



# **Process-ABI: Evaluation of the processes of developing a statewide specialist severe ABI rehabilitation service**

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### Related project

Rehabilitation after catastrophic acquired brain injury: Evaluation of process and outcomes of a specialist ABI unit and its impact on long term quality of life and community participation

### Key words

1. TBI (Traumatic Brain Injury)

2. Rehabilitation

3. Stroke

4. ABI (Acquired Brain Injury)

5. Model of care

6. Best-practice

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## Abbreviations

ABI	Acquired Brain Injury
CPG	Clinical Practice Guideline
TBI	Traumatic Brain Injury
n	Number
p	Probability
RN	Registered Nurse
EN	Enrolled Nurse
ANUM	Assistant Nurse Unit Manager
AIN	Assistant in Nursing
AHA	Allied Health Assistant
NPDS	Northwick Park Dependency Scale
ABS	Agitated Behaviour Scale
FIM™	Functional Independence Measure™

## Executive Summary

The Process-ABI project evaluated the implementation, mechanisms of change and context of implementing the model of brain injury rehabilitation at the Alfred Health Acquired Brain Injury Rehabilitation Service between 08/09/2014 and 31/12/2015, with the aim of developing a best-practice service. This is an evaluation of multiple processes, undertaken simultaneously, and sources of information varied.

This project had the following aims:

1. What components of the implemented model of care map to published clinical practice guidelines?
2. How has the model of care been implemented and adapted over the initial 12 month period?
3. What perceptions are held about the process of care delivery by patients, their families, staff and community collaborators (referrers and post-discharge referrals)?
4. What factors influenced the implementation of the model of care (community, service, funder, patient and family)?

Using an active research translation framework, the effects of interventions provided were measured (using a variety of methods), perceptions were sought from multiple stakeholders (patients, family members, staff and external organisations) and recommendations to staff and management were generated based on the project's data on an ongoing basis throughout the study period.

The important findings arising from this study were:

1. The model of care mapped well to published clinical practice guidelines (CPGs) in brain injury and stroke. Regular audit and feedback embedded in the Service showed improvements in adherence to guideline indicators from 35% to 96%.
2. Processes to implement the model of care were adapted by clinical staff and management during the initial year of operation. Staff levels, diagnoses of patients and the high numbers of admissions who experienced high nursing dependence and behaviours of concern influenced the ease with which the model could be implemented in the new Service.
3. Attitudes towards the Service from both consumers and staff were generally positive, suggesting a general acceptance of a model of care which aims to engage patients and their families in the rehabilitation program and embed evidence into practice.

Recommendations included:

1. The continued development of the admission criteria for the Service, undertaken in conjunction with a review of staffing levels, as data suggested that the admitted patient population differed from the population forecast prior to opening.
2. Rehabilitation services should implement a model of care which ensures advocacy for patient / family goals and engagement with consumers during rehabilitation.
3. Rehabilitation services are encouraged to select and monitor delivery of rehabilitation against CPGs and provide regular opportunities for clinicians to discuss adherence to CPGs so as to indicate potential issues and support change.
4. Additional research should target discharge planning with adults with TBI and could aim to develop a better understanding of the underlying processes that are related to best outcomes, in particular in adults who display challenging behaviours.

## Purpose

Rehabilitation which helps an individual to improve their independence may be expected to reduce the long term costs associated with life-long brain injury. However, for rehabilitation to ultimately be effective, it must be based on best-practice evidence. The Process-ABI study evaluated the implementation, mechanisms of change and context of implementing the model of brain injury rehabilitation at the Alfred Health Acquired Brain Injury Rehabilitation Service, with the aim of developing a best-practice service.

Process evaluations primarily document whether a model of care was implemented as planned and how to improve the implementation of the model to improve results. In this way, the evaluation measured what actions or events were implemented with different clients. This study provides an important contribution for program improvements, looks at future program needs, and will provide new information to other services and clinics seeking to change their model of rehabilitation care. Results should also be of interest to the growing number of services funded to deliver community-participatory approaches to healthcare delivery.

## Key research questions

1. What components of the implemented model of care map to published clinical practice guidelines?
2. How has the model of care been implemented and adapted over the initial 12 month period?
3. What perceptions are held about the process of care delivery by patients, their families, staff and community collaborators (referrers and post-discharge referrals)?
4. What factors influenced the implementation of the model of care (community, service, funder, patient and family)?

## Methods

Evaluation efforts commenced on unit opening (September 2014), and this report highlights evaluation findings from the initial year of operation. This evaluation provides insights regarding the strength of the service relative to its goals and the facilitating factors and barriers encountered on opening. The process evaluation collected data reflecting patient demographic information, patient and family satisfaction, process of care information, and recommendations for program improvement from both staff and consumers using a variety of methods (data linkage, audit, observation, survey and qualitative interviews and focus groups).

This evaluation primarily focused on assessing perceptions, experiences and values against a comprehensive framework developed by Sicotte and colleagues. The selected framework includes goal attainment, production and adaptation to the environment as core dimensions of performance, but it usefully adds a focus on values and culture which we deemed important in undertaking an evaluation of a health service (le modèle d'Evaluation Globale et Intégrée de la Performance des Systèmes de Santé', or the

acronym EGIPSS) (Leggat, Narine et al. 1998, Champagne and Contandriopoulos 2005).

### **Box 1:** Key features of the Evaluation

**Service Provision:** To achieve its goals, the Alfred Health Acquired Brain Injury Rehabilitation Service needs to organise and coordinate its processes (which consist of clinical and support services). This evaluation will centre on assessing the service in terms of intake, volume, staffing ratios and quality of services.

**Adaptation:** The Alfred Health Acquired Brain Injury Rehabilitation Service planned to respond to the needs and priorities of the population and other stakeholders, and to take their values into account. It was also anticipated that new staff would shape policies and procedures to meet service goals over the initial year of operation.

**Goal Attainment:** The Alfred Health Acquired Brain Injury Rehabilitation Service outlined aims and goals it wanted to achieve. The model of care defined the Service goals as consumer satisfaction, patient-centred goal-directed rehabilitation, and evidence-based rehabilitation.

**Culture and Values Maintaining:** The Alfred Health Acquired Brain Injury Rehabilitation Service was evaluated for its ability to maintain fundamental values (including integrity, accountability, collaboration, and knowledge), as well as the organisational climate in which Alfred Health Acquired Brain Injury Rehabilitation Service operates.

Data were collected on the areas outlined in Box 1 from a variety of sources, including (1) in-depth semistructured interviews with patients (n=4) and family members of patients (n=8), (2) data from mailed surveys to patients and family member dyads prior to discharge (n=46) and post-discharge (n=111), (3) focus group interviews with staff (n=2 groups, n = 28 staff), (4) data from mailed surveys to staff and management (n=93) (5) data from mailed surveys to community stakeholders (n=21), (6) consumer audits (n=6), (7) medical record audits and periodic service reviews (n=52 audits), (8) observational audits (n=3 audits of n=12 patients in total), and (9) hospital administration reports (n=3, referral database, Riskman database, staff timesheets/statistics).

Evaluation results have been reviewed by the investigator committee, the executive staff of Rehabilitation and Ageing at Alfred Health, and presented to clinical staff on a regular basis. In this formative component of the participatory evaluation design, information was channelled back to the staff and used as a basis for discussion and, in some cases, changes in staff activities, policies or foci. Key to this action research approach was that staff were supported using a positive-behavioural support model to determine future process of care changes and make their own decisions as a team as to what changes to enact.

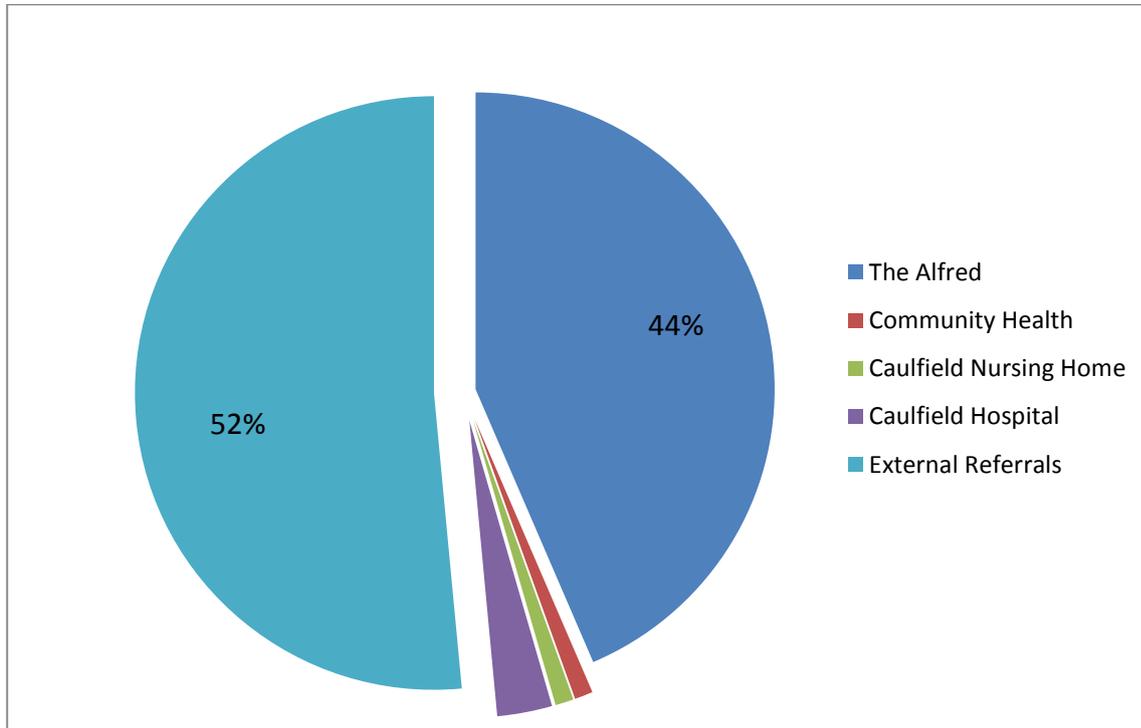
## **Research Findings**

### **Service Provision**

#### *Referral and Intake*

All referrals from the date of the unit opening (08/09/14) until 30/11/2015 were evaluated to provide an understanding of the intake processes in the Alfred Health Acquired Brain Injury Rehabilitation Service. During this period n=275 adults were

referred and n=182 were admitted to the Alfred Health Acquired Brain Injury Rehabilitation Service (66%). Of those patients referred, n=218 received a bed at an Acquired Brain Injury (ABI) rehabilitation unit in Victoria (79%), with Royal Talbot admitting n=31 of this sample (14%), and Alfred Health admitting n=182 (83%).



**Figure 1: Referrals received from 08/09/14 to 30/11/2015**

For patients who were referred but not admitted, the reasons provide in the database for non-admission included mild injury (2%), not medically ready for transfer (4%), being “unsuitable” (58%), and “other” (38%) (data limited by documentation of non-admission reasons). Of those referred for an ABI rehabilitation bed, n=133 were referred from an Alfred Health referral source (48%) demonstrating that approximately half of all referrals were internal (referral sources are outlined in Table 1; demographics of both the referred and admitted patients are outlined in Table 2). The majority of referrals were received within one month of brain injury (n=177, 64%). Time post injury to date of referral did, however vary, with n=14 (5%) of referrals being for adults more than 2 years post-ABI.

**Table 1: Referral source for all new inpatient referrals\***

<b>Alfred referrals</b>			
n= 133 48.36%	The Alfred	120	(44)%
	Community Health	3	(1%)
	Caulfield Nursing Home	2	(1%)
	Caulfield Hospital	8	(3%)
<b>Non-Alfred referrals</b>			
n=142 51.64%	Community Health (non-Alfred Health)	1	(<1%)
	Victorian metropolitan acute hospital	97	(35%)
	Victorian regional rehabilitation hospital	2	(1%)
	other Australian acute hospital	9	(3%)
	Victorian regional acute hospital	9	(3%)
	Victorian metro rehab hospital	18	(7%)
	Other source	6	(2%)

\* Referral database captures only new referrals; only inpatient referrals are reported.

Patients requiring re-admission did not need a new referral and are therefore not included in Table 1. Reasons for re-admission included, but are not limited to: required acute care, absconding, extended leave or failed trial at home. Referred patients with readmissions takes the total number of hospital admissions to 257 reported in the hospital administration database (which is reflected in Table 2).

