

## **VR Research in Brief: Achieving Vocational Success after Traumatic Brain Injury**

*Returning to work, school, or homemaking is a major problem for many people with traumatic brain injury (TBI). And with more than 3.2 million people living with the consequences of TBI in the U.S., the failure to achieve a productive role after TBI comes at great economic and personal cost to the injured person, to his or her family, and to society (Selassie, Zaloshnja, Langlois, Miller, Jones, and Steiner, 2008). Many millions more than those 3.2 million deal with the consequences of TBI but go uncounted because their injuries do not receive medical attention, a common occurrence for injuries received in childhood, through sports accidents, and in cases of physical abuse. Furthermore, TBI is often an injury of one's youth—incidence rates peak between ages 16 and 25 (Sorensen and Kraus, 1991)—meaning that people living with the effects of TBI often do so for the majority of their lifespan. This cost is augmented by the emotional cost of the failure to achieve vocational success after TBI, as research indicates that those who fail to find employment have lower subjective well-being than those who are successful in this regard (O'Neill, Hibbard, Brown et al., 1998; Tsaousides, Ashman, and Seter, 2008).*

*What does research tell us about post-TBI vocational functioning, and what does it suggest as better ways of nurturing success? This brief expands and updates a research review on post-TBI return to work published in 2008 by the Brain Injury Research Center at Mount Sinai School of Medicine, New York City, which was funded through a grant from the National Institute on Disability and Rehabilitation Research (NIDRR).*

### **The State-Federal VR System and People with TBI**

The State-Federal Vocational Rehabilitation (VR) system is not well known to people with TBI. In a sample of people who had been hospitalized with a brain injury, only about one-third were aware of their state's VR program (Sykes-Horn, Wrigley, Wallace, and Yoels, 1997). This may account at least in part for the fact that the number of individuals served by the entire VR system each year is a small fraction (5–6 percent) of the number of working-age people hospitalized with TBI each year, which is estimated at 120,000 (Langlois, Rutland-Brown, and Thomas, 2004). The clear implication is that better outreach from the VR system to people with TBI is needed, both those newly injured and those who have chronic injuries and remain unemployed.

Greater outreach is warranted, as research also shows that the number of people with TBI who fail to return to work is relatively great. Although estimates vary across studies (for many reasons), data from the Colorado state registry of all people hospitalized with a brain injury in that state shows that about one-half had not returned to work by one year after the injury (Whiteneck, Mellick, Brooks, Harrison-Felix, Noble, and Terrill, 2001). A second study, by Kendall and colleagues, found that this rate falls to about a 20 percent failure rate at ten years after injury (Kendall, Muenchberger, and Gee, 2006). Their study also showed that VR services helped only about 50 percent of those served. This study points to a problem with most research that has been done on returning to work after TBI: outcome is assessed at only a single point. But despite the limitations of available research, the fact that retention of employment is a huge problem for people with TBI is well-established. Thus, it is not at all clear from the research described below that what helps a person make a start in an employment setting will keep him or her there.

## **Is What Works in Achieving Vocational Success for People with TBI Known?**

There are many studies, in fact hundreds, focused on determining “what works” in achieving vocational success for people with TBI, but they do not present a strong evidence base. This is a result of the fact that it is very difficult to design and implement studies that unequivocally demonstrate what works vocationally. Exploring the numerous challenges in undertaking high-quality outcome research is beyond the scope of this discussion, but an important implication for the VR system is that it needs to be proactive in reaching out to researchers so that a strong evidence base can be developed in the future to better serve people with TBI. For example, the gold standard for definitively demonstrating that an intervention is effective is the randomized controlled trial; however, researchers at the Mount Sinai School of Medicine found that the VR system with which they worked would not or could not consider random assignment of VR clients to traditional versus innovative services, as this was viewed as violating the *Rehabilitation Act Amendments of 2000* (O’Neill, Zuger, Fields, Fraser, and Pruce, 2004).

