Determining Supervision and Care Needs

The Development, Validation and Utility of the Hope Network Acuity Scale (HAS) Neuro Rehabilitation Acuity Measure

Martin Waalkes, PhD, ABPP, CBIST

Special thanks to:
- Amy Walters, LPN
- Michele Tomlinson, Ph.D.
- Nate Kaufman, BS
- Holly Cramblet, MA, LLP, BCBA

HOPE NETWORK NEURO REHABILITATION

BIA of Michigan Disclosure

Presenter, Martin Waalkes, PhD, ABPP, CBIST has no financial interest to disclose.

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Outline, 60 minutes

1. (5 minutes) The concept of acuity and the dimensions of protective supervision and attendant care in neuro rehabilitation. Review of literature on acuity measures. a. Martin Waalkes

2. (5 minutes) Introduction of the Hope Network Acuity Scale (HAS). Initial development process, Two-factor structure, Rating/rater format, Review of item elements, Research design for validation, Item development trials.

3. (10 minutes) HAS Interrater reliability trial outcomes, item descriptive statistics, factor structure outcomes.
a. Martin Waalkes

4. (15 minutes) Correlational findings with other outcome and treatment measures, cross-sectional and longitudinal patterns. Relationships of acuity to discharge placement.
a. Martin Waalkes

5. (10 minutes) Acuity measures as a business and management tool for resource allocation and cost projection.
a. Martin Waalkes

6. (5 Minutes) Reflections on the role of Acuity as a proxy for functional outcome. Directions for future research and validation trials.

7. (10 minutes) Questions and discussion on the utilization and applications of acuity measurement in neuro rehabilitation.
Martin Waalkes

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Objectives

At the conclusion of this activity, the participant will be able to:

1. Identify acuity as a variable of injury severity and complexity influencing treatment resource demands.
2. Rate acuity with the HAS instrument by noting patient characteristics in inpatient or residential placement.
3. Identify relationships of acuity to functional outcomes, cost and resource demands, and placement decisions.

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Program Description

- **How do you measure the required care and supervision workload in neuro rehabilitation?**
- The Hope Network Acuity Scale (HAS), a two-factor 8-item rating of medical and neurobehavioral acuity, addresses this need. The HAS demonstrates excellent interrater reliability and internal consistency, and factor analysis confirms the two-factor structure.
- Significant correlations with functional outcome measures and supervision ratings, evidence of improvement over the course of treatment, and expected stratification of outcomes on the discharge continuum support validity. Implications for use as a placement tool, measure for efficiency, and even as a working tool for assigning resources or cost estimating will be explored.

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Presenter

Dr. Martin Waalkes is a licensed psychologist specializing in rehabilitation psychology with Hope Network Neuro Rehabilitation where he has worked for 29 years. At Hope Network, Dr. Waalkes is the Director of Neuro Rehabilitation. Dr. Waalkes provides clinical services to patients and their families in the post-acute and residential treatment settings of Hope Network. He supervises the psychology services and oversees the clinical activities and clinical program development for Hope Network locations in Michigan. He also provides consultation and clinical services at Spectrum Health Neuro Rehabilitation. Dr. Waalkes has a Ph.D. in clinical psychology is from Michigan State University. He is board certified in Rehabilitation Psychology from the American Board of Professional Psychology.

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Some Questions

- How will we know if some patients require more care and supervision time than others?
- How can we determine if care workloads are the same from one program to the next?
- How do we know which types of referrals or treatment groups demand the most staffing?
- How do we know where to place a patient in the available program options based on care needs?
- How can we objectively support how much attendant care and supervision a person will need?
- How can we predict what the supervision element of rehabilitative care for a patient will cost?

.....Acuity, That's how!

What is Acuity?

- Acuity is the measure of required care and supervision needs of a patient.
- It is a workload measure

Typical Measures of Acuity

Nursing: used to capture workloads of:

- Procedures
- Care interventions
- Education
- Therapeutic and psychosocial interventions
- Oral medication administration frequencies
- Complicated drugs and other medication administration routines.

Kidd, M., Grove, K., Kaiser, M., Swoboda, B., & Taylor, A. (2014) . A new patient-acuity tool promotes equitable nurse-patient assignments. American nurse today, 9, 1-4.

Related Concepts: Severity vs. Acuity

Severity is a characteristic of the injury and is related to outcome.
There have been several efforts to develop a broad injury severity measure, but the focus is on the complexity of the injury for the patient, with only secondary, inferred implications on the resulting impact on caregivers.
http://emedicine.medscape.com/article/434076-overview#showall

Acuity is a *direct measure* of resulting reliance on others for care and supervision. It is independent of, but related to severity, and can be multi-determined. Acuity can be influenced by:

- Severity
- Arousal
- Environmental supports or aggravations
- Treatment unit architecture
- Treatment patterns
- Risk tolerance
- Family and cultural expectations
- Licensing and policy requirements

Related Concepts – *NOT ACUITY*

Injury Diagnostic features: A measure of patient injury level severity that may predict workload

- Ranchos Los Amigos Scale for Level Of Cognitive Function (RLAS)
- Glasgow Coma Scale, LOC +/-, Days of PTC.

Functional Capacity: A measure of patient skills *indirectly* related to workload

- MPAI-4 (Malec, 2005)
- Neurological Impairment Scale (NIS) (Turner-Stokes, et.al., 2014)
- ASIA scale for SCI injury level and extent
- Neuropsychological testing and discipline clinical scales

Related Concepts – *NOT ACUITY* (cont.)

