referrals and admissions will ultimately be at the discretion of treating clinicians supported by measurable criteria.

Additional considerations:

Decisions regarding alignment with any existing stroke services must be made at a local level. Residents from Northern NSW admitted to BIRU (PAH) should be linked with their local (NSW) community specialist rehabilitation service.^(d)

Slow-to-recover services

Definition/rationale: Some patients with a severe ABI may be capable of functional recovery months to years after injury and are not suitable for time-limited, post-acute rehabilitation programs⁽¹³⁾. These services are commonly called slow-to-recover or slow stream services and are typically provided in longer-term, residential-type facilities.

A high percentage of patients who require slow-to-recover rehabilitation are young adults who are likely to go on to require lifetime care.⁽¹³⁾ It is expected that lifetime care will be provided by disability service providers as a part of the National Disability Insurance Scheme (NDIS) and is not in the Plan's scope (see *Lifetime care* below).

There is a smaller proportion of slow-to-recover patients who have the possibility of future functional recovery with an associated decrease in the ongoing costs associated with long-term rehabilitation.⁽¹⁴⁾

Current service: Casuarina Lodge (Jasmine Unit) located at Wynnum and under the governance of the Division of Rehabilitation at the PAH, has predominantly operated as a residential facility for people with a severe ABI.

Tertiary service: Beyond the remit of the Plan, the tertiary BIRS is undertaking local planning work to determine the future service model for Casuarina Lodge (Jasmine Unit) as part of the specialised tertiary BIRS continuum, in line with the statewide model.

Hub services: Hubs should aim to provide services for people requiring extended rehabilitation either by utilising dedicated, specialised brain injury rehabilitation beds or via

^dThe NSW Brain Injury Rehabilitation Directorate (BIRD) has a northern NSW community service (North Coast Brain Injury Rehabilitation Service) providing outreach services to people residing in the Northern NSW Local Health Districts.

other appropriate mechanisms dependent on local need. Timely access to medical/specialist services, if services are not co-located, will need to be considered when HHS undertake local planning.

Tertiary and hub services: Early transition planning/discharge pathways will be required, following inpatient admission, to support minimal delays and seamless transition to ongoing community care to community services (e.g. disability, housing, mental health, community nursing). This should be undertaken with reference to changes associated with NDIS implementation.

Lifetime care (out-of-scope)

The slow-to-recover patient cohort is likely to be high users of disability support and disability housing expected to be provided via the NDIS or aged care sector. Longer-term community care options (i.e. residential care, long-term medical/allied health care, disability support, mental health) are likely to be required following patient discharge from post-acute services.

There is a current shortage of longer-term housing and disability support options available in Queensland and it is unclear whether implementation of current policies will increase accessibility (i.e. the NDIS or National Injury Insurance Scheme–NIIS). Current shortages affect Queensland Health’s ability to discharge patients in a timely way. Interagency collaboration with government agencies (i.e. housing, disability) will need to be strengthened to continue to highlight the lack of community discharge options and to ensure all government agencies involved in the care of people with an ABI operate seamlessly.

Health service providers and the SRbCN will need to stay abreast of changes associated with the NDIS and the NIIS to identify impacts on service provision, patients and funding opportunities (e.g. lifetime care for catastrophic injuries).

5.2 Transitional rehabilitation services

Definition/rationale: It is widely recognised that the transition from hospital to home is a critical phase of the brain injury rehabilitation continuum and this has been the subject of significant research over the past five years. During this phase individuals and their families begin the process of adjustment and adaptation to living with the impact of an ABI in their home and community.⁽¹⁵⁾



Transitional rehabilitation bridges the gap between inpatient services and the home/community via the provision of intensive short-term, time-limited rehabilitation and acknowledges the pivotal role of families and carers. Provided in the home or home-like environment, rehabilitation allows patients to continue the process of ‘retraining’ in the activities of daily living in contextually relevant setting.

Current service: There is no specific, specialised, transitional rehabilitation service for people with an ABI, although community rehabilitation may be provided relatively intensively in the early stages following discharge.

Future service:

Tertiary service: Over five years, the tertiary BIRS will pilot an evidence-based, specialised transitional rehabilitation service as part of the BIRS service continuum. The pilot will be funded by the Motor Accident Insurance Commission (MAIC) and evaluated on completion.

The purpose of the service will be to facilitate early integration outcomes, including resumption of meaningful life roles, community participation and vocational outcomes. Other patient and system benefits include reduction in inpatient length of stay, a clear community referral pathway, improved continuity between inpatient and community care, the provision of intensive therapy services (e.g. physiotherapy, occupational therapy, speech pathology, exercise physiology, social work, psychology) and prevention of mental health co-morbidities in the community.⁽¹⁵⁾

The exact model of care will be determined by the tertiary BIRS in line with best practice but it is expected to be provided intensively (i.e. 3-4 days a week) following discharge from BIRU, for approximately 8-12 weeks. Transition care will be provided in the home, or home-like environment depending on where the person lives.

Hub services: In the long-term (beyond the Plan's timeframe), specialised transitional services may be developed at hubs in line with available expertise and resources and with due consideration to adequate demand to support sustainability. Any future services should be based on the model of care developed by the tertiary BIRS with evidence-based, local variation as required.

Additional considerations:

Tertiary and hub services: The Plan recommends that, where possible, services provide a combination of home-based and centre-based transitional services. Opportunities may exist to pool resources (i.e. infrastructure) with other transition services (i.e. spinal Transitional Rehabilitation Program) in Townsville HHS. These opportunities will be considered during the Plan's implementation.

5.3 Specialised ambulatory rehabilitation (outpatient and same day inpatient)

Definition/rationale: Same day inpatient rehabilitation services (or hospital day rehabilitation) provide specialised hospital-based rehabilitation treatments to individuals who reside in the community and require specific specialised medical, nursing and allied health specialities (i.e. physiotherapy, occupational therapy, psychology/neuropsychology, social work speech pathology) therapies to improve function and quality of life. People using same day ambulatory hospital services are overseen by a multidisciplinary team and may be referred to multiple or single specialities for a time-limited period. Same day inpatient rehabilitation is usually goal-orientated and time-limited.



Current service: The BIRU Day Hospital is the only ambulatory service specialising in ABI in Queensland. People accessing these services may be admitted to the Day Hospital (same day inpatient) or treated as an outpatient (non-admitted). BIRU refers discharged patients to the Day Hospital for review appointments, to monitor progress with recovery and to advise of future rehabilitation managements. Other Queensland residents, who did not receive inpatient rehabilitation at BIRU, may be referred to the Day Hospital for assessment and management as clinically appropriate.

Future service:

Tertiary service: The BIRU Day Hospital will remain the specialised ambulatory service for Queensland, providing same day inpatient and outpatient services. Introduction of the specialised transitional service may reduce service pressures at the PAH Day Hospital via the provision of community-based therapies. While the exact impacts on Day Hospital service is unknown, it is recommended that this service be reviewed following the operationalisation of the transition service to explore any service duplications and create service efficiencies.

Hub services: Hub sites will grow specialised ambulatory capability (outpatient services) depending on local need.

Additional considerations/recommendations: Ongoing local planning will be necessary to ensure the BIRU Day Hospital can adequately cater for ambulatory demand. Collaboration with hubs will be necessary as hub capability and capacity grows.

5.4 Specialised community services

Definition/rationale: Specialised community services for ABI vary across national and international jurisdictions using case management models or a combination of approaches generally focussed on social rehabilitation goals, such as integration and participation.

Current service: The current Queensland service uses a multipronged approach to enhance quality of life and community integration for people with an ABI. Approaches include specific rehabilitation interventions, case management, training and consultancy and the development of local network groups. Work readiness pre-vocational support has also been integrated into the ABIOS model.



Direct client services are provided to residents within a 150-kilometre radius of the statewide inpatient service by the ABI Outreach Service (ABIOS). ABIOS also provides the Skills to Enable People and Communities (STEPS) program in local communities across Queensland. This is a six-week facilitated information and skill-based, self-management program for people with an ABI, family and carers. Following program completion, participants may choose to form a local STEPS Network Group. Each local network group determines the activities they undertake, such as social outings and/or meetings to discuss particular topic areas.

Future service:

Tertiary service: ABIOS, PAH will have three main roles including:

1. specialised community services (i.e. specific rehabilitation interventions, case management, training and consultancy, work readiness pre-vocational support and local network group development) for residents within the local catchment (Metro South, South West, West Moreton and Darling Downs).
2. statewide lead in consultation/liaison and training. This will include capacity building of staff within hub HHS in Community-Based Rehabilitation Teams (CBRTs) and existing Stroke Care Teams across Queensland.
3. the development of standardised resources for specialised community services.

Hub service: In the short to medium-term, additional specialised community services will be established at hub HHS. Services will be designed around the ABIOS service model, with locally appropriate evidence-based variation as required.

CBRTs may also provide services in rural and remote areas which may be beyond the reach of the specialised teams. However, rural and remote services will be linked with the specialised community services in their respective catchments for the purposes of support and sharing of best practice. Re-entry into specialised programs may be required to ensure services can respond to the longer-term needs of people with an ABI within their catchment.

Formal connections should be established between all community services (specialised and general) to aid cohesion and create a seamless service.

Additional considerations/recommendations:

The Plan recommends hub sites develop specialised community services prior to the development of specialised inpatient services. In some locations (i.e. Townsville and Gold Coast HHS) post-acute capability has already been developed. Therefore, it is recommended that priority be given to developing community specialisation at these sites as soon as possible with support from the ABIOS team as required.

In the short-term, this allows patients either discharged from the tertiary or hub services to reintegrate as soon as possible within their local community with support from their social networks. In the longer-term, this will provide the support required for discharge from more local specialised inpatient services. However, the timing of service development will be at the discretion of the hub sites and with respect to current inpatient and community team capability.

Currently there is significant CBRT variation across Queensland, including variation in service naming, referral processes, eligibility criteria and the length of time services are provided. In practice this has made it difficult for services to refer and follow-up people in the community. These issues will need to be addressed, via the SRbCN, to ensure services operate effectively and seamlessly (refer to section 6.1).

6. Interrelated services

The efficacy of the new statewide model will rely on integration and collaboration with the following interrelated services.

6.1 General rehabilitation services

Activity analysis indicates that there is a cohort of people with an ABI who currently receive rehabilitation in general rehabilitation units and support from CBRTs. This will continue to be appropriate if the patient:

- has less complex rehabilitation needs and rehabilitation outcomes will not be compromised if care is provided within a generalist environment
- is ineligible for admission to the specialised service (e.g. age parameters), and/or
- indicates a preference to be treated closer to home because of cultural beliefs, family needs, travel constraints and socioeconomic factors.

In addition, for patients discharged from specialised services, it may be necessary for (general) local rehabilitation services to be a part of discharge planning.^e To counter some of the practical difficulties identified during consultation, the Plan recommends attention be given to addressing CBRT standardisation and facilitating communication with/between CBRTs as part of SRbCN/CAG future deliberations.

6.2 Mental health services

People with an ABI are at high risk of developing mental illness. Mental illness may be mild, moderate or severe, temporary or prolonged and may exist prior to or because of the ABI. Mental health conditions following an ABI are complex and can manifest for multiple reasons including:

- changes to executive functions, thought and emotional regulation
- overwhelming feelings of grief and loss resulting from significant trauma, and
- significant changes to lifestyle including loss of employment (and resulting financial hardships), loss of social roles and networks, marital strain and/or separations.⁽¹⁶⁾

High rates of depression have also been reported among carers of people with an ABI, including parents and spouses, as the impact of brain injury is often profound.⁽¹⁷⁾

For people with an ABI, the most common mental illnesses are adjustment disorders, depression and anxiety, increasing the likelihood of drug and alcohol abuse, suicide and incarceration.^(16, 17) Dual diagnosis is a term used to describe the presence of both mental illness and ABI.

^eThis will include the general practitioners who can monitor discharged patients for medical complications, mental health issues and ongoing support etc.

A cohort of people with a dual diagnosis have mental illness of such severity they require specialised treatment in an inpatient mental health/ABI (dual diagnosis) unit of which there are four in Queensland, each with a wide geographic catchment (table 2).

Table 2 Queensland dual diagnosis (mental health and ABI) units

Service	Size
Walwa Unit, Baillee Henderson Hospital, Darling Downs HHS.	16 bed inpatient service.
Kirwan Campus, Mental Health ABI Rehabilitation, Townsville HHS.	10 bed inpatient service.
Jacana ABI Centre, Brighton Campus, Metro North HHS.	16 bed residential care.
Wisteria Unit, Casuarina Lodge, Metro South HHS.	20 bed residential care.