**Table 2: Demographics of both referred and admitted patients**

Diagnosis	Referred Patients, n (%)		Admitted Patients, n (%)		
			Total Sample	TAC	Non-TAC
<b>TBI</b>	160	(58%)	154	(60%)	
<b>Non TBI</b>	115	(42%)	103	(40%)	
<b>Total</b>	275 referrals		257 admissions	70 (27%)	187 (73%)
<b>Gender, Male</b>	202	(73%)	185 (72%)	47 (67%)	138 (74%)
<b>Age</b>					
<b>&lt;20 years</b>	14	(5%)	16 (6%)	14 (20%)	3 (2%)
<b>20-29 years</b>	51	(18%)	39 (15%)	19 (27%)	19 (10%)
<b>30-39 years</b>	51	(18%)	49 (19%)	9 (13%)	40 (21%)
<b>40-49 years</b>	41	(15%)	31 (12%)	9 (13%)	22 (12%)
<b>50-59 years</b>	48	(17%)	57 (22%)	11 (16%)	45 (24%)
<b>60-69 years</b>	47	(17%)	46 (17%)	5 (7%)	42 (22%)
<b>70-79 years</b>	17	(6%)	16 (6%)	1 (1%)	15 (8%)
<b>80-89 years</b>	6	(2%)	3 (1%)	2 (3%)	1 (1%)

#### Admission Data

Admitted patients were aged from 16 to 87 years old (mean age 45), and the most common diagnosis was traumatic brain injury (54%) (See Table 3).

Gender: As shown in Table 3, there were more males than females admitted to the service in its first year of operation. While national statistics from the Australian Institute for Health and Welfare suggests the TBI incidence rate (male: female) to be 2.5:1 and stroke incidence rate (male: female) to be 1.9:2.2, incidence rates were more disparate in our sample. Findings therefore need to be considered in light of the under-representation in our sample of females.

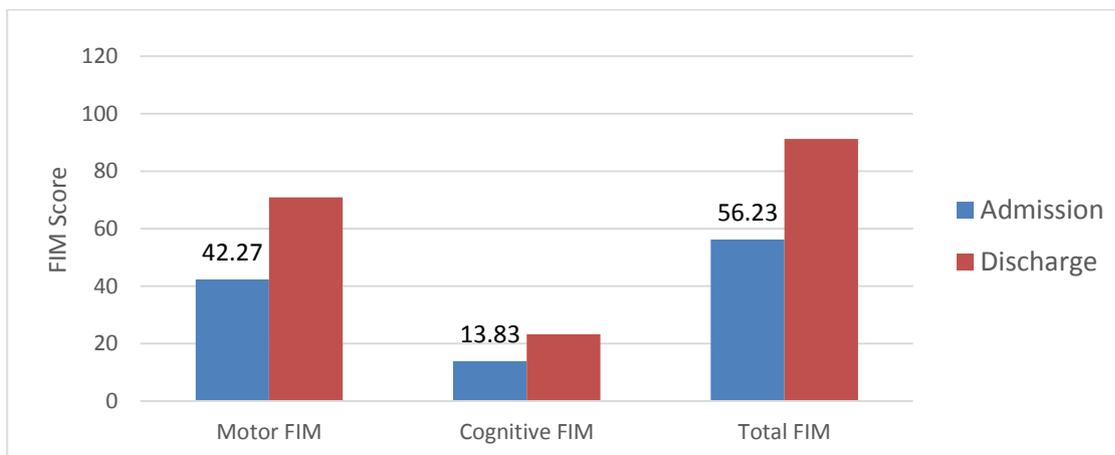
**Table 3: Demographics of admitted patients classified according to diagnosis and compensable status**

		Diagnosis			Compensable Status			Total Sample (n=257)
		TBI (n=138)	Stroke (n=72)	Other Neuro Condition (n=47)	TAC (n=70)	WorkSafe (n=6)	Non-TAC (n=181)	
Age, years	Mean	41.8	49.6	46.4	35.1	38.2	48.8	44.8
	SD	18.3	14.4	14.8	17.1	10.3	15.5	17.0
	Range	16-87	19-71	21-78	16-82	25-53	16-87	16-87
	<b>N</b>	<b>105</b>	<b>48</b>	<b>32</b>	<b>47</b>	<b>5</b>	<b>133</b>	<b>185</b>

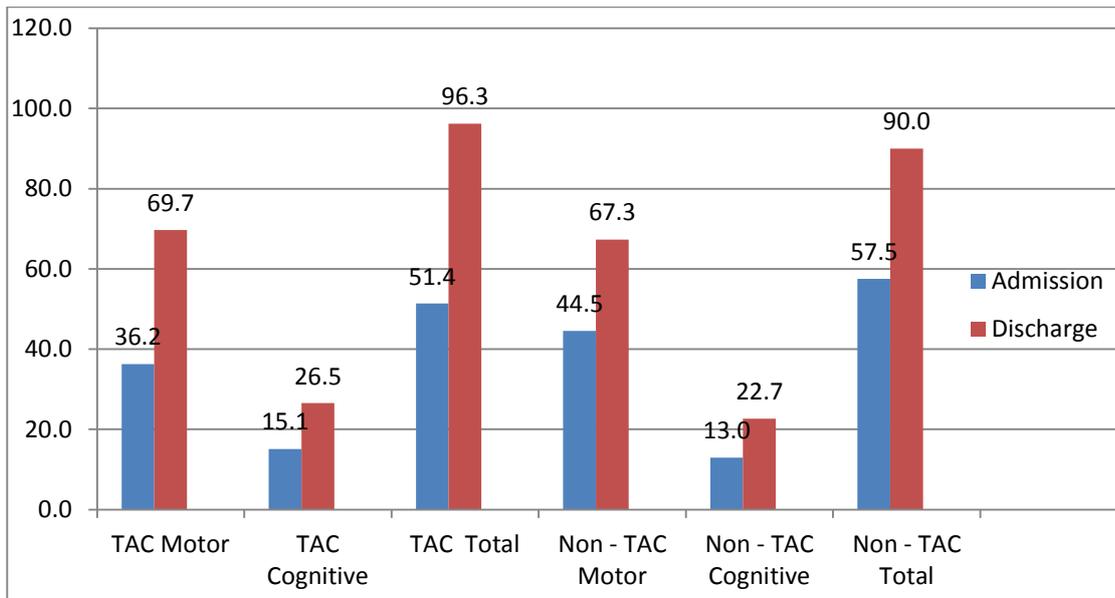
<b>Gender, Male</b>	<b>%</b>	<b>76%</b>	<b>67%</b>	<b>68%</b>	<b>67%</b>	<b>83%</b>	<b>73%</b>	<b>72%</b>
<b>Length of Stay, days</b>	<b>Mean</b>	<b>47</b>	<b>96</b>	<b>55</b>	<b>54</b>	<b>19</b>	<b>67</b>	<b>62</b>
	<b>Median</b>	<b>24</b>	<b>64</b>	<b>47</b>	<b>36</b>	<b>20</b>	<b>44</b>	<b>39</b>
	<b>SD</b>	<b>47</b>	<b>112</b>	<b>51</b>	<b>47</b>	<b>9</b>	<b>81</b>	<b>72.7</b>
	<b>Range</b>	<b>1 - 180</b>	<b>1 - 587</b>	<b>1 - 222</b>	<b>1 - 200</b>	<b>6 - 29</b>	<b>1 - 587</b>	<b>1-587</b>

*Burden of care:* The admitted patient group required a significant amount of care on admission which is shown on the scores in the Functional Independence Measure™ (FIM™) as admission (mean total score 56.2 (Median 54, SD 33.7, Range 18-126, and at discharge from inpatient hospital rehabilitation despite the positive improvements in FIM™ (with discharge FIM™ scores illustrated as Motor score, Cognitive score and Total FIM™ score, see Figure 1). Participants were discharged with an average total FIM™ of 91.3 out of a possible 128 (Median 111, SD 38.4, Range 18 - 126), suggestive of a need for 1-2 hours of help each day from another person to perform basic / personal care activities.

Consistent with the discharge plans for each patient, this average discharge FIM™ score represents the level at which discharge to the home is manageable by family members (Granger 2015). Discharge FIM™ scores did, however, vary; 20% of all discharged patients scored a FIM™ total score of <20 on discharge.



**Figure 2: FIM Scores – All admitted patients** - admission and discharge (maximum motor FIM™ score is 91, maximum cognitive FIM™ score is 35).



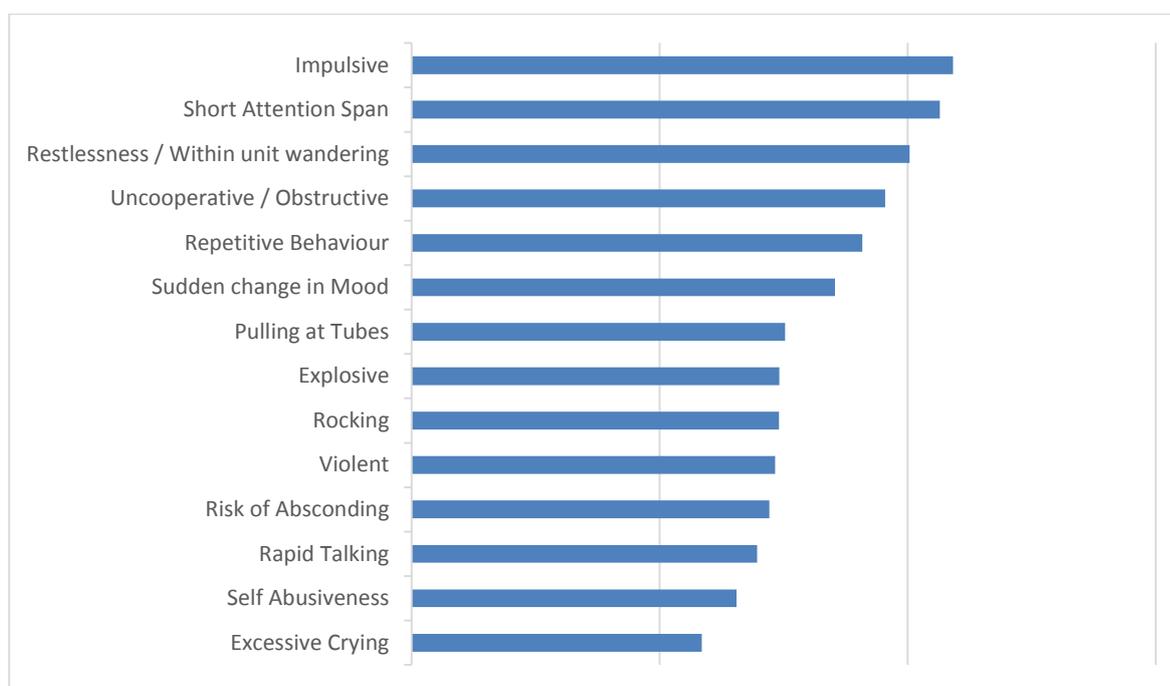
**Figure 3: FIM Scores – TAC and Non-TAC patients – admission and discharge.**

There were n=47 incidents of reported verbal aggression and n=43 incidents of reported physical abuse, n=90 Code Grey security call-outs and n= 8 Code Black Police call-outs over a 12 month period (1 Dec 2014 to 30 Nov 2015).

*There was a likely under-reporting of occasions of verbal aggression and lower levels of physical abuse due to the use of personal distress alarms built into every pager within the Alfred Health Acquired Brain Injury Rehabilitation Service. It was not possible to record the number of distress alarms during the Process Evaluation.*

Of patients with behavioural concerns, the Agitated Behaviour Scale showed the most common concerns assessed were impulsivity, short attention span and restlessness which were rated on average as being of moderate severity (see Figure 2). The average total score for assessed patients was 23 (SD 8.6), the Disinhibition Subscale score was 25, and the average Aggression Subscale score was 22.

Taken together with the incidents of reported behaviours of concern, this suggests a higher number of admitted patients than planned during the modelling phase experienced behaviour related incidents during the first year of operation which has implications on the ability to enact the model of care.



**Figure 4: Ranking of frequency of behaviours of concern as indicated on the Agitated Behaviour Scale**

*Clinical Incidents:* Falls were the largest clinical incident over the initial year of operation (n=157, nil major injury nor death), data did indicate n=85 medication incidents and n=15 pressure injuries acquired in care (all pressure injuries were Grade 2 (low)).

*Staffing: Allied Health*

The Alfred Health Acquired Brain Injury Rehabilitation Service has a multidisciplinary team with significant experience. Staffing ratios in allied health are, however, lower than standards in Neuropsychology, Occupational Therapy, Nutrition, Speech Pathology and Social Work (Table 4).

