



SPAULDING
REHABILITATION
HOSPITAL
NETWORK



Department of Physical Medicine & Rehabilitation
Tel: 617-573-2770
Fax: 617-573-2769
www.hms.harvard.edu/hms/

THE SPAULDING DISORDERS OF CONSCIOUSNESS COMPREHENSIVE EVIDENCE-BASED ASSESSMENT BATTERY

DOC COMPASS



Copyright © 2012 The Spaulding Rehabilitation Hospital Corporation. Copyright claimed as to all materials exclusive of works acknowledged herein as the works of others.

Table of Contents

Section	Page
I. Statement of Purpose	3
II. Program Description and Mission	3
III. Acceptable Use Guidelines and Citation Guide	4
IV. List of Core Metrics	
▪ Agitated Behavior Scale (ABS)	8
▪ Coma Recovery Scale- Revised (CRS-R)	9
▪ Confusion Assessment Protocol (CAP)	25
▪ Disability Rating Scale (DRS)	32
▪ Functional Communication Measures (FCM)	34
▪ Galveston Orientation and Amnesia Test (GOAT)	56
▪ Limb Movement Protocol (LMP)	57
▪ Medical Complications Checklist	61
▪ Nociception Coma Scale- Revised (NCS-R)	62
▪ Verbal Fluency	67
V. List of Specialized Metrics and Protocols	
▪ Arousal Monitoring	72
▪ Auditory Localization	74
▪ Command Following (Eye Gaze)	76
▪ Command Following (Vocalization)	78
▪ Hemispatial Neglect/Hemianopsia	80
▪ Object Recognition	83
▪ MCS Aphasia Assessment	85
▪ Yes/No Comprehension	87
VI. Sample Case Illustration	89

I. Statement of Purpose

The purpose of the DOC COMPASS is to create a single comprehensive resource for administration of a systematic evidence-based neurorehabilitation program for individuals with disorders of consciousness. This binder includes assessment and treatment tools appropriate for both clinical and research purposes. We intend to update this manual as additional evidence accrues in the peer-reviewed literature.

This binder contains:

1. An overview of the SRN DOC Program
2. A compilation of assessment and treatment protocols specifically designed for use in patients with DOC.
3. Data collection forms for all assessment and treatment protocols.
4. A sample Neurobehavioral Profile with data display.

For additional information, please contact:

Joseph T. Giacino, PhD

Director, Spaulding Rehabilitation Network Disorders of Consciousness Program
617-573-2742

II. Program Description

The Spaulding Rehabilitation Network (SRN) Disorders of Consciousness (DOC) Program provides a continuum of care specifically designed for individuals who have experienced severe acquired brain injury and have not yet regained the ability to follow instructions, communicate reliably or perform basic self-care activities. Increasing evidence from carefully-designed research studies indicates that individuals with DOC recover over a longer period of time than previously thought, and many regain the ability to function independently. Because the pace and course of recovery vary widely across individuals, the “one size fits all” model of rehabilitation is likely to be ineffective and may complicate the normal recovery process. In view of the broad range of medical, cognitive and neurobehavioral needs evident in those who survive severe brain injury, SRN has developed a specialized 8-week rehabilitation program for individuals with DOC to help ensure that services are appropriately matched to the current level of recovery and immediate care needs. Level I focuses on individuals who have not yet recovered consciousness, Level II on those who have recovered consciousness but are not able to communicate reliably and Level III on individuals who can communicate but remain disoriented, confused and dependent on others for basic self-care activities. *The overarching objective of the program is to optimize functional recovery through the application of evidence-based assessment and treatment procedures.* Specialized neuromonitoring and clinical intervention programs are located at Spaulding Rehabilitation Hospital-Boston (a CARF-accredited Inpatient Rehabilitation Facility) and, for those who continue to require complex medical management (including ventilator support), specialized rehabilitation services are provided at Spaulding Hospital-Cambridge (a Long-Term Acute Care Hospital). We adhere to a systematic approach in which multidisciplinary assessment strategies and rehabilitation goals are developed and modified based on standardized protocols implemented throughout the course of the program. Progress is monitored weekly using a battery of standardized outcome measures that address medical,

cognitive, linguistic, physical and functional status. Comprehensive Neurobehavioral Profile reports, generated at week 4 and week 8, chart progress across all areas and empirically-derived clinical benchmarks are employed to guide decision-making regarding treatment modifications and program transitions. Family members are an integral part of the care plan and assist in the development of rehabilitation goals and implementation of treatment interventions. The SRN system has also developed a preferred-provider relationship with selected skilled nursing facilities that provide continuing, specialized care to individuals with DOC.

The mission of the DOC Program is threefold:

Clinical: To optimize functional recovery through the application of evidence-based assessment and treatment procedures in individuals with severe acquired brain injury (ABI) who have not yet regained the ability to reliably follow instructions, communicate or perform basic self-care activities.

Research: To conduct an integrated program of research designed to identify pathophysiologic mechanisms that contribute to impaired consciousness, develop and refine diagnostic and prognostic assessment methods and investigate the effectiveness of existing and novel treatment interventions intended to promote recovery following severe TBI.

Education: To disseminate knowledge and provide resources to healthcare professionals, family members, caretakers, payors and policy-makers involved in the care and management of individuals with DOC.

II. Guidelines for Acceptable Use of the SRN DOC COMPASS

Statement Governing Use

Users of the SRN DOC COMPASS, or components thereof (e.g. specialized metrics), will provide proper citations for the materials used. The assessment battery should be cited as follows:

Giacino J. Disorders of Consciousness Comprehensive Evidence Based Assessment Battery (DOC COMPASS), Spaulding Rehabilitation Network, Boston, MA, USA.

Measures included in this assessment battery that were not developed by the SRN DOC Program must be cited appropriately according to the references and copyright statements provided in the Citation Guide below.

Citation Guide

Agitated Behavior Scale (ABS)

Bogner, J.A., Bode, R.K., Corrigan, J.D., & Heinemann, A.W. (2000). Rating scale analysis of the Agitated Behavior Scale. *Journal of Head Trauma Rehabilitation, 15*(1), 656-669.

Copyright © 1989 The Ohio State University. Used with Permission

Coma Recovery Scale- Revised (CRS-R)

Giacino JT, Kalmar K, Whyte J. The JFK Coma Recovery Scale- Revised: Measurement characteristics and diagnostic utility. *Arch Phys Med Rehabil* 2004;85:2020-2029.

Copyright © 2004 Joseph T. Giacino, PhD. Used with permission.

Confusion Assessment Protocol (CAP)

Sherer M, Nakase-Thompson R, Yablon SA, Gontkovsky ST. Multidimensional assessment of acute confusion after traumatic brain injury. *Arch Phys Med Rehabil* 2005;86:896-904.

Copyright © 2012 Mark Sherer, PhD. Used with permission.

Disability Rating Scale (DRS)

Rappaport M, Hall KM, Hopkins K, Belleza T, Cope DN. Disability rating scale for severe head trauma: coma to community. *Arch Phys Med Rehabil* 1982;63:118-123.

Used with permission by Karyl M. Hall, Ed.D.

Functional Communication Measures

ASHA. 2003. Functional Communication Measures. National Outcomes Measurement System (NOMS): Adult Speech-Language Pathology User's Guide.

Galveston Orientation and Amnesia Test (GOAT)

Levin HS, O'Donnell VM, Grossman RG. The Galveston Orientation and Amnesia Test. A practical scale to assess cognition after head injury. *J Nerv Ment Dis* 1979;167:675-84.

Used with permission by Harvey S. Levin, PhD.

Limb Movement Protocol

Unpublished. *See Schiff ND, Giacino JT (co-lead author), Kalmar K, Victor JD, Baker K, Gerber M, Fritz B, Eisenberg B, O'Connor JO, Kobylarz EJ, Farris S, Machado A, McCagg C, Plum F, Fins JJ, Rezaei A. Behavioral improvements with thalamic stimulation after severe traumatic brain injury. Nature 2007;448:600-4, for research application.*

Nociception Coma Scale- Revised (NCS-R)

Schnakers C, Chatelle C, Vanhaudenhuyse A, Majerus S, Ledoux D, Boly M, Bruno M-A, Boveroux P, Demertzi A, Moonen G, Laureys S. The Nociception Coma Scale: A new tool to assess nociception in disorders of consciousness. *Pain* 2010;148:215-219.

Used with permission by Caroline Schnakers, PhD..

Verbal Fluency

Spreen O & Benton AL. Neurosensory Center Comprehensive Examination for Aphasia: Manual of directions. Victoria, BC: Neuropsychology Laboratory, University of Victoria; 1969.

Core Metrics

- Agitated Behavior Scale (ABS)
- Coma Recovery Scale- Revised (CRS-R)
- Confusion Assessment Protocol (CAP)
- Disability Rating Scale (DRS)
- Functional Communication Measures (FCM)
- Galveston Orientation and Amnesia Test (GOAT)
- Limb Movement Protocol (LMP)
- Medical Complications Checklist
- Nociception Coma Scale- Revised (NCS-R)
- Verbal Fluency

AGITATED BEHAVIOR SCALE

Patient _____

Period of Observation:

Observ. Environ. _____

From: _____ a.m.
p.m. ____/____/____

Rater/Disc. _____

To: _____ a.m.
p.m. ____/____/____

At the end of the observation period indicate whether the behavior described in each item was present and, if so, to what degree: slight, moderate or extreme. Use the following numerical values and criteria for your ratings.

- 1 = **absent**: the behavior is not present.
- 2 = **present to a slight degree**: the behavior is present but does not prevent the conduct of other, contextually appropriate behavior. (The individual may redirect spontaneously, or the continuation of the agitated behavior does not disrupt appropriate behavior.)
- 3 = **present to a moderate degree**: the individual needs to be redirected from an agitated to an appropriate behavior, but benefits from such cueing.
- 4 = **present to an extreme degree**: the individual is not able to engage in appropriate behavior due to the interference of the agitated behavior, even when external cueing or redirection is provided.

DO NOT LEAVE BLANKS.

- _____ 1. Short attention span, easy distractibility, inability to concentrate.
- _____ 2. Impulsive, impatient, low tolerance for pain or frustration.
- _____ 3. Uncooperative, resistant to care, demanding.
- _____ 4. Violent and or threatening violence toward people or property.
- _____ 5. Explosive and/or unpredictable anger.
- _____ 6. Rocking, rubbing, moaning or other self-stimulating behavior.
- _____ 7. Pulling at tubes, restraints, etc.
- _____ 8. Wandering from treatment areas.
- _____ 9. Restlessness, pacing, excessive movement.
- _____ 10. Repetitive behaviors, motor and/or verbal.
- _____ 11. Rapid, loud or excessive talking.
- _____ 12. Sudden changes of mood.
- _____ 13. Easily initiated or excessive crying and/or laughter.
- _____ 14. Self-abusiveness, physical and/or verbal.