Complexity: A measure of patient diagnostic and demographic qualities *indirectly* related to workload

- Oxford Case Complexity Assessment Measure (OCCAM) (Troigros, O., et.al., 2014)
- Case Mix Index (CMI). Diagnostic and utilization algorithms that are part of the DRG payment system
- Global Assessment of Functioning (GAF)
- Diagnosis count

Risk: The likelihood in which failure to meet care needs will result in harm or undesired outcomes for the program or stakeholders

- Braden Score Index risk assessment tool for skin wounds
- Johns Hopkins Fall risk assessment

Acuity – A Dependent or Independent Variable?

- **A DEPENDENT variable:** Acuity is determined by objective things like severity of injury, complexity of prescribed care, and the limitations of available equipment. Acuity can also be influenced by intangibles features of the family, institutional risk tolerance, and advanced directives.
- **An INDEPENDENT variable:** Aggregated across a treatment unit, observed acuity can dictate the hours of staff time devoted to care, or increase the costs of providing service.

Types of Acuity in Neuro Rehab: Medical Acuity

Definition: Medical Acuity

- The needed coverage and urgency/intensity of clinical service and monitoring required by activities for consumer **medical care** needs

Measures:

- Vanderbilt University Hospital Acuity Ratings
- Care and Needs Scale (Soo, C., et.al. 2010)
- WIN (Workload Indicator For Nursing)
- Numerous local acuity scales

Types of Acuity in Neuro Rehab: Behavioral Acuity

Definition: Neurobehavioral Acuity

- Frequency and vigilance required for safety monitoring and behavioral direction **due to cognitive and behavioral features**

Measures:

- Vanderbilt University Hospital Acuity Ratings
- Supervision Rating Score

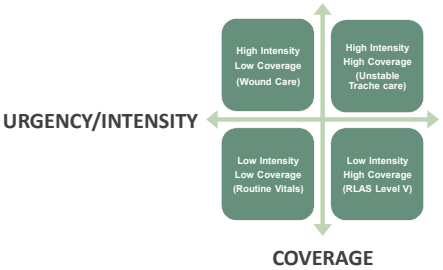
Dimensions of Acuity: Intensity (Urgency)

- What level or speed of response and resources are required to address care needs?
- What is the severity of implications for not addressing the needs in a timely manner?
- Examples:
  - Line of sight supervision
  - Contact guard assist
  - Physical restraints
  - Two-person transfer

Dimensions of Acuity: Coverage

- What part of the patient's day and lifestyle is influenced by care needs?
- Typically measured in hours or proportion of time devoted to protective supervision or care.
  - 2 hours of attendant care support
  - Waking hours supervision
  - 1:3 15 min check general supervision
  - PRN assist
  - Assisted living
  - Structured placement vs. supervised placement

Acuity Dimensions



Related Concepts: Attendant Care – The Provision of Care

Definition:
Attendant Care Coverage

- The degree to which a person requires continuous direct service from an attendant care provider over the dimensions of time, setting, and context to meet all stipulated care needs.
- Measures:
  - Hours of care/time interval (e.g. 4 hrs 2 times /Day)

Definition:
Attendant Care Intensity

- The quantity, magnitude, vigilance and immediacy of interventions and procedures, and potentially number of caregivers to meet physical care needs
- Measures:
  - Staffing ratios, procedure frequencies, medication intervals, X –person transfers.

Related Concepts: Supervision – The Capacity to Intervene

Definition:
Protective Supervision Coverage

- The degree to which the a person requires risk monitoring and cognitive assistance for behavior regulation for basic safety over the dimensions of time, setting, and context.
- Measures:
  - Supervision Rating Scale (Boak, 2000)
  - Level of care (supervised vs. structured)
  - Hours of Service provided

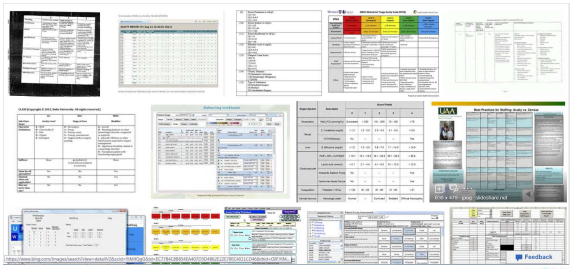
Definition:
Protective Supervision Intensity

- The required level of vigilance, responsiveness, and capacity for control required of a risk event.
- Measures:
  - Supervision Rating Scale (Boak, 2000)
  - Presence of control features, physical capacity for responsiveness, or level of vigilance (check frequencies).
  - Locked settings, arms-length proximity, and auditory monitoring are examples of intensity specification

Another formulation?

- **Medical Acuity:** Attendant Care
- **Neurobehavioral Acuity:** Protective Supervision

There Are a Host of Specialized Options



Hope Network Acuity Scale (HAS) Development

Objectives

- Meaningful for staffing and workload determination
- Clinically descriptive of the burden of care
- Efficiently administered by line supervisory staff
- Generalizable within Hope Network (Neurobehavioral, Transitional Post-acute, Long term care, Community treatment)
- Applicable to acute care as an admission screening tool
- Sensitive to the nuances of post-acute rehab care
- Functional as an outcome measure
- Robust for research and transferable to other settings (acute care, IRF, home based care)

Development of the HAS Beta Version

- Literature Search
- Peer programs
  - Proprietary scales for local use
- Initial priorities
  - Two factor measure equal part medical and neurobehavioral
  - Ascending scale of acuity (high numbers = high acuity)
  - Suited to the post-acute environment
  - Emphasizing the experience of the direct caregiver
  - Ratings by supervisory caregiver staff at the shift level
  - Clear language at the direct care level
  - Capture attendant and supervisory care needs

The Two Sides of Acuity in a Brain injury Environment

Definition:
Medical Acuity

- The frequency of service and monitoring required for care activities for consumer medical needs

Definition:
Neurobehavioral Acuity

- Frequency and vigilance required for protective safety monitoring and behavioral direction due to cognitive and behavioral features