Several systematic reviews have been undertaken to evaluate the hundreds of studies related to interventions aimed at post-TBI return to work (Crepeau and Scherzer, 1993; The ERABI Research Group, 2006; Fadyl and McPherson, 2009; Gordon, et. al., 2006; Ownsworth and McKenna, 2004). The purpose of these reviews is, first, to evaluate each study’s quality to determine the extent to which it provides credible and valid evidence and, second, to review the “strong” studies of specific interventions to determine if the results suggest that they are effective. Before discussing the results of these reviews, a few points about the specific challenges of TBI may be useful.

## **Factors That Shape the Challenge in Post-TBI Return to Work**

*... Every person with a brain injury has two selves, at least in the initial period after injury: “who I am now” and “who I used to be.” Those two selves need to be reconciled before the person can move on to achieving success, vocationally or otherwise.*

First, while typically the task in getting someone back to work after onset of disability is to determine the barriers that prevent return to work and remove them or develop suitable accommodations, one of the challenges within VR is to realize that, for several reasons, this approach may not work for many members of the TBI population. First, each person with a brain injury is different from every other person. Not only is the damage to the brain different (in degree, site and type of damage), but also the implications of brain dysfunction for the person’s day-to-day functioning will differ greatly from person to person. Second, every person with a brain injury has two selves, at least in the initial period after injury: “who I am now” and “who I used to be.” Those two selves need to be reconciled before the person can move on to achieving success, vocationally or otherwise. Finally, people with brain injuries differ greatly in their level of awareness of how they have been changed by the injury. This varies from being totally unaware (because the part of the brain that would support such a self-evaluation is not functioning) to being fully aware, which may trigger major depression or anxiety or both.

*... Any approach to VR that is not person-centered and individualized is a waste of resources.*

These “facts” about brain injury have serious implications. First, “what works” for one person with TBI in getting him or her back to work will not work for everyone. In essence, the research described below can only suggest hypotheses about what will work for any specific individual. A corollary is that any approach to VR that is not person-centered and individualized is a waste of resources. A one-size-fits-all path may work for some, but will widely miss the mark for others. For example, systematic reviews suggest that cognitive rehabilitation helps many people with TBI. While for some that will be all that is needed to enable them to return to old jobs or to find new jobs that fit their new realities, for others, improved cognitive functioning may lead nowhere vocationally because these consumers are unready at that time to move on and accept their post-TBI selves. A final implication is that because TBI is so complex, members of the VR profession cannot really help if they work in a knowledge vacuum. Understanding the basics of acquired brain injury is the first step.

### **Evidence-based Suggestions, in General**

The reviews of research found moderate support for some specific service elements in aiding return to work:

- Providing VR services early in the rehabilitation process
- Creating a supportive work environment
- Providing cognitive skills training
- Supplying assistive technology (AT) and training in its use

Also, the most recent systematic review by Fadyl and McPherson (2009) of return-to-work studies has found some (weak) evidence supporting three general approaches to VR:

- Program-based VR, like that found at the NYU Medical Center Head Trauma Program. This program’s VR is characterized by intensive individualized work skills rehabilitation and interventions within a structured program environment, guided work trials, and assisted job placement with transitional job support.
- Supported employment, advocated and evaluated by Wehman and colleagues (2000). In this approach, interventions are provided solely on the job and the extent of support is not time limited.
- Case coordination, developed and explored by Malec and colleagues (2000), in which the emphasis is on a holistic approach, with close monitoring by a case coordinator, early intervention, and continuity of care.

### **Evidence-based Suggestions Specifically for VR**

Within the specific context of VR agencies, the following elements have been associated with greater probability of returning to work:

- On-the-job training (Johnstone, Vessell, Bounds et al., 2003)
- Counseling and guidance (Johnstone et al., 2003)
- Job placement services (Catalano, Pereira, Wu, Ho, and Chan, 2006; Bolton, Bellini, and Brookings, 2002)

- Creation of a working alliance with the counselor (Lustig, Strauser, Weems et al., 2003)

O'Neill and colleagues (2004) implemented one of the rare studies within the VR community, specifically in two VR offices in New York, in which they compared outcomes of client-centered, community-based teams to the outcomes of typical VR services. In a matched group of clients, they found that the innovative approach outperformed the usual approach in achieving return to work, at equivalent costs. It is well worth obtaining a copy of this publication to garner ideas on implementing a better approach to serving clients with TBI (and one not dependent upon having access to special programs such as those described above) within the VR context.