Collaboration between specialised mental health, mental health and specialised brain injury rehabilitation services will be required to identify mechanisms (e.g. shared-care models) which enable an integrated, holistic and seamless service for people with a dual diagnosis. Collaboration across other service sectors, such as housing and employment, will also be important to ensure people have access to services promoting a meaningful and productive life following completion of rehabilitation.

6.3 Other service providers

There are a number of organisations and services providing direct services, information and support to people with an ABI throughout Queensland including:

- private hospitals, general practitioners and other private service providers.
- Brain Injury Australia; works at a national level to ensure that all people living with an ABI have access to the supports and resources they need to optimise their social and economic participation in the community.
- Synapse: works to promote brain injury awareness, coordinates a range of services in Queensland and provides information for service providers, adults and children with ABI.
- Medical Aids Subsidy Scheme (MASS); provides access to subsidy funding for the provision of aids and equipment to eligible Queensland residents with permanent and stabilised conditions or disabilities. The range of MASS aids and equipment aims to assist people to live at home and avoid premature or inappropriate hospitalisation or residential care.

Collaboration between specialised mental health, mental health and specialised brain injury rehabilitation services will be required to identify mechanisms (e.g. shared-care models) which enable an integrated, holistic and seamless service for people with a dual diagnosis. Collaboration across other service sectors, such as housing and employment, will also be important to ensure people have access to services promoting a meaningful and productive life following completion of rehabilitation.

7. Service Direction actions

Actions are identified under each service direction to achieve the service direction objectives of the Plan. Service directions are not mutually exclusive. Actions within individual service directions are likely to contribute to the achievement of multiple objectives within other service directions.

7.1 Service Direction 1 Coordination

Develop and promote integrated and coordinated specialised brain injury rehabilitation services across the care continuum.

Service actions

Short term (1-2 years)		Responsibility	Funding source
1.1	Explore the option of establishing a brain injury rehabilitation Clinical Advisory Group—(potentially as a subgroup of the SRbCN) to: <ul style="list-style-type: none"> identify issues and service improvements disseminate information about changes to brain injury rehabilitation and facilitate sharing of knowledge advocate for further change to improve implementation of evidence-based care and integrate patient care across settings and stages of rehabilitation consider the merits of developing a brain injury rehabilitation supplement to the to the Rehabilitation Service module (CSCF v3.0). 	SRbCN, Clinical Excellence Division (CED)/ Tertiary BIRS (PAH) Project Team	Department of Health (DoH)
1.2	Promote formal networking between paediatric and adult specialised rehabilitation services to aid transition.	Tertiary BIRS (PAH) Project Team, Hub Services and Statewide Paediatric Services	DoH
1.3	Develop/review and promote tools, processes, protocols and resources to support the formal networking of services between and across Queensland including (but not limited to): <ul style="list-style-type: none"> standardised assessment and referral processes admission criteria and guiding principles referral pathways and transfer guidelines guidelines regarding the provision of in-reach services. 	Tertiary BIRS (PAH) Project Team and Hub Services	DoH
1.4	Interpret the implications of the NDIS and NIIS for the brain injury system in Queensland following government endorsement via an addendum to this Plan.	Exact government and service agencies are yet to be determined	TBC
1.5	Develop recommendations for workforce standards (skill and mix) in consultation with HHS for specialised community brain injury rehabilitation teams.	Tertiary BIRS (PAH) Project Team/Workforce Strategy Branch	DoH

Medium term (3-5 years)		Responsibility	Funding source
1.6	Develop and maintain partnerships with universities and/or peak bodies to identify research opportunities.	CAG/SRbCN/ CONROD	Within existing
1.7	<p>Develop and maintain essential interagency partnerships with other government departments, peak bodies and special interest groups to ensure the special needs of identified groups are represented for including:</p> <ul style="list-style-type: none"> • housing and community-based disability support services for a seamless and timely transition into the community (especially younger people with an ABI) • support for families/carers of people with an ABI (e.g. respite) and issues associated with ageing carers • driving and assessment services • vocational education and training • employment services (e.g. Commonwealth Disability Employment Services) • recreational services • transport services. 	CAG/SRbCN/ Strategic Policy and Legislation Branch	Within existing
1.8	<p>Develop/review mechanisms to promote the formal networking of services such as:</p> <ul style="list-style-type: none"> • adult specialised brain injury rehabilitation services • general rehabilitation services (including CBRTs) • interrelated services such as mental health and general rehabilitation • ABI/mental health dual diagnosis services • external services such as disability and housing • private services • universities. 	Tertiary BIRS (PAH), Project Team and Hub Services	DoH
1.9	<p>In accordance with the <i>Queensland Mental Health Drug and Alcohol Strategic Plan 2014-2019</i>⁽¹⁸⁾, work collaboratively with mental health services to realise the Plan's long-term outcomes with a focus on*:</p> <ul style="list-style-type: none"> • improving integration between specialised rehabilitation and mental health services • promoting the specific needs of people with a dual diagnosis (ABI and mental health) • increasing mental health follow-up in the community for people with a dual diagnosis* • addressing issues associated with acceptance within mental health services when ABI is a co-condition • promoting the uptake of standardised assessments/screening tools to determine whether a person has a mental illness requiring specialist support • creating specific resources and tools for Aboriginal and Torres Strait Islander people • promoting the uptake of skills enhancement opportunities for mental health staff in acute mental health units and community mental health teams to manage people with an ABI. <i>*Note complementary actions within service directions 3 and 4.</i> 	Tertiary BIRS (PAH) Project Team	DoH
1.10	Review and measure the impacts of the transitional rehabilitation service on specialised ambulatory services and make recommendations with a view to creating efficiencies (as appropriate).	Tertiary BIRS (PAH) Project Team	DoH

7.2 Service Direction 2 Access

Improve access to specialised brain injury rehabilitation services across the care continuum to increase equity for all Queensland adults no matter where they live.

Service actions

Short-term (1-2 years)		Responsibility	Funding source
2.1	Redefine the role of the tertiary BIRS as the statewide provider of specialised brain injury rehabilitation services for people with highly complex physical, cognitive and behavioural needs.	Tertiary BIRS (PAH) Project Team and Hub Services	DoH
2.2	Increase local access to specialised rehabilitation services by establishing specialised brain injury hub services, across the continuum, in key locations across Queensland.	Tertiary BIRS (PAH)/ Hub Services	See resource implications table 4
2.3	Develop mechanisms to improve equitable and appropriate access to specialised services for: <ul style="list-style-type: none"> Aboriginal and Torres Strait Islander peoples adolescents transitioning from paediatric services. 	Tertiary BIRS (PAH) Project Team and Hub Services	DoH
2.4	Identify mechanisms to improve timely access to: <ul style="list-style-type: none"> trial equipment and specialised rehabilitation equipment assistive technologies (e.g. touch screen devices) high technology measurements videoconferencing facilities. 	Tertiary BIRS (PAH) and Hub Services	Within existing
2.5	Review specialised brain injury rehabilitation services at Jacana as part of the Metro North HHS business planning model for rehabilitation with a focus on: <ul style="list-style-type: none"> mechanisms to improve patient access to medical/specialist follow-up(e.g. x-ray, dental, mental health, ophthalmology, pain podiatry) equitable funding structures. 	Metro North HHS	Within existing
2.6	Explore opportunities to improve access and create service efficiencies through: <ul style="list-style-type: none"> increasing use of telehealth, videoconferencing and other smart technologies streamlining service provision (e.g. scheduling multiple appointments in one day) identifying opportunities to deliver services in a person's home or community setting. 	Tertiary BIRS (PAH) Project Team and Hub Services	DoH
Medium term		Responsibility	Funding source
2.7	Subsequent to new model development, identify opportunities to increase patient access in inpatient care settings to the following services: <ul style="list-style-type: none"> neurosurgical, neurology, neuropsychiatry, neuropsychology and psychological assessment hypertonicity service modified barium swallow mental health/ABI dual diagnosis units. 	Tertiary BIRS (PAH) and Hub Services	Within existing
2.8	Subsequent to new model development, identify opportunities to increase patient access in ambulatory care settings to:	Tertiary BIRS (PAH) and Hub Services	Within existing

	<ul style="list-style-type: none"> • neuropsychology and psychological assessment • hypertonicity clinics (assessment and management) • vestibular clinics • seating clinics/positioning review. 		
2.9	<p>Subsequent to new model development, identify opportunities to increase patient access to community-based services including:</p> <ul style="list-style-type: none"> • outreach rehabilitation programs and services • short and long-term case management • allied health services in the home • dietetic services and support • community integration/social support • vocational and driving services • carer/family support. • the life-long provision of care and case management. 	Tertiary BIRS (PAH) ABIOS and Hub Services	Within existing
2.10	Identify and develop mechanisms to assist people with cognitive difficulties to access services (e.g. maintain ambulatory appointments).	Tertiary BIRS (PAH) Project Team and Hub Services	DoH
2.11	Explore strategies to increase access for people with an ABI in regional, rural and remote areas to home modification and transport services.	Hub Services	Within existing
2.12	Explore strategies to expand the role of supporting staff (such as Allied Health Assistants) to maximise efficiency and improve access to specialised brain injury rehabilitation services.	Tertiary BIRS (PAH)	Within existing
2.13	Explore different service approaches (e.g. telephone, smart technologies) to follow-up people with an ABI not engaged with community services.	Tertiary BIRS (PAH) and Hub Services	Within existing
2.14	Explore opportunities to improve access for people with an ABI, families and carers to social work/psychology services by extending hours during traditional "out-of-hours" periods.	Tertiary BIRS (PAH) and Hub Services	Within existing

7.3 Service Direction 3 Quality

Deliver quality specialised brain injury rehabilitation services underpinned by evidence based systems and processes to deliver measurable outcomes

Service actions

Short-term (1-2 years)		Responsibility	Funding Source
3.1	Develop admission and prioritisation criteria and guiding principles for referrals to the tertiary service and hub services.	CAG/SRbCN, Tertiary BIRS (PAH) Project Team and Hub Services	DoH
3.2	Develop a central intake registry at the PAH providing Queensland hospitals with information (e.g. bed availability/wait time) to guide timely referral to the tertiary BIRS.	Tertiary BIRS (PAH) Project Team	DoH

3.3	Develop and disseminate a communication package which articulates the role of each brain injury rehabilitation service and outlines service elements, admission criteria, referral pathways, transfer guidelines and articulates the differences between the services.	Tertiary BIRS (PAH) Project Team	DoH
3.4	Develop standardised and evidence-based policies, guidelines, care pathways, standards, tools and assessments and resources (including equipment) for: <ul style="list-style-type: none"> adults with mild to very severe ABI across the continuum, which should include reference to access to ambulatory services where specialised inpatient services have not been necessary Aboriginal and Torres Strait Islander and Culturally and Linguistically Diverse peoples people with co-conditions such as mental health and drug and alcohol issues people with pre-existing issues (social, health, economic) or at high risk of developing psychosocial issues people with behaviour management issues people who may benefit from early rehabilitation adolescents or young adults. 	Tertiary BIRS(PAH) Project Team	DoH
3.5	Develop multidisciplinary teams for inpatient and ambulatory care in accordance with the AFRM Standards ^(4, 5) to deliver minimum hours of rehabilitation (Standard 2.1.19).	Tertiary BIRS and Hub Services	See table 4
3.6	Explore options to improve the patient journey and help navigate patients through the health system from admission to discharge (e.g. nurse navigators/other).	Tertiary BIRS (PAH) Project team	DoH
3.7	Standardise admission coding for specialised brain injury rehabilitation to promote consistent reporting and the equitable distribution of resources.	Clinical Coding Authority of Queensland (CCAQ)/ CAG/SRbCN/ Strategy, HPSP Tertiary BIRS (PAH) Project Team	DoH
3.8	Increase psychological services to support families and carers across all stages of the continuum.	Tertiary BIRS (PAH) and Hub Services	Within existing
3.9	Promote the routine assessment of family and carer support needs (such as psychological support) into practice.	Tertiary BIRS (PAH) and Hub Services	Within existing
3.10	Explore early networking opportunities in the post-acute setting for patients and their families and carers to meet with and discuss experiences with other patients and their families and carers.	Tertiary BIRS (PAH) and Hub Services	Within existing
Medium-term (3-5 years)		Responsibility	Funding source
3.11	Develop sustainability guidelines articulating the minimum activity levels to sustain specialised brain injury rehabilitation services.	CAG/SRbCN, Tertiary BIRS (PAH) Project Team and Hub Services	DoH
3.12	Develop processes to identify, evaluate and implement best practice in line with emerging evidence to provide	CAG/SRbCN, Tertiary BIRS	DoH

	rehabilitation services: <ul style="list-style-type: none"> with the aim of promoting maximum independence, reintegration and employment to adolescents transitioning to adult services. 	(PAH) Project Team and Hub Services	
3.13	Develop and promote: <ul style="list-style-type: none"> a standardised, robust, minimum dataset in order to clearly evaluate service demand, unmet need and performance and enable benchmarking mechanisms to collect quality data collection for the Australasian Rehabilitation Outcomes Centre (AROC) mechanisms and criteria to determine activity associated with specific ABI groups (i.e. mild, moderate, severe and very severe) across Queensland to inform the services of unmet need and future service planning requirements. 	Tertiary BIRS (PAH) Project Team/SRbCN	DoH
3.14	Routinely (e.g. biannually) undertake an audit of specialised brain injury rehabilitation services (e.g. assessment of AROC reports), to promote quality of care.	Tertiary BIRS (PAH) and Hub Services	Within existing
3.15	Develop workforce guidelines for specialised community teams.	Tertiary BIRS (PAH) Project Team and Hub Services	DoH
3.16	Pilot and evaluate an evidence-based transitional rehabilitation service at the tertiary BIRS (PAH).	Tertiary BIRS (PAH) Project Team	MAIC
3.17	Develop workforce guidelines for specialised transitional rehabilitation teams.	Tertiary BIRS (PAH) Project Team	DoH
3.18	Routinely undertake a survey of patients/individuals, families and carers to identify satisfaction and perceptions of quality of care.	Tertiary BIRS (PAH) and Hub Services	Within existing

7.4 Service Direction 4 Capability

Grow health service capacity and capability including infrastructure, workforce, data systems, while growing the capability of people with an ABI and the broader community.

