

# Pragmatic Evidence Based Review

## Employment participation in moderate to severe TBI

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### Important Note:

- This report is not intended to replace clinical judgement, or be used as a clinical protocol.
- A review of; evidence based guidelines, systematic reviews and high quality primary evidence relevant to the focus of this report was carried out incorporating the principles of systematic review. This does not however claim to be exhaustive.
- The document has been prepared by the staff of the research team, ACC. The content does not necessarily represent the official view of ACC or represent ACC policy.
- This report is based upon information supplied up to 12<sup>th</sup> May 2011

### Purpose

The purpose of this report is to:

- Provide where available international Return to Work (RTW) and employment participation rates following moderate to severe Traumatic Brain Injury (TBI)
- Discuss the concept of work and its definitions with relevance to TBI
- Describe approaches/strategies reported in the literature to be effective or models of 'best practice' for RTW for those people who have sustained TBI

This report is focused on moderate to severe TBI\* in both school age children (coming up to employment age) and adults.

The first section aims to clarify terms used throughout the literature and clarify those which will be presented in this report.

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\* Based on the classification of moderate to severe TBI used in the ACC TBI Guideline (2006)<sup>1</sup>. From here on in the report, TBI will refer to this classification.

## Lay Summary

Work is a social determinant of life. Many brain injured individuals are of working age. It therefore seems reasonable that returning to some form of work or employment following traumatic brain injury (TBI) should be an important goal of any rehabilitation programme for this age group. Internationally, return to work rates vary from 30-65% over 1-2 years post-injury. Return to work should be considered a process rather than a single event. Voluntary work and supported, sheltered or part-time employment may be useful preparatory steps towards competitive paid employment. There are some other factors that positively or negatively influence the likelihood of a person returning to work following TBI, including an increased length of stay in hospital following TBI (negative), residual physical deficits (negative) and having family members as social supports (positive).

The use of rehabilitative programs focused on assisting the brain injured individual regain the capacity to work (vocational rehabilitation) increases return to work rates. There are 3 types of vocational rehabilitation program following TBI; Program based, Supported Employment and the case co-ordination approach. The case co-ordinated approach appears to be the most effective.

## Key findings

- The definitions of work, employment, occupation vary across the literature; there is no consensus on terminology; making it problematic to compare RTW rates (page 3, Section 1)
- Internationally; RTW rates range 30-65% over 1-2 years post-injury (page 4, Section 3.1)
- Strong negative association between both Length of Stay (LoS) in hospital and residual physical deficits and RTW (page 5, Section 3.3)
- Strong positive association between having family members as social supports and RTW (page 5, Section 3.3)
- Strong evidence that suffering depression/anxiety is not a significant prognostic factor for RTW (page 5, Section 3.3)
- A higher percentage of moderate to severe TBI clients return to work at 1 year post injury when vocational rehabilitation intervention utilised (10-40% without intervention; compared to 50-95% with intervention) (page 4, Section 3.1)
- There are 3 broad models of vocational rehabilitation following TBI; Program based model, Individual placement model of Supported Employment and case co-ordination approach (page 6, Section 3.4)
- The strongest evidence (moderate level) is for a case co-ordinated approach (page 7 Section 3.4)
- Voluntary/unpaid work may be a useful preparatory step towards paid employment (page 5, Section 3.2)
- Sustainability of work/employment is a key factor that appears to be overlooked in many programs; this is an essential component (page 5, Section 3.2)
- RTW is a process; rehabilitation outcome measures should reflect this (page 5, Section 3.2)

## Recommendations

- A 50% RTW rate 1 year post injury with the use of a Vocational Rehabilitation program following moderate to severe TBI would be a good benchmark for New Zealand to compare with
- Sustained RTW would be a good measure of vocational status & may reflect a successful/effective Vocational Rehabilitation intervention program

- It would be useful for ACC to collect more specific post injury data about; employment role, employer, hours worked per week and number of attempts to return to work
- It would also be useful to have a coding system to record reasons why some clients fail to remain in sustained employment
- It would be instrumental for ACC to collect data (outcomes, costs, hours worked/week) over a longer period of time post injury for each TBI client

# 1. Background

## **The concept of Work**

There are many different terms that are associated with the concept of work and employment. There is some lack of consistency across the TBI literature. The terms work and employment are often used synonymously; which is somewhat inaccurate as they differ slightly. Definitions & relevant terms from across the literature are addressed below;

Work - Defined by some authors<sup>2,3</sup> as taking care of the house or studying; whereas other authors only consider paid work<sup>4,5</sup>. It would seem pertinent to consider what work meant for the client prior to the TBI.