Coverage and intensity concepts apply to both subscales

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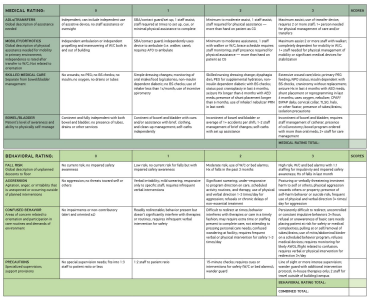
Hope Network Acuity Scale (HAS)



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Hope Network Acuity Scale (HAS) Items

Medical Acuity
- ADLs/Transfers
- Mobility/Orthotics
- Skilled Care
- Bowel/Bladder Care

Neurobehavioral Acuity
- Fall Risk
- Aggression
- Confused Behavior
- Precautions

Researched, but not used:
- High Utilizer
- Safety/Community Interactions

- No Instructions other than the 1 page document

HOPE NETWORK NEURO REHABILITATION

Medical Acuity: ADLs/Transfers

- Global description of assistance needed with ADLs often closely matches the assistance needed with transfers

0	1	2	3
• Independent • Can include the independent use of an assistive device. No staff assistance or oversight	• SBA/contact guard/set up • 1 staff assist • Staff required intermittently to provide set up, verbal cues or minimal level of physical assistance to complete	• Min to Mod assistance • 1 staff assist • Staff presence required for actual physical assistance (more than a hand on the patient as with CG)	• Max assistance • Use of transfer device or lift • Requires 2 or more staff • More than 1 staff person needed for physical management of care and/or transfers

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Medical Acuity: Mobility/Orthotics

- Global description of physical assistance needed for mobility in primary environment
- Independence is rated AFTER they are transferred to their w/c
- This is not an orientation question

0	1	2	3
• Independent ambulation or propelling and maneuvering of W/C both inside and outside of building • *Independence is rated after transfer to their W/C*	• SBA/Contact Guard/Device to ambulate, Requires AFO to ambulate, Requires assistance in Community • *Ind. w/ walker or AFO, Independent Inside building*	• Moderate Assist, 1-2 staff w/walker or W/C, Has a brace schedule which is followed during the day or evening • *Actual physical assistance req.; more than CG*	• Max Assistance, 2 or more staff with W/C mobility or completely dependent for W/C mobility; Cervical collar, Halo • *>1 staff needed for physical management of mobility*

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Medical Acuity: Skilled Care

- How medically complex is the patient? (separate from bowel and bladder management)

0	1	2	3
• No wound issues • No PEG • No BS checks • No insulin • No O2 • No drains or other tubes	• Simple dressing changes • Monitoring of oral intake/food log/calorie counts • Non-insulin dependent diabetic w/o BS checks • Use of rescues inhaler less than 1 x per time per month • Use of incentive spirometry	• Skilled nursing dressing change • Dysphagia diet • PEG for supplemental hydration • Non-insulin dependent diabetic with BS checks • s/p cranioplasty within last 6 months • Seizure hx longer than 6 months ago w/AED medication • Presence of shunt placement longer than 6 month • Use of rescue inhaler/Nebulizer PRN within the last week	• Extensive wound care issues/wound clinic • Primary PEG feedings • NPO status • Insulin dependent w/BS checks • s/p craniotomy w/o replacement • Seizures hx within last 6 months w/AED medication • Shunt placement in last 6 months or shunt reprogramming in last 6 months • Uses O2, nebulizer, CPAP/BiPAP on daily basis • Cervical collar, TLSO, HALO, or other fixator device • Presence of other tubes/drains (i.e. trach, wound drains) • Isolation precautions

Medical Acuity: Bowel/Bladder

- This includes patient's level of self-awareness and ability to physically self-manage

0	1	2	3
• Continent and fully independent with both bowel and bladder • No presence of tubes, drains or other devices	• Continent of bowel and bladder with cues and/or assistance with brief and clothing management and clean up • Self-caths independently	• Incontinent of bowel or bladder (or averages 1 or more accidents per shift) • 1-2 staff to manage brief changes • Self-caths with set up only	• Incontinent of bowel and bladder • Requiring staff management of catheter • Presence of urostomy or colostomy • Bowel program ordered (more than oral medication) • 2 or more staff to manage care

Total Medical Acuity Score Sample

Fall Risk	ADLs/ Transfers	Mobility/ Orthotics	Skilled Care	Bowel/ Bladder	SCORE
2	2	2	1	2	9

Neurobehavioral Acuity: Fall Risk

- How concerned are the staff that this person will fall?

0	1	2	3
• No current risk for falls • No impaired safety awareness	• Low Risk • No current risk for falls but with impaired safety awareness	• Moderate Risk • Use of w/c, bed alarms • Hx of falls in the past 3 months	• High Risk • w/c and bed alarms with 1:1 staffing for impulsivity and impaired safety awareness • Hx of falls in last month

Neurobehavioral Acuity: Aggression

- Agitation that is unexpected or occurring outside of planned interventions

0	1	2	3
• No aggression • No threats towards self or others	• Verbal irritability • Mild swearing • Responsive only to specific staff • Requires infrequent verbal interventions	• Significant swearing • Under-responsive to program direction on care and scheduled activity routines and therapy • Use of physical and verbal direction up to 1-3 times for aggression • Refusals or chronic delays of non-essential treatment	• Posturing or verbally threatening imminent harm to self or others • Physical aggression towards other patients, staff, or property • Presence of self-injurious behaviors or suicide attempt or active monitoring of risk • Frequent use of physical and verbal direction more than 3 times per day for aggression • Refusals or chronic delays of essential treatment and scheduled therapy

Neurobehavioral Acuity: Confused Behavior

- Areas of concern related to orientation and participation in care routines and demands of the environment