_____ **Total Score**

CRS-R

COMA RECOVERY SCALE-REVISED

©2004

Administration and Scoring Guidelines

Joseph T. Giacino, Ph.D. and Kathleen Kalmar, Ph.D.

*Center for Head Injuries
Edison, New Jersey*



Johnson Rehabilitation Institution
Affiliated with JFK Medical Center



JFK COMA RECOVERY SCALE - REVISED ©2004

Record Form

This form should only be used in association with the "CRS-R ADMINISTRATION AND SCORING GUIDELINES" which provide instructions for standardized administration of the scale.

Patient:	Diagnosis:	Etiology:
-----------------	-------------------	------------------

Date of Onset:	Date of Admission:
-----------------------	---------------------------

Date	ADM	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Week																

AUDITORY FUNCTION SCALE

4 - Consistent Movement to Command *																
3 - Reproducible Movement to Command *																
2 - Localization to Sound																
1 - Auditory Startle																
0 - None																

VISUAL FUNCTION SCALE

5 - Object Recognition *																
4 - Object Localization: Reaching *																
3 - Visual Pursuit *																
2 - Fixation *																
1 - Visual Startle																
0 - None																

MOTOR FUNCTION SCALE

6 - Functional Object Use †																
5 - Automatic Motor Response *																
4 - Object Manipulation *																
3 - Localization to Noxious Stimulation *																
2 - Flexion Withdrawal																
1 - Abnormal Posturing																
0 - None/Flaccid																

OROMOTOR/VERBAL FUNCTION SCALE

3 - Intelligible Verbalization *																
2 - Vocalization/Oral Movement																
1 - Oral Reflexive Movement																
0 - None																

COMMUNICATION SCALE

2 - Functional: Accurate †																
1 - Non-Functional: Intentional *																
0 - None																

AROUSAL SCALE

3 - Attention																
2 - Eye Opening w/o Stimulation																
1 - Eye Opening with Stimulation																
0 - Unarousable																

TOTAL SCORE

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Denotes emergence from MCS[†]
Denotes MCS^{*}

BRAIN STEM REFLEX GRID ©2004

Record Form

Patient:		Date:					
Pupillary Light	Reactive						
	Equal						
	Constricted						
	Dilated						
	Pinpoint						
	Accommodation						
Corneal Reflex	Absent						
	Present Unilateral						
	Present Bilateral						
Spontaneous Eye Movements	None						
	Skew Deviation						
	Conjugate Gaze Deviation						
	Roving						
	Dysconjugate						
Oculocephalic Reflex	None						
	Abnormal						
	Full						
	Normal						
Postural Responses (Indicate Limb)	Abnormal Extension						
	Abnormal Flexion						

NOTES

AROUSAL FACILITATION PROTOCOL ©2004

GUIDELINES

- 1) The goal of this intervention is to prolong the length of time the patient maintains arousal (i.e. eye opening)
- 2) The protocol is administered anytime the patient is observed to:
 - Exhibit sustained eyelid closure **AND/OR**
 - Stops following commands for a period of at least one minute.
- 3) Readminister the arousal facilitation protocol when:
 - Sustained eye closure re-occurs **OR**
 - Behavioral responsiveness ceases despite sustained eye opening.

INTERVENTIONS

Deep Pressure:

- 1) Present deep pressure stimulation unilaterally to the face, neck, shoulder, arm, hand, chest, back, leg, foot, and toes. The muscle should be firmly grasped at its base between the thumb and forefinger. While squeezing the muscle firmly, it should be "rolled" back and forth through the finger tips three to four times. This procedure should be repeated sequentially working from the facial musculature to the toes. The examiner should assure that there are no internal lines, local injuries (e.g., fractures, contusions, decubiti) or systemic complications (e.g., heterotopic ossification) before administering deep pressure.
- 2) Administer same on contralateral side.

AUDITORY FUNCTION SCALE ©2004

Score	Item	Method	Response
4	Consistent Movement to Command	<p>1. Observe frequency of spontaneous movement for a one minute interval (See Baseline Observation and Command Following Protocol on page 5).</p> <p>2. Choose at least 1 object-related and 1 non-object related command from the Command Following Protocol. The type of command chosen (eye, limb, oral) should be based on patient's physical capacity and should be of low spontaneous frequency. If time permits, more than one type of command from each category may be used. The command should be repeated once during the 10 second response interval.</p> <p>a. Object-Related Eye Movement Commands: Present 2 common objects simultaneously and approximately 16 inches apart within the patient's field of view. Ask the patient to look at the object named (i.e. "Look at the [name object]"). Next, reverse the positions of the 2 objects and ask the patient to look at the same object again (i.e. "Look at the [name object]"). Administer two additional trials using the same 2 objects and repeat the above procedure with instruction to look at the other object on both trials. Two trials per object should be administered for a total of 4 trials.</p> <p>b. Object-Related Limb Movement Command: Present 2 common objects simultaneously and approximately 16 inches apart within the patient's field of view and within arm's (or leg's) length and ask the patient to touch the object named with their hand (or foot). Next, reverse the positions of the 2 objects and ask the patient to touch the same object again. Administer two additional trials using the same two objects and repeat the above procedure with instruction to touch the other object on both trials. Two trials per object should be administered for a total of 4 trials.</p> <p>c. Non-Object Related Commands: Select at least 1 eye movement, limb movement or oral movement/vocalization command and present it over 4 trials at 15 second intervals. The same command should be used for all 4 trials. Movements that occur between commands (ie: after the response interval has elapsed) should be noted but not scored.</p>	<p>Clearly discernible and accurate responses occur within 10 seconds on all 4 trials administered.</p> <p>This item is credited only when all 4 trials of 2 different commands are passed.</p>
3	Reproducible Movement to Command	Same as above	3 clearly discernible responses occur over the 4 trials on any one of the object or non-object related commands.
Continued			

AUDITORY FUNCTION SCALE ©2004

Score	Item	Method	Response
2	Localization to Sound	Standing behind the patient and out of view, present an auditory stimulus (eg. voice, noise) from the right side for 5 seconds. Perform a second trial presenting the auditory stimulus from the left side. Repeat above procedure for a total of 4 trials, 2 on each side.	Head and/or eyes orient toward the location of the stimulus on both trials in at least one direction. This item is scored when there is clear evidence of head and/or eye movement. It is not dependent on the degree or duration of movement.
1	Auditory Startle	Present a loud noise directly above the patient's head and out of view. Administer 4 trials.	Eyelid flutter or blink occurs immediately following the stimulus on at least 2 trials.
0	None	See above	No response to any of the above

BASELINE OBSERVATION AND COMMAND FOLLOWING PROTOCOL ©2004

Commands	Baseline	Trial 1	Trial 2	Trial 3	Trial 4
	1 minute frequency count				
I Object Related Commands					
A. Eye Movement Commands					
Look at the <i>(object #1)</i>					
Look at the <i>(object #2)</i>					
B. Limb Movement Commands					
Take the <i>(name object #1)</i>					
Take the <i>(name object #2)</i>					
Kick the <i>(name object #1)</i>					
Kick the <i>(name object #2)</i>					
II Non-Object Related Commands					
A. Eye Movement Commands					
Look away from me					
Look up <i>(at ceiling)</i>					
Look down <i>(at floor)</i>					
B. Limb Movement Commands					
Touch my hand					
Touch your nose					
Move your <i>(object/body part)</i>					
C. Oral Movement/ Vocalization Commands					
Stick out your tongue					
Open your mouth					
Close your mouth					
Say "ah"					
Spontaneous Eye Opening		Yes:		No:	
Spontaneous Visual Tracking		Yes:		No:	
Resting Posture					
RUE:					
RLE:					
LUE:					
LLE:					

VISUAL FUNCTION SCALE ©2004

Score	Item	Method	Response
5	Object Recognition	Same as Consistent Movement to Command on Auditory Function Scale, Section 2a and b (p. 3).	3 to 4 clearly discernible responses occur over the 4 trials administered.
4	Object Localization: Reaching	<ol style="list-style-type: none"> 1. Identify the arm or leg with the greatest range of movement. 2. For upper extremity reaching, select common ADL objects (e.g. comb, toothbrush, etc.). For lower extremity assessment, select a ball suitable for kicking. 3. Present the object approximately 8 inches to the left or right of the limb's resting position. The object should be placed in a position that is not obstructed from view. The patient should be instructed to "Touch the (name object)" with the appropriate arm or leg. 4. The command may be repeated once within the assessment interval. Do not provide any tactile cues, as these may stimulate random limb movement. 5. Present an object twice to the left of the limb and twice to the right of the limb, in random order for a total of 4 trials. 	<p>Score the direction in which the limb first moves within a 10 second observation period, or score as no movement. The limb does not need to make contact with the object, only to move toward it;</p> <p style="text-align: center;"><i>and</i></p> <p>Movement must occur in the correct direction on 3 of the 4 trials administered.</p>
3	Visual Pursuit	<p>Hold a hand mirror 4-6 inches directly in front of the patient's face and verbally encourage the patient to fixate on the mirror.</p> <p>Move mirror slowly 45 degrees to the right and left of the vertical midline and 45 degrees above and below the horizontal midline.</p> <p>Repeat the above procedure so that a total of 2 trials are administered in each plane.</p>	<p>Eyes must follow the mirror for 45 degrees without loss of fixation on 2 occasions in any direction.</p> <p><i>If above criterion is not met, repeat the procedure assessing one eye at a time (using an eye patch).</i></p>
2	Fixation	Present a brightly colored or illuminated object 6 to 8 inches in front of the patient's face and then rapidly move to upper, lower, right and left visual fields for a total of 4 trials.	Eyes change from initial fixation point and refixate on the new target location for more than 2 seconds. At least 2 episodes of fixation are required.
1	Visual Startle	Present visual threat by passing finger 1 inch in front of patient's eye. Be careful not to touch eyelashes or create a breeze (manually open eyes if necessary). Conduct 4 trials per eye.	Eyelid flutter or blink following presentation of visual threat on at least 2 trials with either eye.
0	None	See above	No response to any of the above.