Service actions

Short-term (1-2 years)		Responsibility	Funding source
4.1	Continue to develop and promote educational resources and/or other efficacious mechanisms for patients/individuals with an ABI, families and carers about ABI and recovery, post-discharge accommodation options and behaviours associated with ABI.	Tertiary BIRS (PAH) Project Team	DoH
4.2	Explore strategies for staff to move across services and sectors to up-skill/multi-skill in the management of people with an ABI.	Tertiary BIRS (PAH)	Within existing

Medium-term (3-5 years)		Responsibility	Funding source
4.3	Promote knowledge and skills enhancement for mental health unit staff in the management of people with an ABI.	Tertiary BIRS (PAH)	Within existing
4.4	Continue to develop and promote quality educational resources for use across Queensland Health and wherever possible with other health care providers with a focus on the particular needs of: <ul style="list-style-type: none"> • Aboriginal and Torres Strait Islander and Culturally and Linguistically Diverse peoples • people with a mental health condition, either pre-existing or as a consequence of ABI • people with drug and alcohol issues • people with psychosocial and behavioural issues • patients/individuals with an ABI, families and carers • people with a mTBI. 	Tertiary BIRS (PAH) Project Team	DoH
4.5	Explore strategies to increase opportunities for staff education and training through the use of telehealth/ videoconferencing.	CAG	Within existing
4.6	Monitor the outcomes of HHS business planning around the provision of community-based specialised brain injury rehabilitation infrastructure.	Tertiary BIRS (PAH) and Hub Services	Within existing
4.7	Explore opportunities to improve funding, collaborate with universities and improve staffing for research activities including: <ul style="list-style-type: none"> • specialised community rehabilitation services • best practice for the management of hypertonicity • models of care • outcomes assessment • community integration and developmental needs following an ABI. 	CAG	Within existing
4.8	Explore strategies (e.g. linking with universities) to promote specialised workforce recruitment and retention, particularly in rural and remote locations for: <ul style="list-style-type: none"> • specialised staff generally • nurses and nurse practitioners • community workers to provide follow-up, routine screening and monitoring. 	CAG/Workforce Strategy Branch	Within existing
4.9	Collaborate with, and build on, the work undertaken by the Allied Health Profession's Office Queensland, to promote specialised workforce recruitment and retention across Queensland for allied health staff (i.e. psychologists, physiotherapists, occupational therapists, speech pathologists, dietitians, neuropsychologists).	Tertiary BIRS (PAH), Specialised Hubs Allied Health Profession's Office	Within existing

7.5 Service sustainability

In a fiscally constrained environment, health services must be cost-effective, efficient and sustainable. Sustainability is predicated on a number of factors including the volume of activity (bed days) in relation to staff skill and mix and overall cost of the service. There is a point at which the volume of activity is too low or too high for a service to be sustainable and cost-effective, often referred to as economies of scale.

There is currently no identified, minimum volume of activity on which to base the development of a specialised brain injury rehabilitation unit. In addition, activity data is not ideal due to coding inconsistencies and limited data clarity. However, historical activity has been utilised to consider likely activity levels in different geographical catchments.

7.6 Model rationale

In the absence of reliable data and information to inform brain injury rehabilitation unit service development, the statewide service model is based on historical activity, evaluated evidence and expert feedback. Projected bed days and conversion to required beds is presented in table 3.

Princess Alexandra Hospital

- Rigorous statewide consultation and analysis of historical activity suggests that one specialised tertiary unit for the state is sustainable within the timeframe of the Plan. The BIRU, PAH is the only existing service in Queensland with established specialisation, provided in a stand-alone, secure unit.

The Townsville Hospital

- Five year (2008/09–2012/13) historical activity shows that northern residents have limited utilisation of specialised services (approximately three per cent). This is likely to be due to a combination of distance to services in the South East Queensland corner and historically high demand at the PAH. Economic disadvantage is likely to be higher for those who live further away from services due to long length of stay associated with post-acute rehabilitation for brain injury. These factors, coupled with developed capability at TTH to manage moderate to high complex patients with an ABI warrant future development in the Townsville HHS with due consideration of factors affecting sustainability such as levels of activity and workforce requirements.

Royal Brisbane and Women's Hospital

- Activity projections indicate that 10 beds^f will be required for the Metro North catchment by 2024/25. The Royal Brisbane and Women's Hospital (RBWH) is likely to establish services prior to the SCUH. This will mean that residents from the SCUH catchment will continue to flow to the RBWH until capability is fully developed. Patients from the Metro South catchment may be referred to the RBWH due to its proximity to the tertiary service if demand for statewide high complex beds limits availability for less complex local Metro South residents.

^f Consultation with clinicians indicates this is sufficient to sustain a brain injury rehabilitation service.

- Metro North has already developed capability to provide specialised post-acute services to people with an ABI via the Jacana ABI Unit.

Gold Coast University Hospital

- Five year (2008/09–2012/13) historical activity shows that Gold Coast residents have had limited utilisation of specialised services at the PAH (less than six per cent). The Gold Coast University Hospital has meanwhile developed capability to provide specialised post-acute rehabilitation services to moderate/high complex residents with an ABI, including residents from Northern NSW. The Gold Coast Community Adult Rehabilitation Services (CARS) has also developed specialisation in community rehabilitation for adults with an ABI.

Sunshine Coast University Hospital

- Local planning for the new Sunshine Coast University Hospital proposes beds for brain injury rehabilitation as part of a larger rehabilitation service. The bed projections for the SCUH are similar to the GCUH bed projections. Services are not likely to be operational in the early period following opening of the new facility.

Future considerations

The Clinical Services Capability Framework for public and licensed private health facilities (CSCF v3.2)(19) describes a set of capability criteria identifying minimum patient safety requirements by service level. There is no specific CSCF v3.2 specialised brain injury rehabilitation service module, in the *Rehabilitation Service* module. To guide minimum service requirements, the *Rehabilitation Service* module has been considered throughout the Plan's development.

Table 3 Projected BIR beds by HHS of residence, 2015-2025

Hospital	HHS of residence	Projected years		
		2014/15	2019/20	2024/25
The Townsville Hospital	Torres and Cape	727	803	886
	Cairns and Hinterland	692	764	844
	Townsville	396	438	483
	North West	129	143	158
	Central West	42	46	51
	Mackay	411	454	501
	Total bed days	2398	2648	2924
	Total beds	8	9	9
Sunshine Coast University Hospital	Sunshine Coast	1171	1293	1428
	Wide Bay	473	522	577
	Total bed days	1644	1815	2004
	Total beds	6	6	7
Royal Brisbane and Women's Hospital	Metro North	2206	2436	2689
	Central QLD	424	468	517
	Total bed days	2631	2904	3207
	Total beds	9	9	10
Gold Coast University Hospital	Gold Coast (including Northern NSW)	1868	2063	2277
	Total bed days	1868	2063	2277
	Total beds	6	7	7
Princess Alexandra Hospital	Metro South	3715	4102	4529
	South West	51	56	62
	West Moreton	766	846	934
	Darling Downs	968	1069	1180
	Total bed days	5501	6073	6705
	Total beds	17*	19*	21*
	Grand total beds	46	50	54

15-69 years of age with overnight or longer hospital stay.

*Includes patient bed days with a SNAP code Brain Dysfunction and Brain, Neuro, Spine and MMT (excluding those patients in the spinal unit) and a primary diagnosis of Intracranial Injury(ICD,S06), Subarachnoid Haemorrhage (ICD,I60), Intracerebral Haemorrhage (ICD,I61) and Other Nontraumatic Intracranial Haemorrhage (ICD,I62) followed by any episode of rehabilitation.

Excludes patient bed days for which a place of residence was not recorded.

There were no patient bed days recorded for Northern NSW residents in 2011/12 and 2012/13.

*The PAH will always require additional beds above that indicated in the table as the bed days associated with high complexity patients (outside the local PAH catchment) are not necessarily accounted for in the projected years. Additionally, the current PAH bed stock (26 beds) will continue to be required as specialised hub capability and associated infrastructure will take time to develop.

Source: Queensland Hospital Admitted Patient Data Collection (QHAPDC), extracted June 2014 and 2015.

8. Service enablers

Service enablers are factors that support services to operate effectively. Workforce, information and communication technology (ICT), data availability and infrastructure have been identified as the primary enablers for effective support of the brain injury rehabilitation system. Further enabling functions may be identified as the new brain injury rehabilitation service model is implemented. Requirements associated with the primary enablers are summarised as follows:

Workforce

- Specialised, multidisciplinary teams at all hubs for inpatient and ambulatory, in line with the AFRM workforce standards.
- Specialised teams for transitional and specialised community services.
- Increased capability via targeted training and support from the relevant tertiary lead service.
- Local strategies as required, including consideration of job rotations, temporary placements and coaching/mentoring.

Information and communication technology

- Increased use of information and communication technology (i.e. telehealth, videoconferencing and other smart technologies) in clinical practice and training to overcome issues around geographical distance and increase staff capability. Any developments in ICT should be in line with current Queensland Health information and communication technology policy.
- The use of the integrated electronic Medical Record (ieMR) program to improve rapidity and reliability of communication, especially with respect to the transfer of patients between facilities.

Data

- Standardised, robust dataset in order to clearly evaluate service demand, performance and allow benchmarking. Data will also support future development and improvement.

Infrastructure

- New purpose-built infrastructure will be required for inpatient and ambulatory services at the PAH as recognised in state health infrastructure planning.
- A review of current infrastructure may be required to ensure hub hospitals, for which there is no planned, new infrastructure, will meet the needs of people receiving brain injury rehabilitation.
- New hospitals (currently being built in some hub sites) will need to consider the specific design features associated with the provision of care to brain injury rehabilitation patients within their general, neuro-rehabilitation or multispecialty units (e.g. secure/locked wards) now and into the future.
- Leased and /or purpose-built infrastructure, to support transitional services, may be required at the specialised hubs.

9. Implementation, monitoring and review

9.1 Implementation planning and resourcing

Implementation planning should be undertaken, as required, by each HHS in accordance with the *Hospital and Health Boards Act 2011*, to enable due consideration of factors affecting implementation including resource identification and management, timing and risk. The extent of implementation planning undertaken by each HHS should be commensurate with the role assumed in the statewide brain injury service model. Implementation plans should be sufficiently informative to act as a practical guide to staff and should be based on the detailed actions identified within this Plan. Implementation planning should include risk management strategies to take into account any new or emerging issues. It is recommended that criteria be developed to measure progress against each short term action.

Metro South HHS (PAH) is responsible for the majority of service actions identified in this Plan and in the Statewide adult spinal cord injury health service plan 2016–2026. The Department has identified synergies between these Plans and recommends a project team, based at the PAH, commences implementation planning for short term actions over the next two years. Funding for this project team will be sourced following endorsement of both Plans.

The Plan identifies longer-term actions for which there may be ongoing resource implications (i.e. project team) however, this will be more clearly understood following the initial implementation phase. Funding for, and continuation of, the project team will need to be considered in usual budgetary processes and will be advocated for by Strategy, Policy and Planning Division.