0	1	2	3
• No impairments or non-contributory (alert and oriented x 4)	• Readily redirectable • Behavior present but not significantly interfering with therapies or routines • Requires infrequent verbal interventions for safety	• Intermittently difficult to redirect • Behavior interfering with delivery of therapies or care in a timely fashion • May require additional time or additional staffing present to complete care • Not attending to pressing personal needs (continence, meals, obvious hygiene needs) • Confused wandering about the facility • Requires frequent verbal or physical intervention for safety 1-3 times per day	• Persistently difficult to redirect • Uncontrolled or constant (more than 3 per hour) impulsive behaviors • Refusal or complete unawareness of basic care needs placing patient at risk for safety or medical complications • Pulling at /self-removal of tubes/drains • Use of mitts/abdominal binder on a scheduled, formal behavior program • Refusing medical devices (e.g. helmet, cervical collar, splints) • Requires monitoring for likely AWOL or flight behavior related to confusion or disorientation • Requires constant verbal or physical intervention for safety redirection more than 3 times per day

Neurobehavioral Acuity: Precautions

- What level of staffing does the patient require to maintain their physical safety in the building?

0	1	2	3
• No special supervision needs • Fits into 3:1 staffing or less	• 2:1	• 15 minute checks • Wander guard • Requiring cues or interventions for safety (w/c or bed alarms)	• Line of sight or more intense supervision • Wander guard with additional intervention protocol • In-house therapies only • 2:1 travel outside building/campus

Total Medical Acuity Score Sample

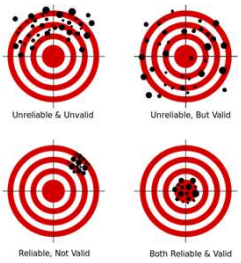
Fall Risk	ADLs/ Transfers	Mobility/ Orthotics	Skilled Care	Bowel/ Bladder	SCORE
2	2	2	1	2	9

Safety/ Community	Aggression	Confused Behavior	Precautions	High Utilizer	SCORE
3	1	2	3	1	9

Initial Roll-Out Procedures

- Test runs for functional utility in our Neurobehavioral unit
- Weekly data from transitional settings for impressions
- Quarterly data on Long-Term Residential including Community Living, establishing scope of functional utility at the log post-acute interval
- Multiple drafts until consensus on language from the rater pool
- Drafts eventually "Locked Down" for the study.
- Two items were thought relevant, but did not hold up to analysis:
  - High Utilizer
  - Safety/ Community interactions

Reliability Study



HAS Interrater Reliability Trial

208 Acuity Scale ratings on 104 consumers were performed

- Each consumer had two completed ratings performed on the same day by staff members familiar with the consumer; one by the Residential Supervisor ("designated rater" or A) and one by another ("non-designated rater" or B) staff member.
- B raters:
  - Shift Lead (86.5%)
  - Rehabilitation Technician (5.8%)
  - Nurse (2%)
  - Other staff member (5.8%)
- A one-way random Intraclass correlation (ICC) is calculated for reliability. This particular ICC is used because there are potentially two different raters for each participant. It is the most conservative ICC.

Interrater Reliability: (Descriptive Statistics A/B Scores)

Interrater Reliability Trial Descriptive Statistics					
	N	Min	Max	Mean	SD
Rater A Total	104	.00	23.00	7.80	5.73
Rater A Behavioral	104	.00	12.00	3.83	2.84
Rater A Medical	104	.00	12.00	3.97	3.61
Rater B Total	104	.00	23.00	8.16	5.70
Rater B Behavioral	104	.00	12.00	4.17	3.03
Rater B Medical	104	.00	12.00	3.99	3.55
Valid N (list wise)	104				

RESULTS: IRR Interclass Correlation Data

Medical Subscale	.94 (95% CI .92 -.96)
Behavioral Subscale	.90 (95% CI .86 -.93)
Total Scale	.95 (95% CI .93 -.97)

** 1-way random ICC*

IRR Interclass Correlation Data

Table 2. Intraclass Correlation Coefficient – Acuity Total							
	Intraclass Correlation	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig
Single Measures	.952	.930	.967	40.44	103	104	.000
One-way random effects model where people effects are random.							

Table 2. Intraclass Correlation Coefficient – Medical Acuity Total							
	Intraclass Correlation	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig
Single Measures	.943	.917	.961	34.037	103	104	.000
One-way random effects model where people effects are random.							

Table 4. Intraclass Correlation Coefficient – Behavioral Acuity Subscale							
	Intraclass Correlation	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig
Single Measures	.902	.859	.933	19.437	103	104	.000
One-way random effects model where people effects are random.							

Dataset Descriptive Statistics

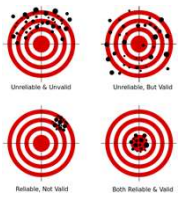
- **Full Dataset** (Transitional initial scores and long-term residents) (Used for inter-item correlations and factor analyses)
  - N = 240
  - Mean age = 48.0 (SD = 15.06; Range = 18 – 87)
  - 66.7 % Male
- **Transitional Dataset** (Used for outcome and correlational analyses)
  - N = 105
  - Mean age = 46.9 (SD = 16.54; Range 18- 87)
  - 61% Male
  - Ave LOS 76.7 days (SD = 67.46, range = 11 -375)

Item Scores: Full Sample Descriptive Statistics

	N	Min	Max	Mean	SD	Skew	Kurtosis
ADLs/Transfers	240	0.00	3.00	1.32	1.07	0.32	-1.12
Mobility/Orthotics	240	0.00	3.00	1.14	1.07	0.44	-1.09
Skilled Medical Care	240	0.00	3.00	1.39	1.26	0.16	-1.62
Bowel/Bladder	240	0.00	3.00	1.02	1.16	0.69	-1.05
Fall Risk	240	0.00	3.00	1.38	1.02	0.20	-1.07
Aggression	240	0.00	3.00	0.76	0.87	0.95	0.07
Confused Behavior	237	0.00	3.00	1.11	0.99	0.34	-1.05
Precautions	240	0.00	3.00	1.05	1.15	0.42	-1.43
Medical Total	240	0.00	12.00	4.87	3.76	0.45	-0.90
Behavioral Total	240	0.00	12.00	4.27	2.94	0.48	-0.56
Acuity Total	240	0.00	24.00	9.14	5.91	0.41	-0.68

Validation Studies

- Does the test measure what it is supposed to measure?
- Does it show changes that are meaningful to the concept?