MOTOR FUNCTION SCALE ©2004

Score	Item	Method	Response
6	Functional Object Use	<p>Select 2 common objects (e.g. comb, cup). Place one of the objects in the patient's hand and instruct the patient to "Show me how to use a [name object]." Next, place the second object in the patient's hand and restate the same instruction.</p> <p>Repeat the above procedure using the same objects so that a total of 2 trials are administered with each object.</p>	<p>Movements executed are generally compatible with both object's specific function (e.g. comb is placed on or near the head) on all 4 trials administered.</p> <p><i>If the patient is unable to hold the object because of neuromuscular involvement, this should be noted on the record form and the item should not be scored.</i></p>
5	Automatic Motor Response	<p>Observe for automatic motor behaviors such as nose scratching, grasping bedrail that occur spontaneously during the examination.</p> <p>If spontaneous automatic motor behaviors are not observed, present a familiar gesture (e.g. wave) in association with the following series of alternating commands:</p> <ol style="list-style-type: none"> 1) "Show me how to wave" (demonstrate gesture). 2) "I'm going to wave again. Do not move at all. Just hold still." (demonstrate gesture). 3) "Show me how to wave" (demonstrate gesture). 4) "I'm going to wave again. Do not move at all. Just hold still." (demonstrate gesture). <p>For patients with limited ability to move the limbs, objects associated with oromotor activity may be used (e.g. spoon). Place the object in front of the patient's mouth without making contact. Administer the following series of alternating commands:</p> <ol style="list-style-type: none"> 1) "Show me how to use (name object). 2) "I'm going to show you (name object) again. Do not move at all. Just hold still." 3) "Show me how to use (name object)." 4) "I'm going to show you (name object) again. Do not move at all. Just hold still." 	<p>At least 2 episodes of automatic motor behavior are observed within the session and each episode can be clearly differentiated from a reflexive response.</p> <p>Patient performs the gesture (e.g. waves) <i>on trials 2 and 4</i> (regardless of performance on trials 1 and 3).</p> <p>Patient performs the oral movement pattern (e.g. mouth opening occurs when spoon is brought to mouth by examiner) <i>on trials 2 and 4</i> (regardless of performance on trials 1 and 3).</p>
Continued			

MOTOR FUNCTION SCALE ©2004

Score	Item	Method	Response
4	Object Manipulation	<p>Place a baseball size ball on the dorsal surface of one of the patient's hands. Roll the ball across the index finger and thumb without touching the undersurface of the hand or fingers. While moving the ball, instruct the patient to, "Take the ball."</p> <p>Repeat the above for a total of 4 trials.</p>	<p>The following criteria must be met on 3 of the 4 trials administered:</p> <p>1. The wrist must rotate and the fingers should extend as the object is moved along the dorsal surface of the hand;</p> <p style="text-align: center;"><i>and</i></p> <p>2. The object must be grasped and held for a minimum of 5 seconds. The object cannot be held by means of a grasp reflex or increased finger flexor tone.</p>
3	Localization to Noxious Stimulation	<p>Extend all four extremities. Apply pressure to the finger or toe of an extremity (use best extremity on each side of the body) for a minimum of 5 seconds (ie. squeeze the finger or toe between your thumb and index finger). Administer 2 trials on each side for a total of 4 trials.</p>	<p>The non-stimulated limb must locate and make contact with the stimulated body part at the point of stimulation on at least 2 of the four trials.</p>
2	Flexion Withdrawal	<p>Extend all 4 extremities. Apply deep pressure to nailbeds of each extremity (ie. press the ridge of a pencil into the cuticle). Administer 1 trial per extremity.</p>	<p>There is isolated flexion withdrawal of at least one limb. The limb must move away from the point of stimulation. If quality of response is uncertain, the trial may be repeated.</p>
1	Abnormal Posturing	<p>Observe response to above method</p>	<p>Slow, stereotyped flexion or extension of the upper and/or lower extremities occurs immediately after the stimulus is applied.</p>
0	None/Flaccid	<p>Observe response to above method</p>	<p>There is no discernible movement following application of noxious stimulation, secondary to hypertonic or flaccid muscle tone.</p>

OROMOTOR/VERBAL FUNCTION SCALE ©2004

Score	Item	Method	Response
3	Intelligible Verbalization	<p>1. Tell patient "I would like to hear your voice." This should be followed by an attempt to directly elicit speech using the verbal prompts shown below. At least one prompt should be selected from the Aural Set and at least one from the Visual Set.</p> <p>2. A maximum of 3 trials should be administered for each prompt chosen from the Aural and Visual Sets. Prompts should be administered at 15 second intervals.</p> <p>Aural Set:</p> <p>a) "What is your name?" b) "How are you today?" c) "Where do you live?"</p> <p>Visual Set:</p> <p>a) "What do you call this thing?" (Hold up common object in front of the patient's right and then left visual field for 10 seconds). b) "How many fingers am I holding up right now?" (Hold up 1 finger in front of the right and then left visual field for 10 seconds). c) "What part of my body is this?" (Point to your nose while positioned at the patient's visual midline).</p>	<p>Each of the following criteria must be met:</p> <p>1. Each verbalization must consist of at least 1 consonant-vowel-consonant (C-V-C) triad. For example, "ma" would not be acceptable, but "mom" would. Make sure objects chosen have a C-V-C sequence;</p> <p style="text-align: center;"><i>and</i></p> <p>2. Two different words must be documented by the examiner to ensure that a repetitive word-like sound is not mistaken for a word. Words need not be appropriate or accurate for the context, but must be fully intelligible;</p> <p style="text-align: center;"><i>and</i></p> <p>3. Words produced by writing or alphabet board are acceptable.</p> <p><i>Verbalizations that occur spontaneously or at other times during the assessment and meet the above criteria should also receive a score of 3.</i></p>
2	Vocalization / Oral Movement	<p>Observe for non-reflexive oral movements, spontaneous vocalizations or vocalizations that occur during administration of vocalization commands (see page 5).</p>	<p>At least one episode of non-reflexive oral movement and/or vocalization occurs spontaneously or in response to application of sensory stimulation.</p> <p><i>Yawning is scored as reflexive oral movement.</i></p>
1	Oral Reflexive Movement	<p>Present tongue blade between patient's lips and/or teeth</p>	<p>There is clamping of jaws, tongue pumping, or chewing movement following introduction of tongue blade into mouth.</p>
0	None	See above	No response to any of the above.

COMMUNICATION SCALE ©2004

(if there is no evidence of reproducible command following or spontaneous communicative behavior,
the Communication subscale is not administered)

Score	Item	Method	Response
2	Functional: Accurate	Administer the 6 Situational Orientation questions from the Communication Assessment Protocol (page 12). The examiner may use the Visual set, Auditory set or both sets, if appropriate.	Clearly discernible and accurate responses occur on all 6 of the Visual or Auditory Situational Orientation questions from the Communication Assessment Protocol (see page 12).
1	Non-Functional: Intentional	Same as above	<p>A clearly discernible communicative response* (e.g. head nods/shakes, thumbs up) must occur within 10 seconds on at least 2 of the 6 Situational Orientation questions (irrespective of accuracy).</p> <p><i>*The examiner must determine that this response occurs more frequently following verbal prompting (e.g. questions) than when non-specific auditory stimulation (e.g. hand clapping) is administered.</i></p>
0	None	See above	No discernible verbal or non-verbal communication responses occur at any time.

COMMUNICATION ASSESSMENT PROTOCOL ©2004

Situational Orientation

Visually Based				Aurally Based		
Am I touching my ear right now? (do not touch ear)				Am I clapping my hands right now? (do not clap)		
Am I touching my nose right now? (touch nose)				Am I clapping my hands right now? (clap)		
Am I touching my nose right now? (touch nose)				Am I clapping my hands right now? (clap)		
Am I touching my ear right now? (do not touch ear)				Am I clapping my hands right now? (do not clap)		
Am I touching my nose right now? (do not touch nose)				Am I clapping my hands right now? (clap)		
Am I touching my ear right now? (touch ear)				Am I clapping my hands right now? (do not clap)		
			Date			
Score						
of 6	of 6	of 6		of 6	of 6	of 6
			Date			
Score						
of 6	of 6	of 6		of 6	of 6	of 6

AROUSAL SCALE ©2004

Score	Item	Method	Response
3	<i>Attention</i>	Observe consistency of behavioral responses following verbal or gestural prompts.	There are no more than 3 occasions across the length of the evaluation in which the patient fails to respond to a verbal prompt.
2	<i>Eye Opening w/o Stimulation</i>	Observe status of the eyelids across length of assessment.	Eyes remain open across the length of the examination without the need for tactile, pressure or noxious stimulation.
1	<i>Eye Opening with Stimulation</i>	Same as above	Tactile, pressure or noxious stimulation must be applied at least once during the examination in order for the patient to sustain eye opening (the length of time the eyes remain open may vary and is not considered in the scoring).
0	<i>Unarousable</i>	See above	No eye opening noted.

ASSESSMENT OF CONTINGENT BEHAVIOR ©2004

(Supplementary Item)

Score	Item	Method	Response
Not Scored	Contingent Vocalization / Gesture / Affective Response	<p>1. Vocalizations, gestures and affective responses are assessed through a combination of reports from family and clinicians, and direct observations from treating staff. Family and clinical staff should be questioned about any vocalizations, gestures or affective responses (i.e. smiling, laughing, frowning, crying) that are observed to occur spontaneously or in response to a specific stimulus.</p> <p>2. If above response is based on report, staff should attempt to directly elicit the behavior again with the assistance of the individual who reported it.</p> <p>3. If affective responses are observed during direct examination, the examiner should attempt to re-elicite the behavior using the same eliciting stimulus previously noted to produce the behavior. Examples of appropriate eliciting stimuli include verbal requests ("What's your name?"), limb gestures (wave), facial gestures (sticking out tongue) and pictures (family photos).</p> <p>4. The examiner should document:</p> <p style="margin-left: 20px;">a. The nature of the eliciting stimulus (e.g. Verbal: "Are you feeling sad?"; Limb gesture: handshake);</p> <p style="margin-left: 20px;">b. Specific characteristics of the behavioral response (e.g. facial grimace with tearing of the eyes; smiling, moaning);</p> <p style="margin-left: 20px;">c. Number of times the behavior has been observed to occur within 10 seconds of the eliciting stimulus;</p> <p style="margin-left: 20px;">d. Number of times the behavior has been observed to occur spontaneously;</p> <p style="margin-left: 20px;">e. The time frame allowed for "c" and "d" should be specified and approximately the same.</p>	<p>A vocalization, gesture or affective response occurs significantly more often in response to a specific eliciting stimulus, than when the stimulus is absent.</p> <p><i>Contingent responses do not include those that occur following administration of painful stimuli.</i></p>

RECORD DATE AND DESCRIPTION OF ABOVE STIMULI UTILIZED AND RESPONSES OBSERVED

DATE	ELICITING STIMULUS	TARGET BEHAVIOR	# SPONTANEOUS OCCURRENCES OF TARGET BEHAVIOR	# OCCURRENCES OF TARGET BEHAVIOR WITHIN 10 SEC OF ELICITING STIMULU

CRS-R TOTAL SCORE PROGRESS TRACKING CHART ©2004

Record Form

Patient:	Diagnosis:	Etiology:
Date of Onset:		Date of Admission:

Date																	
Week	Adm	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
23																	
22																	
21																	
20																	
19																	
18																	
17																	
16																	
15																	
14																	
13																	
12																	
11																	
10																	
9																	
8																	
7																	
6																	
5																	
4																	
3																	
2																	
1																	
0																	
CRS-R Total Score																	

CAP Scoring Criteria (rev 2007 04 27)

Name: _____ Date: _____ CAP# _____ Subject ID# _____ NeuroHX: _____
 Dates of Rehab Admit: _____ Rehab DC _____ DOB _____ DOI _____
 ED_GCS _____ Education Yrs _____ Gender _____ Coma Date _____ Rater _____

1. Cognitive Impairment (CI):

CAP Score

	Correct	Incorrect		CI Score	
TOTART Counting to 20 forward	2	0		_____	
TOTART Counting to 20 backward	4	0		_____	
TOTART Reciting months forward	2	0		_____	
TOTART Reciting months backward	6	0		_____	
	<u>36</u>	<u>30-35</u>	<u><30</u>		
CTD Vigilance (hits X 2) - commissions	4	2	0	_____	
	<u>4</u>	<u>3</u>	<u>2, 1, 0</u>		
CTD Comprehension	4	2	0	_____	
	<u>10</u>	<u>9</u>	<u>8-7</u>	<u>6-0</u>	
CTD Recognition	6	4	2	0	_____
TOTAL SCORE				_____	

Cognitive Impairment (Total possible score = 28. Scores ≤ 18 indicate substantial impairment and count as one symptom of post-traumatic confusion. (*cog_imp; 0=absent 1=yes, present*)) _____

2. Disorientation:

(Measured with the GOAT. GOAT error scores > 24 indicate disorientation and count as one symptom of post-traumatic confusion.) (*disorie; 0=absent 1=yes, present*) _____

3. Agitation:

(Measured with the ABS. ABS scores > 17 indicate increased restlessness and count as one symptom of post-traumatic confusion.) (*agitate; 0=absent 1=yes, present*) _____

4. Fluctuation of Symptoms (DRS-R):

(Clinician Rated Item 1. Scores of 1 or 2 indicate significant fluctuation and count as one symptom of post-traumatic confusion.) (*sx_fluct; 0=absent 1=yes, present*) _____

5. Sleep Disturbance:

(Clinician Rated Item 2 as informed by sleep charts and other information. Scores of 2 or 3 indicate significant sleep disturbance and count as one symptom of post-traumatic confusion.) (*sleepdis; 0=absent 1=yes, present*) _____

6. Decreased Daytime Arousal:

(Clinician Rated Item 3. Scores of 2 or 3 indicate significantly decreased daytime arousal and count as one symptom of post-traumatic confusion.) (*dayarous; 0=absent 1=yes, present*) _____

7. Psychotic Type Symptoms (DRS-R):

(Clinician Rated Items 4 and 5. Scores of 1, 2, or 3 on item 4 or scores of 1, 2, or 3 on item 5 indicate psychotic type symptoms and count as one symptom of post-traumatic confusion. (*psych_sx; 0=absent 1=yes, present*)) _____

CAP TOTAL SCORE (captotal)

(Patients showing 4 or more symptoms are confused and patients showing 3 or more symptoms are confused if 1 of the symptoms is disorientation.) _____

Circle one: (*rating*)

Non-confused (1)

Confused (2)

Confusion Assessment Protocol

CTD Visual Picture Memory Test – Learning Trial (VPMT-1): *I am going to show you pictures of common objects. Look carefully and try to remember each picture.* Name each object as you point to it. Show each picture for 3 seconds. Circle form used.

Form A: table car hammer cup key
Form B: dog knife pants boot paint brush

TOTART Attentional Subtest (TAS): *Now I want you to ...*

A. ... *count forward from 1 to 20 as quickly as you can.* (tot_a)

_____ correct (1) _____ incorrect (2)

B. ... *count backwards from 20 to 1.* (can cue 20, 19, 18, ...) (tot_b)

_____ correct (1) _____ incorrect (2)

C. ... *recite the months of the year.* (tot_c)

_____ correct (1) _____ incorrect (2)

Jan Feb Mar Apr May Ju Jul Aug Sept Oct Nov Dec

D. ... *recite the months of the year backwards.* (tot_d)

_____ correct (1) _____ incorrect (2)

Dec Nov Oct Sept Aug Jul Ju May Apr Mar Feb Jan

* TAS Test Completion Codes (circle one): 0 1 2 3 4 5 6 9
 (tas_tcc)

CTD Vigilance (V1): *I am going to read you a long series of letters. Whenever you hear the letter H, indicate by raising your hand at the wrist (demonstrate) and then putting it back down. Let's try these letters to practice, B H D.* Note whether patient follows instructions on this sample and repeat as necessary.

Read the letter list at the rate of one letter per 2 seconds. Put a slash mark through each letter the patient responds to and circle omissions (/ = response, O = omission). Circle form used. Alternate between forms on different administrations.

Form A: H E G H F E H D H F H C B F H A D H C E H I H G D H
 C E B H E G H I H C H E H F C I H E B H G F D H B E

Form B: H B H A E H B H C F A H F H G H C G D H C B A H G D
 E H C H B E H D G H D A F H B I F H E B H D H E H G

CTD Vigilance Score = Hits (correct targets identified) X 2 – Commissions (incorrect targets identified): _____ (c_crcom1)

*V1 Test Completion Code (circle one): 0 1 2 3 4 5 6 9 (v1tcc)

***Test Completion Codes:** 0=Standard Administration, 1=Arousal Impairment Code – Inability to complete item/test due to inability to stay alert, 2=Motor Impairment Code – Inability to give ANY motor response or patient was restrained, 3=Visual Impairment Code – Inability to see test stimuli (e.g., blind), NOT perceptual impairment, 4=Phonation Impairment Code=Gives NO speech at ANY time, too dysarthric to give intelligible response, or intubated, 5=Aphasia Code – Profound language impairment that COMPLETELY interferes with ability to participate in task, 6=Agitation Code – Patient extremely agitated and thus non-cooperative with test administration, 9=Test Not Administered.

If more than one applies, use the code that interfered most with administration of the test.

Galveston Orientation and Amnesia Test (GOAT)

Type of Administration: Standard _____ Modified _____ (goat_t)

- _____ 1. *What is your name?* (2) _____; *When were you born?* (4) _____
 Where do you live? (4) _____
- _____ 2. *Where are you now?* (unnecessary to state name of hospital) city (5) _____
 hospital (5) _____
- _____ 3. *On what date were you admitted to the hospital?* (5) _____; *How did you get to the hospital?*
 (5) _____
- _____ 4. *What is the first event you can remember after the injury?* (5) _____;
 Can you describe in detail (e.g., date, time, companions) the first event you recall after the injury? (5)

- _____ 5. *What is the last event you can recall before the injury?* (5) _____;
 Can you describe in detail (e.g., date, time, companions) the last event you can recall before the injury?
 (5) _____
- _____ 6. *What time is it now?* _____: _____ am pm (1 point for each ½ hour off, max of 5 points)
- _____ 7. *What day of the week is it?* _____ (1 point for each day off, max of 3 points)
- _____ 8. *What day of the month is it?* _____ (1 point for each day off, max of 5 points)
- _____ 9. *What is the month?* _____ (5 points for each month off, max of 15 points)
- _____ 10. *What is the year?* _____ (10 points for each year off, max of 30 points)
- _____ Total error points (*goat_err*)

*GOAT Test Completion Code (circle one): 0 1 2 3 4 5 6 9
 (*goat_tcc*)

***Test Completion Codes:** 0=Standard Administration, 1=Arousal Impairment Code – Inability to complete item/test due to inability to stay alert, 2=Motor Impairment Code – Inability to give ANY motor response or patient was restrained, 3=Visual Impairment Code – Inability to see test stimuli (e.g., blind), NOT perceptual impairment, 4=Phonation Impairment Code=Gives NO speech at ANY time, too dysarthric to give intelligible response, or intubated, 5=Aphasia Code – Profound language impairment that COMPLETELY interferes with ability to participate in task, 6=Agitation Code – Patient extremely agitated and thus non-cooperative with test administration, 9=Test Not Administered.
If more than one applies, use the code that interfered most with administration of the test.

CTD Comprehension (Comp): *I am going to ask you some questions that can be answered yes or no. If your answer is yes, nod your head or say yes. If your answer is no, shake your head or say no.* Read each question twice and circle correct answers. Alternate between forms on serial administrations.

Form 1

- Will a stone float on water?* (no)
Can you use a hammer to pound nails? (yes)
Do two pounds of flour weigh more than one? (yes)
Will water go through a good pair of rubber boots? (no)

Form 2

- Will a leaf float on water?* (yes)
Is a hammer good for cutting wood? (no)
Is one pound of flour heavier than two? (no)
Will a good pair of rubber boots keep water out? (yes)

Comp: ____/4 (*c_aud*)

Supplemental Yes / No Auditory Items

1. Am I clapping my hands right now? (do not clap) (no)
 2. Am I clapping my hands right now? (clap) (yes)
 3. Am I clapping my hands right now? (clap) (yes)
 4. Am I clapping my hands right now? (do not clap) (no)
 5. Am I clapping my hands right now? (clap) (yes)
 6. Am I clapping my hands right now? (do not clap) (no)

Supplemental Yes / No

Give either visual or auditory items.

Visual Items

1. Am I touching my ear right now? (no)
 (do not touch ear)
 2. Am I touching my nose right now? (yes)
 (touch nose)
 3. Am I touching my nose right now? (yes)
 (touch nose)
 4. Am I touching my ear right now? (no)
 (don't touch ear)
 5. Am I touching my nose right now? (no)
 (do not touch nose)
 6. Am I touching my ear right now? (yes)
 (touch ear)

CRS_R Yes No Accuracy Score

Visual _____ (0-6)
 Auditory _____ (0-6)

***Auditory comprehension Completion Code:** 0 1 2 3 4 5 6 9
 (*mastytc*)

CTD Visual Picture Memory Test – Recognition (VPMT-2): *Now I am going to show you some more pictures. Some you have just seen but others will be shown for the first time. Let me know whether or not you have seen the picture before by nodding your head or saying yes or shaking your head or saying no. Remember indicate yes if you have seen the picture before and no if you have not seen the picture before.* (Circle correct answers.)