**Table 4: Allied Health Staffing Ratios (per 10 beds), Alfred Health Acquired Brain Injury Rehabilitation Service compared to published Australian benchmarks**

	Alfred Health Staffing Levels	Published / Benchmarked Staffing Ratios		
		AFRM* <i>TBI</i>	AFRM* <i>Stroke/ Neurology</i>	AHRCC† <i>Rehabilitation</i>
<b>Allied Health Assistants</b>	1.31	0.2	0.5	-
<b>Clinical Psychology</b>	0.33	0.2	0.2	0.2
<b>Neuropsychology</b>	0.53	1	0.6	1
<b>Occupational Therapy</b>	1.38	1.5	1.5	1.5
<b>Nutrition</b>	0.43	0.5	.5	0.5
<b>Prosthetics and Orthotics</b>	0.14	-	-	-
<b>Podiatry</b>	0.05	consult	0.2	0.025
<b>Physiotherapy</b>	1.46	1.25	1.5	1.5
<b>Speech Pathology</b>	0.86	1.5	1.5	1.5
<b>Social Work</b>	1.01	1.2	0.5	1.2

\*AFRM=Australasian Faculty of Rehabilitation Medicine; †AHRCC=Allied Health in Rehabilitation Consultative Committee

Within the inpatient service, clinical statistics were collected which demonstrated that across the n=42 beds:

- allied health assistants provide an average of 1597 occasions of service per month;
- clinical psychology provide an average of 255 occasions of service per month, most commonly providing care planning support;
- neuropsychology provide an average of 296 occasions of service per month, most commonly assessing behaviours of concern;
- nutrition provide an average of 175 occasions of service per month, most commonly providing feeding reviews;
- occupational therapy provide an average of 1086 occasions of service per month, most commonly providing activities of daily living rehabilitation;
- prosthetics and orthotics provide an average of 142 occasions of service per month, most commonly reviewing patients;
- podiatry provide an average of 19 occasions of service per month, most commonly reviewing patients;
- physiotherapy provide an average of 994 occasions of service per month, most commonly providing physical assessment;
- speech pathology provide an average of 736 occasions of service per month, most commonly providing cognitive rehabilitation;
- social work provide an average of 550 occasions of service per month, most commonly providing care planning.

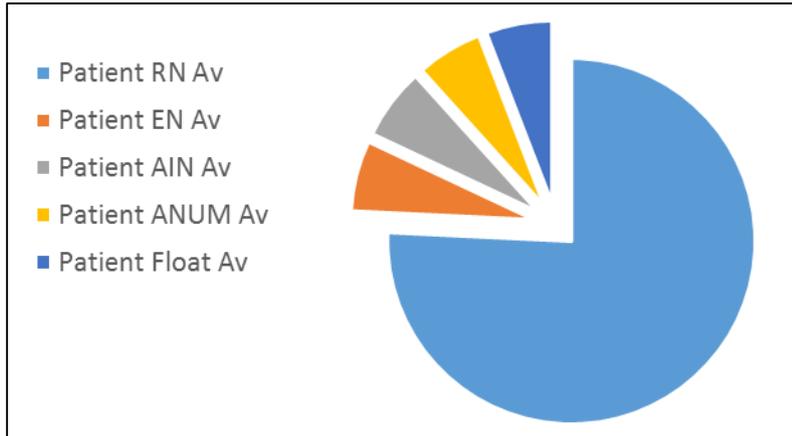
*Key Liaison Roles:* All allied health and senior nursing staff additionally provide general case management support during rehabilitation as a Key Liaison Person (KLP) for admissions. This role coordinates the patient issues list (which requires the KLP to liaise with all involved team members prior to team meetings), is the primary contact for all patient and family questions and concerns, and discusses all plans and goals. There is significant time spent synthesising information for complex admissions, and significant role overlap and potential duplication for social workers, psychologists and occupational therapists.

*Given the importance of this role, the acknowledged specialised skills for case management outlined in the literature, and the inconsistency reported by families in the current process of delivering this role, a recommendation is to undertake an in-depth review of the KLP role.*

#### *Staffing: Nursing*

Nursing staff hours (RN, EN, ANUM, AIN) allocated to direct patient care (not inclusive of those who were observational without allocation) were collated to provide an overview of nursing in the Alfred Health Acquired Brain Injury Rehabilitation Service (Figure 3). When comparing the Service data to benchmarked international datasets, we first confirmed consistent levels of severity of population.

*Comparing our data to the benchmark in UK:* The UK mean total Northwick Park Dependency Scale (NPDS) score in specialist ABI units (Level 1 Rehabilitation Services) is 24.4; mean total Northwick Park Dependency Scale score for our service was 26.1 (*NPDS scores of  $\geq 25$  is a classification of "High" dependency: patients require help from two or more people for most ADL tasks, and often also have special nursing needs*).



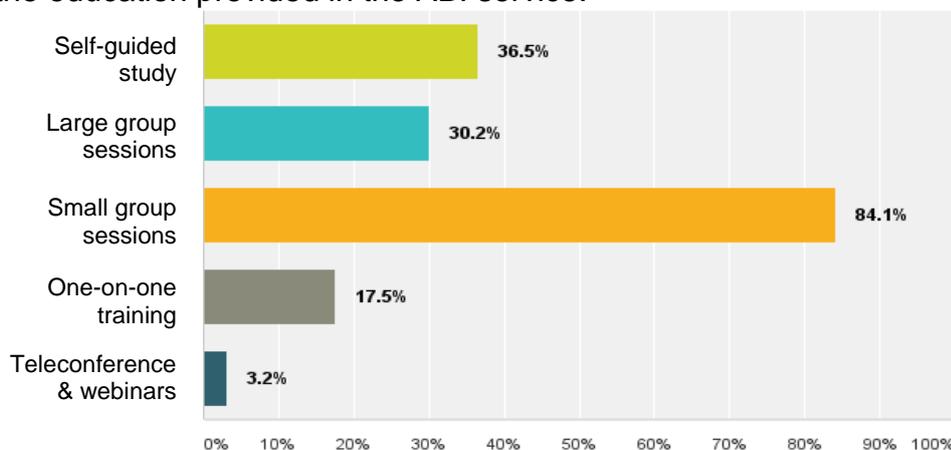
**Figure 5: Nursing staffing breakdown** (average proportions)

The Alfred Health Acquired Brain Injury Rehabilitation service nursing levels produced an effective nursing hours calculation of 40 whole time equivalents (WTE) for 42 beds (19 WTE per 20 beds, majority RN hours). Comparing our data to UK NHS standards for a Level 1 Rehabilitation Unit, they report requiring 25-35 WTE per 20 beds. *Comparisons suggest that Service nursing levels remain lower than benchmarked services both interstate and overseas.*

### Implementation of the model of care

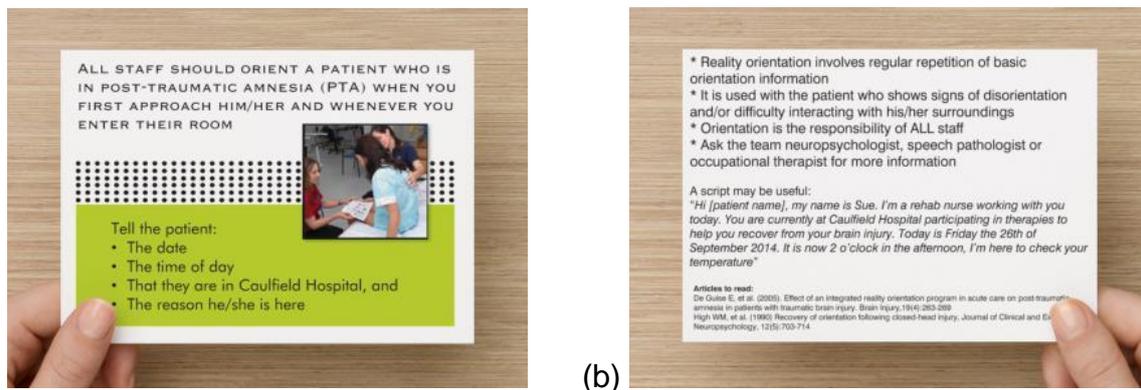
The model of care implemented in the Alfred Health Acquired Brain Injury Rehabilitation Service mapped well to published clinical practice guidelines (Appendix A). Key to the implementation of the model of care were that staff would be evidence-based practitioners, that is, understand clinical practice guidelines, implement research into practice, and collaborate with patients and their families to set goals and plan interventions based on evidence. Process-ABI provided implementation interventions to systematically target the evidence-needs of staff.

On opening, 41% of staff reported knowledge of clinical practice guidelines in brain injury rehabilitation while only 26% were actively implementing these guidelines. Staff identified preferred way(s) of learning about relevant evidence (Figure 4) which guided the education provided in the ABI service.



**Figure 6: Preferred education modalities identified by staff** (percentage)

Over the first year of operation, a number of evidence translation interventions were provided to all staff. These included hosting researchers presenting guest lectures to staff (topics included Using Smartphone technology in clinical practice, Metacognitive Training, Developing a motor circuit group, Relearning emotions after brain injury, Functional assessment: how to use the FAM, Evaluating Nursing Dependency after brain injury, Evaluating outcomes to demonstrate benefits of rehabilitation, Supporting independence and wellness in a mobile technology world after brain injury, Improving community participation: Outdoor mobility and transport training, and Training emotional processing in adults with brain injury), providing point-of-care devices pre-loaded with clinical practice guidelines, posters outlining evidence-summaries from the clinical practice guidelines, and providing a postcard evidence-summary with each payslip every pay-cycle (see example, Figure 5).



**Figure 7: Example postcard evidence summary: reorientation of patients in an amnesic state, front (a) and back (b)**

### *Adaptations to the model of care*

The Alfred Health Acquired Brain Injury Rehabilitation Service model of care was modified in response to the changes and clarifications to processes during the first year of operation. A full list of changes is outlined in Appendix B.

## **Service Goal Attainment**

### **Consumer satisfaction: Patients and Families**

We used a cross sectional, prospective mixed method design (survey and / or qualitative interview data collection method) to better understand consumer satisfaction with our service. Inpatients and their family member(s) were offered an opportunity to complete a satisfaction survey on discharge from the Service (January 2015 and December 2015); patients and families were also offered the opportunity to participate in an interview in addition or instead of completing the survey to further understand satisfaction with our service. The primary outcome measure used was a modified version of the Alfred Health Patient Experience Survey. The survey was modified to include aspects of a systematic review on dissatisfaction with rehabilitation by Alan (1998).

Findings showed that “All things considered, patients would rate the overall quality of care that they received while they had been at the Alfred Health Acquired Brain Injury Rehabilitation Service” as being 6 out of a possible 7 (i.e. excellent), and that “All things considered, families would rate the overall quality of care that the patient (your family member / friend) received while they had been at the Alfred Health Acquired Brain Injury

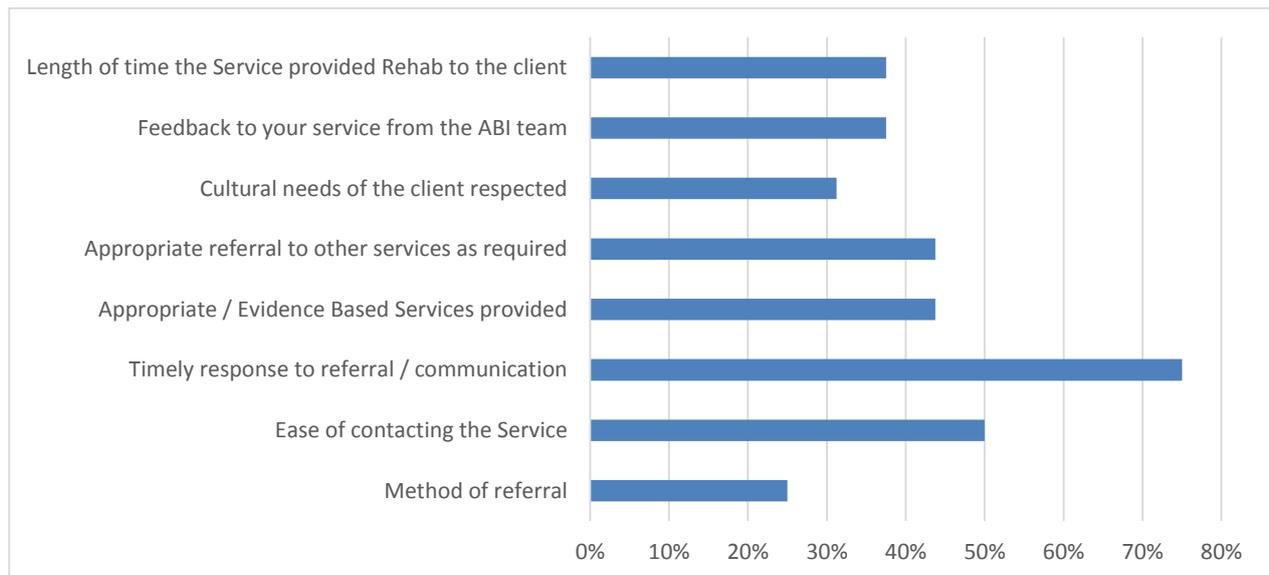
Rehabilitation Service” as being 6.2 out of a possible 7 (i.e. excellent). Despite such high ratings of overall quality, variability in reported levels of involvement in decision-making and planning was noted (see Table 5). Qualitative interviews further elucidated consumer perceptions and raised issues. In particular, variability in staff approachability, an inconsistent approach to discharge planning, the importance of patient and family engagement in goal setting (and a family preference this engagement be managed by social work professionals), and the variability in timeliness of response to family needs and questions between different staff were all noted.