Construct Validity: Corrected Item – Total Correlations for Subscale Items

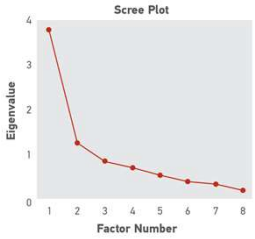
Medical Acuity: α = .84		
	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
ADLs/Transfers	.79	.75
Mobility/Orthotics	.71	.79
Skilled Medical Care	.55	.87
Bowel/Bladder	.70	.79

Behavioral Acuity: α = .70		
	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Fall Risk	.48	.65
Aggression	.30	.74
Confused Behavior	.60	.57
Precautions	.59	.57

EFA: Total Variance Explained

Factor	Eigenvalue	% of Variance	Cumulative Variance %
1	3.89	48.58	48.58
2	1.15	14.39	62.97
3	0.86	10.69	73.66
4	0.63	7.88	81.54
5	0.55	6.87	88.41
6	0.37	4.56	92.97
7	0.34	4.20	97.17
8	0.23	2.83	100.00

RESULTS: Construct Validity (EFA)



Pattern Matrix

	Factor 1	Factor 2
ADLs/Transfers	.980	
Mobility/Orthotics	.740	
Skilled Medical Care	.595	
Bowel/Bladder	.732	
Fall Risk		.512
Aggression		.395
Confused Behavior		.790
Precautions		.607

Extraction Method: Maximum Likelihood.
Rotation Method: Oblimin with Kaiser.

Factor Analysis: Pattern Mix Factor Loadings

	Factor 1	Factor 2
ADLs/Transfers	.980	
Mobility/Orthotics	.740	
Skilled Medical Care	.595	
Bowel/Bladder	.732	
Fall Risk		.512
Aggression		.395
Confused Behavior		.790
Precautions		.607

Concurrent Validity: Spearman's Rho: HAS and SRS

Admission	Acuity Total	Medical Subscale	Behavioral Subscale
SRS Rating	.525**	.260**	.638**
Discharge	**Acuity Total**	**Medical Subscale**	**Behavioral Subscale**
SRS Rating	.662**	.536**	.610**

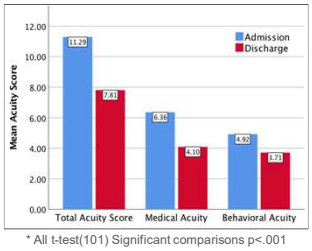
**p< .01

Concurrent Validity: Pearson Correlations: HAS and MPAI

Admission	Acuity Total	Medical Subscale	Behavioral Subscale
MPAI Total Score	.799**	.638**	.739**
MPAI Abilities Score	.701**	.596**	.606**
MPAI Adjustment Score	.705**	.517**	.704**
MPAI Participation Score	.787**	.672**	.676**
Discharge	**Acuity Total**	**Medical Subscale**	**Behavioral Subscale**
MPAI Total Score	.813**	.680**	.768**
MPAI Abilities Score	.765**	.691**	.668**
MPAI Adjustment Score	.714**	.532**	.742**
MPAI Participation Score	.814**	.706**	.741**

**p< .01

Discriminate Validity/Sensitivity to change Treatment Efficacy: Admission and Discharge HAS Scores



* All t-test(101) Significant comparisons p<.001

Intake and Discharge Scores by Clinical Pathway (awaiting statistical analyses 5/31/2019) HIDE SLIDE FOR NOW

No Need to Edit

Clinical Pathway		MPAI Intake Total Tscore	Total Acuity Intake	MPAI Discharge Total T-Score	Total Acuity Discharge	MPAI TScore CHANGE	Total Acuity CHANGE
Medical Transitional Rehab	Mean		9.06		5.41		-3.07
	Std. Deviation		5.67		4.06		3.33
	Median		7.00		4.00		-2.00
	Skewness		.31		.76		-1.40
	Kurtosis		-1.71		-.83		2.56
	N		17		17		15
Medically and Cognitively Complex Neuro Rehab	Mean	65.92	18.36	52.69	13.36	-13.23	-5.00
	Std. Deviation	4.66	3.65	9.72	6.06	12.18	6.54
	Median	64.00	19.00	52.00	13.50	-9.00	-3.00
	Skewness	1.47	-.56	-.85	-.07	-1.87	-1.34
	Kurtosis	2.89	-.16	.97	-1.23	4.71	.55
	N	13	14	13	14	13	14
Transitional Neuro Rehab	Mean	52.86	10.67	43.71	7.17	-9.14	-3.64
	Std. Deviation	9.64	5.15	13.66	5.93	8.55	4.90
	Median	51.00	10.00	42.00	5.00	-9.00	-3.00
	Skewness	.17	.24	.34	.93	.54	-.73
	Kurtosis	-.82	-.98	-.22	-.21	2.34	.36
	N	69	87	69	88	69	86
Transitional Neuro Rehab - 6 Mo Post	Mean	57.38	8.43	52.75	8.50	-4.63	.86
	Std. Deviation	6.89	3.46	7.39	4.44	6.32	1.21
	Median	58.00	9.00	51.00	8.00	-4.00	.00
	Skewness	-.12	1.02	.31	1.44	-.56	1.15
	Kurtosis	-.83	2.08	-1.24	3.17	-.60	-.06
	N	9	7	8	8	8	7
Total	Mean	55.14	11.29	45.81	7.81	-9.33	-3.43
	Std. Deviation	9.95	5.44	13.20	5.99	9.12	4.92
	Median	54.50	11.00	45.00	6.00	-9.00	-2.00
	Skewness	-.07	.31	.04	.80	-.40	-1.10
	Kurtosis	-.86	-.51	-.41	-.46	3.78	1.21
	N	90	103	90	105	90	102

*Note: Change computed as (Discharge – Intake) so that a negative score is a reduction in symptoms (i.e. a good thing!).