Work ability – two definitions are offered<sup>2</sup>; the first covers specific jobs that require special training or education; having the occupational competence, the health required for the competence, and the occupational virtues that are required for managing the work tasks, assuming that the tasks are reasonable and that the work environment is acceptable.

The second covers jobs that most people can manage given a short period of practice; having work ability is having the health, the basic standard competence and the relevant occupational virtues required for managing some kind of job, assuming that the work tasks are reasonable and that the work environment is acceptable.

Work disability - can therefore be considered to be lacking the skills, training or functional ability required for the competence to do a specific job assuming that the tasks are reasonable and the work environment is acceptable

Work integration – inclusion within the mainstream labour market in jobs that pay market wages<sup>6</sup>

Employment – the state of being employed; performing an activity or service for another

Employment participation can therefore be considered as being instrumental in performing a service for another

Sustained employment - 3 consecutive months performing the same duties<sup>3</sup>

Unmodified employment - 3 consecutive months performing the same duties as those performed pre injury<sup>3</sup>

In relation to the term employment it is also useful to consider; unemployment, underemployment and precarious employment

Vocational Rehabilitation – a rehabilitation approach designed to serve survivors of TBI with the main goal of achieving a vocational outcome (RTW, employment, job retention)<sup>7</sup>

Occupation – composed of all the tasks and activities in which a person engages in everyday life that are both culturally and personally meaningful<sup>8</sup>

Successful outcome for ACC is for a client to no longer be on weekly compensation, as such within the recommendations of this report RTW can be defined as maintaining a position in competitive paid employment for at least 3 months.

## 2. Methodology

A comprehensive literature search focused on moderate to severe TBI was undertaken by an information specialist. The following databases, websites and search tools were used to identify primary and secondary studies; AMED, Cochrane Library, Embase, Global Evidence Mapping Initiative (TBI section), Medline (and Pre-Medline), NHS CRD databases, NHS

Evidence, TRIP database. Additionally the following sites were used to identify guidelines: Australian Clinical Practice Guidelines Portal, Guidelines International Network (GIN) database, National Guideline Clearinghouse, SIGN (Scottish Intercollegiate Guidelines Network). The keywords “Rehabilitation”, “Vocational”, “Sick Leave”, “Work”, “Employment”, “Sheltered Workshops”, “Vocational rehabilitation”, “return to work”, “back to work”, “stay at work” were searched alone and in combination. The search was limited to the English language and humans for the years 2004 – 2011. The literature was critically appraised using SIGN<sup>11</sup> grading for systematic reviews and Randomised Controlled Trials (RCTs), and the AGREE<sup>12</sup> instrument for appraisal of guideline quality.

### **3. Review of the Literature**

Employment is a social determinant of health<sup>6</sup>. Traumatic Brain Injury (TBI) primarily affects young adults in their economically productive years. TBI affects, to varying degrees, cognitive, behavioural and physical function which may impact on employability. Gaining and maintaining employment remains an elusive goal for many people with disability resulting from TBI<sup>11</sup>.

This section of the report aims to address employment participation in TBI clients. Return to work (RTW) rates, and strategies to facilitate RTW & employment participation following TBI will be discussed. Young people with TBI transitioning from school into employment will be considered separately.

#### **3.1 Return to Work rates**

RTW rates vary across the literature; it is evident<sup>11 12</sup> that RTW rates in the TBI population are higher when some form of vocational rehabilitation (VR) intervention is utilised.

Without specific VR intervention, RTW rates are 10-40% at one year post injury. With specific VR intervention, RTW rates are increased to 50-96% at one year post-injury<sup>11 12</sup>.

It is noteworthy that some of this data is inclusive of mild TBI which is out of scope of this report.

These findings advocate the use of VR programs to improve RTW and employment participation in the TBI population. The variation in definitions of work and employment used across the literature may also go some way to influencing the range of RTW rates reported across the literature. The inconsistency in definitions makes it difficult to directly compare studies.