**Table 5:** Survey results showing the average responses for responding patients (n=70) and families (n=41)

		Patient Response	Family Response
How involved have you felt in the process of making decisions and planning for discharge?	Not involved	8.7%	2.4%
	Slightly involved	11.6%	2.4%
	Moderately involved	23.2%	19.5%
	Very involved	36.2%	36.6%
	Extremely involved	20.3%	39%
Do you feel that the things that are important to you (i.e. Your goals and wishes) have been listened to by the staff when you have been planning for your (family member’s) discharge?	Never	2.9%	0%
	Rarely	5.8%	2.6%
	Some of the time	15.9%	5.1%
	Most of the time	39.1%	46.2%
	All of the time	36.2%	46.2%

**Consumer satisfaction: Community Collaborators**

Community collaborating services were invited to provide feedback on the Acquired Brain Injury Rehabilitation Service (n=13 responses received from across acute hospital (referring services), private practice / therapy services, community nursing service, community health, supported accommodation, and advocacy services). Despite a low response rate, the most favourable feature of the Alfred Health Acquired Brain Injury Rehabilitation Service reported by community collaborators was the timeliness of communication, in addition to other characteristics (See Figure 6, over page).



**Figure 8:** Favourable features of the Alfred Health Acquired Brain Injury Rehabilitation Service as reported by community collaborators.

**Staff Satisfaction:** A staff practices survey was administered at three time points to staff; December 2014/ January 2015 (n=24), in April 2015 (n=22), and in August 2015 (n=20). At time points one and two, majority of responding staff identified that they had worked for Alfred Health between 3-5 years (30.4% and 36.4%) and in time frame three, the majority of respondents (50%) identified less than 12 months suggesting that early recruitment attracted internal staff. Majority of respondents at time point one (70%) reported working in the area of ABI rehabilitation for less than 6 months (but greater than 3 months), and at time points two and three, the majority of staff reported greater than 6 months, 48% and 75% respectively. When asked “how well prepared did you feel to work in the Alfred Health Acquired Brain Injury Rehabilitation Service” the majority of staff at time point one (50%) and two (45.5%) reported somewhat well prepared, and in time point three, majority identified with pretty well prepared (45%).

Further evaluation of satisfaction (beyond preparedness) showed that the majority of staff identified that “most of the time” the ABI rehabilitation service is a great service to work in (average 60%). Staff were also asked about their perceived strengths of the ABI unit:

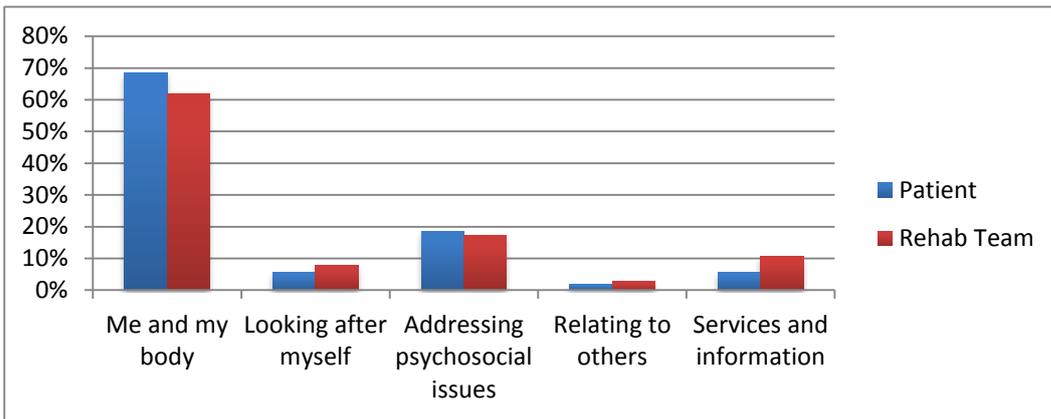
- Time point 1: teamwork, staff expertise, patient and family focus, and working environment
- Time point 2: teamwork, patient centred care, staff expertise, evidence-based rehabilitation, working environment and staff passion
- Time point 3: teamwork, staff expertise, evidence-based rehabilitation, working environment, flexibility and adaptability to feedback and staff dedication.

Taken together, the top rated strengths of the Service as perceived by the staff working in the Service were:

1. teamwork and collaboration
2. staff experience
3. evidence-based rehabilitation

### ***Patient-centred goal-directed Rehabilitation:***

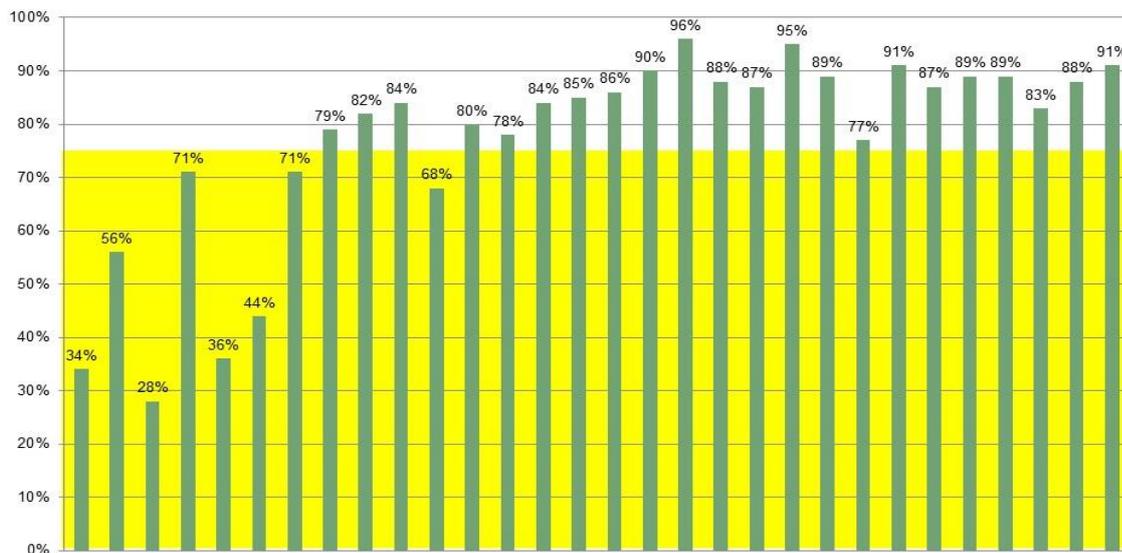
To further investigate goals set during rehabilitation, we randomly selected n=20 patients and further rated the quality and types of goals / ambitions set by the patient and their team goals; a total of n=294 goals were set for these 20 patients, inclusive of patient goals, family goals, Rehabilitation Team goals, and individual clinician goals (e.g. physiotherapy goals). Using the goal taxonomy of Simpson et al (Simpson, Foster et al. 2005), we classified the random selection of goal statements (n=294) into categories of “Me and my body”, “Looking after myself”, “Addressing psychosocial issues”, “Relating to others” or “Services and information”. As shown in Figure 7, the majority of goals set were in the category of “Me and my body” by both patient and rehabilitation staff, with goal statements relating to physical goals, personal care goals, or sexual health goals (such independent mobility). This finding is likely reflective of the importance of building foundation skills during inpatient rehabilitation while independence skills may potentially develop later during rehabilitation or during community rehabilitation.



**Figure 9: Goal areas of goals set by patients and the corresponding rehabilitation team member goals, n=20 patients**

**Evidence-based Rehabilitation:** Using a periodic service review methodology, rehabilitation care was audited fortnightly against ten published Clinical Practice Guidelines (132 observable criteria). Each fortnight, two multidisciplinary feedback sessions, which summarised the observed clinical adherence to the Clinical Practice Guidelines, were provided to clinicians and they were encouraged to assess and adjust their own performance using solution-focused discussion. 23 audit/feedback cycles were completed on two randomly selected patients each cycle. Clinical practice changed during the audit period, resulting in an improvement from 34% to a highest adherence of 96%. There was a 54% improvement in adherence to audited CPG's during the Process ( $p=0.0001$ ), with practice consistently remaining >75% adherence from fortnight 11 (Figure 8). These findings demonstrated a clinically significant increase in adherence to Clinical Practice Guidelines using an intensive audit/feedback method. To achieve sustainable change in practice, such data probably should be incorporated into a comprehensive rehabilitation program and become the responsibility of clinicians rather than researchers.

*This change has now been implemented; the Alfred Health Acquired Brain Injury Rehabilitation Service staff conduct audits in practice for the purpose of adhering to clinical practice guidelines.*



**Figure 10: Overall adherence to clinical practice guidelines from fortnightly audit and feedback sessions. Goal was to attain 75% or higher compliance CPGs.**

**Maintaining Culture and Values:** The Alfred Health Acquired Brain Injury Rehabilitation Service was evaluated for its ability to maintain the vision of Alfred Health, and Alfred Health’s values:

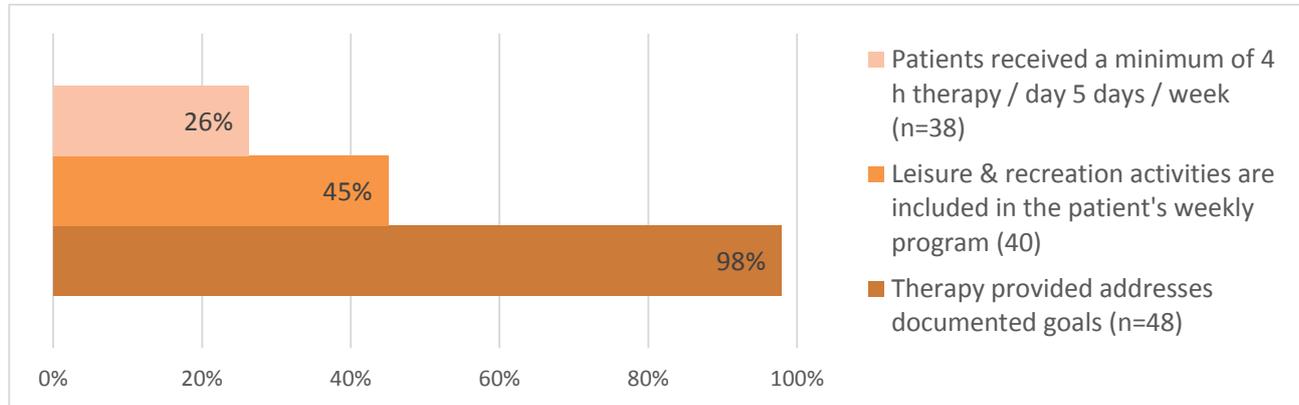
**Integrity:** The service aimed to engage others in a respectful, fair and ethical manner, fulfilling our commitments as professionals and employees. To evaluate integrity within the unit, we asked consumers living with brain injury and carers of adults living with brain injury to conduct consumer-audits within the Service (n=6 audits on n=3 occasions). Audits showed that the Victorian patient charter documents had not been placed on the ward; staff feedback and solution-focused discussion led to changes in behaviour with the Ward Leadership team leading an initiative to provide materials on patient rights to all patients and families and development of a ward-specific patient handbook.