9.2 Resource implications for service delivery

The revised service model for provision of brain injury rehabilitation in Queensland requires changes to the current service configuration. A summary of the changes, resource implications and likely funding mechanisms is provided in tables 4 and 5. The resource implications for the implementation of specific actions, not directly related to changes with the service model, are outlined in section 7.

Table 4 Summary of tertiary BIRS resource implications, 2016-2026

Tertiary Specialised BIR Services		
AFRM standards will inform workforce requirements for inpatient and ambulatory services, with additional staffing requirements identified to support capability development across the wider system beyond PAH.		
Future service	Resource implications	Funding mechanism
Post-acute (inpatient) rehabilitation (BIRU)		
<ul style="list-style-type: none"> specialised tertiary service delivered at the PAH. statewide brain injury rehabilitation services across the continuum for people with an ABI of the highest complexity. specialised service for its local catchment. 	<ul style="list-style-type: none"> staffing to align with AFRM* standards (inpatient). fit-for-purpose-infrastructure. 	<ul style="list-style-type: none"> inpatient activity is purchased under Activity-Based Funding (ABF). additional workforce will be funded at the discretion of the HHS via ABF. capital funding for new infrastructure is considered via the Investment Review Committee. consideration of excess costs of delivery above the weighted activity unit (WAU) due to highly complex patients usually accounted for under site-specific grants (HPSP).
<ul style="list-style-type: none"> in-reach service. 	<ul style="list-style-type: none"> additional activity and staffing to be determined locally. 	<ul style="list-style-type: none"> additional resources required will need to be negotiated within the HHS.
Ambulatory (BIRU Day Hospital)		
<ul style="list-style-type: none"> increased activity to improve access, especially to specialised services e.g. hypertonicity. 	<ul style="list-style-type: none"> staffing to support alignment with AFRM* standards (ambulatory). 	<ul style="list-style-type: none"> consideration of excess costs of delivery above the weighted activity unit (WAU) due to highly complex patients usually accounted for under site-specific grants (by HPSP). ambulatory activity is purchased under ABF. Data to support and project historical demand by place of residence required.
Transitional Rehabilitation Service		
<ul style="list-style-type: none"> specialised TRS delivered from the PAH (pilot). 	<ul style="list-style-type: none"> multidisciplinary team at appropriate levels determined by local planning (service action 3.17). in-centre independent living units OR out-of-centre independent living units (leased infrastructure) OR home-based service requiring community-based workforce. 	<ul style="list-style-type: none"> in-centre—purchased activity via ABF. methods for purchasing out-of-centre transition and home-based activity to be considered by the HPSP. capital funding for specialised equipment.
Specialised community rehabilitation service		
<ul style="list-style-type: none"> statewide lead for consultation and training and the development of standardised resources for specialised community rehabilitation services. specialised service for its local catchment. 	<ul style="list-style-type: none"> staffing to align with workforce guidelines as agreed and developed (Service action 3.15). project team to support capability in other HHS. 	<ul style="list-style-type: none"> additional workforce will be funded at the discretion of the HHS. purchasing of non-ABF via purchasing framework.

Table 5 Summary of hub services resource implications 2016-2026

Specialised primary hub services	
Future service	
<p>To accurately determine hub service requirements, it is recommended that each hub HHS:</p> <ul style="list-style-type: none"> define current capability, against the <i>Clinical Service Capability Framework v3.2</i>, Rehabilitation Service module⁽¹⁹⁾ identify gaps in hub capability required to meet current and future demand not currently factored into existing funding ensure all components of specialised services are included in negotiations between DoH and HHS so all hub services are adequately resourced. 	
Known resources implications	Funding mechanism
Post-acute inpatient beds	
<ul style="list-style-type: none"> resources for staffing to align with AFRM standards (inpatient). it is expected services will operate within current or proposed built capacity. 	<ul style="list-style-type: none"> inpatient activity is funded at the discretion of the HHS via purchased activity under ABF. additional workforce will be funded at the discretion of the HHS via purchased activity under ABF. consideration of excess costs of delivery above the weighted activity unit (WAU) due to highly complex patients usually accounted for under site-specific grants (HPSP). capital funding for specialised equipment.
Ambulatory Services	
<ul style="list-style-type: none"> anticipated growth in ambulatory services. staffing to align with AFRM standards (ambulatory). 	<ul style="list-style-type: none"> ambulatory funded via purchased activity. additional workforce will be funded via purchased activity.
Specialised community services	
<ul style="list-style-type: none"> anticipated growth in specialised community services. staffing to align with workforce guidelines as agreed and developed (Service action 3.15). 	<ul style="list-style-type: none"> additional workforce will be funded via purchased activity. purchasing of non-ABF community services is provided via purchasing framework. service growth will be purchased by negotiation via the service agreement development process.

* Staffing is based on the Australian Faculty of Rehabilitation Medicine (AFRM) standards for the provision of Inpatient Adult Rehabilitation Medicine Services in Public and Private Hospitals 2011 and Australian Faculty of Rehabilitation Medicine (AFRM) standards for the provision of Rehabilitation Medicine Services in the Ambulatory Setting 2014 (Traumatic Brain Injury).

9.3 Monitoring, review and evaluation

Monitoring

Careful monitoring during the implementation phase is critical to ensure plans are operationalised as intended, risks identified, remedial actions set and expected timeframes met. Implementation will commence on the date the plan is endorsed and published.

The Department will require information from the relevant HHS at specific intervals throughout the life of this Plan to adequately monitor progress. From commencement of implementation reporting will include:

- a formal report, to monitor progress towards the Plan's overall objectives, within a timeframe deemed appropriate by the Department (*i.e. 2, 5, 10 years*) during the life of the Plan,
- a short report, at **any time** during the life of the Plan, if a major issue, requiring urgent attention is identified during implementation.

The level of detail provided in the above reports will be proportionate to the role of the HHS in implementation but sufficiently informative to provide a clear picture of progress against relevant service actions (section 7). All HHS reports will be collated by the Department and progressed and disseminated as appropriate.

Review and evaluation

The Department will undertake a formal review of the Plan, at a timeframe deemed appropriate. This report will primarily be based on information provided in earlier reports however, additional information may be required upon request. Based on the outcomes of the review, a full or partial revision of the Plan may be justified. This report will be provided to the Department's executive and disseminated to the SRbCN and all HHS.

It is anticipated the Department will evaluate the Plan at *ten years* (end of the Plan's timeframe) to help inform future activities. Specifically it will evaluate whether the original objectives of Plan were achieved and examine the process to achieve them.

Appendices

Appendix 1

Care continuum of specialised brain injury rehabilitation services

In-reach services

Specialised in-reach rehabilitation (or early rehabilitation) is a service provided to people with an ABI, by multidisciplinary teams, in an acute setting (e.g. Intensive Care Unit, neurosurgical unit). A consultation/liaison service is currently provided by BIRU to staff in acute wards/units at the PAH and RBWH.

Specialised post-acute services

Specialised post-acute inpatient rehabilitation services are holistic and comprehensive assessments and interventions aimed at maximising the patient's physical, cognitive, functional, psychological, social, emotional, vocational and avocational independence. Services may be provided in a dedicated unit (stand-alone or physically separated) and are provided by multidisciplinary teams.

The BIRU at the PAH is the only dedicated unit in Queensland. Some brain injury rehabilitation specialisation is developing in other HHS across Queensland including general rehabilitation units, with a focus on neurological rehabilitation (i.e. Gold Coast University Hospital (GCUH) and The Townsville Hospital (TTH)).

The Jacana ABI Unit at Bracken Ridge, Metro North HHS has nine beds for specialised post-acute, multidisciplinary, goal-focussed and time-limited services to people with an ABI in what was historically a residential care facility (36-bed facility).

Slow-to-recover services

Slow stream or slow-to-recover post-acute services are services provided to people with a severe brain injury who require a prolonged period of rehabilitation to improve functioning prior to discharge to the community (often to long-term residential accommodation or with significant disability support). Even though people with a severe ABI represent a smaller cohort (in comparison to people with mild and moderate ABI), services are typically resource and support intensive. The survival rates associated with severe traumatic brain injury are also increasing, so it is anticipated there will be increased demand for post-acute, slow-to-recover services⁽¹⁴⁾. Casuarina Lodge (Jasmine Unit) has predominantly operated as a residential facility but is likely to commence a slow-to-recover ABI program again in the future.

Transitional rehabilitation services

There is currently no specialised transitional rehabilitation service in Queensland for people with an ABI. People with an ABI admitted to BIRU or to the general rehabilitation unit at TTH may be referred to an independent living unit following clinical assessment. The purpose of these units is to allow staff to assess a patient's ability to manage independently prior to hospital discharge, however these units are not specifically designed for people with an ABI. The PAH and TTH have independent living units as part of their general rehabilitation service.

Specialised ambulatory services

Specialised ambulatory brain injury rehabilitation services (including same day admitted rehabilitation) provides specialised hospital-based rehabilitation treatments to individuals who reside in the community and who no longer require inpatient care.

The BIRU Day Hospital at the PAH is the only day hospital in Queensland providing specialised brain injury rehabilitation ambulatory services including rehabilitation medicine consultant, psychology/neuropsychology, occupational therapy, hypertonicity, physiotherapy, social work and speech pathology clinics. People with a brain injury may receive treatment from one or multiple clinicians—depending on their rehabilitation needs. People may be directly referred from an inpatient setting or be may be referred from the community. Therapy is typically goal-orientated, time-limited and provided on a weekly basis.

Some HHS across Queensland provide single, specific, ambulatory/outpatient clinics for people with an ABI such as neuropsychology ambulatory services at the GCUH. General ambulatory services are available at other hospitals/sites across Queensland and may provide general services for people with an ABI (e.g. physiotherapy).

Specialised community services

Specialised community rehabilitation services to help maintain a person in the community are typically based on social rehabilitation approaches including integration and psychosocial support. The PAH-based ABIOS is the only specialised community rehabilitation service operating in Queensland. ABIOS accepts referrals from formal sources (e.g. clinicians, service providers) and informal sources (e.g. family, carers). Referrals to this service may follow an inpatient stay or people may be referred from the community. The current ABIOS service uses a multipronged approach to assist people to reintegrate including:

- specific rehabilitation interventions (e.g. compensatory cognitive strategies)
- case management services (i.e. helping people to coordinate multiple services which may be provided by multiple agencies)
- work readiness and pre-vocational support
- training and consultancy (i.e. helping people to understand the specific requirements of people with an ABI, their families and carers)
- assisting people to self-manage in the community (i.e. through self-management programs—STEPS)
- establishing sustainable local networks of support and encouraging participation/connection within a person's local community (STEPS initiative).

ABIOS uses multiple means such as email, videoconference and teleconference to provide these services.

A number of general CBRTs and CARS operate in most areas across Queensland and provide general rehabilitation services to a range of people for a range of rehabilitation needs. Typically, these are time-limited services, which focus on a person's physical functioning rather than social roles and community participation. Some generalist teams have been identified as having developed capability in the management of clients with an ABI (e.g. Gold Coast CARS).

Appendix 2 Supporting information

A number of information sources were reviewed in the development of this plan. These are described below.

Policy context

Commonwealth

National Disability Insurance Scheme (NDIS)

Under a Heads of Agreement with the Commonwealth signed in May 2013, Queensland will introduce NDIS from 1 July 2016, with full implementation by 1 July 2019. In future, services that fall within the scope of the NDIS will be available to people through this scheme rather than through current funding models. Queensland Health has committed \$73.4M from 2016-17 to the State contribution of \$2.03B to the NDIS. Program areas identified as being potentially in scope for the NDIS include aids and equipment, community mental health, high-cost home support and services provided to long-stay, younger people with disability in public health facilities. However, to date, the exact implications of the NDIS for people with an ABI are unknown. It is expected that services aimed at assisting a person to remain in the community will be available to people with an ABI.

National Injury Insurance Scheme (NIIS)

The Australian Government is currently working with States and Territories to develop the NIIS as a federated model of separate, state-based, no-fault schemes that provide lifetime care and support for people who have sustained a catastrophic injury, including people with an ABI. NIIS will build on existing State and Territory accident compensation schemes for people suffering catastrophic injuries from accidents (e.g. motor vehicle and workplace accidents) to complement Disability Care Australia.⁽²⁰⁾ Until this scheme is implemented, the exact implications for people with an ABI are unknown.

Primary Health Networks (PHNs)

In the 2014 Federal Budget a recommendation was adopted to replace Medicare Locals with PHNs from July 2015. PHNs align with HHS boundaries and have increased authority to engage directly with them, as well as increased purchasing powers. The key objective of all PHNs is to 'increase the efficiency and effectiveness of medical services for patients, particularly those at risk of poor health outcomes, and improve coordination of care to ensure patients receive the right care in the right place at the right time.'⁽²¹⁾ However, the exact benefits for people with an ABI are unknown.