A systematic review<sup>5</sup> of international (USA, Canada, Japan, Israel, Europe, UK, South Africa, New Zealand and Australia) TBI literature reports that 30-65% of the TBI population RTW post injury; more specifically a mean of 40.7% RTW 1 year post injury and 40.8% RTW within 2 years post injury. The similarity in these RTW rates over the 2 years may not accurately reflect what is happening. It is unclear from this report how many of those gaining employment in the first year are able to maintain their employment and therefore contribute to the statistic for the second year. It may also be inferred from this that only 40% of the TBI population have the capacity to RTW.

It is reported<sup>13</sup> that in New Zealand the overall RTW rates for people sustaining spinal cord injury (SCI) and TBI are 31% at 10-15 years post injury. At present there are no data available for RTW in the first 10 years post-injury, it is therefore difficult to comment on sustainability of post injury employment or the time taken to return to some level of employment in New Zealand.

It would be appropriate for New Zealand to use 50% RTW rate at 1 year post injury following moderate to severe TBI as a benchmark to compare with. This is based on the most up to date RTW rates reported in the international literature<sup>5</sup>. The evidence<sup>12</sup> suggests that a 50%

RTW rate is the minimum that could be expected at 1 year post injury when some kind of VR program is used.

### **3.2 Measuring RTW/Employment participation**

As previously discussed for people sustaining TBI, RTW/employment participation is a desirable outcome. The literature highlights that following injury and disease, an individual's capacity to return to work is commonly used to track the progress of rehabilitation<sup>14</sup>. RTW as a rehabilitation outcome measure (or metric) is utilised by some workers' compensation schemes<sup>15</sup> to monitor their effectiveness in facilitating injured workers' RTW.

Vogel<sup>3</sup> defined sustained employment as '3 consecutive months performing the same duties'. Unmodified employment is defined as '3 consecutive months performing the same duties as pre-injury'<sup>3</sup>. Following a moderate to severe TBI an individual may not regain the full capacity to return to pre injury work; making this a somewhat unrealistic goal.

A primary focus for New Zealand should be to achieve sustained RTW; this would be a useful outcome measure of vocational status and may reflect a successful/effective VR intervention program.

Different impressions of rehabilitative success can be obtained depending on the criteria used to define a TBI clients' RTW or employment participation. Returning to pre injury work may be an unrealistic goal for many people sustaining TBI; that is not to say that they lack the capacity to fulfil a different or modified role. Wasiak et al<sup>16</sup> suggest that productivity is one of the most important indicators of work status. Maintaining employment to levels equal to, or greater than, pre injury function (as reflected in working hours and continuous employment) can be considered a broad, but useful, measure of performance. Incorporating data on duties and performance can meaningfully inform the degree to which injured employees are able to return to pre injury productivity levels.

RTW is a process that can be considered along a spectrum - from returning to full pre injury employment, to modified or new employment - measured through sustaining or increasing the employed position. Vogel<sup>3</sup> presents four key concepts in RTW outcome measurement;

1. Attempts to return to work (no attempt, failed attempt, successful attempt)
2. Current working status (working/not working)
3. Duration of return to work (>3 months or <3months)
4. Number of working hours (less than, equal to or greater than pre injury).

Methods reported in the literature<sup>5</sup> used to determine RTW vary from; questionnaires, medical records, interviews (telephone, structured, open ended), centralized database, McAuley outcome scale and clinical evaluation. Methods need to be consistent, reliable and appropriate for tracking the progress for a TBI client and may vary across each phase of the rehabilitation process.

Currently ACC records data about weekly compensation and type of employment (sedentary, light, medium, heavy) for TBI clients.

It would be useful for ACC to collect more specific post injury data about; employment role, employer, hours worked per week and number of attempts to return to work. It would also be useful to have a coding system to record reasons why some clients fail to remain in sustained employment. It would be instrumental for ACC to collect data over a longer period of time for each TBI client in order to monitor their employment progress.

### **3.3 Barriers/prognostic factors to RTW/employment participation**

Understanding prognostic factors of RTW and job stability are instrumental to forming an effective vocational rehabilitation plan.