A recent study by Catalano and colleagues (2006) analyzed RSA-911 data on 7,366 persons with TBI who ended services in 2004. To determine the services associated with successful return to work, the researchers used a “data mining” statistical technique known as CHAID (Chi-squared Automatic Interaction Detection). Homogeneous groups of clients were created (on the basis of gender, age, co-occurring conditions such as substance abuse, etc.), with a focus on defining the types of services and conditions that supported or hindered successful closure. The successful clients:

- Had more money spent on their services
- Spent less time receiving services
- Received on-the-job training, job readiness training, other training, job search assistance, job placement assistance, on-the-job supports, maintenance, rehabilitation technology, or other services

Individuals with the lowest rates of return to work were receiving disability-related benefits and received only services such as assessment and counseling. However, the interpretation of such findings is unclear. For example, if those who only received assessment services had received more services, would there have been any difference in outcomes? Alternatively, were those who were viewed as “destined to fail no matter what” provided minimal services to avoid “wasting” resources? Among others Catalano’s study suggests that “job placement” services are effective in achieving successful return to work scenarios. However, is this simply an artifact, because this service is provided only to those who through other means have been prepared for returning to work? Despite the drawback in interpretation, because of the large number of records examined in the study, Catalano’s findings provide leads about what may be helpful in nurturing return to work and generating specific hypotheses for further study.

### **The Evidence Provides Suggestions or Hypotheses**

*Until better research reveals which clients are unlikely to benefit, the hypothesis should be that “on-the-job training works.”*

In essence, the body of research reviewed does not offer a strong basis for “evidence-based practice” in post-TBI VR. However, study results do offer some interim hypotheses about what helps people in achieving post-TBI employment. The ideas that find weak-to-moderate support in research reviews provide potential directions for service providers in providing appropriate VR services. Catalano and colleagues (2006) note, for example, that although on-the-job training was strongly associated with return to work, most post-TBI VR clients did not receive this service. Until better research reveals which clients are unlikely to benefit, the hypothesis should be that “on-the-job training works.” Further, most of the interventions tested use an

individualized approach to define how any specific intervention will be applied to each person entering the program. The same principle applies to VR: one has to determine each client's strengths and weaknesses, the functional consequences of his or her impairments, and his or her vocational goals before developing an individualized plan based upon this complex information base. Needless to say, a stronger research base is needed, requiring a proactive stance from within the VR system.

## **Bibliography**

- Ben-Yishay, Y., Silver, S.M., Piasetsky, E., and Ratok, J. (1987). Relationship Between Employability and Vocational Outcome after Intensive Holistic Cognitive Rehabilitation. *Journal of Head Trauma Rehabilitation*, 2(1), 35–48.
- Bolton, B.F., Bellini, J.L., and Brookings, J.B. (2002). Predicting Client Employment Outcomes from Personal History, Functional Limitations, and Rehabilitation Services. *Rehabilitation Counseling Bulletin*, 44, 10–12.
- Catalano, D., Pereira, A.P., Wu, M.Y., Ho, H., and Chan, F. (2006). Service Patterns Related to Successful Employment Outcomes of Persons with Traumatic Brain Injury in Vocational Rehabilitation. *NeuroRehabilitation*, 21, 279–293.
- Crepeau, F. and Scherzer, P. (1993). Predictors and Indicators of Work Status after Traumatic Brain Injury: A Meta-Analysis. *Neuropsychological Rehabilitation*, 3, 5–35.
- The ERABI Research Group. (2006). *Evidence-Based Review of Moderate to Severe Acquired Brain Injury*. Ontario, Canada: Ontario Neurotrauma Foundation.
- Fadyl, J.K. and McPherson, K.M. (2009). Approaches to Vocational Rehabilitation after Traumatic Brain Injury: A Review of the Evidence. *Journal of Head Trauma Rehabilitation*, 24, 195–212.
- Gordon, W.A., Zafonte, R., Cicerone, K., Cantor, J., Brown, M., Lombard, L., Goldsmith, R., and Chandna, T. (2006). Traumatic Brain Injury Rehabilitation: State of the Science. *American Journal of Physical Medicine and Rehabilitation*, 85, 343–382.
- Johnstone, B., Vessell, R., Bounds, T. et al. (2003). Predictors of Success for State Vocational Rehabilitation Clients with Traumatic Brain Injury. *Archives of Physical Medicine and Rehabilitation*, 84, 161–167.
- Kendall, E., Muenchberger, H., and Gee, T. (2006). Vocational Rehabilitation Following Traumatic Brain Injury: A Quantitative Synthesis of Outcome Studies. *Journal of Vocational Rehabilitation*, 25, 149–160.
- Langlois, J.A., Rutland-Brown, W., and Thomas, K.E. (2004). *Traumatic Brain Injury in the United States: Emergency Department Visits, Hospitalizations, and Deaths*. Washington, DC: Dept. of Health and Human Services, Centers for Disease Control and Prevention, Division of Acute Care, Rehabilitation Research and Disability Prevention, National Center for Injury Prevention and Control.
- Lustig, D.C., Strauser, D.R., Weems, G.H. et al. (2003). Traumatic Brain Injury and Rehabilitation Outcomes: Does the Working Alliance Make a Difference? *Journal of Applied Rehabilitation Counseling*, 34, 30–37.

