

## **NRI Outcome Validation Study Highlights for 2014 Patient Demographics and Characteristics**

### **Demographics and Characteristics**

The NRI Outcome Study for the period ending December 31, 2014, addressed the discharges of 30 individuals. There were 25 males and 5 females. The age range was 19-74 and the average age at discharge was 43. The average length of stay on the NRI program was 2 ½ years with a range of 2 weeks to 18 years.

### **Mechanism of Injury**

The etiology of the brain injuries for the discharge population in this study includes motor vehicle crashes, anoxia, cerebrovascular accidents, and physical assault. Patients sustained moderate to severe injuries resulting in significant physical, medical, cognitive, and behavioral deficits. Most showed post-injury history of aggressive behavior including aggression toward self and others, elopement issues, non-compliance issues, and impulsivity. Patients had a range of cognitive problems involving attention, planning, organization, problem solving, and auditory verbal and visual memory.

### **Introduction**

During 2014, the NRI program experienced continued growth in programming and use of professional staff with a licensed professional counselor and licensed marriage and family therapist. Further, NRI provided additional training to counseling, SLP, occupational therapist assistants and interns in 2014. A number of programming developments from previous years have continued to increase opportunities for all patients to go into the community to practice community reintegration skills acquired during their rehabilitation, as well as opportunities to attend groups that are focused on the cognitive abilities. The peer council that was established in 2013 continues to function as a key mechanism for engaging patients in treatment and improving their insight into disability. Individuals selected by the council are provided various self-chosen positive reinforcers/rewards.

### **Outcome Measures**

The NRI outcome study continues to include objective outcome measures including the Brief Neuropsychological Cognitive Examination (Tonkonogy, 1997) and the Mayo-Portland Adaptability Inventory (MPAI-4) developed by Malec and Lezak (2003). The objective measures are combined with previous categorical measures that address the areas of Return to Independence, Social Role Return, Vocational Re-entry and Self Management.

In using objective measures, the MPAI-4 has an Adjustment subscale that speaks to behavior management, and that subscale took the place of the Self-Management of Behavior category in

2009. During 2010, the Self-Management of Behavior category was re-implemented. Following is the NRI Outcome Validation Study for 2014.

### Categorical Data Outcomes 2005-2014

<b>TABLE 1. Return to Independence</b>										
The table below indicates that the discharge destination of clients who completed the NRI program primarily returned home with minimal to moderate supports for 2014.										
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Return to independence with minimal to moderate support <6 hrs/day	60%	45%	14%	14%	0%	13%	6%	24%	35%	17%
Return to congregate living or extended supports in the home >6hrs/day	10%	0%	14%	29%	50%	17%	65%	38%	19%	29%
Return to group home with 24 hr/day support	10%	33%	57%	14%	11%	37%	29%	19%	19%	27%
Return to nursing home or hospital setting 24 hr/day care	20%	22%	15%	43%	39%	33%	0%	19%	27%	27%

<b>TABLE 2. Vocational Re-Entry</b>										
The return to meaningful life activities such as work, school, and volunteering is an important measure of completing rehabilitation. The return to competitive employment, school or vocational training program decreased from 2012 to 2014 and may be related to increased severity of injuries.										
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Return to competitive employment, school or vocational training program	0%	11%	0%	14%	0%	0%	6%	19%	11%	10%
Supported employment or volunteer work	10%	11%	17%	14%	0%	13%	22%	9%	0%	17%
Sheltered workshop or day activity program	20%	11%	33%	29%	11%	29%	17%	19%	0%	23%
Unable to work	50%	45%	33%	0%	50%	42%	44%	29%	79%	23%
Requires 24 hr/day supervision	20%	22%	17%	43%	39%	16%	11%	24%	10%	27%

**TABLE 3. Social Role Return**

The return to pre-injury social role is a determinant in an individual maintaining his or her independence over time. Returning to pre-injury social role and responsibilities decreased from 2010 to 2013 with an increase over the past year in those requiring 24 hr/day supervision.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Return home with independence and minimal modifications to social role	0%	12%	0%	14%	28%	4%	11%	14%	35%	10%
Return home to dependent care status	70%	33%	33%	14%	11%	21%	17%	19%	10%	13%
Return home with <2 hrs/day paid behavioral support	10%	0%	33%	10%	0%	0%	0%	0%	6%	3%
Return home with >2 hrs/day paid behavioral support	0%	0%	0%	24%	11%	4%	17%	24%	6%	4%
Attend day program providing structured care 3-5 days/week	0%	33%	71%	14%	11%	8%	0%	10%	19%	13%
24 hr/day Supervision	20%	22%	0%	24%	39%	63%	55%	33%	24%	57%

**TABLE 4. Self Management of Behavior**

The self-management of behavior is a key factor in long-term success. Individuals completing the NRI program demonstrate an increase in their capacity to self-regulate behavior.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
No behavioral support services required	30%	45%	66%	28%	See MPAI results	0%	11%	23%	4%	23%
Weekly contact with therapist, 0-5 outbursts per week	10%	0%	17%	28%	See MPAI results	33%	44%	57%	24%	43%
2 or more contacts per week with therapist, 6+ outbursts per week	20%	0%	0%	0%	See MPAI results	16%	6%	10%	24%	10%
Requires daily structured behavioral program	20%	33%	0%	0%	See MPAI results	13%	6%	0%	24%	11%
24 hour placement	20%	22%	17%	44%	See MPAI results	38%	33%	10%	24%	13%

## Data Outcomes 2014

**TABLE 5. BNCE and MPAI-4 Scores**

BNCE		MPAI - 4	
<b>Average Admit Score</b>	15.1	<b>Average Admit Score</b>	54.1
<b>Average D/C Score</b>	17.7	<b>Average D/C Score</b>	49.7
<b>Difference</b>	+2.6	<b>Difference</b>	-4.4
Admit n =19	D/C n = 19	Admit n = 17	D/C n = 17

### Table Notes

- BNCE: in general, a total score <22 indicates the individual may need significant support systems.
- BNCE: higher scores indicate a better level of functioning.
- MPAI-4: Scores reported as t-scores (Mean=50; Standard Deviation=10). Lower scores indicate a better level of functioning.
- The data above has (n) as less than the number of pt discharged due to missing data.

### Interpretation

From the table, the BNCE data and cut-off scores reflect that the NRI patients at admission had from mild to severe deficits related to their injury. With an average admission score of 15.1, results indicated that individuals in the study will struggle to live without significant support systems. From the average discharge score of 17.7, the data indicates that the patients, on average, experienced positive improvement. Admission BNCE scores ranged from minimal problems to severe and discharge scores varied widely with scores ranging from mild to severe deficits. In general, participants saw modest changes in functioning upon comparison of pre and post-treatment.

The Mayo-Portland average scores indicate an overall improvement. Recall the lower scores are reflective of a higher level of functioning and a negative value indicates an improvement in functioning on the MPAI-4. Admission average score is 54.1 compared to a discharge average score of 49.7. The overall scores reflected an improvement on average of 4.4 points, or a reduction in score indicating overall improvement (recall that the lower the score on the MPAI the higher the implied functioning of the individual).

### Conclusion

The NRI program has used objective measures for program evaluation for the past nine years. Categorical outcomes related to independence, social role return, management of behavior and vocational re-entry are provided. In conclusion, results continue to represent positive outcomes for the individuals we serve. Efforts will continue to be placed toward improving the outcomes

through empirically validated measures as a part of the research base for individuals living with the effects of brain injury.

Respectfully submitted,

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