Queensland

Many of Queensland's priority areas grow from contextual factors that are reflected throughout the country. Queensland continues to endeavour to 'close the gap' in longevity and health outcomes for Aboriginal and Torres Strait Islander Queenslanders and to improve service access and health and wellbeing for all rural and remote Queenslanders.

The Health of Queenslanders 2014 report⁽²²⁾ highlights the strong requirement for health promotion and ill health prevention, which needs to be underpinned by wide community health literacy to enable Queensland Health to promote messages around disease and injury prevention and the management of chronic conditions. Effective preventive health is also likely to require a shared responsibility for policy implementation between government, business, community groups and individuals, whilst encouraging personal responsibility for healthy lifestyle choices.

As well as striving for Queenslanders to be as healthy as possible for as long as possible, Queensland Health has a responsibility to provide public health services with as much equity of access as can be effectively and efficiently achieved. This requires attention to rural and remote health service provision and continual service improvement and attention to specific problems in rural and regional areas as evidenced by burden of disease data. In addition, public health services need to support innovation and research to enable constant improvements to be realised and the system should be underpinned by a strong governance framework to measure success, identify challenges and ensure accountability and responsibility where it is required.

Specific statewide strategies or plans, reviews and progress reports that have been published during 2014 have been considered in the development of this paper including, for example, mental health, drugs and alcohol, cancer, and respiratory services.

Literature and practice review

Prevalence

Around one in 45 Australians experience ABI activity limitation or participation restriction due to disability.⁽²³⁾ In 2007, the prevalence rate for people aged under 65 years in Queensland was significantly higher than the Australian average (2.5 per cent versus the national average of 1.8 per cent).⁽²³⁾

Physical, cognitive and emotional impacts of ABI

ABI often results in a range of medical, physical, cognitive and emotional consequences which may be mild, moderate or severe. People with moderate and severe brain injuries often require clinical assessment, treatment and management by a multidisciplinary team to comprehensively address the multiple impacts of ABI.

Multidisciplinary teams include rehabilitation medicine physicians, who are responsible for the overall coordination of care both in the inpatient and outpatient settings and provide specific expertise with reference to prognosis, monitoring and selected interventions.⁽²⁴⁾ Other multidisciplinary team members include nurses and allied health clinicians (table 6).

Physical consequences of ABI include problems with speech, language, swallowing, walking, sitting, performing activities of daily living (e.g. washing, dressing). Medical complications following an ABI include, but are not limited to, seizures, hydrocephalus, heterotopic ossification and hypertonicity. These complications may involve a range of tests, medications, surgery and therapy and may sometimes cause additional physical complications.

The cognitive, behavioural and personality consequences of ABI are often more disabling than the residual physical deficits (table 7).⁽²⁵⁾ These neurological consequences can affect

many aspects of a person's life including relationships, work and social function. The ability to retain old, and form new friendships is central to the long-term hardship frequently report by people with an ABI.⁽²⁶⁾

Cognitive deficits are sometimes hard to recognise making it difficult for others to acknowledge or grasp the extent of cognitive impairment. Socially inappropriate behaviours such as lack of insight, inflexibility, irritability, emotional lability and impulsivity may be viewed as personality traits rather than as consequences of ABI. Disadvantage is further compounded because, compared to the general population, people with an ABI are more likely to:

- have an increased chance of a subsequent ABI. The increased likelihood of a subsequent brain injury can be caused by factors such as compromised balance, concentration, disinhibition and alcohol intolerance.
- have mental health problems. Adjustment disorders including depression, anxiety and drug and alcohol addiction may precede the brain injury or occur as a result of an ABI.⁽²⁷⁾
- exhibit challenging behaviours including physical and verbal aggression, self-injury, agitation or sexually inappropriate behaviours.⁽²⁸⁾
- be at increased risk of offending and reoffending⁽²⁹⁾ and are overrepresented in the criminal justice system both as victims and as offenders.⁽³⁰⁾

Lifestyle changes following an injury can create barriers to a healthy life including decreased levels of physical activity due to mobility impairment, fear, pain, financial costs, transport difficulties and limited local specialised services.⁽³¹⁾ Physical inactivity can cause and accelerate chronic diseases such as cardiovascular disease, diabetes and cancer.⁽³¹⁾ People with an ABI tend to have complex disability and have reported more disability groups and health conditions than the average person with a disability.⁽²³⁾

Assistive technologies can facilitate greater independence and community participation for people with an ABI. For example, assistive technologies can be used to assist with mobility (e.g. wheelchairs, gait aids) and communication and cognition (e.g. Teletypewriter, TTYs, palm pilot, computer software).

Table 6 Role of allied health clinicians in the treatment and management of ABI

Social workers	Focus on social and emotional consequences of an ABI providing support to patients and families to assist them to adjust to lifestyle, work and social changes (i.e. through counselling, support advocacy, advice and/or referral to other services).
Speech Pathologists	Diagnose, manage and treat people with communication difficulties or who have problems eating or swallowing following an ABI. Includes assessment and treatment of how a person after an ABI understands speech, expresses themselves, their reading and writing skills as well as communication with others socially.
Occupational therapists	Assist people to develop and maintain skills associated with everyday activities such as work, self-care, leisure etc. Occupational therapists can assess how a person's skills have changed after an ABI and suggest new ways of doing things, or equipment to assist with greater independence.

Physiotherapists	Assist people to maximise functioning after an ABI including assessment and treatment of posture, movement, muscle strength, coordination, balance and stamina. Physiotherapists can provide advice on splints, walking aids, develop plans (fitness and mobility) and provide training to family/carers.
Psychologists	Assist people with everyday psychological challenges following an ABI such as behaviour and coping. This may involve learning strategies or skills to reduce the impact of the ABI.
Neuropsychologists	Assesses and explains the impact of ABI on a person's cognitive abilities e.g. memory and thinking. Neuropsychologists can provide strategies to manage these impacts.
Dietitians	Help people to maintain a healthy weight following an ABI and may work collaboratively with speech pathologists where swallowing is affected.

Source: Adapted from the NSW Care and Support Pathways for people with an Acquired Brain Injury.⁽³²⁾

Table 7 Changes associated with ABI

Cognitive	Personality, behavioural, mental health	Physical changes
<ul style="list-style-type: none"> – memory problems. – language problems (dysphasia, problems finding words and impaired reading and writing skills). – difficulty concentrating. – difficulty planning, organising, making decisions. – difficulty problem-solving. – difficulty with new learning. – reduced speed and flexibility of thought processing. 	<ul style="list-style-type: none"> – altered emotional control; irritability, anger. – reduced insight, disinhibition, impulsivity, inflexibility. – self-centredness. – impaired social and coping skills. – dependency reduced self-esteem. – apathy, amotivational states. – psychiatric disorders (anxiety, depression, post-traumatic stress disorder, psychosis). 	<ul style="list-style-type: none"> – motor function impairment (coordination, balance, walking, hand function, speech). – sensory loss (taste, touch, hearing, vision, smell). – sleep disturbance (insomnia, fatigue). – medical complications (spasticity, post-traumatic epilepsy, hydrocephalus, heterotopic ossification). – vestibular dysfunction (dizziness). – sexual dysfunction. – chronic pain. – headaches. – weakness.

Source: Adapted from The Medical Journal of Australia, Rehabilitation after traumatic brain injury 2003.

Clinical measurement

The Glasgow Coma Scale (GCS) and Post-Traumatic Amnesia (PTA) are two reliable indicators measuring acute brain injury severity (see Glossary for more information). The GCS typically provides a prognosis for survival rather than long-term functional outcomes.⁽³³⁾ The risk of dying from ABI is low after mild (approximately 1 per cent), intermediate after

moderate (up to 15 per cent) and high (up to 40 per cent) after severe.⁽³⁴⁾ Assessment of severity largely dictates the choice of service and therapeutic response.

The duration of PTA is the best indicator of the extent of cognitive and functional deficit after ABI. PTA is defined as that period of time in which the brain is unable to lay down continuous day-to-day memory.⁽³³⁾

The majority of people assessed with mTBI, most (>90 per cent) symptoms will resolve within 3 months.⁽³⁵⁾ mTBI is typically defined by a loss of consciousness of 30 minutes or less, a GCS of 12-15 and limited PTA.

Most people who sustain a mild TBI are assessed and treated in emergency departments or by general practitioners with symptoms resolving within 3 months.^{(33),(35)} Approximately 10-15 per cent of people with mTBI will remain symptomatic for longer periods of time.⁽³³⁾

Symptoms include post-traumatic headache, sleep disturbance, disorders of balance, cognitive impairments, fatigue, dizziness and mood or affective disorders resulting in functional limitations, heightened emotional distress and delayed return to activity, work or school.⁽³⁶⁾ The main treatment approach for this cohort includes, patient/family education, reassurance and psychological support. Patients with mTBI rarely require inpatient rehabilitation.

People with a moderate to severe ABI can have a range of outcomes and it is generally difficult to predict the extent of recovery in the initial weeks after trauma.⁽³³⁾ However, people of working age, with a moderate to severe injury are generally accepted to specialised brain injury rehabilitation services to maximise potential recovery. Table 8 outlines the scores used to measure mild, moderate and severe brain injury.

Table 8 **Measuring brain injury severity**

Severity category	Initial Glasgow Coma Scale score	Duration of Post-Traumatic Amnesia
Mild	12-15	Less than 24 hours
Moderate	9-11	1-7 days
Severe	3-8	1-4 weeks
Very severe	-	More than 4 weeks

Source: Fary K, Ian. J Baguley and Ian, D Cameron. *Rehabilitation after traumatic brain injury. Medical Journal of Australia.* 2003; 178:290-5.

What is rehabilitation?

'Rehabilitation care is care in which the primary clinical purpose or treatment goal is improvement in the functioning of a patient with an impairment, activity limitation or participation restriction due to a health condition. The patient will be capable of actively participating. Rehabilitation care is always:

- delivered under the management of, or informed by, a clinician with specialised expertise in rehabilitation, and
- evidenced by an individualised multidisciplinary management plan, which is documented in the patient's medical record, that includes negotiated goals within specified time frames and formal assessment of functional ability'.⁽³⁷⁾

Specialised rehabilitation services are different to general rehabilitation services for several reasons. Specialised rehabilitation services are solely provided to and designed for, particular patient cohorts (such as people with an ABI). They are typically more intensive and are provided by multidisciplinary staff skilled in the particular clinical service area, in a dedicated unit. General rehabilitation typically provides different types of rehabilitation to people with different types of disability in a single ward/unit environment. For example, patients with orthopaedic injuries may receive orthopaedic rehabilitation and stroke patients may receive stroke rehabilitation. The patient mix is based on staff expertise and the needs of the local population.

The highly complex pathology of brain injury requires specialised staff to recognise, interpret and respond to the needs of people with an ABI. Specialised staff, who have a higher frequency of exposure in a unit dedicated to the treatment of brain-injured patients, become adept at recognising problems and identifying effective treatment options in an appropriate multidisciplinary manner. A specialised service with large volumes of patients also allows the required skill mix to be achieved and retained.

Evidence suggests that the more intensive rehabilitation delivered by a specialised multidisciplinary team, supported by higher staff to patient ratios (than recommended for general rehabilitation) can result in patients having decreased length of stay in hospital, greater functional outcomes and higher rates of survival.^(11,12) However, general rehabilitation remains an important component of the specialised rehabilitation system as these services may be involved in discharge planning as people return to their local communities.

Brain injury rehabilitation service models

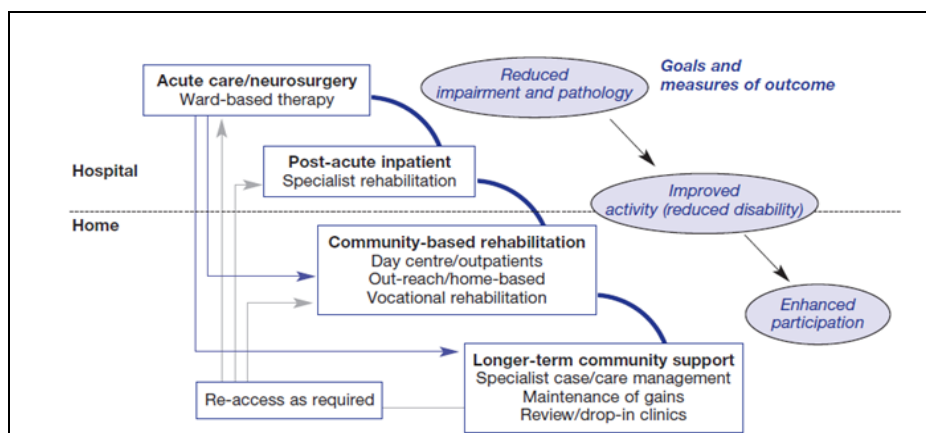
National and international specialised brain injury rehabilitation service models were reviewed to inform development of the Queensland service model. In terms of efficacy, policy literature generally categorises brain injury rehabilitation into one of the following themes:

- Coordination and communication between services—effective coordination and communication for seamless/continuous transition between services as people with an ABI progress through the phases of rehabilitation and to other supporting services.
- Care provided by a multidisciplinary team—delivery of brain injury rehabilitation by a coordinated, multidisciplinary team of people from a range of different disciplines.
- Post-discharge services—development of, or discharge to, specialist community rehabilitation and case management services following inpatient rehabilitation.
- Co-morbidity/dual diagnosis guidelines—clear guidelines for assessment, referral pathways, treatment and prevention of co-conditions such as mental illness.
- Support for caregivers and/or family members—ensuring support/education/involvement of caregivers and family members.
- System-wide planning—collaborative system-wide service planning to improve pathways; and systematic data collection and analysis to inform an evidence-based, responsive, cost-efficient system-wide service.
- Disability policies and conventions—development of systems and supports which enable the full inclusion and participation of people with a disability in the community.