- Malec, J., Buffington, A., Moessner, A., and Degiorgio, I. (2000). A Medical/Vocational Case Coordination System for Persons with Brain Injury: An Evaluation of Employment Outcomes. *Archives of Physical Medicine and Rehabilitation*, 81, 1007–1015.
- O’Neill, J., Hibbard, M.R., Brown, M. et al. (1998). The Effect of Employment on Quality of Life and Community Integration after Traumatic Brain Injury. *Journal of Head Trauma Rehabilitation*, 13, 68–79.
- O’Neill, J.H., Zuger, R.R., Fields, A., Fraser, R., and Pruce, T. (2004). The Program Without Walls: Innovative Approach to State Agency Vocational Rehabilitation of Persons with Traumatic Brain Injury. *Archives of Physical Medicine and Rehabilitation*, 85, 68–72.
- Owensworth, T. and McKenna, K. (2004). Investigation of Factors Related to Employment Outcome Following Traumatic Brain Injury: A Critical Review and Conceptual Model. *Disability and Rehabilitation*, 26, 765–784.
- Selassie, A.W., Zaloshnja, E., Langlois, J.A., Miller, T., Jones, P., and Steiner, C. (2008). Incidence of Long-Term Disability Following Traumatic Brain Injury Hospitalization, United States, 2003. *Journal of Head Trauma Rehabilitation*, 23, 123–131.
- Sorensen, S.B. and Kraus, J.F. (1991). Occurrence, Severity, and Outcomes of Brain Injury. *Journal of Head Trauma Rehabilitation*, 6,1–10.
- Sykes-Horn, W., Wrigley, M., Wallace, D., and Yoels, W. (1997). Factors Associated with Awareness of Vocational Rehabilitation Services after Traumatic Brain Injury. *Archives of Physical Medicine and Rehabilitation*, 78, 1327–1330.
- Tsaousides, T., Ashman, T., and Seter, C. (2008). The Psychological Effects of Employment after Traumatic Brain Injury: Objective and Subjective Indicators. *Rehabilitation Psychology*, 53(4), 456–463.
- Wehman, P., Bricout, J., and Targett, P. (2000). Supported Employment for Persons with Traumatic Brain Injury: A Guide for Implementation. *Traumatic Brain Injury Rehabilitation: Practical Vocational, Neuropsychological and Psychotherapy Interventions*. Boca Raton, FL: CRC Press, 201–240.
- Whiteneck, G., Mellick, D., Brooks, C., Harrison-Felix, C., Noble, K., and Terrill, M.S. (2001). *Colorado Traumatic Brain Injury and Follow Up System Data Book*. Englewood, CO: Craig Hospital.

*This report has been funded at least in part with federal funds from the United States Department of Education under contract number ED060062/003. The content of this publication does not necessarily reflect the policies of, nor imply endorsement by, the United States Government.*

Source: <http://www.statedata.info/>