- Form A**
- | | | | |
|---------------|-------|--------------|-------|
| <i>Car</i> | (yes) | <i>Key</i> | (yes) |
| <i>Glass</i> | (no) | <i>Truck</i> | (no) |
| <i>Lock</i> | (no) | <i>Cup</i> | (yes) |
| <i>Table</i> | (yes) | <i>Chair</i> | (no) |
| <i>Hammer</i> | (yes) | <i>Saw</i> | (no) |

- Form B**
- | | | | |
|-------------------|-------|-------------------|-------|
| <i>Fork</i> | (no) | <i>Toothbrush</i> | (no) |
| <i>Boot</i> | (yes) | <i>Knife</i> | (yes) |
| <i>Paintbrush</i> | (yes) | <i>Shoe</i> | (no) |
| <i>Cat</i> | (no) | <i>Dog</i> | (yes) |
| <i>Dress</i> | (no) | <i>Pants</i> | (yes) |

Recognition: ____/10 (*c_rec*)

***VPMT-1, VPMT-2 Completion Code:** 0 1 2 3 4 5 6 9
 (*vpmt_tcc*)

***Test Completion Codes:** 0=Standard Administration, 1=Arousal Impairment Code – Inability to complete item/test due to inability to stay alert, 2=Motor Impairment Code – Inability to give ANY motor response or patient was restrained, 3=Visual Impairment Code – Inability to see test stimuli (e.g., blind), NOT perceptual impairment, 4=Phonation Impairment Code=Gives NO speech at ANY time, too dysarthric to give intelligible response, or intubated, 5=Aphasia Code – Profound language impairment that COMPLETELY interferes with ability to participate in task, 6=Agitation Code – Patient extremely agitated and thus non-cooperative with test administration, 9=Test Not Administered.

If more than one applies, use the code that interfered most with administration of the test.

Clinician Rated Items (DRS-R and Additional Items)

1. Fluctuation of symptom severity (*drsr_15*)

Rate the waxing and waning of an individual or cluster of symptom(s) over the time frame being rated. Usually applies to cognition, affect, intensity of hallucinations, thought disorder, language disturbance. Take into consideration that perceptual disturbances usually occur intermittently, but might cluster in period of greater intensity when other symptoms fluctuate in severity.

- 0 no symptom fluctuation
- 1 symptom intensity fluctuates in severity over hours
- 2 symptom intensity fluctuates in severity over minutes

2. Sleep-disturbance (*ad_item2*)

Rate sleep-pattern at night using all sources of information, including from family, caregivers, nurses= reports, and patient. Try to distinguish sleep from resting with eyes closed.

- 0 not present
- 1 mild sleep continuity disturbance at night
- 2 moderate disorganization of sleep-wake cycle (eg several brief awakenings during the night with confusion/behavioral changes or very little nighttime sleep)
- 3 severe disruption of sleep-wake cycle (eg, day-night reversal of sleep-wake cycle or severe circadian fragmentation with multiple periods of sleep and wakefulness or severe sleeplessness)

3. Level of Arousal/ Daytime Drowsiness (Note that naps can be of variable duration; few minutes to hours) (*add_item*)

- 0 Normal; alert during the day.
- 1 Napping during the day.
- 2 Difficulty staying alert during therapy sessions and naps during day.
- 3 Unable to stay alert at bedside or therapy sessions; persistently hypoaroused.

4. Perceptual disturbances and hallucinations (*drsr_2*)

Illusions and hallucinations can be of any sensory modality. Misperceptions are "simple" if they are uncomplicated, such as a sound, noise, color, spot, or flashes and "complex" if they are multidimensional, such as voices, music, people, animals, or scenes. Rate if reported by patient of caregiver, or inferred by observation.

- 0 not present
- 1 mild perceptual disturbances (eg, feelings of derealization or depersonalization; or patient may not be able to discriminate dreams from reality)
- 2 illusions present
- 3 hallucinations present

5. Delusions (*drsr_3*)

Delusions can be of any type, but are most often persecutory. Rate if reported by patient, family or caregiver. Rate as delusional if ideas are unlikely to be true yet are believed by the patient who cannot be dissuaded by logic. Delusional ideas cannot be explained otherwise by the patient's usual cultural or religious background.

- 0 not present
- 1 mildly suspicious, hypervigilant, or preoccupied
- 2 unusual or overvalued ideation that does not reach delusional proportions or could be plausible
- 3 delusional

Delirium Symptom Checklist for DSM-IV Diagnosis:

Patient Name: _____ Rater: _____

Date of Evaluation: _____

- A. _____ Disturbance of Consciousness (i.e., reduced clarity of awareness of the environment) with reduced ability to focus, sustain, or shift attention. (*ddc_1*)
- B. _____ A change in cognition (such as memory deficit, disorientation, language disturbance) or the development of a perceptual disturbance that is not better accounted for by a preexisting, established, or evolving dementia. (*ddc_2*)
- C. _____ The disturbance develops over a short period of time (usually hours to days) and tends to fluctuate during the course of the day. (*ddc_3*)
- D. _____ There is evidence from the history, physical examination, or laboratory findings that the disturbance is caused by the direct physiological consequences of a general medical condition. (*ddc_4*)

TBI NATIONAL DATABASE COLLECTION FORM

Patient Name: _____ Date of Rating: _____

Name of Person Completing Form: _____

DISABILITY RATING SCALE:

Disability Rating Scale ratings to be completed within 72 hours after Rehab. Admission. And within 72 hours before Rehab. Discharge.

A. EYE OPENING:

- (0) Spontaneous
- (1) To Speech
- (2) To Pain
- (3) None

0-SPONTANEOUS: eyes open with sleep/wake rhythms indicating active arousal mechanisms, does not assume awareness.
1-TO SPEECH AND/OR SENSORY STIMULATION: a response to any verbal approach, whether spoken or shouted, not necessarily the command to open the eyes. Also, response to touch, mild pressure.
2-TO PAIN: tested by a painful stimulus.
3-NONE: no eye opening even to painful stimulation.

B. COMMUNICATION ABILITY:

- (0) Oriented
- (1) Confused
- (2) Inappropriate
- (3) Incomprehensible
- (4) None

0-ORIENTED: implies awareness of self and the environment. Patient able to tell you a) who he is; b) where he is; c) why he is there; d) year; e) season; f) month; g) day; h) time of day.
1-CONFUSED: attention can be held and patient responds to questions but responses are delayed and/or indicate varying degrees of disorientation and confusion.
2-INAPPROPRIATE: intelligible articulation but speech is used only in an exclamatory or random way (such as shouting and swearing); no sustained communication exchange is possible.
3-INCOMPREHENSIBLE: moaning, groaning or sounds without recognizable words, no consistent communication signs.
4-NONE: no sounds or communications signs from patient.

C. MOTOR RESPONSE:

- (0) Obeying
- (1) Localizing
- (2) Withdrawing
- (3) Flexing
- (4) Extending
- (5) None

0-OBEYING: obeying command to move finger on best side. If no response or not suitable try another command such as "move lips," "blink eyes," etc. Do not include grasp or other reflex responses.
1-LOCALIZING: a painful stimulus at more than one site causes limb to move (even slightly) in an attempt to remove it. It is a deliberate motor act to move away from or remove the source of noxious stimulation. If there is doubt as to whether withdrawal or localization has occurred after 3 or 4 painful stimulations, rate as localization.
2-WITHDRAWING: any generalized movement away from a noxious stimulus that is more than a simple reflex response
3-FLEXING: painful stimulation results in either flexion at the elbow, rapid withdrawal with abduction of the shoulder or a slow withdrawal with adduction of the shoulder. If there is confusion between flexing and withdrawing, then use pinprick on hands.
4-EXTENDING: painful stimulation results in extension of the limb.
5-NONE: no response can be elicited. Usually associated with hypotonia. Exclude spinal transection as an explanation of lack of response; be satisfied that an adequate stimulus has been applied.

D. FEEDING (COGNITIVE ABILITY ONLY)

- (0.0) Complete
- (1.0) Partial
- (2.0) Minimal
- (3.0) None

Does the patient show awareness of how and when to perform this activity? Ignore motor disabilities that interfere with carrying out this function. (This is rated under Level of Functioning described below.)
0-COMPLETE: continuously shows awareness that he knows how to feed and can convey unambiguous information that he knows when this activity should occur.
1-PARTIAL: intermittently shows awareness that he knows how to feed and/or can intermittently convey reasonably clearly information that he knows when the activity should occur.
2-MINIMAL: shows questionable or infrequent awareness that he knows in a primitive way how to feed and/or shows infrequently by certain signs, sounds, or activities that he is vaguely aware when the activity should occur.
3-NONE: shows virtually no awareness at any time that he knows how to feed and cannot convey information by signs, sounds, or activity that he knows when the activity should occur.

E. TOILETING (COGNITIVE ABILITY ONLY)

- (0.0) Complete
- (1.0) Partial
- (2.0) Minimal
- (3.0) None

Does the patient show awareness of how and when to perform this activity? Ignore motor disabilities that interfere with carrying out this function. (This is rated under Level of Functioning described below.) Rate best response for toileting based on bowel and bladder behavior
0-COMPLETE: continuously shows awareness that he knows how to toilet and can convey unambiguous information that he knows when this activity should occur.
1-PARTIAL: intermittently shows awareness that he knows how to toilet and/or can intermittently convey reasonably clearly information that he knows when the activity should occur.
2-MINIMAL: shows questionable or infrequent awareness that he knows in a primitive way how to toilet and/or shows infrequently by certain signs, sounds, or activities that he is vaguely aware when the activity should occur.
3-NONE: shows virtually no awareness at any time that he knows how to toilet and cannot convey information by signs, sounds, or activity that he knows when the activity should occur.

F.GROOMING (COGNITIVE ABILITY ONLY)

- (0.0) Complete
- (1.0) Partial
- (2.0) Minimal
- (3.0) None

Does the patient show awareness of how and when to perform this activity? Ignore motor disabilities that interfere with carrying out this function. (This is rated under Level of Functioning described below.) Grooming refers to bathing, washing, brushing of teeth, shaving, combing or brushing of hair and dressing.

0-COMPLETE: continuously shows awareness that he knows how to groom self and can convey unambiguous information that he knows when this activity should occur.

1-PARTIAL: intermittently shows awareness that he knows how to groom self and/or can intermittently convey reasonably clearly information that he knows when the activity should occur.

2-MINIMAL: shows questionable or infrequent awareness that he knows in a primitive way how to groom self and/or shows infrequently by certain signs, sounds, or activities that he is vaguely aware when the activity should occur.

3-NONE: shows virtually no awareness at any time that he knows how to groom self and cannot convey information by signs, sounds, or activity that he knows when the activity should occur.

G.LEVEL OF FUNCTIONING (PHYSICAL, MENTAL, EMOTIONAL OR SOCIAL FUNCTION))

- (0.0) Completely Independent
- (1.0) Independent in special environment
- (2.0) Mildly Dependent-Limited assistance (non-resid - helper)
- (3.0) Moderately Dependent-moderate assist (person in home)
- (4.0) markedly Dependent-assist all major activities, all times
- (5.0) Totally Dependent-24 hour nursing care.