RTW work should be considered a long term functional outcome measure as work/employment is such an important part of life. A recent systematic review<sup>17</sup> highlighted that the most important factors to consider in RTW appeared to be; Length of Stay (LoS) in hospital, residual physical deficits and having family. There was strong evidence for a negative association between LoS and RTW; those patients with increased LoS were less likely to RTW. Presumably increased LoS reflected an increased severity of injury and/or more associated co-morbidities. Residual physical deficits were also negatively associated with RTW; greater residual physical deficits reduced the probability of RTW; this seems reasonable given that a decrease in physical function will reduce a person's employment capacity. Conversely having the support of family members was positively associated with RTW; a person will likely have an increased social support network. This would suggest that family members can play a key role helping those with TBI throughout the RTW process. Residual physical deficits following TBI are trainable/treatable; therefore focusing on managing these deficits may help to improve the RTW process.

Interestingly the literature reflects little to no evidence around the following factors; employer/colleague co-operation, accessibility to work, ability to perform activities of daily living (ADL) and number of associated injuries. It is reasonable to suggest that the paucity of research surrounding these factors is not a true reflection of their importance and that consideration should still be given to these factors as an integral part of any RTW process. It is unlikely that one single factor can reliably predict RTW.

Wehman et al<sup>18</sup> (1991) reported that of the TBI clients not retaining employment only 38.% of the employment separations were initiated by the clients. This highlights the importance of employer involvement.

Long-term post acute care, psychological problems and substance abuse have been cited<sup>4</sup> as strong predictors for a person with TBI not gaining or retaining employment; ideally a vocational rehabilitation program will include interventions to address all of these factors. A prospective cohort study identified a common theme of impaired work habits being due to psychiatric, psychological or social adjustment problems, throughout many client job separations. As such allocation of resources to address these psychosocial problems has been postulated to enhance vocational outcomes in the TBI population<sup>4</sup>. There is strong evidence that suffering depression/anxiety is not an associated prognostic factor for RTW<sup>17</sup>; this is an interesting finding and is further discussed in the relevant section.

### **3.4 Facilitating RTW**

A high quality systematic review of literature including all categories of Vocational Rehabilitation (VR) programmes providing they incorporate a clearly identified VR or work therapy element (these may include: general brain injury rehabilitation programmes offering vocational rehabilitation as part of their curriculum; specialist vocational rehabilitation services, specifically designed to support brain injured individuals back into work; and pan-disability vocational rehabilitation programmes) reported that RTW rates in the TBI population are higher when some form of VR intervention is utilised (without VR 10-40% RTW 1 year post injury; with VR 50-96% RTW at 1 year post injury<sup>12</sup>). Vocational rehabilitation increases societal participation and vocational outcomes<sup>19</sup> and is therefore essential for TBI clients to help them achieve RTW. Different approaches to VR are reported in the literature but there is little guidance regarding how to identify the best option for a particular context and which is the most effective<sup>19</sup>. The literature clearly describes 3 broad models of vocational rehabilitation following TBI<sup>7 11</sup>. Fadyl<sup>7</sup> evaluated the evidence for;

effectiveness, strengths, weaknesses, and application of each approach for the TBI population through pragmatic review of articles.

The 3 categories identified were on the basis of models that underpin them;

1. Program-based vocational rehabilitation model; this is characterized by a module based program (Appendix 1) aimed at maximising vocational outcome. The literature highlights some variation in specific components of the modules, but programs are generally based on the New York University (NYU) medical centre head trauma program model<sup>20</sup> which contains 3 sequential modules;

i) Intensive individualised holistic remedial rehabilitation and interventions within a structured program environment - 5 hours per day, 4 days per week for 20 wks; including cognitive remediation, self-awareness & social skills.

ii) Guided occupational/work trials (usually on-site; 3-9 months) form part of the treatment plan. Objectives and monitoring include competence, productivity & interpersonal appropriateness.

iii) Assisted vocational placement with transitional job support including assisted job search, familiarisation & early adjustment monitoring. Programs may also include follow up at specific time points following discharge.

Refer to Fadyl et al 2009 page 198

Ben-Yishay et al<sup>20</sup> report reasonable success following this program for vocational outcomes;

- At 6 months post injury 56 % of persons with TBI were in competitive employment and 22% were in sheltered employment

- At 3 years post injury 50 % of persons with TBI were in competitive employment and 22% were in sheltered employment.

This suggests that 6% of those included in the program did not sustain their employment.

It may therefore be useful for a vocational rehabilitation program to have no time limit for ongoing support or follow up time or may at least need to be extended beyond 3 years to ensure employment is sustained and any issues threatening employment are addressed early.

