Brookhaven Neurorehabilitation Institute
Outcome Validation Study Highlights for 2024

Demographics and Characteristics

The NRI Outcome Study for the period ending December 31, 2024, addressed the discharges of 8 individuals, seven males and one female with ages ranging from 18 to 52 years at the time of admission. One of the males admitted due to forensic charges and was a short-term stay. He was not representative of the other patients in the sample from the length of stay, cause of injury, or cognitive deficits. He was excluded from the sample.

Age at admission ranged from 20 to 52 years. Admission post injury ranged from 25 years (Childhood Maltreatment) to one year (myocardial infarction with anoxia). The average length of stay (LOS) on the NRI program was 1215 days with a range of 579 days to 1760 days. Individual lengths of stay, in days were: 579. 639, 1043, 1374, 1439, 1673, 1760.

Mechanism of Injury

The etiology of the brain injuries for the discharge population in this study includes myocardial infarction with anoxia (2), childhood abuse with psychiatric symptoms (2), assault, fall, and a bike accident. Patients sustained moderate to severe injuries resulting in significant physical, medical, cognitive, and behavioral deficits. Many showed post-injury history of aggressive behavior including aggression toward self and others, elopement, non-compliance, and impaired impulse control. Patients had a range of cognitive problems involving attention, planning, organization, problem solving, and auditory, verbal, and visual memory.

Objective Measures of Outcomes 2024

Overt Behavior Scale: (added in 2022): The OBS is designed to clarify observable challenging behaviors that can occur following acquired brain injury. The scale includes nine categories of behavior rated by severity, frequency, and impact of that behavior. The only objective measure, however, relates to the severity of that behavior, and is the only category which generates the total score. All patients receive OBS updates every 28 days with results reported during treatment team.

Patient Health Questionnaire Somatic Anxiety Depression Symptoms (PHQ-SADS) added in 2023: This is a standard questionnaire frequently used by primary care physicians and in other medical settings. This instrument includes a nine-item version to assess symptoms of depression (PHQ-9), a seven-item version to assess symptoms of anxiety (GAD-7), a 15-item version to detect somatic symptoms (PHQ-15), and additional questions related specifically to panic attack. All have been well validated. In our program this questionnaire must be administered every 28 days to patients with diagnoses of depression or anxiety. Those scores are reported in the treatment team. Some patients, even with those diagnoses, are not appropriate for PHQ-SADS due to cognitive or behavioral issues.

Mayo-Portland Adaptability Inventory — 4th edition: The NRI outcome study continues to include objective outcome measures including the Mayo-Portland Adaptability Inventory (MPAI-4) developed by Malec and Lezak (2003). To expand the utility of the MPAI-4 data we also analyze the tool's subscales. In addition to objective measures, NRI collects the following categorical measures for Return to Independence, Social Role Return, Vocational Re-entry and Self-Management.

	Mayo-Portland Adaptability Inventory - 4				
	Ability	**Adjustment**	**Participation**	**Total**	**(N =)**
Admission	51	58	54	57	**7**
Discharge	42	48	51	46	**7**
Change	9	10	3	11	

- **MPAI-4 Scores report as t-scores (Mean=50; Standard Deviation=10). Lower scores indicate better function.**
- 40-50 suggests mild to moderate limitations
- 50-60 suggests moderate to severe limitations
- 60 suggests severe limitations

Interpretation

The Mayo-Portland Adaptability Inventory (MPAI-4) is normed on a national Acquired Brain Injury population. Lower scores indicate better functioning compared to other patients. A reduction of 5 is considered Clinically Important and a reduction of 9 is a Robust Clinical Difference. Upon admission this group's average Total score of 57 (Moderate to Severe Limitations), reflected deficits in bodily function, activity limitations and participation restrictions. Their average Discharge score of 46, an 11-point improvement, reflected a Robust Clinical Improvement, globally, from Moderate/Severe limitations to Mild/Moderate limitations. The Abilities subscale includes basic physical as well as cognitive capabilities. This sample was higher in terms of other year's samples physically but made significant improvements in cognitive abilities, as represented by their behavioral outbursts. That 9-point improvement (Robust Clinical Improvement) reflected progress in both physical capabilities and attention/concentration, memory and problem solving. The Adjustment subscale reflects depression, anxiety, inappropriate anger, somatization, and social deficits. The 10-point improvement (Robust Clinical Improvement) documents substantial progress towards management of those symptoms. The Participation Scale reflects a patient's ability for social integration in family, employment, money management and self-care, and leisure. The 3 points improvement was short of the mark for significant changes in these higher-level abilities. Many of the patients discharging in 2024 had good outcomes but were unable to make much headway in independence or participation. Most discharged to another structured facility, though at a lower level of care. It is noted that this 2024 group had a much wider range of abilities than most samples, so their Averages might not be representative.

Categorical Data Outcomes 2024

Return to Independence: The table below indicates that the discharge destination of 2023 patients primarily returned to relative independence, congregate living or group home.

1.	Return to independence with minimal to moderate support <6 hrs./day	0
2.	Return to congregate living or extended support in the home >6hrs/day	0
3.	Return to group home with 24 hr./day support	5
4.	Return to nursing home or hospital setting 24 hr./day care	2

Vocational Reentry: The table below indicates that two patients returned to full employment, while most returned to some type of vocational activity with support. Two were unable to return in any capacity due to substantial cognitive and behavioral deficits.

1.	Competitive Employment	0
2.	Supported employment or volunteer work	2
3.	Sheltered workshop	3
4.	Unable to work	2

Social Role Return: The table below indicates that most patients continue to have moderate to significant difficulties resuming their social and interpersonal roles. Three were able to reintegrate in their household and social roles with only minor support for modifications.

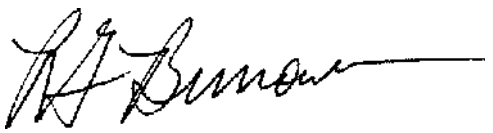
1.	Return home with independence or minimal modification to social role	0
2.	Return home with moderate modifications to social role	2
3.	Significant modification preventing a return to social role	5

Self-Management of Behavior: The table below indicates that all patients were able to manage their behavior with no more than weekly therapy contacts. This represents a significant decrease in the level of care for behavioral management and is commensurate with outpatient therapy.

1.	No behavioral support services required	1
2.	Weekly contact with therapists; 0-5 outburst per week	6
3.	Twice weekly contact with therapist; 6 or more outbursts per week	0

CONCLUSION: Objective and categorical data from the 7 patients discharging in 2024 reflect robust improvement across three of the four scores as measured by the Mayo Portland Adaptability Inventory-4. The most significant (Robust Clinical Improvement) occurred in the Discharge Total scores (11) where the Mayo indicated that these patients improved significantly. The areas of psychiatric symptoms, anger management, and improved social interaction, as well as physical and cognitive improvement indicated Robust Clinical Improvement. In 2024, five of the seven patients transitioned to the CNR-Oklahoma, or were programming there daily. Six of the seven patients

continued to require some type of emotional or behavioral support though all seven discharged to a lower level of care than they required upon admission. Results indicate that NRI programming continues to have a positive impact on its patients, improving emotional and social functioning and allowing for discharge to a lower level of care. For this group, the length of stay did not appear to be a significant factor.



R.G. Burrows, Ph.D.
NRI Director
Brookhaven Hospital