NRI
Outcome Validation Study Highlights for 2021

Demographics and Characteristics

The NRI Outcome Study for the period ending December 31, 2021, addressed the discharges of 10 individuals. There were nine males and one female with ages upon admission ranging from 19 to 61 years. The average length of stay (LOS) on the NRI program was 607 days with a range of 78 days to 1694 days. Individual lengths of stay, in days were: 78, 174, 182, 188, 238, 249, 713, 1223, 1442, and 1694. There were four patients identified as outliers, whose data was not included here. Those patients were generally characterized as grossly noncompliant, with prominent substance abuse history and lengths of stay around one month and discharging AMA.

Mechanism of Injury

The etiology of the brain injuries for the discharge population in this study includes motor vehicle accidents, pedestrian–MVA, bicycle accident, struck by heavy equipment, seizure disorder, CVA with anoxia and fall from a ladder. Two had poorly documented physical assault injuries, but symptoms related to underlying Personality Disorders were the most prominent features of their presentation.

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.

Program Overview

During 2021, the NRI program continued its expansion geographically and the mix of funders expanded its catchment area to additional states and experienced an rapid growth in average census to a record high of 49.63, i.e. compared to averages of 38.55, in 2019, 37 patients in 2018 and 35 in 2017. Currently, NRI has two full-time clinical psychotherapists, two speech/language pathologists, two occupational therapists, an occupational therapy assistant, a recreational therapist, a job coach and student interns in speech, occupational therapy, and occupational therapy assistant.

The NRI program provides its patients individual and group therapy across a variety of modalities. Individual sessions tend to focus on restoration or compensation for those deficits that pose the greatest barrier to independence and community reintegration. Group sessions serve to bolster the gains made in individual sessions by addressing similar deficits but in a group-training context. Recreational therapy, both on and off campus, is also offered frequently. For those interested in culinary activities, a cooking class meets weekly for NRI patients. Volunteer opportunities are provided through a local Food Bank.

Our community living options (CNR-Oklahoma) continues to offer a less-restrictive environment for our patients that have had successful progress within the inpatient program. Here, patients provided an appropriate level of structure with greater independence and the opportunity to initiate and complete tasks with minimal assistance such as cooking, domestic chores and budget shopping in the community. Community activities were often restricted during 2021 due to Covid-related guidelines. NRI has continued with itd more integrated relationship with CNR facilities in Iowa. That has benefitted NRI through additional admissions from that state and allowed a smoother, finely tuned transition for our Iowa patients.

Outcome Measures

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 collect the following categorical measures for Return to Independence, Social Role Return, Vocational Re-entry and Self-Management. Following is the NRI Outcome Validation Study for 2021. One patient admitted prior to initiation of MPAI-4 data collection, leaving a total of 10 records for outcomes analysis.

Objective Measures Outcomes 2021

	Mayo-Portland Adaptability Inventory - 4				
	Ability	**Adjustment**	**Participation**	**Total**	**(N =)**
Admission	41	55	53	50	**10**
Discharge	34	42	44	38	**10**
Change	7	13	9	12	

- **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 TBI population. Lower scores indicate a better of functioning as compared to other patients with acquired brain injury. 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 was 50 (Mild - Moderate Global Impairment), reflecting deficits in bodily function, activity limitations and participation restrictions. Their average Discharge score of 38, a 12 point improvement, reflected a global improvement from Mild/Moderate limitations to a category approaching the general population. The Abilities subscale includes basic physical as well as cognitive capabilities. Most 2021 admissions had no significant physical deficits so

the 7 point improvement reflected progress in attention/concentration, memory and problems solving. The Adjustment subscale reflects depression, anxiety, inappropriate anger, somatization, and social deficits. The 13 point improvement document substantial progress towards management of those symptoms. Participation reflects a patient's ability for social integration in family, employment, money management and self-care, and leisure. The 9 points indicates robust improvements in those areas. It is noted that substantial improvement in this category is harder to demonstrate prior to reintegration into the community, however, most of these patients (9/11) progressed to our CNR group home, allowing for greater demonstration of their community-based capabilities.

Categorical Data Outcomes 2021

Return to Independence: The table below indicates that the discharge destination of 2021 patients primarily returned to relative independence, congregate living or group home.

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

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

1. Competitive Employment	2
2. Supported employment or volunteer work	6
3. Sheltered workshop	0
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 of modifications.

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

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 level of care for behavioral management and is commensurate with outpatient therapy.

1. No behavioral support services required	4
2. Weekly contact with therapist; 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 10 patients to discharge in 2021 reflect robust improvement across a wide range of abilities as measured by the Mayo Portland Adaptability Inventory-4. The most significant improvements occurred in areas of psychiatric symptoms, anger management, and improved social interaction. They also demonstrated robust improvements in the higher level skills related to self-management of finances, social interaction and general community reintegration. Those improvements allowed 9 of 10 patients to transition to CNR-Oklahoma, our community living level of care. All 10 discharged to a lower level of care than they required upon admission. Two discharged to competitive employment and six to supported employments. Eight of 10 were able to reengage to some extent with their prior social roles. All discharged patients were able to manage their prior maladaptive behavior with no more than weekly outpatient therapy, with four requiring no behavioral support services at all. These 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.

As a group these patients had more cognitive capability than our typical long-term patient but presented with significant behavioral and emotional issues. Length of stay was not a strong predictor of outcome in this particular sample, with highest level outcomes more apparently related to the etiology of injury and retained cognitive ability. It was the robust improvements in psychiatric and behavioral symptoms that drove the successful discharges. For some of the patients that improvement came over the course of years.

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