Is the patient charter poster clearly displayed in the ABI unit?	1	
Are patient charter brochures available in prominent locations?	1	
Did the patients / family members / advocates receive a copy of the patient handbook?	2	
Is a copy of the patient handbook available in the waiting rooms?	1	
Have patients from NESB had the contents of the patient handbook explained to them in their own language?	3	
Do patients report that they are working towards their most important goals in all their therapy sessions?	3	
Do families report that they have had opportunities to contribute to decision making around goal setting and discharge planning?	2	
Are patients and family members / advocates spoken to in a respectful manner?	3	
Is patient privacy being respected in the unit?	2	
Do patients / family members / advocates feel able to express their comments and concerns about their care?	2	

**Figure 11: Consumer scorecard average scoring across all time points, 1= poor, 2= developing, 3= outstanding**

**Accountability:** Fortnightly audits of rehabilitation activities (scored against the clinical practice guidelines, Appendix A) provided an important opportunity to evaluate staff accountability. Key issues facing rehabilitation services nationally include the amount of therapy provided (CPG recommend aiming for 4 hours per day, a minimum of 5 days per week), integrating leisure and recreation activities alongside physical and cognitive rehabilitation; and most importantly, providing therapy which addresses the goals of the patient and family. These three indicators were targeted and performance against these indicators were feedback to all staff fortnightly. While the ability to provide at least 4 hours of therapy per day, 5 days per week was very difficult to achieve consistently over the first 12 months of operation, findings were able to show that staff routinely provide therapy which addresses the goals of the patient and family (Figure 10). These findings concur with the results of an observational audit undertaken during the Process Evaluation. We undertook an audit of physical activity (included activities such as attendance at physically based therapy sessions), cognitive activity (included activities such as reading the paper/book) and social activity (included any activities which involved verbal communication with people present)(Janssen, Ada et al. 2014) which

showed that on average, audited patients (n=9) did not receive 4 hours of therapy a day. Following feedback on the amount of physical, cognitive and social activity undertaken during rehabilitation, the Alfred Health Acquired Brain Injury Rehabilitation Service commenced an “Environmental Enrichment” working party who became responsible for encouraging increased therapy time, modifying the environment to maximise self-practice, train families and staff to carry-over rehabilitation exercises, and conduct drop-in groups for motor training to increase the amount of therapy provided.

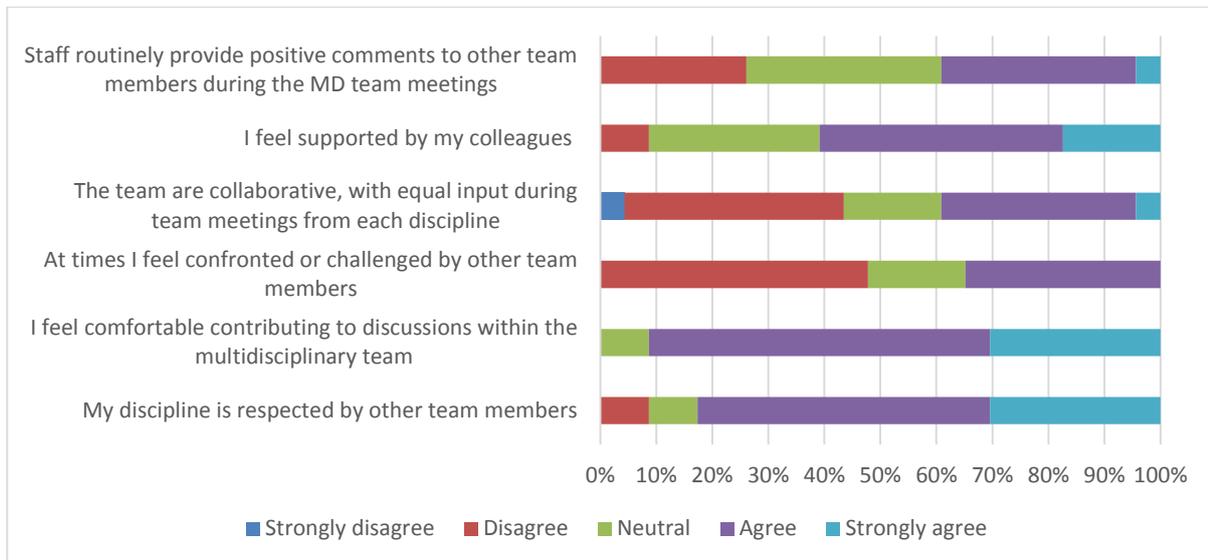


**Figure 12: Audit of rehabilitation therapies over 52 weeks demonstrating clinician accountability and commitment to improving performance.**

**Collaboration:** An audit of team meeting processes and qualitative interviews carried out with clinical staff showed that team meeting processes did not have a formal structure to support patient-centred rehabilitation (despite the social work processes consistently developing patient and family goals); documentation of the team meetings were not uniform across all teams, and varied in content recorded versus discussion recorded; staff were not reporting on rehabilitation based on models of care or patient goals; an inconsistent approach to discharge planning; and key liaison role overlap with professional responsibilities to enact elements of the model of care (in particular regarding responsibility for goal setting, responsibility for discharge planning, responsibility for family support and education).

*These findings were used to develop positive changes in processes for team meeting documentation and ongoing discussions regarding rehabilitation and evidence-based practice (See Appendix B for implemented changes).*

A survey of team dynamics completed in late 2015 revealed a positive, collaborative staff environment within the Alfred Health Acquired Brain Injury Rehabilitation Service, despite the challenges of working in a new service. Particular strengths were the level of respect felt and the level of comfort contributing to team discussions. Areas for potential improvement included ensuring equal input across professions during team meetings, and ensuring that team members don't provocatively challenge / confront one another (see Figure 11).



**Figure 13: Team dynamics survey of staff (n=24 respondents).**

**Knowledge:** The delivery of opportunities for evidence translation embedded into practice were key to enabling staff to make knowledge-based decisions. These knowledge strategies were re-evaluated at the completion of the initial 12 months of practice, and survey findings revealed that the large majority of staff, 88.24%, were aware of the clinical practice guidelines in brain injury (improvement from commencement was statistically significant,  $Z=4.97$   $p=0.0002$ ). Further, 70.29% of staff reported implementing these guidelines in their everyday practices (improvement from commencement was statistically significant,  $Z=4.709$   $p=0.0002$ ).

## Discussion, conclusions and implications

This process evaluation is part of a larger evaluation of the Alfred Health Acquired Brain Injury Rehabilitation Service; the outcome evaluation is not yet complete. To understand in depth the admitted patient cohort, the cost-benefit of rehabilitation and the long-term functional abilities following rehabilitation, an outcome evaluation must be conducted (Outcome: ABI). The formative evaluation results from this process evaluation completed during the initial year of operation do, however, provide important information for service development and suggest that it is possible to embed research and evidence into rehabilitation practice. This work has involved many challenges, including the confronting nature of data on processes of care and clinician performance, problems obtaining synthesised hospital data and responses to multiple surveys during the study period, and the difficulty of changing behaviour in hospitals. Nonetheless, the results presented here demonstrate that a participatory approach to process evaluation which includes clinicians as partners with researchers to collect and interpret data can be analysed to identify process-of-care gaps, and initiate solutions which may be trialled to improve processes of care.

The results from this process evaluation suggest that there were successful and less successful strategies trialled during the evaluation period. Strategies which were effective in driving the implementation of the model of care included:

- use of both “light” and “heavy” touch knowledge translation strategies- i.e. using some strategies which did not require large investment (such as the postcards or e-readers), alongside strategies which were heavy touch (such as the periodic service evaluation) led to significant increases in knowledge of brain injury rehabilitation research findings;
- employment of persons living with brain injury and persons who are carers of persons living with brain injury as research assistants to audit staff commitment to patient-directed healthcare;
- use of audit methods and qualitative interviews to collect information.

It was less successful to use survey methods to collect information with busy clinicians, although this was addressed by using multiple surveys, long feedback time and frequent reminders in the current project. The large number of audits and qualitative interviews, while successful in obtaining real-time data, were expensive to undertake and future projects will also need to consider costs in planning hospital-based process evaluations.

The experiences of the Alfred Health Acquired Brain Injury Rehabilitation Service suggest that some lessons have been learned about process evaluations in hospitals. This includes the ability to use a strength-based approach in which clinicians and consumers help identify issues or problems in partnership, and clinicians lead the development and implementation of potential solutions. Another important lesson learned is that there needs to be a balance between the development of processes and highlighting gaps and issues in the initial phase of a process evaluation of a new service- discussion of gaps needs to be sufficiently spaced to ensure ongoing commitment from clinicians to remain invested in an ongoing process evaluation such as this. The investment of time in the development of a strong culture of evidence-based practice, consumer-focused healthcare and goal-directed rehabilitation while empowering clinicians to engage in solution-focused thinking resulted in Alfred Health

building a strong infrastructure which will hold the team in excellent stead for ongoing enactment of the model of care.

## Potential impact, use of the research and recommendations

The process findings and changes implemented are expected to lead to a range of impacts in the short to medium term for Alfred Health, including delivery of evidence-based rehabilitation, improvement in engagement of consumers and community collaborators in healthcare delivery, and empowered clinician-led process of care changes in the future. Improvements in adherence to clinical practice guidelines and delivery of evidence-based rehabilitation is anticipated to lead to improved independence on discharge; this hypothesis will be evaluated in the outcome evaluation underway, *Outcome ABI*.

Service specific recommendations have arisen from this synthesis of findings from the process evaluation and have not yet been enacted through the action-research process (as outlined in Appendix B), these include:

1. Revision of admission criteria and admission planning: staffing ratios for allied health and nursing will need to be considered once target ratio of patients with co-commitment behaviours of concern is established.
2. Staffing review: nursing. While this process evaluation showed a lower level of 19 WTE nurses per 20 beds in comparison to similar units overseas, we acknowledge that no nursing workforce planning method is perfect. What remains unknown is the relationship between staffing levels and nursing quality - that is, we do not know if 40 WTE nurses is enough to maintain an acceptable standard of care across the 42 bed Service, or to ensure equitable workloads, job satisfaction and therefore, a desire to stay in the job. We therefore recommend a follow-up study of nursing care quality and nurses' job satisfaction once the Service has been operational at full occupancy for 2 years.
3. Staffing review: allied health. Should the mix of patients (higher levels of dependency, higher levels of behaviours of concern and shorter length of stay than predicted) continue, we recommend higher ratios of neuropsychology, psychology, social work and occupational therapy services. Of issue is the high demand on goal setting, discharge planning, establishment of daily living routines, management of behaviours of concern, support for staff to enact the behaviours of concern and support for family services as provided by the above allied health staff members.
4. Staffing review: Key Liaison Person (KLP) role. Given the additional case management time and demands of the KLP, feedback from families of slower response times to part-time staff acting as KLP, blurred and unclear role delineation between allied health professional and KLP roles, and high demands on staff from certain allied health professions (see point 3) and nursing staff (see point 2), a review of KLP role is recommended and cost-comparison study of the current KLP process versus use of a stand-alone KLP position is recommended.
5. Process review: discharge planning. Undertaking a specific review of current discharge planning practices, discharge planning interventions provided and not provided, critical success factors from the perspectives of patients, families,

clinical staff and management, and of continuity of care effectiveness is key to refining the discharge planning processes is recommended.

To assist hospitals in Australia incorporate the lessons learned from studying the processes within the Alfred Health Acquired Brain Injury Rehabilitation Service, we recommend the following actions which were found to be highly successful:

1. Develop a clear model of care that incorporates evidence-based rehabilitation, and support this model of care with processes and resources.
2. Implement a clear goal setting model which ensures advocacy for patient-directed and family-centred goal setting.
3. Select quality indicators for evidence-based rehabilitation that are measureable and for which there are clinical practice guidelines or standards, and audit against these. Establish regular, periodic reporting on quality of care to staff, consumers, and executive staff.
4. Use dedicated data analysis to monitor quality of care indicators, identify outliers and variations within the hospital, and compare performance with evidence-based standards and national benchmarks to identify areas that need improvement.
5. Use dedicated staff to liaise with patients and families (consumers) and provide varied opportunities (both pre- and post-discharge) and methods to provide feedback (including qualitative interviewing and surveys, as well as consumer auditors / data collectors).
6. Provide regular opportunities for clinicians to question, debate and analyse the data to indicate potential issues within the Service, and support process.

Even in the face of numerous challenges, an important conclusion from the initial year of operation of the Alfred Health Acquired Brain Injury Rehabilitation Service is that the management and clinical team have been successful in embedding evidence into practice, and that by implementing their innovative model of care they have shown that change in how rehabilitation is delivered is possible. The Alfred Health Acquired Brain Injury Rehabilitation Service has made significant progress towards its goals, and has been successful in developing and initiating a culture of reviewing its own practice in collaboration with consumers. The extent to which this model of care is having a significant, positive impact on health outcomes is currently being evaluated.