HAS Discharge Scores by Discharge Placements (N>=7)

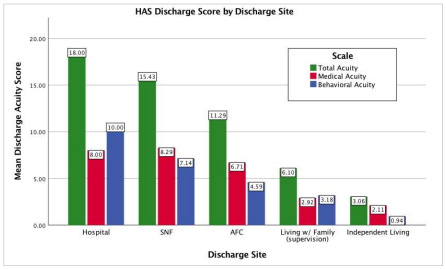


Table X. Descriptives: Discharge HAS Scores by Discharge Location

		Total Acuity		Medical Acuity		Behavioral Acuity	
	N	Mean	SD	Mean	SD	Mean	SD
Hospital	7	18.00	3.87	8.00	2.16	10.00	2.38
SNF	7	15.43	5.53	8.29	3.55	7.14	3.39
AFC	17	11.29	4.31	6.71	3.12	4.59	2.48
Supported Living	5	6.20	4.44	4.25	5.44	2.75	1.50
Living w/ Family (supervision)	49	6.10	4.73	2.92	2.90	3.18	2.86
Independent Living	18	3.06	2.15	2.12	1.67	1.06	1.00/
Other	2	4.50	0.71	1.50	0.71	3.00	0.00

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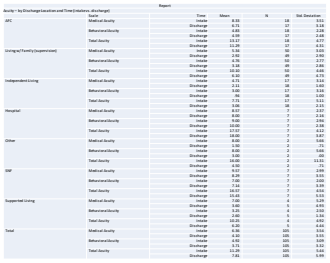
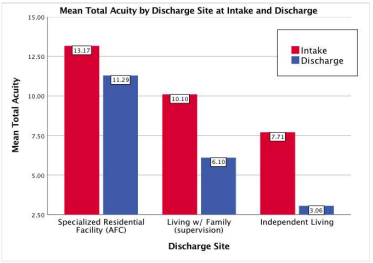


HAS Scores at Admission and Discharge by Discharge Placement



Discriminant Validity: HAS Scores at Discharge by Discharge Placement

	Total Acuity		Medical Acuity		Behavioral Acuity	
	Test Statistic	Sig*	Test Statistic	Sig*	Test Statistic	Sig*
Independent Living, Living w/Family (Supervision)	16.48	.042	5.22	1.00	20.53	.006
Independent Living, AFC	41.85	.000	33.54	.000	34.71	.000
Living w/Family (Supervision), AFC	25.37	.001	28.32	.000	14.18	.110

*Bonferonni corrected

Possible Future Studies

- Relationships to rank-ordering of patients
- Relationships to objective supervision provided (forthcoming)
- Relationships to any other measure of perceived workload
- Relationships to Fall documentation (forthcoming)
- Relationships to all Incident Reports
- Relationships to program costs
- Relate to E scores, ABS scores, or Dementia screening tools (MOCA)

HAS as a Program Management Tool

Uses of An Acuity Measure

- Staffing levels in individual and congregate settings
- Supervision and attendant care determination
- Thresholds for placement decisions
- Quantifying risk response implications
- Determining program costs and pricing

Uses of An Acuity Measure (cont.)

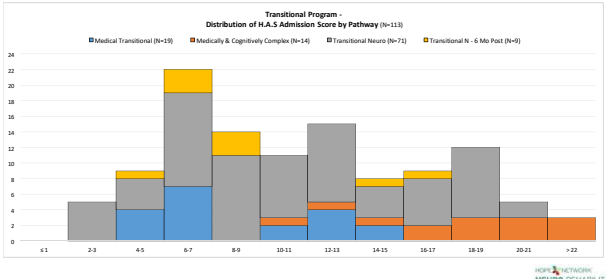
- Outcome measure
  - Acuity is a discharge criteria – "No 1:1, No Alarms"
  - Aftercare planning element – "Requires 16 hours waking hours supervision"
  - Benchmark for a successful outcome – "Discharged with independence for self-care"
- *Acuity is a proxy for recovery of independence*
- The patient is reducing the help they need from a provider.

HAS Admission Scores by Pathway (see figure on next slide) HIDE SLIDE

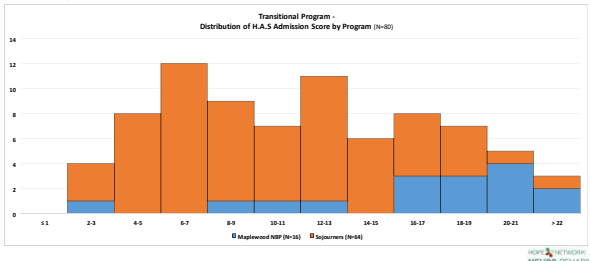
NO NEED TO EDIT

	Medical Transitional (N=19)	Medically & Cognitively Complex (N=14)	Transitional Neuro (N=71)	Transitional N - 6 Mo Post (N=9)
≤ 1				
2-3			5	
4-5	4		4	1
6-7	7		12	3
8-9			11	3
10-11	2	1	8	
12-13	4	1	10	
14-15	2	1	4	1
16-17		2	6	1
18-19		3	9	
20-21		3	2	
> 22		3		
	19	14	71	9