2. Supported employment model; Supported Employment (SE) was developed (1993)<sup>21</sup> as a rehabilitation alternative used to assist individuals with TBI RTW. A study by Wehman et al<sup>21</sup> reported that, as a result of an SE program, 80 individuals with severe TBI were placed into competitive employment during a 5-year time period. The SE model involves job placement (based on assessment of abilities, limitations, interests and work environment), on-the-job training, and long term support & job skills reinforcement through on the job coaching. Minimal pre-employment training is required as all training and interventions are done on the job in natural settings<sup>4</sup>. Overall Wehman et al.<sup>21</sup> found that SE improved the vocational capacity of severely head injured individuals.

The intensity of the interventions in the SE model are justified by the severity of disability in TBI which can result in clients being unlikely to manage in the work environment without such intervention. The targeted outcome of this approach, competitive wage employment, differs to that of other approaches, but is achievable with ongoing job coach support.



The supported competitive employment program includes the following elements;

- Job placement following ecologic analysis of potentially suitable work environments based on abilities, limitations and interests. Due to on the job training the client may be placed in a job they can't initially do. The employment specialist (job coach) will consider the implications of: availability of transport, family support, effects on benefits and expectations of client on career choices.
- Job training and support efforts individually determined for each placement. This phase includes ensuring job specific skills can be performed to an acceptable quality and quantity. It may also be necessary for the employment specialist to restructure the work environment or tools to accommodate a client's limitations. Strategies to address reasoning, memory or cognitive skills are put in place, e.g. checklists or other prompts.
- Counselling and training in self management of behaviour is an important part of this phase to help facilitate positive interactions in the work environment. It is the role of the employment specialist to educate the employer and co-workers in useful responses to any aberrant or unusual behaviours. In the early part of this phase the employment specialist is with the client 100% of the time. This requires a great deal of time and involvement. Involvement of the employment specialist is gradually reduced as a client becomes more proficient and socially interactive.
- The employment specialist then continues to monitor work performance and social adjustment through interviews with client, employer, co-workers and family. Any problems are addressed before they become job threatening. Problems outside of work that may influence work performance must also be monitored and addressed, e.g. drug use, financial and/or family problems.

Within SE a key outcome indicator used to assess RTW capacity is the monthly employment ratio<sup>21</sup>, which is computed by dividing the number of months employed during an employment phase (i.e pre/post injury) by the total possible months an individual would have the opportunity to be employed. The monthly employment ratio increased from 13% after injury with no SE to 67% with SE services. The majority of individuals were employed in warehouse, clerical and service-related occupations. A mean of 250 staff intervention hours were required to train and provide follow-up services to program participants.

Wehman et al<sup>4</sup> report an average of 291 hours per case at approx US\$29 per hour from employment specialist services; approx US\$8700 was spent per placement.

3. Case coordination approach; this is a holistic approach; vocational rehabilitation is part of an overall rehabilitation plan individualised to suit specific needs. Clients are overseen and assessed for service needs by a case co-ordinator and referred accordingly. This may result in referral for aspects of vocational rehabilitation used in other models (vocational counselling, pre-employment training, assisted job placement and on the job support). A key distinguishing feature is monitoring of progress by a case co-ordinator and integration of vocational rehabilitation into a holistic rehabilitation plan.

There is little clear evidence to suggest what should be considered the "best practice" approach to vocational rehabilitation<sup>7</sup>. However it is noteworthy that the level of evidence for the case coordination approach is higher, suggesting that it results in higher employment and productivity outcomes than previously reported in the literature. At 1 year follow up 80% were in some form of community based employment (supported, sheltered, voluntary & education) and 50% in paid competitive employment without support<sup>7</sup>. However long-term post acute care, psychological problems and substance abuse have been cited as strong predictors for a person with TBI not gaining or retaining employment; the SE model offers interventions to address all of these factors.

The literature would suggest that a VR program with services in place after vocational placement would be useful in helping the TBI population maintain employment<sup>7 11 19 21 22</sup>.

It is difficult to be prescriptive about specific types and amounts of each intervention within vocational rehabilitation programs<sup>22</sup>; this may be determined by considering variables that potentially act as predictors. The most important components of vocational rehabilitation services have been identified as job coaching.

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