In addition, brain injury rehabilitation:

- generally follows a consistent pathway of inpatient rehabilitation followed by ambulatory care and community reintegration.
- is commonly based on the 'slinky' model (figure 3) centred on the following concepts:
 - patients need to access different services as they progress, and their transition is facilitated by communication and information sharing between services, so that they progress in a seamless/continuous manner across the care continuum
 - rehabilitation is a non-linear process and patients will often need to visit and revisit points along the continuum as their recovery progresses and new challenges emerge
 - should be standardly provided in a holistic and interdisciplinary manner⁽³⁸⁻⁴⁰⁾ should be matched to the needs, strengths and capacities of each patient and modified as those needs change over time.⁽⁴¹⁾

Figure 4 The slinky model of the phases of rehabilitation



Source: Royal College of Physicians and British Society of Rehabilitation Medicine. *Rehabilitation following ABI: National Clinical Guidelines*. London; 2003.

Governance Process

Project governance arrangements were established to support consistency and effectiveness of project related decisions, led by an identified project sponsor and a project steering committee and supported by a key clinician advisory group and a project team (figure 5).

Figure 5 **Project governance structure**



Appendix 3 Service activity

Current patterns of service use

Historical activity analysis was attempted for all elements of the continuum. Data analysis was challenging due to inconsistent admitting or coding practices, a wide variety of data sources and in some cases minimal or no data availability. Where data was available, analyses were undertaken for the five financial years to 2012–13 and divided by HHS of residence and/or treatment as appropriate.

Specialised inpatient brain injury rehabilitation

In-reach (early) rehabilitation

No specific data collection occurs to indicate the number of consultation/liaison occasions of service provided.

Post-acute rehabilitation

Inpatient data was analysed from the Queensland Hospital Admitted Patient Data Collection (QHAPDC) system—the data source for public and private inpatient hospital activity in Queensland—over five financial years to 2012–13 by place of residence and place of treatment. Due to coding variations across Queensland hospitals, a number of classifications were selected and analysed to determine brain injury rehabilitation inpatient activity. This included a cohort of patients sustaining a diffuse injury as a result of cerebro-vascular accident (CVA or ‘stroke’) considered to benefit from brain injury rehabilitation.

Classifications included in this analysis were:

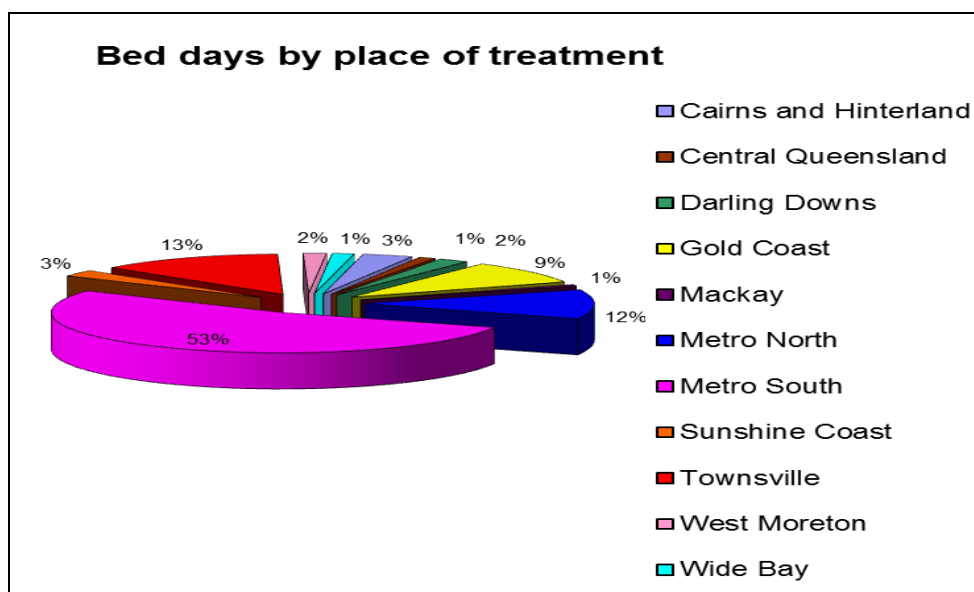
- ‘brain dysfunction or ‘brain, neuro, spine and major multiple trauma’⁷ (MMT)—Australian National Sub and Non-Acute Patient (AN-SNAP)
- a principal diagnosis⁸(followed by a rehabilitation episode) of one of the following:
 - Intracranial injury (ICD S06)
 - Subarachnoid haemorrhage (ICD I60)
 - Intracerebral haemorrhage (ICD I61)
 - Other non-traumatic intracranial haemorrhage (ICD I62).

Analysis shows approximately 53 per cent of all Queensland brain injury rehabilitation bed days were at Metro South (PAH) (figure 5). Of the remaining activity, the majority (34 per cent) was provided at general rehabilitation units in Townsville, Metro North and Gold Coast HHS. There has been an 18 per cent growth in the number of brain injury rehabilitation bed days in Queensland over five years. Patient flows to each HHS by place of residence in 2012–13 are provided in table 9.

⁷ excludes patients admitted to the spinal unit

⁸ (International Classification of Diseases ICD–10–AM)

Figure 6 Five year average bed days, by HHS of treatment, 2008-09 to 2012-13



Source: Queensland Hospital Admitted Patient Data Collection (QHAPDC), extracted 26 June 2015.

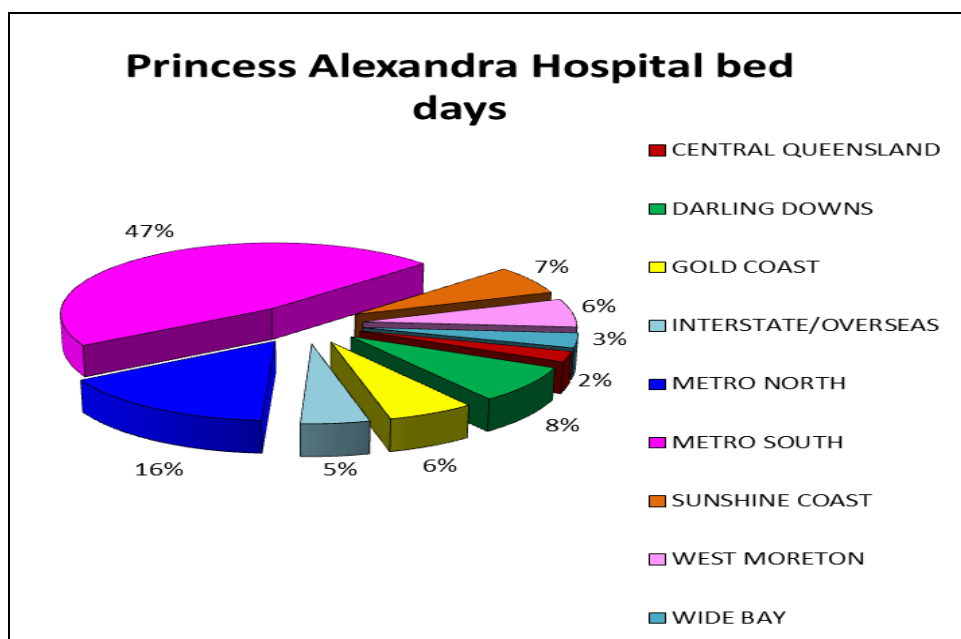
Bed days for adults 15–69 years of age with overnight or longer hospital stay.

*Includes patient bed days with a SNAP code Brain dysfunction and Brain, Neuro, Spine and MMT (excluding those patients in the spinal unit) and a primary diagnosis of Intracranial Injury (ICD,S06), Subarachnoid Haemorrhage (ICD,I60), Intracerebral Haemorrhage (ICD,I61) and Other Nontraumatic Intracranial Haemorrhage (ICD,I62) followed by any episode of rehabilitation

No bed days were recorded at Torres and Cape, North West, South West and Central West over the five years. Northern NSW resident data was not included.

Of all residents admitted to the PAH for brain injury rehabilitation, almost half (47 per cent) were from Metro South and 16 per cent were from Metro North. Activity, from all remaining HHS (for which there was recorded activity), was 34 per cent (figure 6).

Figure 7 Five year average PAH bed days, by HHS of residence, 2008-09 to 2012-13



Source: Queensland Hospital Admitted Patient Data Collection (QHAPDC), extracted 26 June 2015.

Bed days for adults 15–69 years of age with overnight or longer hospital stay.

*Includes patient bed days with a SNAP code Brain dysfunction and Brain, Neuro, Spine and MMT (excluding those patients in the spinal unit) and a principle diagnosis of Intracranial Injury (ICD,S06), Subarachnoid

Haemorrhage (ICD,I60), Intracerebral Haemorrhage (ICD,I61) and Other Nontraumatic Intracranial Haemorrhage (ICD,I62) followed by any episode of rehabilitation
No bed days were recorded at the PAH for residents of Torres and Cape, North West and Central West residents over the five years.
Resident activity was less than 1 per cent for each of the following HHS—Cairns and Hinterland, Townsville, South West and North West.

There is no inpatient activity data available for Jacana ABI Unit due to its historical status as a residential care facility and therefore no requirement for reportable data as part of the admitted patient data collection. The recording of a separation of activity only when complete would also result in difficulties analysing data even if such patients were treated as 'admitted'. However, anecdotal information indicates very long stays and minimal access opportunities for new patients to this service.

Coding variations between facilities limits the accuracy of activity analysis for specialised brain injury rehabilitation. It should be noted that an inpatient episode is only counted in the data for a given year if it has been completed by the year end date. This means that long admissions which are still ongoing are not counted and roll to the subsequent year, leading to potential data inaccuracies. Inpatient data also does not clearly identify whether a rehabilitation admission was because of the brain injury or due to other factors, particularly for people with a mTBI.

Slow-to-recover

There is no inpatient activity data available for Casuarina Lodge (Jasmine Unit) due to its historical status as a residential facility with no requirement for reportable data as part of the admitted patient data collection.

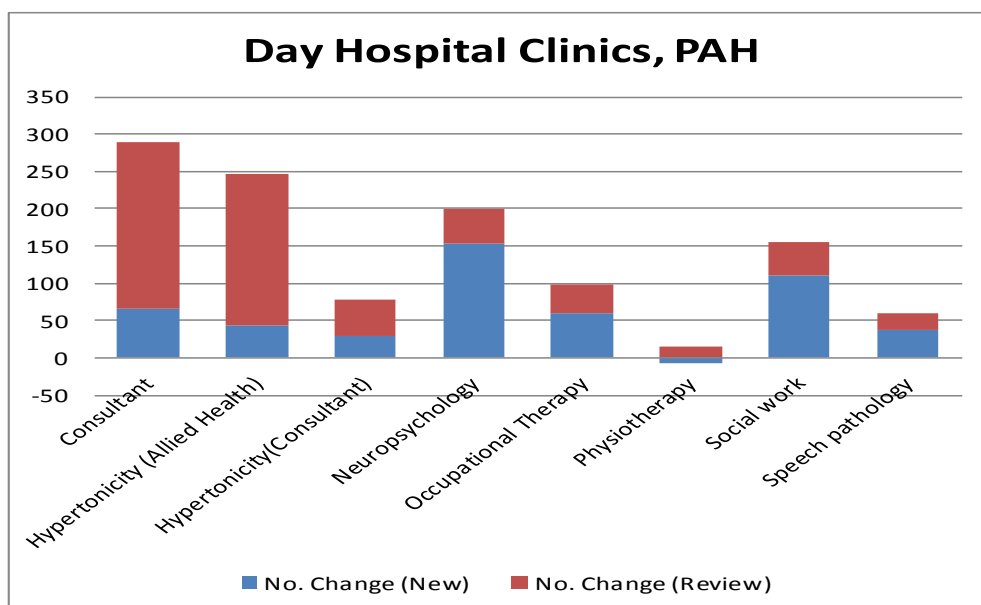
Transition rehabilitation

No transitional rehabilitation activity data is available. However, as there is no formal transition-based service for brain-injured patients, any access will rely on acceptance into programs offered by other clinical specialities or will be based around intensive community rehabilitation. Given limited infrastructure and community workforce, it is assumed that few patients with a brain injury currently have access to transition care.