## References

- Allied Health in Rehabilitation Consultative Committee: Guidelines for Allied Health: Resources required for the provision of Quality Rehabilitation Services-Version 10 July 2007. 2007, 1–16.
- Champagne, F. and A. P. Contandriopoulos (2005). Lementos de Arquitetura dos Sistemas de Avaliação do Desempenho dos Sistemas de Serviços de Saúde.
- Granger, C. V. (2015, 16 October 2015). "Quality and Outcome Measures for Rehabilitation Programs " e-Medicine Retrieved February, 2016, from <http://www.emedicine.com/pmr/topic155.htm>.
- Janssen, H., L. Ada, J. Bernhardt, P. McElduff, M. Pollack, M. Nilsson and N. Spratt (2014). "Physical, cognitive and social activity levels of stroke patients undergoing rehabilitation within a mixed rehabilitation unit." Clin Rehabil 28(1): 91-101.
- Leggat, S. G., L. Narine, L. Lemieux-Charles, J. Barnsley, G. R. Baker, C. Sicotte, F. Champagne and H. Bilodeau (1998). "A review of organizational performance assessment in health care." Health Serv Manage Res 11.
- Simpson, G., M. Foster, P. Kuipers, M. Kendall and J. Hanna (2005). "An organizational perspective on goal setting in community-based brain injury rehabilitation." Disabil Rehabil 27(15): 901-910.

# Appendices

## Appendix A: Alfred Health Acquired Brain Injury Rehabilitation Service model of care mapped to Clinical Practice Guidelines

- Green GO: High-quality evidence exists supporting the effectiveness of this intervention, therefore use this approach.
- Yellow MEASURE: Low-quality or conflicting evidence exists supporting the effectiveness of this intervention, therefore measure the outcomes of intervention carefully when using this approach to ensure the goal is met.
- Red STOP: High-quality evidence exists demonstrating this intervention is ineffective—therefore do not use this approach.

<b>CATEGORY</b>	<b>GUIDELINES</b>	
General Principles for Organisation of Rehabilitation Services	RCP: Royal College of Physicians; RACP: Royal Australian College of Physicians; NSF: National Stroke Foundation; NZ: NZ ACC TBI; ABIKUS: Evidence Review in ABI;	
	RCP: "Following acute ABI, patients should be transferred as soon as possible to a rehabilitation programme of appropriate intensity to meet their needs" A	
	NZ: Patients should be referred to rehabilitation if they have: <ul style="list-style-type: none"> <li>• difficulty with body functions</li> <li>• difficulty with activities that they were able to complete prior to the injury</li> <li>• difficulty participating in their usual social roles." A</li> </ul>	
	ABIKUS: "Patients with moderate TBI should receive 4 hours of therapy at least 5 days a week for at least 2 months." A	
	ABIKUS: "Interdisciplinary protocols or integrated care pathways should be in place for management of common problems". A	
	RACP: "Specialist neurological rehabilitation services for people with acquired brain injury should comprise the following: <ul style="list-style-type: none"> <li>• a coordinated interdisciplinary team of all the relevant clinical disciplines</li> <li>• staff with specialist expertise in the management of brain injury including a consultant specialist in rehabilitation medicine" C</li> </ul>	
	Nursing Staffing Provision	RACP: 1-1.2 WTE per bed
	Occupational Therapy Staffing	RACP: 1 WTE per 5 beds
	Physiotherapy Staffing	RACP: 1 WTE per 5 beds
	Speech and Language Therapists	RACP: 1 WTE per 7-8 beds
	Clinical/Neuropsychologists	RACP: 1 WTE per 8-10 beds
	Social Workers	RACP: 1 WTE per 10-12 beds
	Dieticians	RACP: 1 WTE per 20 beds
	Medical Staff	RACP: a 26 bed unit should have 1 WTE consultant accredited in rehabilitation medicine plus 2 WTE training grades (specialist registrar or senior resident)
		RCP: "Rehabilitation services taking patients for post-acute rehabilitation, i.e. directly from neurosurgical or acute medical services, should have appropriate arrangements for 24-hour emergency medical and surgical cover." D
	RACP: "Interdisciplinary teams are recommended where the team works together towards a single set of agreed goals, often undertaking joint sessions" D	
	RACP: "A rehabilitation programme of appropriate intensity to meet their needs allows a patient to receive as much therapy as they need, can be given and find tolerable, and is given as much opportunity as possible to practise skills outside formal therapy sessions." A	
	RACP: "Good rehabilitation requires clear leadership by a single designated individual with the requisite leadership skills." Good Practice Point (no evidence)	
	RCP: "There should be a single interdisciplinary patient record system in which all members of the team record their interventions." D)	

	RCP: "A designated member of the team (e.g. a 'key-worker') should be responsible for overseeing and coordinating the patient's programme and acting as a point of communication between the team and the patient/family: D
	RCP: "All major decision-making meetings, e.g. assessment, goal planning, case conferences, discharge planning, should be undertaken by the relevant members of the interdisciplinary team, in conjunction with the patient and their family/carers as appropriate, and should be documented in the case records." Good Practice Point
	RACP: "Specialist neurological rehabilitation services for people with acquired brain injury should include educational programmes for staff, patients and carers" C
	SIGN: "Rehabilitation Centres should consider providing a specific local expert therapist to provide advice to rehabilitation teams including signposting to relevant statutory services" Good Practice Point (No evidence)
	RACP: "Contractual arrangements should be in place for equipment such as: – electronic assistive technology - communication aids, and - specialised seating systems " C
	RACP: "Every patient with an acquired brain injury should have access to specialist neurological rehabilitation services for as long as required – which may be life-long." A
	RACP: "Within each service network, there should be a case management or equivalent system which gives brain-injured patients and their families/carers an identifiable guide and advocate through the whole care pathway" D
	RACP: "The individuals or teams providing this 'case management' system should: • register or be aware of patients with symptomatic ABI within their catchment area • take responsibility for coordinating care and providing support and information for patients with acquired brain injury and their families from the time of injury, through the period of recovery and for as long as is required, to ensure continuity of care" D
	RACP: "There should be recognition of the need for life-long contact to meet the changing clinical, social and psychological needs of patients and carers." D
Early Assessment, Treatment and Care	ABIKUS: "patients with ABI should be receive their "last weeks of inpatient rehabilitation" in a transitional living setting" B
	ABIKUS: "The current investigation of choice for the detection of acute clinically important brain injures is Computed Tomography (CT) imaging of the head." A
	NZ: "The following areas should be assessed: • motor impairments, such as weakness, altered tone and lack of coordination in the limbs • problems with speech and swallowing • sensory impairment, including visual problems, such as reduced visual acuity, loss of visual field, gaze palsies and hearing loss • cognitive impairments, especially of memory, concentration and/or orientation • language problems, particularly cognitive communication disorder or aphasia • reduced control over bowels and bladder • emotional, psychological and neurobehavioural problems." C
	ABIKUS: "The management of head injured patients should be guided by clinical assessments and protocols based on the Glasgow Coma Scale score. The adult and paediatric versions of the Glasgow Coma Scale should be used to assess people." B
	ABIKUS: "The current investigation of choice for the detection of acute clinically important brain injures is Computed Tomography (CT) imaging of the head. CT scans should be immediately requested for adults who have sustained a head injury, if they have any one of the following factors: ♦ Any deterioration in condition ♦ A GCS score of less than 13 when assessed, irrespective of the time elapsed since the injury ♦ Post-traumatic seizure ♦ Coagulopathy ♦ New onset severe and persistent headache" B

	NZ: People with TBI should be assessed for functional deficits in Activities of Daily Living (ADL) by an occupational therapist and for specific impairments in physical, cognitive, behavioural/emotional and communicative functioning by a multidisciplinary team. Assessment should include seeking information about pre-TBI functioning from family and take into account the person's participation goals for post-rehabilitation. Good Practice Point.
Behavioural Rehabilitation	ABIKUS: "There should be careful consideration of the sensitivity of people with traumatic brain injury to psychotropic medication before trial use. Psychotropic medication should be used with caution. Where medications are clinically indicated 'start low and go slow', keep under direct clinical monitoring to ensure that the drug is tolerated and producing the expected improvement and used with caution where indicated." (ABIKUS C, adapted from NZG, 14.4.10.3, 182)
	Ylvisaker: Behavioural intervention in general (i.e. not a specific behavioural intervention protocol) for behaviour problems after TBI should be implemented at both acute and post-acute stages of recovery. (accumulated evidence from two Class 1, 2 class 2 and 36 Class II studies)
	Ylvisaker: Behaviour specialists should target internalizing as well as externalizing disorders. Even if these interventions prove to be unsuccessful, clinical insight will be gained (Good Practice Point).
	Ylvisaker: Individuals with challenging behaviour after TBI should be provided with systematically organised behavioural interventions and supports consistent with the available evidence and based on individualised functional behaviour assessments. <i>Specific</i> behavioural interventions which are based on Contingency Management Procedures (such as ABA) and Positive Behaviour Interventions and Supports are considered to be evidence-based treatment options. (Class II)
Medication Management of Early Post Traumatic Agitation and Post Traumatic Amnesia	ABIKUS: "Perform a detailed physical exam prior to commencing any trial of medications. People with traumatic brain injury and their caregiver should be asked about any prescribed medications, over the counter remedies, herbs or supplements they are taking to check for potential interactions and adverse effects. Appropriate investigations should be completed prior to medication trials to rule out and minimize metabolic abnormalities including evaluation of: plasma blood sugar, electrolytes, hormones, haemoglobin, oxygenation and infection. Clinicians should also consider the possibility of brain injury related sleep disorders as a cause of cognitive and other behavioural changes. (adapted from Mahmood et al., 2004)" C
	ABIKUS: "Any trial of medication for a person with traumatic brain injury should be preceded by a clear explanation to the person with traumatic brain injury and their caregivers, and a caution that effects of medications are less predictable in people with traumatic brain injury." Good Practice Point
	ABIKUS: "There is no medication that has been shown to be effective to manage agitation in all persons with brain injury during the period of PTA. Therefore the clinician is advised to consider the other effects of medications in selecting medication for treatment of agitation in the acute phase." Good practice point
	ABIKUS: "Minimize use of Benzodiazepines and Neuroleptic antipsychotic medications as animal studies suggest these medications may slow recovery after brain injury." (ABIKUS C)
	ABIKUS: "Beta Blockers are recommended for the treatment of aggression after TBI. Studies reported the efficacy of both Propranolol (maximum dose 420-520 mg/day) and Pindolol (maximum dose 40-100 mg/ day) in the treatment of aggression in this population." A
	ABIKUS: "G17 Carbamazepine and/or Valproic Acid may be used to decrease the incidence of aggressive behaviours." B
Behavioural Rehabilitation	ABIKUS: "Valproic Acid may be preferred over Phenytoin post brain injury as it does not have any significant neuropsychological side effects, and is effective for controlling established seizures and stabilizing mood." B
	NZ: "Assessment of the behavioural and emotional functioning of people with TBI should include assessment for: <ul style="list-style-type: none"> <li>• emotional lability</li> <li>• poor initiation</li> <li>• mood change</li> <li>• adjustment problems</li> </ul>