0-COMPLETLY INDEPENDENT: able to live as he wishes, requiring no restriction due to physical, mental, emotional or social problems.

1-INDEPENDENT IN SPECIAL ENVIRONMENT: capable of functioning independently when needed requirements are met (mechanical aids)

2-MILDLY DEPENDENT: able to care for most of own needs but requires limited assistance due to physical, cognitive and/or emotional problems (e.g., needs non-resident helper).

3-MODERATELY DEPENDENT: able to care for self partially but needs another person at all times. (person in home)

4-MARKEDLY DEPENDENT: needs help with all major activities and the assistance of another person at all times.

5-TOTALLY DEPENDENT: not able to assist in own care and requires 24-hour nursing care.

H."EMPLOYABILITY"(AS A FULL TIME WORKER, HOMEMAKER, OR STUDENT)

- (0.0) Not Restricted
- (1.0) Selected jobs, competitive
- (2.0) Sheltered workshop, Non-competitive
- (3.0) Not Employable

0-NOT RESTRICTED: can compete in the open market for a relatively wide range of jobs commensurate with existing skills; or can initiate, plan execute and assume responsibilities associated with homemaking; or can understand and carry out most age relevant school assignments.

1-SELECTED JOBS, COMPETITIVE: can compete in a limited job market for a relatively narrow range of jobs because of limitations of the type described above and/or because of some physical limitations; or can initiate, plan, execute and assume many but not all responsibilities associated with homemaking; or can understand and carry out many but not all school assignments.

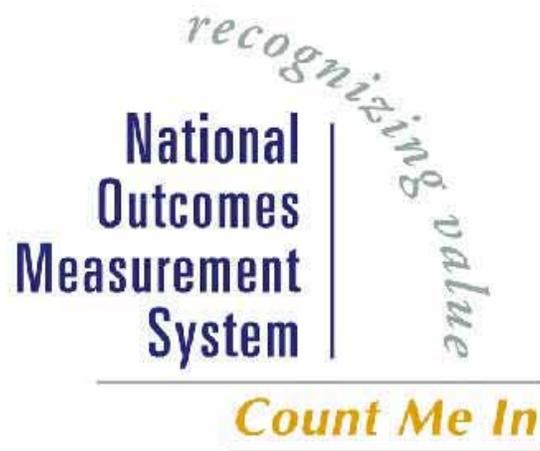
2-SHELTERED WORKSHOP, NON-COMPETITIVE: cannot compete successfully in a job market because of limitations described above and/or because of moderate or severe physical limitations; or cannot without major assistance initiate, plan, execute and assume responsibilities for homemaking; or cannot understand and carry out even relatively simple school assignments without assistance.

3-NOT EMPLOYABLE: completely unemployable because of extreme psychosocial limitations of the type described above, or completely unable to initiate, plan, execute and assume any responsibilities associated with homemaking; or cannot understand or carry out any school assignments.

The psychosocial adaptability or "employability" item takes into account overall cognitive and physical ability to be an employee, homemaker or student.

This determination should take into account considerations such as the following:

1. Able to understand, remember and follow instructions.
2. Can plan and carry out tasks at least at the level of an office clerk or in simple routine, repetitive industrial situation or can do school assignments.
3. Ability to remain oriented, relevant and appropriate in work and other psychosocial situations.
4. Ability to get to and from work or shopping centers using private or public transportation effectively.
5. Ability to deal with number concepts.
6. Ability to make purchases and handle simple money exchange problems
7. Ability to keep track of time and appointments



Adults in Health Care

Functional Communication Measures (FCMs)

Speech-Language Pathology



AMERICAN
SPEECH-LANGUAGE-
HEARING
ASSOCIATION

Functional Communication Measures

Introduction

The Functional Communication Measures (FCMs) are a series of seven-point rating scales, ranging from least functional (Level 1) to most functional (Level 7). They have been developed by ASHA to describe the different aspects of a patient's functional communication and swallowing abilities over the course of speech-language pathology intervention.

In 2008, eight of the 15 Functional Communication Measures (FCM) from the Adult National Outcomes Measurement System (NOMS) were submitted to the National Quality Forum (www.qualityforum.org) for review. All eight were endorsed and subsequently became part of the public domain. It is important to note that the FCMs are one component of NOMS. To receive access to all of the components of NOMS - national database of treatment outcomes and customized data reports - you must become a registered NOMS user. Additional information pertaining to becoming a registered NOMS user is available at www.asha.org/members/research/NOMS.

The following are the 15 FCMs used with the Adult Healthcare component of NOMS:

- Alaryngeal Communication
- Attention
- Augmentative-Alternative Communication
- Fluency
- Memory
- Motor Speech
- Pragmatics
- Problem Solving
- Reading
- Spoken Language Comprehension
- Spoken Language Expression
- Swallowing
- Voice
- Voice Following Tracheostomy
- Writing

These FCMs were designed to describe functional abilities over time from admission to discharge in various speech-language pathology treatment settings. They are not dependent upon administration of any particular formal or informal assessment measures, but are clinical observations provided by the speech-language pathologist of the patient's communication and/or swallowing abilities addressed by an individualized treatment plan.

FCMs should only be scored if they specifically relate to the patient's individualized treatment plan and goals. It is not anticipated that all of the FCMs will be scored for any one patient. On average, only a few FCMs per patient will be selected.

Description of Seven-Level FCM scoring

Each level of the FCMs contain references to the intensity and frequency of the cueing method and use of compensatory strategies that are required to assist the patient in becoming functional and independent in various situations and activities. Both the amount and intensity of the cueing must be considered in scoring an FCM. Familiarize yourself with the following descriptors and refer to them when scoring the FCM scales.

Frequency of Cueing

Consistent	Required 80–100% of the time.
Usually	50–79% of the time.
Occasionally	20–49% of the time.
Rarely	Less than 20% of the time.

Intensity of Cueing

Maximal	Multiple cues that are obvious to nonclinicians. Any combination of auditory, visual, pictorial, tactile, or written cues.
Moderate	Combination of cueing types, some of which may be intrusive.
Minimal	Subtle and only one type of cueing.

You will notice that the intensity and frequency of the cueing may be modified from one FCM level to another as the complexity of the information/task or situation increases. Outlined below are some examples of general types of activities in which the patient may engage throughout the course of recovery. These are provided merely for illustration and are not intended as must-do activities for rating a patient at a particular FCM level.

Simple routine living activities	Basic self-care activities that most adults carry out every day: following simple directions; eating a meal; and completing personal hygiene, dressing, etc.
Complex living activities	Changing a flat tire; reading a book; planning and preparing a meal; and managing one's own medical, financial, and personal affairs, etc.

We tried as much as possible to ensure consistency among similar levels of performance on the various FCM scales; however, this was not always possible given the nature of the different aspects of communication and swallowing abilities. For example, do not assume that a Level 5 on one scale is comparable to a Level 5 on a different scale. Both the amount and intensity of the cueing must be considered in scoring an FCM.

Alaryngeal Communication

Note: *This FCM should be used for individuals who have had a total or near-total laryngectomy. Scoring on this FCM does not include ability to independently clean and manage prosthetic equipment. Application of this FCM assumes appropriate sizing and placement of prosthesis.*

Communication can be achieved with 1 or more of the following alaryngeal communication methods: tracheo-esophageal puncture (TEP), the use of an artificial larynx (AL) or esophageal speech production (ES). Primary type of alaryngeal communication must be indicated on Admission Form.

LEVEL 1: The individual is unable to vocalize as a result of total or near-total laryngectomy. Alternate means of communication (e.g. writing, gestures, mouthing, electronic device, etc.) are used all of the time. Individual cannot participate in vocational, avocational and social activities requiring oral communication.

LEVEL 2: With consistent, maximal cueing, the individual can produce short consonant-vowel combinations and/or simple words in known contexts. However, intelligibility/accuracy may vary. Participation in vocational, avocational and social activities requiring oral communication is significantly limited with alternate means of communication needed all of the time.

LEVEL 3: The individual usually requires moderate cueing to produce simple words and short phrases with familiar communication partners, although accuracy/intelligibility may vary. Participation in vocational, avocational and social activities requiring oral communication is limited most of the time and alternate means of communication may be needed.

LEVEL 4: The individual occasionally requires minimal cueing to produce sentences/messages during structured conversations with familiar communication partners and usually requires moderate cueing to produce sentences/messages with unfamiliar partners, although accuracy/intelligibility may vary. Spontaneous conversation is not consistent and the individual rarely produces complex sentences/messages that are understood by others. Participation in vocational, avocational and social activities requiring oral communication is limited some of the time and alternate means of communication may be needed.

LEVEL 5: The individual is successfully able to communicate using alaryngeal communication in simple structured conversations with both familiar and unfamiliar communication partners. The individual occasionally requires minimal cueing during spontaneous conversation to intelligibly produce more complex sentences/messages with unfamiliar partners. The individual occasionally self-monitors communication effectiveness and uses compensatory strategies when encountering difficulty.

LEVEL 6: The individual is successfully able to communicate using alaryngeal communication, but some limitations are still apparent in vocational, avocational and social activities. The individual rarely requires minimal cueing during spontaneous conversation to intelligibly produce complex sentences/messages with unfamiliar communication partners and usually self-monitors communication effectiveness and uses compensatory strategies when encountering difficulty.

LEVEL 7: The individual's ability to successfully and independently participate in vocational, avocational and social activities is not limited by alaryngeal communication. The individual independently self-monitors communication effectiveness and uses compensatory strategies when encountering difficulty.

Attention

Note: *The following are some examples of living activities as used with this FCM:*

Simple living activities *following simple directions, reading environmental signs, eating a meal, completing personal hygiene, and dressing.*

Complex living activities *watching a news program, reading a book, planning and preparing a meal, and managing one's own medical, financial, and personal affairs.*

LEVEL 1: Attention is nonfunctional. The individual is generally unresponsive to most stimuli.

LEVEL 2: The individual can briefly attend with consistent maximal stimulation, but not long enough to complete even simple living tasks.

LEVEL 3: The individual maintains attention over time to complete simple living tasks of short duration with consistent maximal cueing in the absence of distracting stimuli.

LEVEL 4: The individual maintains attention during simple living tasks of multiple steps and long duration within a minimally distracting environment with consistent minimal cueing.

LEVEL 5: The individual maintains attention within simple living activities with occasional minimal cues within distracting environments. The individual requires increased cueing to start, continue, and change attention during complex activities.

LEVEL 6: The individual maintains attention within complex activities, and can attend simultaneously to multiple demands with rare minimal cues. The individual usually uses compensatory strategies when encountering difficulty. The individual has mild difficulty or takes more than a reasonable amount of time to attend to multiple tasks/stimuli.