Specialised ambulatory rehabilitation

Occasions of service at the BIRU Day Hospital were analysed via the Outpatient Service Information Management (OSIM) system (figure 8). There was an annual average of approximately 1600 ambulatory occasions of service annually in the four years to 2012–13, representing a growth rate of over 28 per cent annually, significantly in excess of population growth and growth in incidence of ABI. This is likely to be a result of additional service provision plus the general move towards earlier discharge. The greatest increase in OOS was for new outpatient attending neuropsychology clinics (153 OOS—100 per cent growth), and for review outpatients attending consultant clinics (203 OOS—93 per cent growth) and hypertonicity clinics (203 OOS—472 per cent growth). Anecdotal data from clinicians indicates inadequate ambulatory rehabilitation capacity, particularly within some of the specialty clinics, but there is no data available to quantify this feedback.

Figure 8 Occasions of service by clinic type at the BIRU Day Hospital, 2009-10 to 2012-13



Source: Outpatient Services Information Management (OSIM) system, extracted 8 January 2014

Specialised community rehabilitation activity

Data held by ABIOS indicates that an annual average of 223 clients received direct services in the five years to 2012–13, 55 per cent of those within South East Queensland, consistent with the ABIOS model to provide direct services within a 150 kilometre radius. Annual activity has remained steady.

ABIOS also provided 129 training events to 2137 participants over the five years examined, with annual activity steady during that period. Almost all of these events were provided to other formal organisations (e.g. slow stream rehabilitation units, non-metropolitan allied health professionals, nursing services, lifestyle support services and other disability services).

Over the five financial years to 2012–13, the STEPS Program provided services to an average of 220 people with an ABI and carers per year through the six week STEPS Skills Program, to increase capability and promote independence in the community. Furthermore, active membership of ongoing, monthly Network Groups increased from 158 people in 2010 to 418 in 2013. There are currently 29 Network Groups in Queensland communities, optimising local community participation and reintegration. The largest proportion of clients in this program was residents from Metro South, Metro North and Central Queensland. There is no available community data to quantify unmet demand.

In summary, whilst increasing inpatient activity is largely a result of population growth, there has been much faster growth in demand for ambulatory services which is likely to continue.

Projected service use

Five-year, historical activity⁹ by place of residence was used to project bed days to 2025. As there was significant variability in bed days—across HHS year on year—the five-year average was used as the base data. A Compound Annual Growth Rate of 2.0 per cent (in line with the current population growth rate) was applied to the average and projected using linear trending. This projected activity was converted to required bed numbers using the Department's endorsed health service planning guideline for adult rehabilitation beds. The functional conversion to determine bed requirements is:

Required beds = annual bed days ÷ annual days of operation * ÷ target occupancy * where:

* annual bed days = overnight bed days (actual and projected)

* annual days of operation = assumed to be 365 days

* target occupancy = 0.90 (i.e. 90%)

Table 3 (page 34) details projected bed requirements across Queensland. These bed numbers must be viewed with caution for several reasons including:

- data variability and coding anomalies
- projections that are based on five-year historical data, therefore the outlying years cannot be projected with certainty
- the projections do not account for any population changes above those within the five year trends.

⁹ 2008/09 to 2012/13 based on AN-SNAP codes and episode codes for brain injury rehabilitation and haemorrhagic stroke outlined in section 11.3.2

Patient flows

Table 9 Patient flow by place of residence in 2012–13

HHS of residence	HHS of treatment			
Cairns and Hinterland	Cairns and Hinterland 51%	Townsville 47%	Metro North 2%	Metro South 1%
Central QLD	Central Queensland 52%	Metro South 42%	Metro North 6%	
Central West	Townsville 50%	Metro North 39%	Central Queensland 10%	Metro South 2%
Darling Downs	Metro South 61%	Darling Downs 25%	Metro North 14%	
Gold Coast	Gold Coast 73%	Metro South 23%	Metro North 3%	
Mackay	Townsville 53%	Metro South 25%	Mackay 22%	
Metro North	Metro North 67%	Metro South 33%	Gold Coast 1%	
Metro South	Metro South 90%	Metro North 7%	Gold Coast 3%	
North West	Townsville 100%			
South West	Metro North 100%			
Sunshine Coast	Sunshine Coast 50%	Metro South 37%	Metro North 11%	Cairns and Hinterland 2%
Torres and Cape	Cairns and Hinterland 96%	Townsville 4%		
Townsville	Townsville 76%	Metro South 24%		
West Moreton*	Metro South 45%	West Moreton 39%	Townsville 9%	Metro North 6%
Wide Bay	Wide Bay 37%	Metro North 34%	Metro South 30%	

Source: Queensland Hospital Admitted Patient Data Collection (QHAPDC), extracted 26 June 2015.

Bed days for adults 15–69 years of age with overnight or longer stay.

Includes bed days where a patient had a primary diagnosis of ICD codes S06 (Intracranial Injury), I60 (Subarachnoid haemorrhage) I61 (Intracerebral haemorrhage) I62 (Other non-traumatic intracranial haemorrhage) followed by any episode of rehabilitation

Excludes patients with a SNAP code of brain, neuro, spine MMT in spinal units, people for which a place of residence was not recorded and Northern NSW stroke patients

*Approximately 2% of West Moreton residents received treatment in the Darling Downs HHS

Totals may not equal 100% due to rounding.

Appendix 4 **Summary of service needs and issues in the current provision of specialised brain injury rehabilitation services**

Consultation was undertaken across the state to identify perceived current service issues, needs and gaps. Stakeholders confirmed that optimal outcomes for people with an ABI are constrained by the current health system and service model issues. Metro South HHS identified this as an issue when requesting the Plan and by the PSC and CAG in directing the project.

Thematic analysis was performed on all feedback and a number of themes emerged from the consultation. These are presented in detail in the *Service Needs and Issues Paper*⁽⁴²⁾ and a summary is provided here to provide context for the actions identified in this plan.

Service needs and issues

System, communication and coordination issues

Stakeholders indicated that the development of overarching statewide governance via a group similar to a clinical network could drive quality improvement; consistency; effectiveness and efficiency; encourage partnerships between care providers across the continuum and help avoid services and professionals operating in silos. The NSW Brain Injury Rehabilitation Directorate (BIRD) is an example of a formalised network with the potential to unite the brain injury rehabilitation system across the state. Such a network could assist in improving coordination, communication and collaboration between service providers and provide a means of information sharing beyond the boundaries of direct service provision by including representation from supportive agencies and academia.

It has become apparent that there are limited mechanisms to demonstrate patient outcomes, including benchmarks and key performance indicators as well as mechanisms to inform rigorous service planning. Consultation indicated the following factors contributed to these issues:

- integration between service settings and stages of care
- timely transfer of patient records including through an electronic medium
- standardisation of data including coding inconsistencies across facilities
- ability to evaluate and benchmark performance.

Access

Probably the most significant current issue for brain injury rehabilitation in Queensland is the need for improved, equitable and timely access to all elements of the rehabilitation care continuum plus required mental health, drug and alcohol services. This includes not only access to specialised in-hospital services, irrespective of where someone lives in Queensland, but also community rehabilitation including transitional rehabilitation and

ambulatory clinics. Stakeholders identified access to hypertonicity services and case management as particularly difficult. The BIRU Day Hospital at PAH currently provides the only multidisciplinary specialist hypertonicity service in Queensland, limiting access for outpatients beyond practical geographic distances.

Case management services, provided by ABIOS, enable continuity and consistency in the coordination of support services as client's transition through a range of care environments. Case management also supports psychological adjustment and family sustainability after brain injury, but insufficient services and an inadequate current reach means that people in regional, rural and remote locations have minimal access to short and long-term case management services, including specialist behaviour management.

Increasing demand and the concentration of specialist service provision in the South East Queensland corner are considered the major causative factors in limiting equitable access. Variations in eligibility criteria for accessing supportive care, cultural factors, and social and cognitive difficulties for brain injured adults are also associated with hindering access.

Clinical issues

Those consulted confirmed a commitment to the provision of holistic patient and family care underpinned by robust, goal-based, person-centred, care planning which includes all stakeholders and is guided by evidence-based clinical guidelines, care pathways, processes, models of care and protocols between services. Feedback identified a number of areas for ongoing improvement including early intervention (often delayed due to bed availability), improved attention to psychosocial and behavioural issues rather than concentration on physical rehabilitation alone, and the need to cater to the unique needs of different patient groups. Gaps in provision were noted across the broad spectrum of severity (mild to severe) particularly with respect to services for people with a mild traumatic brain injury and around care provision for those with severe brain injury requiring a more prolonged period of rehabilitation. Despite agreement that most people with an ABI require life-long care, there is less emphasis on long-term/life-long rehabilitation requirements as opposed to the immediate post-acute period.

Development of standardised tools, pathways and protocols would assist in the provision of high quality effective and efficient care. Respondents also highlighted that continuity was key to maximising rehabilitation outcomes.

Transition and community

A major gap identified during consultation was the lack of transitional rehabilitation services (ideally home-based) to support early discharge and provide intensive therapy whilst adjusting to living in the community. Additional community discharge options (including accommodation and disability support), access to vocational, education and training opportunities and funding geared toward community-based rehabilitation would aid successful independent living and minimise hospital readmissions whilst offering the opportunity to participate in a meaningful way in community life. The current scarcity of accommodation and disability support options for young people with an ABI often leads to inappropriate placement of young people in aged care or living in inappropriate accommodation options that increase vulnerability. Greater clarity around implications associated with the introduction of the NDIS and NIIS will also be required, as more information becomes available regarding the roll-out of these schemes.

Workforce

Respondents indicated there is a need for increased numbers of specialised staff to support, manage and follow-up adults, particularly in regional, rural and remote areas. Improved access to education and training (including resources) for staff to gain skills in ABI is necessary across the care continuum, including specialty areas, general rehabilitation units, community and primary care providers such as General Practitioners. Consideration of sufficient staff numbers to support education provision and attendance at training is required during workforce planning activities.

Technology, equipment, innovation

Respondents indicated there is a need for improved access to technologies such as telehealth, videoconferencing, Skype and other smart technologies to circumvent the need for patient travel and enable improved provision of care in regional, rural and remote areas.

Issues associated with specific population groups

There is general consensus among stakeholders that whilst current services are insufficient to meet the needs of the general population, some groups face additional disadvantage due to a variety of system, service model and cultural issues.

There is limited access to services close to home for people living in rural and remote locations due to current service models. People with a brain injury who usually live in rural and remote locations are removed from family and support networks for extended periods for inpatient treatment, and frequent travel by family members may be difficult. There may be significant expenses associated with travelling to receive treatment at specialised services and ongoing difficulties when people return to their community due to minimal community support.

Aboriginal and Torres Strait Islander peoples appear to be underrepresented in specialised brain injury rehabilitation service utilisation⁽⁴³⁾. The reasons for this are assumed to be complex, incorporating pre-existing disadvantage associated with health, economic and social factors, along with kinship and family obligations which tend to be of greater importance than personal health needs and affect the likelihood of accepting long hospital stays and ongoing dependence upon health care services. This is even more pronounced for Aboriginal and Torres Strait Islander people living in rural and remote areas. The low use of rehabilitation services by Aboriginal and Torres Strait Islander people can lead to the inaccurate perception that the need for disability services is minimal rather than recognising the barriers to service utilisation⁽⁴⁴⁾.

Although the BIR service typically provides care to people aged up to 65, it is recognised that retirement ages are rising and people are frequently economically active beyond 65 years. In addition, many 65 year olds are relatively fit and healthy and stand to benefit greatly from the intensive rehabilitation that specialist BIR provides. There was general consensus that older people (65 and over) should have access to specialised BIR services where benefit was considered to exist and that decisions should be made on an individual basis by clinicians via the referral process.

BIR for children and adolescents was beyond the remit of this Plan. However, it was noted that whilst specialised BIR services for children are provided at the Lady Cilento Hospital, there is a gap in specialised provision for adolescents. Transition practices for seamless

progression from paediatric to adult services also requires attention in instances of ongoing rehabilitation requirements.