HAS Admission Scores by Clinical Pathway



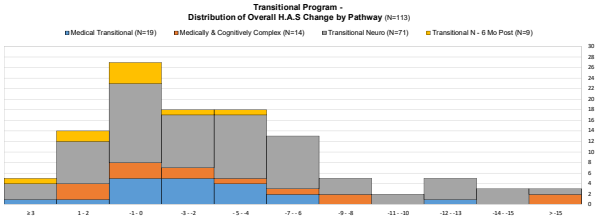
HAS Admission Scores by Program Assignment



HAS Change Statistics by Clinical Pathway

Clinical Pathway (n)	Average MPAI-4 T-Score			Average HAS Score FY 2018		
	Admit	Discharge	Change	Admit	Discharge	Change
Transitional Neuro Rehab (45)	51.7	42.3	9.4	10.0 (37)	5.9 (37)	4.1
Med & Cog Complex Neuro Rehab (13)	68.3	53.4	14.92	17.9 (8)	13.4 (8)	4.5
Transitional Neuro Rehab - 6 Mo Post (8)	56.4	51.3	5.1	5.2 (5)	6.4 (5)	-1.2
Social Behavioral Neuro Rehab (4)	60.8	56.3	4.5	13 (2)	14.5 (2)	-1.5
Medical Transitional Rehab (19)	N/A	N/A	N/A	8.3 (12)	6 (12)	2.3
Grand Total (89)	55.8 (70)	46.1 (70)	9.7 (70)	10.4 (64)	7.2 (64)	2.9

Changes in Acuity Admission to Discharge by Clinical Pathway



**Note: Change computed as (Discharge – Intake) so that a negative score is a reduction in symptoms (i.e. a good thing!).*

What Happens to Acuity in Post-Acute Residential Placement?

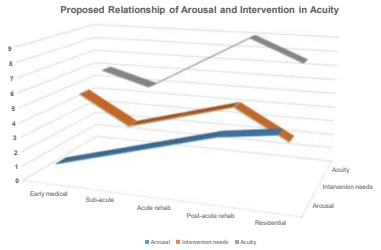
- 4% Acuity Increased (got worse)
- 12% Acuity remained or increased by 1
- 84% Acuity Decreased by >1 (got better)

Why does acuity increase?

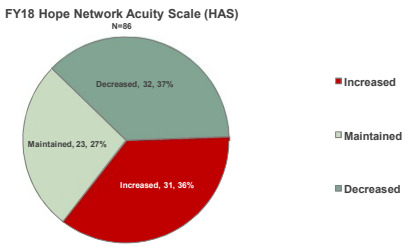
- Some people get worse.
- Some people become more active as they get better and emerge into agitation or impulsivity risks.
- New interventions and medications may reflect progress, but increase care complexity. (e.g. Serial Casting)
- It is more complex and time consuming to assist some alert, complex patients than provide efficient total care.

Why Do Some Patients INCREASE Acuity?

- Waking into greater activity levels
- Function of arousal and requirements for intervention
- Creating inadvertent dependence through caregiving vigilance



Long-Term Residents 2018 Findings



2018 4th Quarter HAS Scores for Long-Term Residential

Program	Medical	Behavioral	Total
Lakewood (6)	9.2	6.7	15.8
Arbor Glen (9)	7.0	7.0	14.0
Southwood (4)	4.8	7.3	12.0
Maplewood NBP (4)	3.5	7.0	10.5
Cedarwood (10)	5.0	5.0	10.0
Wildwood West (15)	4.9	4.5	9.4
Ada House (6)	5.2	3.7	8.8
Eastwood (4)	3.5	4.5	8.0
Sojourners (3)	5.3	2.3	7.7
Coldwater CSLP (8)	3.5	3.9	7.4
East Lansing Residential (8)	3.3	3.6	6.9
Forest Glen I (6)	3.3	1.3	4.7
Maryland Home (5)	2.2	2.0	4.2
Forest Glen II (6)	1.0	2.5	3.5
Grand Rapids CSLP (11)	1.4	2.1	3.5
Wildwood IP/East (15)	1.7	1.7	3.4
Lansing CSLP (6)	0.2	1.7	1.8
Michael House (6)	0.0	0.5	0.5

Ideas for Further Development in Applications

- Inclusion in initial assessment for placement and clinical pathway consideration
  - Program placement
  - Staffing considerations (1:1)
- Setting staffing profiles
- Rate Setting (Acuity + Clinical Pathway = Individual Service Profile prediction)
- Use as an outcome measure (already underway…)
- Use to understand the timing of longitudinal change
- Use as a discharge planning criteria

HOPE NETWORK NEURO REHABILITATION

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- Holly Cramblet, MA, LLP, BCBA
- Hope Network Residential Supervisors, Nurses and Shift Leads

HOPE NETWORK NEURO REHABILITATION

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HOPE NETWORK NEURO REHABILITATION

HOPE NETWORK ACUITY SCALE (HAS)

UPDATED: NOVEMBER 2018

The Hope Network Acuity Scale (HAS) is a behavioral rating scale that quantifies the care workload associated with the support and supervision of adults living with brain injury, within a post-acute transitional residential setting.

Case #:	Patient Name:	Rater Name:	
Date:	Residential Location:	Rater Role:	
Rating Interval:	Pre-Admit: ☐ Admit: ☐ Interval (see note below): Weekly: ☐ Monthly: ☐ Quarterly: ☐ Discharge: ☐ Other: _____		

Circle areas that apply for each acuity type; should represent the patient's consistent presentation for the reporting period.
Each acuity type is scored from a "0," indicating no care needs associated with that acuity, to a "3," indicating significant care needs.