	<ul style="list-style-type: none"> <li>• personality changes, including:           <ul style="list-style-type: none"> <li>– aggressive outbursts</li> <li>– disinhibition</li> <li>– inappropriate sexual behaviour</li> </ul> </li> <li>• poor motivation.</li> </ul> <p>It is also important to consider the possibility of drug and alcohol misuse and mental health disorders, particularly depression, anxiety disorders and psychosis." Good Practice Point</p>
	SIGN: "Propranolol or pindolol may be considered as a first line treatment option for moderate levels of agitation/aggression." B
	ABIKUS: "Staff should be trained in specific behavioural change strategies, especially in understanding of brain-behaviour relationships, and these should be applied consistently." C
	ERABI/ABIKUS: Behavioural change strategies should be developed and monitored by a lead clinician who will provide guidance to all staff working with the patient, such as a neuropsychologist who leads a Behavioural Support Team. Good Practice Point
	ABIKUS: "Behavioural Assessment data must identify possible or probable cause/function of targeted behaviour. The relationship of environmental triggers, and reinforcing events to the occurrence of both target behaviours and adaptive alternatives must be described. Any behavioural management plan must include a consideration of the precipitating factors or triggers possibly leading to the behaviour". B
Cognitive Rehabilitation	ABIKUS: "When necessary, an assessment by a neuropsychiatrist, behavioural neurologist, or psychiatrist should be made to differentiate neurobehavioral difficulties from symptoms of a functional illness (e.g. seizures, mood, anxiety disorders, personality disorders, metabolic disorders, and medication adverse effects)." C
	ABIKUS: "An organization providing service to individuals with brain injury should have a crisis prevention plan as well as a policy in effect." C
	ABIKUS: "Any restrictive interventions (e.g. restraints) must be subject to professional and administrative review and approval in accordance with professional practice guidelines, legislation and organizational policies." Good Practice Point
	NZ: "Assessment of the cognitive functioning of people with TBI should include the following areas: <ul style="list-style-type: none"> <li>• insight and awareness</li> <li>• attention</li> <li>• memory</li> <li>• speed of information processing</li> <li>• perception</li> <li>• complex problem-solving</li> <li>• self-monitoring</li> <li>• social judgement." Good Practice Point</li> </ul>
	ABIKUS: "Strategy training across all cognitive domains is recommended during postacute rehabilitation for persons with TBI" A
	ABIKUS: "All patients after moderate to severe ABI should be referred for neuropsychology, occupational therapy and speech language assessment to evaluate cognitive functioning" C
	SIGN: "Patients with attention impairment in the post-acute phase after TBI should be given strategy training relating to the management of attention problems in personally relevant functional situations." C
	SIGN: "In the post-acute setting interventions for cognitive deficits should be applied in the context of a comprehensive/holistic neuropsychological rehabilitation programme. This would involve an interdisciplinary team using a goal-focused programme which has the capacity to address cognitive, emotional and behavioural difficulties with the aim of improving functioning in meaningful everyday activities." D
	SIGN: "Cognitive behavioural therapy should be considered for the treatment of acute stress disorder following mild TBI." B
	SIGN: "Cognitive behavioural therapy should be considered for the treatment of anxiety symptoms following mild to moderate TBI, as part of a broader neurorehabilitation programme." B

	<p>SIGN: "Patients with memory impairment after TBI should be trained in the use of compensatory memory strategies with a clear focus on improving everyday functioning rather than underlying memory impairment.          - For patients with mild-moderate memory impairment both external aids and internal strategies (e.g. use of visual imagery) may be used.          - For those with severe memory impairment external compensations with a clear focus on functional activities is recommended." D</p> <p>SIGN: "Learning techniques that reduce the likelihood of errors being made during the learning of specific information should be considered for people with moderate-severe memory impairment." B</p> <p>ABIKUS: "Cognitive rehabilitation should include the use of periodic, random auditory alerting tones to improve sustained attention in subacute ABI/TBI" A</p> <p>ABIKUS: "Cognitive rehabilitation should include the use of self instructional training/ internal training (e.g. self cueing, self talk)." A</p> <p>ABIKUS: "Cholinesterase Inhibitors: Donepezil (5-10 mg/day) is recommended to enhance aspects of memory function for patients with moderate to severe TBI in subacute and chronic periods of recovery" B</p> <p>ABIKUS: "Stimulants: Methylphenidate in a dose of 0.30 mg/kg bid may be considered as an option to enhance learning and memory in persons who are within a few months of brain injury onset when other strategies are ineffective." B</p> <p>ABIKUS: "Use of metacognitive strategy training (e.g. goal/ plan/ do/ review, goal management training) is recommended for people with executive dysfunction." A</p>
	<p>ABIKUS: "Repeated exposure and practice on computer based tasks without some involvement by a therapist is not recommended due to demonstrated lack of efficacy" A</p> <p>ABIKUS: "Specific structured attention programs using drill and practice are not recommended due to a demonstrated lack of efficacy" A</p> <p>SIGN: "Patients with TBI and deficits in executive functioning should be trained in meta-cognitive strategies relating to the management of difficulties with planning, problem solving and goal management in personally relevant functional situations." B</p> <p>ABIKUS: "Dopamine Enhancers: Bromocriptine in a dose of 2.5 mg is recommended for use in enhancing aspects of executive functioning (e.g. divided attention/ central executive functions) in patients with severe TBI." B</p> <p>ABIKUS: "Stimulant medication for arousal and attention: Methylphenidate (0.25-0.30 mg/kg bid) is recommended in adults to enhance attentional function in the adult population. Methylphenidate (0.25-0.30 mg/kg bid) is also recommended to enhance the speed of cognitive processing, although only one study provides evidence to support a change in speed in a naturalistic task" A</p>
Communication Rehabilitation	<p>NZ: "A speech-language therapist should lead both the assessment and planning of dysphagia therapy. This should include:          • a detailed diagnostic assessment, to address issues of diagnosis, aetiology and functional impairment          • a rehabilitation-focused assessment, which addresses the need for, and the potential to benefit from, rehabilitation." Good Practice Point</p> <p>ABIKUS: "Instrumental assessment of dysphagia in patients post TBI should be considered where:          - bedside assessment indicates possible pharyngeal stage problems (which would potentially include the aspiration of food and fluid into the lungs)          - the risks of proceeding on the basis of the bedside assessment outweigh the possible benefits (the patient at very high risk of choking or aspiration if fed orally)          - the bedside assessment alone does not enable a sufficiently robust clinical evaluation to permit the drawing up of an adequate plan for swallowing therapy." D</p> <p>ABIKUS: All patients with moderate to severe ABI should have their communication ability assessed, regardless of their level of consciousness" Good Practice Point</p> <p>ABIKUS: "A communication rehabilitation program should give the opportunity to rehearse communication skills in situations appropriate to the context in which the patients will live/ work/ study/ socialize after discharge." C</p>
	<p>ABIKUS: "The assessment and prescription of, augmentative and alternative communication devices should be made by suitability accredited clinicians: speech</p>

	<p>language pathologists (for communication), and occupational therapists (for access of devices, writing aids etc.)." C</p> <p>ABIKUS: "A communication rehabilitation program should provide education and training of communication partners." C</p> <p>SIGN: "Patients with communication deficits post TBI should be referred to speech and language therapy for assessment and management of their communication impairments." D</p>
Rehabilitation of Motor Function and Control	<p>ABIKUS: "Therapists (primarily physiotherapy and occupational therapy) need to be not only skilled in the physical management of neurological deficits, but also experienced in recognition and handling of associated cognitive and behavioural deficits, as well as orthopaedic or associated musculoskeletal disorders, which may impact on the patient's ability to engage and cooperate in therapy sessions and to carry over physical gains into daily activities." C</p> <p>SIGN: "Upper Limb Rehabilitation to include five one-hour sessions of individualised task-specific motor therapy in addition to 30 minutes of usual motor control therapy to shoulder and elbow five times per week" D</p> <p>SIGN: "Spasticity Management: BoNT may be considered to reduce tone and deformity in patients with focal spasticity. BoNT should be used in a multidisciplinary setting with physiotherapist/occupational therapist and orthotic inputs where appropriate." B</p> <p>SIGN: "Contracture Management: "Casts, splints and passive stretching may be considered in cases where contracture and deformity are progressive" C</p> <p>SIGN: "Patients with TBI receiving gait training should not undergo treadmill training in preference to conventional overground training." C</p> <p>SIGN: "Repetitive task-oriented activities are recommended for improving functional ability, such as sit to stand or fine motor control." B</p> <p>SIGN: "Walking Aids: Walking aids should be considered only after a full assessment of the potential benefits and harms of the walking aid in relation to the individual patient's physical status and cognitive ability." Good Practice Point</p> <p>ABIKUS: "Persons with moderate to severe ABI should be given opportunities to practice their motor skills outside of formal therapy." A</p> <p>NZ: "Assessment of the physical functioning of people with TBI should include checking for the following:</p> <ul style="list-style-type: none"> <li>• motor deficits           <ul style="list-style-type: none"> <li>– muscle weakness and paralysis</li> <li>– abnormal muscle tone (spasticity)</li> <li>– deficits in joint range of motion</li> <li>– ataxia/incoordination</li> </ul> </li> <li>• sensory deficits           <ul style="list-style-type: none"> <li>– visual/hearing loss</li> </ul> </li> <li>• physical symptoms           <ul style="list-style-type: none"> <li>– e.g., headache, fatigue, pain</li> </ul> </li> <li>• dysphagia</li> <li>• seizures</li> <li>• impaired functional mobility           <ul style="list-style-type: none"> <li>– changing and maintaining body position</li> <li>– carrying, moving and handling objects</li> <li>– walking and moving (including, but not limited to, crawling, climbing, running, jumping and swimming)</li> <li>– mobilising with the aid of assistive technology." D</li> </ul> </li> </ul>
Sensory Impairment	<p>ABIKUS: "Persons with a moderate to severe ABI with any visual impairment should be assessed by a team, which includes:</p> <ul style="list-style-type: none"> <li>◆ Ophthalmologists</li> <li>◆ Persons with expertise in rehabilitation for the visually impaired" A</li> </ul> <p>ABIKUS: "Persons with a moderate to severe ABI with hearing loss should be assessed and treated by an audiologist." C</p>

Optimising Performance in Daily Living Tasks	<p>RCP: "Patients with very severe brain injury often require two or more people to assist with transfers or to provide therapeutic handling.</p> <ul style="list-style-type: none"> <li>• Others who are independently mobile but who are disorientated and confused frequently require one-to-one supervision to ensure their safety.</li> <li>• Advice, support and intervention for families must be considered independently of the patient's immediate needs." D</li> </ul>
Assessment and Management of Complications	<p>SIGN: "Pre-discharge home visits performed by various members of the multidisciplinary team (usually an occupational therapist) aim to give staff (hospital and community), patients and carers the opportunity to identify actual and likely problems, as well as to address any other needs that the patient/carer may have." D</p>
	<p>NZ: "When an item of equipment has been identified as required for a person with TBI, it should be provided as quickly as possible and before the person is discharged to the community." (Good Practice Point)</p>
	<p>RCP: "Interdisciplinary protocols or integrated care pathways should be in place for management of common problems" Good Practice Point</p>
	<p>ABIKUS: "Persons with moderate to severe ABI with spasticity should be assessed and treated and provided with a coordinated plan for interdisciplinary management including:</p> <ul style="list-style-type: none"> <li>• identify and treat aggravating factors such as pain and infection</li> <li>• the use of specific treatment modalities such as serial casting or removable splints</li> <li>• the use of anti-spasmodic drugs (i.e. Baclofen, Tizanidine) including botulinum toxin where appropriate</li> <li>• rehabilitation should consider a range of motion and positioning routine.</li> </ul>
	<p>NZ: "For the management of constipation, institute an active bowel management regimen which includes:</p> <ul style="list-style-type: none"> <li>• sufficient fluid intake</li> <li>• natural or simple bulk laxatives</li> <li>• exercise and standing (if possible)</li> <li>• avoiding medications which slow gut motility</li> <li>• maximum privacy and comfort during defecation</li> <li>• supported sitting up for defecation at the earliest safe opportunity, and at a regular time each day.</li> </ul> <p>Where the rectum is full but no spontaneous evacuation occurs, daily rectal stimulation may be used. If the rectum is empty for three days consecutively despite continuing oral intake, consider the use of an osmotic laxative or a stimulant."</p>
	<p>SIGN: "Instrumental assessment of dysphagia in patients post TBI should be considered where:</p> <ul style="list-style-type: none"> <li>- bedside assessment indicates possible pharyngeal stage problems (which would potentially include the aspiration of food and fluid into the lungs)</li> <li>- the risks of proceeding on the basis of the bedside assessment outweigh the possible benefits (the patient at very high risk of choking or aspiration if fed orally), and</li> <li>- the bedside assessment alone does not enable a sufficiently robust clinical evaluation to permit the drawing up of an adequate plan for swallowing therapy." D</li> </ul>
Depression	<p>ABIKUS: "Patients and their caregivers should be made aware of the risk of depression following TBI" C</p>
Pain	<p>ABIKUS: "Pain management protocols should be in place, which include:</p> <ul style="list-style-type: none"> <li>◆ Regular review and adjustment</li> <li>◆ Handling, support and pain relief appropriate to the individual needs</li> <li>◆ Staff and caregivers should be educated about appropriate handling of paretic upper limbs during transfers, hypersensitivity and neurogenic pain" B</li> </ul>