The Plan recommends consideration of the specific needs of children with an ABI in any statewide paediatric plan development, including adolescents transitioning to adult services. It is recommended that paediatric planning focuses on, but is not limited to:

- developing mechanisms (i.e. clinical guidelines, pathways) to support seamless transitioning between services
- ensuring appropriate specialised paediatric services e.g. return to school and ongoing school support are available post transition, as and when required to adolescent using adult services.

Appendix 5 Project members and stakeholders

Project Steering Committee members

Position	Role
Nursing Director, Division of Rehabilitation, Princess Alexandra Hospital	Chair
Medical Chair, Division of Rehabilitation Service, Princess Alexandra Hospital	Steering Committee Member
Nurse Practice Consultant, Rehabilitation Unit, Caloundra Hospital	Steering Committee Member
Director, Geriatrics and Rehabilitation Services, Royal Brisbane and Women's Hospital	Steering Committee Member
Ass. Allied Health Director/Service Manager, Jacana ABI Unit Bracken Ridge	Steering Committee Member
Consultant, Rehabilitation Unit, The Townsville Hospital	Steering Committee Member
Senior Director, System Planning Branch, Strategy, Policy and Planning Division	Project Owner and Sponsor
Director, Health Services Research, Analysis and Modelling (HSRAM), Strategy, Policy and Planning Division	Project Director

Clinical Advisory Group members

Position	Role
Medical Director, Rehabilitation Service, Gold Coast University Hospital	Clinical Advisory Member
A/Director, Brain Injury Rehabilitation Service, Princess Alexandra Hospital	Clinical Advisory Member
Staff Specialist, Rehabilitation, The Prince Charles Hospital	Clinical Advisory Member
Manager, ABI Outreach Service (ABIOS), Princess Alexandra Hospital	Clinical Advisory Member
Skills to Enable People and Communities (STEPS)	Clinical Advisory Member
Acting Clinical Nurse Consultant, Brain Injury Rehabilitation Unit, Princess Alexandra Hospital	Clinical Advisory Member

Stakeholders consulted

Organisation	Participants
Brain Injury Australia	Executive Officer
Open Minds	ABI Consultant
Rehability	Director

Organisation	Participants
Royal Australian New Zealand College of Psychiatrists	Chair
Speech Pathology Australia	Manager, Policy and Advocacy
Australian Association of Social Workers (Qld Branch)	Multiple members
Dietitians Association of Australia	Senior Policy Officer
James Cook University, Mount Isa Centre for Rural and Remote Health	Director
Centre of National Research on Disability and Rehabilitation (CONROD)—Griffith University and University of Queensland	Senior Research Fellows, CONROD Chair in rehabilitation, CONROD Associate Director Associate Professor (School of Health and Rehabilitation Sciences and Princess Alexandra Hospital. University of Queensland) Associate Professor (CONROD and Rehability ABI Services) Multiple other members
Agency for Clinical Innovation—New South Wales Brain Injury Directorate	Manager, Brain Injury Directorate, NSW
Allied Health Professions' Office Queensland, Health Service Clinical Innovation Division	A/Team Leader
Health Support Queensland	Principal Radiographic Advisor
Carers Queensland	Manager Client Services North
Gold Coast Hospital and Health Service	Medical Director, Rehabilitation GCUH Project Director, GCUH Director Medical Services, Tweed Byron Health Service Group, The Tweed Hospital General Manager, GCUH Speciality and Procedural Services,
Darling Downs Hospital and Health Service	Team Leader Geriatric Adult Rehabilitation Stroke Service (GARSS) Social Worker, GARSS Nursing Director, Disability options, Extended Inpatient Mental Health Services Nurse Unit Manager (NUM) Rehabilitation Ward NUM, Walwa Unit, Extended Inpatient Mental Health Services CN, Rehabilitation Coordinator AAHP Physiotherapist. Multiple officers, Warrina Services Consumers Carer Consultant Student OT, Multicultural Development Association Physiotherapist Support workers, Quality Lifestyle Support.

Organisation	Participants
Cape York Hospital and Health Service	Principal Workforce Planner, Rural and Remote Clinical Support Unit
Central West Hospital and Health Service	Executive Director, Medical Services
South West Hospital and Health Service	CNC, Roma Hospital
Sunshine Coast Hospital and Health Service	Rehabilitation Consultant, Caloundra Hospital, Nurse Unit Manager, Rehabilitation Unit Caloundra Hospital Director, Engagement and Planning Project Manager, Planning and Capacity Development Professional Lead, Social Work, Nambour Hospital Allied Health Assistant Director-Surgical Services GP Liaison Officer Project Manager/Clinical Planner
Metro North Hospital and Health Service	Allied Health Team, Jacana Bracken Ridge Executive Director Clinical Services, RBWH Director of Geriatric Medicine, RBWH Director Occupational Therapy, RBWH Staff Specialist Rehabilitation, TPCH Staff Specialist Rehabilitation Redcliffe Caboolture Health services Service Manager, Jacana ABI Unit Director of Subacute/Director of Nursing Brighton Campus Team Leader, Central Clinical Networks
Metro South Hospital and Health Service	Division of Clinical Support Services A/Director BIRS Neuropsychologist A/NUM PAH Physiotherapist Team Leader OT Speech Pathologist Manager ABIOS A/Clinical Nurse Consultant Social Worker A/NUM Casuarina Lodge (Jasmine Unit) Staff Specialist Rehabilitation, PAH Director of Psychology, PAH
Statewide Trauma Clinical Network	Chair Principal Project Officer
Motor Accident Insurance Commission (MAIC) Queensland Treasury and Trade	Principal Policy Officer
NRMA Insurance Australia Limited	Senior Manager, Policy, Scheme Design and Injury Prevention
Suncorp Insurance	Injury Management Specialist

Glossary

Term	Description
ABI	Any damage to the brain that occurred after birth. Common causes of ABI include accidents, stroke, lack of oxygen and degenerative neurological disease. ABI-related disability can affect cognitive, physical, emotional and independent functioning. ⁽²³⁾
Activity Based Funding	A way of funding hospitals where hospitals are paid for the number and mix of patients they treat. Each patient episode is counted including inpatient admissions, emergency department presentations and outpatient appointments as well as a range of mental health and rehabilitation services. ⁽⁴⁵⁾
Australian Rehabilitation Outcomes Centre (AROC)	The Australasian Rehabilitation Outcomes Centre (AROC) is a joint initiative of the Australian rehabilitation sector. AROC was established to develop a national benchmarking system, produce information on the efficacy of rehabilitation interventions, develop clinical and management information reports, provide education and training and certification in the use of Functional Independence Measure (FIM) and other outcome measures, provide annual reports summarising Australasian rehabilitation data, develop research proposals. ⁽⁴⁶⁾
Australian Productivity Commission	An Australian Government independent research and advisory body on a range of economic, social and environment issues affecting the welfare of Australians ⁽⁴⁷⁾ .
Block funding	Another way of providing funding for health services. In Queensland it is provided to small and regional hospital services when activity-based funding (ABF) is not a suitable model to use. ⁽⁴⁸⁾
Care continuum	A concept involving an integrated system of care that guides and tracks patients over time through a comprehensive array of health services spanning all levels of intensity of care.
Focal brain injury	Damage to the brain is localised/confined to a particular area. Focal brain damage is produced by collision forces acting on the skull and resulting in compression of the tissue underneath the cranium at the site of impact (coup) or of tissue oppositely to the impact (contre-coup). ⁽³⁴⁾
Glasgow Coma Scale	An indicator that generates a score between 3 and 15 based on a person's abilities in eye opening and motor and verbal function. It is a quick and easy tool used to assess the severity of traumatic brain injury in the acute setting. The GCS gives a prognosis for survival rather than for functional outcomes. ⁽³³⁾
Diffuse brain injury	Damage to the brain is widespread and is most often caused by rapid acceleration-deceleration of the head e.g. high-speed motor-vehicle accidents. As a result certain segments of the brain move at a slower rate than others, causing shear, tensile and compressive forces within the brain tissue. ⁽³⁴⁾
Heterotopic ossification	The formation of lamellar bone inside soft-tissue structures where bone normally does not exist. ⁽⁴⁹⁾
Hypertonicity	One of the biggest limitations to regaining function. Consequences of hypertonicity may include joint contractures, pressure areas, weakness and tightness of muscles, pain, other soft tissue changes and difficulty with activities of daily living with secondary consequences of falls and fractures often resulting in lengthy hospital admissions. Active management can improve function and lead to decreased rates of hospital readmission. ⁽⁵⁰⁾
Hypertonicity clinics	A specialised medical and allied health run clinic created to assist those people post ABI with hypertonicity as a major limitation to functional recovery. ⁽⁵⁰⁾

Term	Description
Mental health problems/conditions	Mental health problems are diminished cognitive, emotional or social abilities but not to the extent that the criteria for mental illness are met. ⁽⁵¹⁾
Mental illness	Mental illness is a clinically diagnosable disorder that significantly interferes with an individual's cognitive, emotional and social abilities. The diagnosis of mental illness is generally made according to the classification systems of Diagnostic and Statistical Manual of Mental Disorders (DSM) or the International; Classification of diseases. ⁽⁵¹⁾
Models of care	Best practice patient care delivery through the application of a set of service principles across identified clinical streams and patient flow continuums. An overarching design or description of how care is managed and organised within the system (i.e. the, who, what, where and when of patient care in a particular context).
Multidisciplinary team	A team that collectively provides more knowledge and experience than disciplines operating in isolation. Teams utilise the skills and experience of individuals from different disciplines, with each discipline approaching the patient from their own perspective. These may occur in a "one-stop-shop" fashion with all consultations occurring as part of a single appointment on a single day. It is common for multidisciplinary teams to meet regularly, in the absence of the patient, to "case conference" findings and discuss future directions for the patient's care. ⁽⁵²⁾
Post-traumatic amnesia (PTA)	The period of recovery between sustaining a traumatic brain injury and the return of reliable continuous memory. A person experiencing PTA will present as confused about the time, the place he/she is in and personal details. They will have unreliable continuous memory for day to day events, such as who had visited the previous day. ⁽⁵³⁾
Specialised hub service	A HHS that provides the continuum of brain injury rehabilitation services to a designated catchment.
Specialised Tertiary BIRS	A HHS that provides the continuum of brain injury rehabilitation services to the most complex patients.
Traumatic Brain Injury	A non-degenerative, non-congenital insult to the brain from an external mechanical force, possibly leading to permanent or temporary impairment of cognitive, physical, and psychosocial functions, with an associated diminished or altered state of consciousness.
Vestibular clinics	The vestibular system including the parts of the inner ear and brain that process the sensory information involved with controlling balance and eye movements. If disease or injury damages these processing areas, vestibular disorders can result. Vestibular rehabilitation is an exercise-based program, designed by a specialised physiotherapist, to improve balance and reduce dizziness-related problems.

Abbreviations

Abbreviation	Term
ABI	Acquired Brain Injury
ABIOS	ABI Outreach Service
AFRM	Australasian Faculty of Rehabilitation Medicine
AN-SNAP	Australian National Sub and Non-Acute Patient
AROC	Australasian Rehabilitation Outcomes Centre
BIRD	Brain Injury Rehabilitation Directorate
BIRS	Brain Injury Rehabilitation Service
BIRU	Brain Injury Rehabilitation Unit
CAG	Clinical Advisory Group
CARS	Community Adult Rehabilitation Service
CBRT	Community-Based Rehabilitation Team
CCAQ	Clinical Coding Authority of Queensland
CONROD	Centre for National Research on Disability and Rehabilitation Medicine
GCHHS	Gold Coast Hospital and Health Service
GCS	Glasgow Coma Scale
GCUH	Gold Coast University Hospital
HHS	Hospital and Health Service
HPSP	Healthcare Purchasing and System Performance Division
ICD	International Classification of Diseases
ieMR	integrated electronic Medical Record
MAIC	Motor Accident Insurance Commission
MMT	Major Multiple Trauma
mTBI	mild traumatic brain injury
NDIS	National Disability Insurance Scheme
NIIS	National Injury Insurance Scheme
NSW	New South Wales
PAH	Princess Alexandra Hospital
PHN	Primary Health Network
PSC	Project Steering Committee
PTA	Post Traumatic Amnesia
RBWH	Royal Brisbane and Women's Hospital
SCHHS	Sunshine Coast Hospital and Health Service
SRbCN	Statewide Rehabilitation Clinical Network
STEPS	Skills to Enable People and Communities
the Plan	Statewide Adult Brain Injury Rehabilitation Plan
THHS	Townsville Hospital and Health Service
TTH	The Townsville Hospital
TTY	Teletypewriter

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