MEDICAL RATING:	0	1	2	3	SCORES
ADLs/TRANSFERS Global description of assistance needed	Independent; can include independent use of assistive device; no staff assistance or oversight	SBA/contact guard/set up; 1 staff assist; staff required at times to set up, cue, or minimal physical assistance to complete	Minimum to moderate assist, 1 staff assist; staff required for physical assistance — more than hand on patient as CG	Maximum assist; use of transfer device; requires 2 or more staff; 1+ person needed for physical management of care and/or transfers	
MOBILITY/ORTHOTICS Global description of physical assistance needed for mobility in primary environment; independence is rated after transfer to W/C; Not related to orientation	Independent ambulation or independent propelling and maneuvering of W/C both in and out of building	SBA/contact guard; independently uses device to ambulate (i.e. walker, cane); requires AFO to ambulate	Minimum to moderate assistance, 1 staff with walker or W/C; brace schedule requires staff monitoring; staff presence required for physical assistance — more than hand on patient as CG	Maximum assist 2 or more staff with walker; completely dependent for mobility in W/C; 1+ staff needed for physical management of mobility or significant medical devices for stabilization	
SKILLED MEDICAL CARE Separate from bowel/bladder management	No wounds; no PEG; no BS checks; no insulin; no oxygen; no drains or tubes	Simple dressing changes; monitoring of oral intake/food log/calories; non-insulin dependent diabetic; no BS checks; use of inhaler less than 1x/month; use of incentive spirometry	Skilled nursing dressing change; dysphagia diet; PEG for supplemental hydration; non-insulin dependent diabetic with BS checks; status post cranioplasty in last 6 months; seizure Hx longer than 6 months with AED meds; presence of shunt placement longer than 6 months; use of inhaler/ nebulizer PRN in last week	Extensive wound care/clinic; primary PEG feeding; NPO status; insulin dependent with BS checks, craniotomy without replacement; seizure Hx in last 6 months with AED meds; shunt placement or reprogramming in last 6 months; uses oxygen, nebulizer, CPAP/ BiPAP daily; cervical collar, TLSO, halo, or other fixator, presence of tubes/drains; isolation precautions	
BOWEL/BLADDER Patient's level of awareness and ability to physically self-manage	Continent and fully independent with both bowel and bladder; no presence of tubes, drains or other services	Continent of bowel and bladder with cues and/or assistance with brief, clothing, and clean-up management; self-caths independently	Incontinent of bowel and bladder or average of 1+ accidents per shift; 1-2 staff management of brief changes; self-caths with set up assistance	Incontinent of bowel and bladder; requires staff management of catheter, presence of col/urostomy; bowel program ordered with more than oral meds; 2+ staff for care management	
				MEDICAL RATING TOTAL:	

BEHAVIORAL RATING:	0	1	2	3	SCORES
FALL RISK Global description of unplanned descents to floor	No current risk; no impaired safety awareness	Low risk; no current risk for falls but with impaired safety awareness	Moderate risk; use of W/C or bed alarms; Hx of falls in the past 3 months	High risk; W/C and bed alarms with 1:1 staffing for impulsivity and impaired safety awareness; Hx of falls in last month	
AGGRESSION Agitation, anger, or irritability that is unexpected or occurring outside of planned interventions	No aggression; no threats toward self or others	Verbal irritability; mild swearing; responsive only to specific staff; requires infrequent verbal interventions	Significant swearing; under-responsive to program direction on care, scheduled activity routines, and therapy; use of physical and verbal direction 1-3 times/day for aggression; refusals or chronic delays of non-essential treatment	Posturing or verbally threatening imminent harm to self or others; physical aggression towards others or property; presence of self-harm behavior or suicide risk; frequent use of physical and verbal direction 3+ times/day for aggression	
CONFUSED BEHAVIOR Areas of concern related to orientation and participation in care routines and demands of environment	No impairments or non-contributory (alert and oriented x4)	Readily redirectable; behavior present but doesn't significantly interfere with therapies or routines, requires infrequent verbal intervention for safety	Difficult to redirect at times; behavior interferes with therapies or care in a timely fashion; may require extra time or staffing present to complete care; not attending to pressing personal care needs; confused wandering at facility; requires frequent verbal or physical intervention for safety 1-3 times/day	Persistently difficult to redirect; uncontrolled or constant impulsive behaviors 3+/hour; refusal or unawareness of basic care needs placing patient at risk for safety or medical complexities; pulling at or self/removal of tubes/drains; use of mitts/abdominal binder on a scheduled behavior program; refuses medical devices; requires monitoring for likely AWOL/flight related to confusion; requires verbal or physical intervention for redirection 3+/day	
PRECAUTIONS Specialized supervision; support provisions	No special supervision needs; fits into 1:3 staff to patient ratio or less	1:2 staff to patient ratio	15-minute checks; requires cues or interventions for safety (W/C or bed alarms); wander guard	Line of sight or more intense supervision; wander guard with additional intervention protocol; in-house therapies only; 2 staff for travel outside of building/campus	
				BEHAVIORAL RATING TOTAL:	
				COMBINED TOTAL:	

LIST OF ABBREVIATIONS

AED = Anti-Epileptic Drugs
AFO = Ankle-Foot Orthosis
BiPAP = Bilevel Positive Airway Pressure
BS = Blood Sugar
CG = Contact Guard
CPAP = Continuous Positive Airway Pressure
Hx = Medical History
NPO = Nothing by Mouth
PEG = Percutaneous Endoscopic Gastrostomy
PRN = As Needed
SBA = Stand by Assist
S/P = Status Post
TLSO = Thoracic Lumbar Sacral Orthosis
W/C = Wheelchair

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