LEVEL 7: The individual's ability to participate in vocational, avocational, or social activities is not limited by attentional abilities. Independent functioning may occasionally include the use of compensatory strategies.

Augmentative-Alternative Communication

Note: This FCM should be used when supplementing or replacing an individual's natural speech with one or more aided or unaided augmentative-alternative communication (AAC) systems. Examples of augmentative-alternative communication include use of gestures, eye blink system, alphabet board, communication book, electronic device, etc. Scoring on this FCM does not include ability to independently set up and manage AAC system.

The following are examples of communication exchanges as used with this FCM:

Rote/automatic:	conveying basic and/or automatic information such as greetings, indicating pain, or need for elimination.
Simple:	conveying personal wants/needs such as hunger, thirst, sleep, or personal-biographical information.
Complex:	conveying medical, financial and/or vocational information.

LEVEL 1: The individual attempts to communicate (e.g. gestures, pointing, communication board, electronic device, etc). However communication using augmentative-alternative communication is not meaningful to familiar or unfamiliar listeners at any time regardless of amount of cueing or assistance.

LEVEL 2: The individual attempts to communicate rote/automatic messages (e.g. waving hello when greeted, responding to name). With consistent, maximal cueing and additional time, the individual can use augmentative-alternative communication to convey simple messages related to personal wants/needs with familiar communication partners. However, communication attempts are rarely accurate or meaningful and the communication partner must assume responsibility for structuring all communication exchanges.

LEVEL 3: The individual usually requires moderate cueing and additional time to use augmentative-alternative communication to convey simple messages related to personal wants/needs with familiar communication partners, although accuracy may vary. The communication partner must assume responsibility for structuring most communication exchanges.

LEVEL 4: The individual occasionally requires minimal cueing and additional time to use augmentative-alternative communication to convey simple messages related to routine daily activities in structured conversations with familiar communication partners. He/she usually requires moderate cueing and additional time to convey simple messages to unfamiliar communication partners with varying accuracy.

LEVEL 5: The individual is successfully able to use augmentative-alternative communication in structured conversations with both familiar and unfamiliar communication partners. However, he/she may occasionally require minimal cueing and additional time in communication exchanges with unfamiliar communication partners. The individual occasionally requires moderate cueing and additional time to convey more complex thoughts/messages and occasionally self-monitors communication effectiveness when encountering difficulty.

LEVEL 6: The individual is successfully able to communicate using augmentative-alternative communication in most daily activities, but some limitations are still apparent in vocational, avocational and social activities. The individual rarely requires minimal cueing and additional time to convey complex thoughts/messages and usually self-monitors communication effectiveness when encountering difficulty.

LEVEL 7: The individual's ability to successfully and independently participate in vocational, avocational and social activities is not limited by augmentative-alternative communication skills. The individual independently self-monitors communication effectiveness when encountering difficulty.

Fluency

Note: *This FCM should not be used for individuals who exhibit difficulty with rate and prosody as a result of a neurological impairment, cluttering, foreign dialect, or developmental disability.*

- LEVEL 1:** Fluency is so disrupted that speech is often not functional for communication. Attempts at speech communication are extremely labored in all situations, which renders the speaker virtually unintelligible. Alternative means of speaking are used most of the time. Listeners avoid spoken interaction with the individual.
- LEVEL 2:** Speech is functional most of the time, but labored in many day-to-day situations due to extended disruptions of speech flow which sometimes render the individual difficult to understand. Participation in vocational, avocational, and social activities requiring speech is reduced overall. Listener discomfort is evident throughout conversational interactions.
- LEVEL 3:** Speech is functional. Dysfluencies are evident in all situations, but are particularly frequent in problem situations. Vocational, avocational, and social participation requiring speech is occasionally reduced overall, and significantly reduced within what the individual perceives as problem situations. Some listener discomfort is evident throughout interactions.
- LEVEL 4:** Speech is functional for communication, but there is extreme situational variation. The frequency and severity of disruptions of speech flow within problem situations is distracting most but not all of the time. Vocational, avocational, and social participation requiring speech is limited most of the time in problem situations. Listeners are often aware of fluency difficulty.
- LEVEL 5:** Speech is functional for communication, and fluency can be maintained in some situations. Self-monitoring is inconsistent. The frequency and severity of disruptions of speech flow within problem situations is distracting some of the time. Speech difficulties are noticeable when they occur, and sometimes limit vocational, avocational, and social activities requiring speech in problem situations. Listeners are occasionally aware of fluency difficulties relative to particular situations.
- LEVEL 6:** Speech is functional for communication, and fluency can be maintained most of the time. Self-monitoring is consistent. Vocational, avocational, and social activities requiring speech is not restricted most of the time. Listeners are infrequently aware of fluency difficulties even in problem situations.
- LEVEL 7:** Disruptions in speech flow do not call attention to the speaker, and participation in activities requiring speech is not limited. May include self-monitoring as needed.

Memory

Note: The following terms are used with this FCM:

External Memory Aid *calendars, schedules, communication/memory books, pictures, color coding.*

Memory Strategies *silent rehearsals, word associations, chunking, mnemonic strategies.*

LEVEL 1: The individual is unable to recall any information, regardless of cueing.

LEVEL 2: The individual consistently requires maximal verbal cues or uses external aids to recall personal information (e.g., family members, biographical information, physical location, etc.) in structured environments.

LEVEL 3: The individual usually requires maximum cues to recall or use external aids for simple routine and personal information (e.g., schedule, names of familiar staff, location of therapy areas, etc.) in structured environments.

LEVEL 4: The individual occasionally requires minimal cues to recall or use external memory aids for simple routine and personal information in structured environments. The individual requires consistent maximal cues to recall or use memory aids for complex and novel information (e.g., carry out multiple steps activities, accommodate schedule changes, anticipate meal times, etc.), plan and follow through on simple future events (e.g., use calendar to keep appointments, use log books to complete a single assignment/task, etc.) in structured environments.

LEVEL 5: The individual consistently requires minimal cues to recall or use external memory aids for complex and novel information. The individual consistently requires minimal cues to plan and follow through on complex future events (e.g., menu planning and meal preparation, planning a party, etc.).

LEVEL 6: The individual is able to recall or use external aids/memory strategies for complex information and planning complex future events most of the time. When there is a breakdown in the use of recall/memory strategies/external memory aids, the individual occasionally requires minimal cues. These breakdowns may occasionally interfere with the individual's functioning in vocational, avocational, and social activities.

LEVEL 7: The individual is successful and independent in recalling or using external aids/memory strategies for complex information and planning future events in all vocational, avocational, and social activities.

Motor Speech

Note: Individuals who exhibit deficits in speech production may exhibit underlying deficits in respiration, phonation, articulation, prosody, and resonance. In some instances it may be beneficial to utilize additional FCMs focusing on voice if disordered phonation is a large component.

- LEVEL 1:** The individual attempts to speak, but speech cannot be understood by familiar or unfamiliar listeners at any time.
- LEVEL 2:** The individual attempts to speak. The communication partner must assume responsibility for interpreting the message, and with consistent and maximal cues, the patient can produce short consonant-vowel combinations or automatic words that are rarely intelligible in context.
- LEVEL 3:** The communication partner must assume primary responsibility for interpreting the communication exchange, however, the individual is able to produce short consonant-vowel combinations or automatic words intelligibly. With consistent and moderate cueing, the individual can produce simple words and phrases intelligibly, although accuracy may vary.
- LEVEL 4:** In simple structured conversation with familiar communication partners, the individual can produce simple words and phrases intelligibly. The individual usually requires moderate cueing in order to produce simple sentences intelligibly, although accuracy may vary.
- LEVEL 5:** The individual is able to speak intelligibly using simple sentences in daily routine activities with both familiar and unfamiliar communication partners. The individual occasionally requires minimal cueing to produce more complex sentences/messages in routine activities, although accuracy may vary and the individual may occasionally use compensatory strategies.
- LEVEL 6:** The individual is successfully able to communicate intelligibly in most activities, but some limitations in intelligibility are still apparent in vocational, avocational, and social activities. The individual rarely requires minimal cueing to produce complex sentences/messages intelligibly. The individual usually uses compensatory strategies when encountering difficulty.
- LEVEL 7:** The individual's ability to successfully and independently participate in vocational, avocational, or social activities is not limited by speech production. Independent functioning may occasionally include the use of compensatory techniques.

Pragmatics

- LEVEL 1:** Pragmatics are nonfunctional in all situations or settings regardless of feedback and cueing. The individual cannot initiate appropriate responses to the environment and is unaware of the needs and feedback of the communication partner.
- LEVEL 2:** On rare occasions, pragmatics are functional in familiar and structured settings with familiar people and maximum cueing.
- LEVEL 3:** Pragmatics are functional a majority of the time when the individual is given consistent and maximum cueing in highly-structured settings or situations with familiar partners. The individual rarely uses common and simple social communication without cues.
- LEVEL 4:** Pragmatics are functional a majority of the time without cues in structured settings or situations with familiar communication partners. With unfamiliar partners or in unstructured settings, the individual needs maximal cues. The individual uses and adheres to common and simple rules of social communication but is unaware of subtle feedback from the environment.
- LEVEL 5:** Pragmatics are functional in unfamiliar settings and with unfamiliar partners with consistent minimal cueing. The individual inconsistently responds to subtle feedback from the environment.
- LEVEL 6:** Pragmatics are functional in most settings or situations with occasional minimal cues. The majority of the time, the individual is able to modify behaviors in response to subtle feedback from the environment.
- LEVEL 7:** The individual's ability to successfully and independently participate in vocational, avocational, and social activities is not limited by pragmatics. The individual rarely experiences pragmatic difficulties, but when this occurs, is consistently and independently able to modify behaviors in response to feedback from the environment.

Problem Solving

Note: Individuals should be scored on this FCM based on their problem solving ability during the completion of functional activities. Problem solving involves the ability to identify the problem, generate appropriate solutions and evaluate the outcome in a reasonable/timely manner.

Individuals must demonstrate sufficient attention and memory skills to be scored on this FCM (functioning at a minimum of level 3 on the Attention and Memory FCMs).

For the purposes of this scale, supervision is defined as follows: 1:1 supervision - for safety reasons, the individual requires monitoring at all times; close supervision - individual requires someone standing by or within arm's reach during problem solving task; and distant supervision - individual requires someone checking in during problem solving tasks.

The following are examples of problem solving tasks as used with this FCM:

Rote Problem Solving Tasks: picking up dropped item when knocked over, turning on/off television or light, and answering telephone.

Simple Problem Solving Tasks: following schedule, requesting assistance, using call bell, identifying basic wants/needs, cold meal preparation, and completing personal hygiene/dressing.