Coma, Vegetative State and Minimal Conscious State	ABIKUS: "Every brain-injured patient who remains unconscious (or is unable to sit themselves up) should have a graded program to increase tolerance to sitting and standing." C
	ABIKUS: "For all patients with a diminished level of consciousness, assessment should be undertaken by a team with specialized experience in profound brain injury to establish the level of awareness and interaction." C
	SIGN: "The Coma Recovery Scale - Revised should be used to assess patients in states of disordered consciousness. Clinicians should have training in administering disorders of consciousness assessment tools and also an appreciation of the range of assessment tools available for use with this population." B
	SIGN: "Amantadine may be considered as a means of facilitating recovery of consciousness in patients following severe brain injury." B
Discharge Planning	RCP: "Rehabilitation programmes should be developed in collaboration with family, carers or nursing staff to ensure that the programme is carried over into daily activities." D
	SIGN: "At the time of discharge, the discharge document should be sent to all the relevant agencies and teams." D
	ABIKUS: "Copies of both the care plan and the discharge report should be provided to the patient/ family/ caregivers and all professionals relevant to the patient's current stage of rehabilitation, especially the General Practitioner (GP)" C
	SIGN: "Planned discharge from inpatient rehabilitation to home for patients who have experienced an ABI provides beneficial outcomes and should be an integrated part of treatment programmes" D
	SIGN: "Essential alterations to the patient's home should be completed and necessary aids installed prior to discharge." D
	ABIKUS: "Care plans should be reviewed (usually 3-6 months post discharge)." C
Community Reintegration	SIGN: "The following information should be accurately and legibly displayed in the discharge documents: - Diagnoses - Investigations and results - Medication and duration of treatment if applicable - Levels of achievement, ability and recovery (including patient goals and outcome measures) - Team care plan - Further investigations needed at primary care level with dates - Further investigations needed at hospital and dates - Further hospital attendance with dates (including follow-up therapy and review arrangements) - Transport arrangements - The hospital name, hospital telephone number, ward name or number, ward telephone number - Consultant's name and named nurse - The date of admission and discharge." D
	SIGN: "Patients with moderate to severe TBI should receive a home-based/outreach, individualised program of rehabilitation from a multidisciplinary team which uses a goal planning framework and where participants are seen for two to six hours per week" B (RCT)
	SIGN: "Community rehabilitation services for patients with brain injuries should include a wide range of disciplines working within a co-ordinated interdisciplinary model/framework and direct access to generic services through patient pathways." D
	SIGN: as a minimum, a community specialist service to support people with brain injuries should include: - specialist brain injury nurses - physiotherapists - occupational therapists - speech and language therapists - clinical psychologists - specialist social workers

	<ul style="list-style-type: none"> <li>- dietitians</li> <li>- technical instructors</li> <li>- generic assistants</li> <li>- consultants in rehabilitation medicine</li> <li>- with access to other relevant services such as neurology, neurosurgery, neuropsychology, neuropsychiatry and mental health services as required." D</li> </ul>
Leisure and Recreation	<p>ABIKUS: "Patients with difficulty undertaking leisure activities of their choice should be offered a goal directed community-based program aimed at increasing participation in leisure and social activities, in liaison with local volunteer organizations." B</p>
Family and Caregivers	<p>SIGN: "The family and key members of the affected individual's social network should be provided with education about appropriate management of behaviour and emotion." Good Practice Point (no evidence)</p> <p>ABIKUS: "Preparing family/ caregivers and patient for community transition should include:</p> <ul style="list-style-type: none"> <li>◆ Assessment of discharge destination environment and support available</li> <li>◆ Provision of any equipment and adaptations that are required</li> <li>◆ Training of caregivers/ family in the use of equipment and in managing the patient to ensure patient safety in the home environment</li> <li>◆ Educating patients and family/ caregivers about relevant formal and informal resources and how to access these resources including voluntary services and self-help groups" C</li> </ul> <p>SIGN: "Family and carers should be provided with access to ongoing support when the patient with brain injury is living within the community." D</p>

**Appendix B: Adaptations to the model of care during 2015**

Date	Change	Description	Expected impact
November 2014	Circuit groups commenced	Circuit group runs 5 days per week. Initially all levels attended each session but sessions were changed to accommodate a high level and a low level group. Low level groups were made at later time as they could not be ready for early morning sessions.	<ul style="list-style-type: none"> <li>- Improve patient attendance</li> <li>- Ensure group meets each patient's therapeutic goals</li> <li>- Increase amount of time spent on therapeutic activities</li> </ul>
April 2015	Practice Booklets	A small exercise book provided to the patient with therapeutic activities to encourage therapy outside of designated therapy times. Can include ideas for therapy to be facilitated by friends and family when visiting the unit.	<ul style="list-style-type: none"> <li>- Increase amount of time spent on therapeutic activities</li> <li>- Enable communication with families</li> </ul>
June 2015	Lighting reduced at night	During the 36 hour visual audit it was identified that the lighting remained on all through the night. This impacted patients that required regular orientation to time.	<ul style="list-style-type: none"> <li>- Increase patient orientation to day/night</li> <li>- Reduce over-stimulation</li> <li>- Create a therapeutic environment which mimicked the home environment (i.e. dark at night).</li> </ul>
August 2015	Communal dining	Communal dining introduced to large dining room. Patients are encouraged to eat lunch and dinner in the large dining area.	<ul style="list-style-type: none"> <li>- increase socialisation</li> <li>- enable staff to assist patients with meals</li> <li>- encourage patients to manage meals independently</li> <li>- increase communication between therapy staff</li> <li>- provide a therapeutic and supportive environment</li> </ul>

July 2015	Employment of Recreation Therapist	Audits revealed that patients spent significant time alone and/or watching TV. Recreation therapist employed to increase meaningful engagement in activity by patients.	<ul style="list-style-type: none"> <li>- Increase meaningful engagement in activity</li> <li>- Reduce boredom and subsequent behaviours of concern</li> <li>-Support therapy staff</li> </ul>
August 2015	TPM documentation	The expectation is that this template will be used for all TPMs in order to clearly define the purpose, issues for discussion, intervention approaches for implementation & subsequent actions to be taken. This hopefully will also further contribute to a consistent approach to care.	Improve consistency and documentation
August 2015	Full Nursing team	Team nursing structure that includes the AINs within the profile and no longer includes 'float' role. The nursing leadership team are actively supporting and promoting the importance of the team lead role in facilitating effective teamwork and escalating issues and concerns up to the ANMs and then ANUM.	Facilitating team work, improving continuity and quality of care.
August 2015	Commencement of PM activities in Low Stimulus Unit	AM activities unsuccessful in LSA. Trial of PM activities with additional AHA support.	Increase engagement in activity – reduce behaviours of concern.
August 2015	LSA plans	<p>Processes around the development of LSA plans.</p> <ul style="list-style-type: none"> <li>- For patients admitted who are in PTA &amp; have nil known complex BOC, treating OT/SP to develop LSA plan &amp; page NP to advise that the plan has been completed.</li> <li>- Treating OT/SP to liaise with NP re: those patients being admitted with known BOC – team to then decide who will develop LSA plan</li> </ul>	Increase engagement in activity – reduce behaviours of concern.

August 2015	Staff training DAMA	Alfred Psychiatric nurses allocated to deliver practical sessions to all ABI clinical staff on the current practice and organisational overview surrounding De-escalation and Management of Aggression 'DAMA'.	Enable staff to confidently manage behaviours of concern including risk assessment, communication and de-escalation principles
August 2015	Team meeting - summary of audit provided	Working party provided with team meeting audit results. Gaps in nursing attendance at meetings and improving documentation to be focused on.	Enable working party to make changes to current protocols to improve documentation in team meetings and increase nursing attendance at team meeting.
September 2015	Jacqui Morarty rotates into position - AH manager ABI	Change in allied health management- from a portfolio (part-time manager external to unit) to an internal manager	Greater continuity within the ABI unit.
September 2015	Creation of guidelines for TPM	In a response to the research team audit of team meetings - guidelines developed for TPM. The therapist that identifies the need for a TPM is responsible for: <ul style="list-style-type: none"> <li>o Developing the TPM Agenda on the template and emailing it to relevant staff PRIOR to the TPM</li> <li>o Chairing and note-taking during the TPM to ensure all agenda items are covered and actions are delegated</li> <li>o Copying and pasting the TPM document into a "KLP Progress Note" on Powerchart</li> </ul>	Improve documentation, efficiency and effectiveness of TPM.
September 2015	Staff attendance at Journey Board (JB)	A trial of fewer staff attending journey board. A representative of each discipline to report back to team.  Each discipline plan to: <ol style="list-style-type: none"> <li>1. Send 1 – 2 people only</li> <li>2. Devise a system of communicating back to people in your team (e.g., Psych use a notebook)</li> </ol>	Reduce time pressure on JB meeting. Enable more availability of staff for morning routine to better support patients and Nursing staff.

October 2015	Journey Board - length of meeting	<p>Journey board is a good opportunity to meet together as an interdisciplinary team to discuss the following patient issues:</p> <ul style="list-style-type: none"> <li>• Any patients who have exhibited behaviours of concern (Code Greys, code blacks, etc).</li> <li>• To discuss discharge plans.</li> <li>• To identify any medical issues that the patient may be experiencing.</li> <li>• To identify barriers for discharge and to identify clinicians responsible for addressing these discharge barriers.</li> </ul> <p>Greater length of time is required to address all of these issues. Therefore the meeting extended to 30 minutes.</p>	Enable more in depth discussion of patients particularly those with behaviours of concern. Provision of adequate time to address barriers to discharge.
December 2015	Team meeting (case discussion)	<p>Chair Role: To be undertaken by Grade 4's and above/equivalent.</p> <p>Team Meeting Chair and Scribe: Rather than list individual names for scribe and chair disciplines are allocated.</p>	To enable smoother and more equitable team meetings.
December 2015	KLP documentation after team meeting	Reminder for staff to document following team meeting.	To facilitate better information sharing with nursing staff and meet documentation requirements.
December 2015	Journey board	Chair rotates weekly between disciplines. I.e. physio one week, psych another week	To break up workload evenly between disciplines.
February 2016	<p><b>Changes to referral process</b></p> <p>Process thus far has been:</p> <ol style="list-style-type: none"> <li>1. Review agreed process to align with existing bed admission process for all RACC inpatients, including clear process to feedback to referrers.</li> <li>2. Review ABI target patient group, to inform a checklist for referrals and triaging clinicians</li> </ol>	<p>Key changes implemented thus far:</p> <ol style="list-style-type: none"> <li>1. Draft ABI target group and process map to confirm key roles and responsibilities</li> <li>2. RACCS commenced triaging external referrals from Monday 15th February</li> <li>3. Implemented IT system via power chart to log all referrals, record clinical notes and outcome of triage, record clinical considerations for bed allocation for wait listed patients and reason for cancellation for cancelled referrals.</li> </ol>	Review aimed to improve consistency of management of internal and external referrals ABI, reduce time spent managing referrals, and improve data reporting and documentation.

	<p>3. Establish IT systems to document and record all referrals and outcome of referral.</p> <p>4. Establish process for routine reporting of referrals and performance against agreed KPIs</p>	<p>4. Currently reviewing ABI referral form to minimise delays in triage (incomplete information and insufficient to triage the referral)</p> <p>5. Currently drafting reporting requirements and process</p>	
February 2016	Psychiatry Registrar Staffing Increase	In response to increase in ABI/psych co-morbidity greater input required by Psychiatry.	<ul style="list-style-type: none"> <li>- Reduce behaviour of concern</li> <li>- Increase monitoring of patients with psychiatric co-morbidity</li> <li>- Provide greater support to Nursing and Allied health staff</li> </ul>
February 2016	Clinical staff auditing for implementation of the Periodic Service Review	In response to the cessation of audit and feedback which had been embedded in the Service since opening, management will now fund the Periodic Service Review ongoing.	Continued emphasis on enacting the model of care and implementing evidence-based practice within the Service.

Champagne, F. and A. P. Contandriopoulos (2005). Lementos de Arquitetura dos Sistemas de Avaliação do Desempenho dos Sistemas de Serviços de Saúde.

Granger, C. V. (2015, 16 October 2015). "Quality and Outcome Measures for Rehabilitation Programs " e-Medicine Retrieved February, 2016, from <http://www.emedicine.com/pmr/topic155.htm>.

Janssen, H., L. Ada, J. Bernhardt, P. McElduff, M. Pollack, M. Nilsson and N. Spratt (2014). "Physical, cognitive and social activity levels of stroke patients undergoing rehabilitation within a mixed rehabilitation unit." Clin Rehabil **28**(1): 91-101.

Leggat, S. G., L. Narine, L. Lemieux-Charles, J. Barnsley, G. R. Baker, C. Sicotte, F. Champagne and H. Bilodeau (1998). "A review of organizational performance assessment in health care." Health Serv Manage Res **11**.

Simpson, G., M. Foster, P. Kuipers, M. Kendall and J. Hanna (2005). "An organizational perspective on goal setting in community-based brain injury rehabilitation." Disabil Rehabil **27**(15): 901-910.