Complex Problem Solving Tasks: working on a computer, managing personal, medical, and financial affairs, preparing complex meal, grocery shopping, and route finding/map reading.

LEVEL 1: Problem solving skills are nonfunctional in all situations or settings regardless of cueing or additional time given. The individual does not recognize a problem given any level of cueing. 1:1 supervision is required.

LEVEL 2: The individual is able to solve rote problems (i.e. picking up a cup, if knocked over) in immediate environment. With consistent, maximal cues/assistance and additional time, the individual is able to recognize problems, generate appropriate solutions and/or carry out steps to complete simple problem solving tasks in structured environments. However, problem solving attempts are rarely accurate and 1:1 supervision is required.

LEVEL 3: The individual usually requires moderate cues/assistance and additional time to recognize problems, generate appropriate solutions and/or carry out steps to complete simple problem solving tasks in structured environments, although accuracy may vary. Close supervision is required.

LEVEL 4: The individual occasionally requires minimal cues/assistance to complete simple problem solving tasks in structured environments. Additional time may be needed to recognize problems, generate appropriate solutions and carry out steps to solve problems. Distant supervision may be required to complete simple problem solving tasks.

The individual demonstrates emerging problem solving skills for complex problem solving tasks. With consistent, maximal cues/assistance and additional time, he/she is able to identify salient features of complex problems, but rarely provides appropriate solutions. The individual rarely self-monitors effectiveness of performance and/or uses strategies when encountering difficulty. Close supervision may be required during complex problem solving tasks.

(continued)

Problem Solving FCM continued

LEVEL 5: The individual demonstrates functional problem solving skills in routine daily activities. He/she rarely requires minimal cueing/assistance or additional time to recognize problems, identify various solutions and carry out steps to complete simple problem solving tasks.

The individual usually requires moderate cues/assistance to identify salient features of complex problems and occasionally provides appropriate solutions. He/she usually needs additional time to complete complex problem solving tasks and occasionally self-monitors effectiveness of performance and uses strategies when encountering difficulty. Distant supervision may be required to complete complex problem solving tasks.

LEVEL 6: Problem solving skills are functional in most settings, but some limitations in problem solving are still apparent in vocational, avocational and social activities. The individual rarely requires minimal cueing/assistance or additional time to generate multiple solutions and carry out steps to complete complex problem solving tasks. He/she usually self-monitors effectiveness of performance and uses strategies when encountering difficulty.

LEVEL 7: The individual's ability to successfully and independently participate in vocational, avocational, or social activities is not limited by problem solving skills. Independent functioning rarely requires more than a reasonable time to complete complex problem solving tasks. The individual independently self-monitors effectiveness of performance and uses strategies when needed.

Reading

- LEVEL 1:** The individual attends to printed material, but doesn't recognize even single letters or common words.
- LEVEL 2:** The individual reads single letters and common words with consistent maximal cueing.
- LEVEL 3:** The individual reads single letters and common words, and with consistent moderate cueing, can read some words that are less familiar, longer, and more complex.
- LEVEL 4:** The individual reads words and phrases related to routine daily activities, and words that are less familiar, longer, and more complex. The individual usually requires moderate cueing to read sentences of approximately 5–7 words.
- LEVEL 5:** The individual reads sentence-level material containing some complex words. The individual occasionally requires minimal cueing to read more complex sentences and paragraph-level material. The individual occasionally uses compensatory strategies.
- LEVEL 6:** The individual is successfully able to read most material but some limitations in reading are still apparent in vocational, avocational, and social activities. The individual rarely requires minimal cueing to read complex material. Although reading is successful, it may take the individual longer to read the material. The individual usually uses compensatory strategies when encountering difficulty.
- LEVEL 7:** The individual's ability to successfully and independently participate in vocational, avocational, and social activities is not limited by reading skills. Independent functioning may occasionally include use of compensatory strategies.

Spoken Language Comprehension

- LEVEL 1:** The individual is alert, but unable to follow simple directions or respond to yes/no questions, even with cues.
- LEVEL 2:** With consistent, maximal cues, the individual is able to follow simple directions, respond to simple yes/no questions in context, and respond to simple words or phrases related to personal needs.
- LEVEL 3:** The individual usually responds accurately to simple yes/no questions. The individual is able to follow simple directions out of context, although moderate cueing is consistently needed. Accurate comprehension of more complex directions/messages is infrequent.
- LEVEL 4:** The individual consistently responds accurately to simple yes/no questions and occasionally follows simple directions without cues. Moderate contextual support is usually needed to understand complex sentences/messages. The individual is able to understand limited conversations about routine daily activities with familiar communication partners.
- LEVEL 5:** The individual is able to understand communication in structured conversations with both familiar and unfamiliar communication partners. The individual occasionally requires minimal cueing to understand more complex sentences/messages. The individual occasionally initiates the use of compensatory strategies when encountering difficulty.
- LEVEL 6:** The individual is able to understand communication in most activities, but some limitations in comprehension are still apparent in vocational, avocational, and social activities. The individual rarely requires minimal cueing to understand complex sentences. The individual usually uses compensatory strategies when encountering difficulty.
- LEVEL 7:** The individual's ability to independently participate in vocational, avocational, and social activities are not limited by spoken language comprehension. When difficulty with comprehension occurs, the individual consistently uses a compensatory strategy.

Spoken Language Expression

Note: This FCM should not be used for individuals using an augmentative/alternative communication system.

- LEVEL 1:** The individual attempts to speak, but verbalizations are not meaningful to familiar or unfamiliar communication partners at any time.
- LEVEL 2:** The individual attempts to speak, although few attempts are accurate or appropriate. The communication partner must assume responsibility for structuring the communication exchange, and with consistent and maximal cueing, the individual can only occasionally produce automatic and/or imitative words and phrases that are rarely meaningful in context.
- LEVEL 3** The communication partner must assume responsibility for structuring the communication exchange, and with consistent and moderate cueing, the individual can produce words and phrases that are appropriate and meaningful in context.
- LEVEL 4:** The individual is successfully able to initiate communication using spoken language in simple, structured conversations in routine daily activities with familiar communication partners. The individual usually requires moderate cueing, but is able to demonstrate use of simple sentences (i.e., semantics, syntax, and morphology) and rarely uses complex sentences/messages.
- LEVEL 5:** The individual is successfully able to initiate communication using spoken language in structured conversations with both familiar and unfamiliar communication partners. The individual occasionally requires minimal cueing to frame more complex sentences in messages. The individual occasionally self-cues when encountering difficulty.
- LEVEL 6:** The individual is successfully able to communicate in most activities, but some limitations in spoken language are still apparent in vocational, avocational, and social activities. The individual rarely requires minimal cueing to frame complex sentences. The individual usually self-cues when encountering difficulty.
- LEVEL 7:** The individual's ability to successfully and independently participate in vocational, avocational, and social activities is not limited by spoken language skills. Independent functioning may occasionally include use of self-cueing.

Swallowing

Note: In Levels 3–5, some patients may meet only one of the “and/or” criteria listed. If you have difficulty deciding on the most appropriate level for an individual, use dietary level as the most important criterion if the dietary level is the result of swallow function rather than dentition only. Dietary levels at FCM Levels 6 and 7 should be judged only on swallow function, and any influence of poor dentition should be disregarded.

- LEVEL 1:** Individual is not able to swallow anything safely by mouth. All nutrition and hydration is received through non-oral means (e.g., nasogastric tube, PEG).
- LEVEL 2:** Individual is not able to swallow safely by mouth for nutrition and hydration, but may take some consistency with consistent maximal cues in therapy only. Alternative method of feeding required.
- LEVEL 3:** Alternative method of feeding required as individual takes less than 50% of nutrition and hydration by mouth, and/or swallowing is safe with consistent use of moderate cues to use compensatory strategies and/or requires maximum diet restriction.
- LEVEL 4:** Swallowing is safe, but usually requires moderate cues to use compensatory strategies, and/or the individual has moderate diet restrictions and/or still requires tube feeding and/or oral supplements.
- LEVEL 5:** Swallowing is safe with minimal diet restriction and/or occasionally requires minimal cueing to use compensatory strategies. The individual may occasionally self-cue. All nutrition and hydration needs are met by mouth at mealtime.
- LEVEL 6:** Swallowing is safe, and the individual eats and drinks independently and may rarely require minimal cueing. The individual usually self-cues when difficulty occurs. May need to avoid specific food items (e.g., popcorn and nuts), or require additional time (due to dysphagia).
- LEVEL 7:** The individual’s ability to eat independently is not limited by swallow function. Swallowing would be safe and efficient for all consistencies. Compensatory strategies are effectively used when needed.

Diet levels/restrictions are defined on the next page. Your facility’s levels may not exactly match these, but please use these levels as a guide in scoring this FCM.

(continued)

Swallowing: Dietary Levels/Restrictions

- Maximum restrictions:** Diet is two or more levels below a regular diet status in solid and liquid consistency.
- Moderate restrictions:** Diet is two or more levels below a regular diet status in either solid or liquid consistency (but not both), OR diet is one level below in both solid *and* liquid consistency.
- Minimum restrictions:** Diet is one level below a regular diet status in solid *or* liquid consistency.

Solids

- Regular:** No restrictions.
- Reduced one level:** Meats are cooked until soft, with no tough or stringy foods. Might include meats like meat loaf, baked fish, and soft chicken. Vegetables are cooked soft.
- Reduced two levels:** Meats are chopped or ground. Vegetables are of one consistency (e.g., soufflé, baked potato) or are mashed with a fork.
- Reduced three levels:** Meats and vegetables are pureed.

Liquids

- Regular:** Thin liquids; no restrictions.
- Reduced one level:** Nectar, syrup; mildly thick.
- Reduced two levels:** Honey; moderately thick.
- Reduced three levels:** Pudding; extra thick.

Voice

Note: *This FCM should not be used for individuals who have had a laryngectomy or tracheotomy, or for individuals with resonance disorders.*

- LEVEL 1:** The individual is unable to use voice to communicate. Alternative means for communicating are used all of the time. The individual cannot participate in vocational, avocational, and social activities requiring voice.
- LEVEL 2:** Voice is not functional for communication most of the time. Alternative means for communicating must be used most of the time. The individual's participation in vocational, avocational, and social activities is significantly limited all of the time.
- LEVEL 3:** Voice is functional for communication, but is consistently distracting and interferes with communication by drawing attention to itself. Participation in vocational, avocational, and social activities is limited most of the time.
- LEVEL 4:** Voice is functional for communication, but sometimes distracting. The individual's ability to participate in vocational, avocational, and social activities requiring voice is occasionally affected in low-vocal demand activities, but consistently affected in high-vocal demand activities.
- LEVEL 5:** Voice occasionally sounds normal with self-monitoring, but there is some situational variation. The individual's ability to participate in vocational, avocational, and social activities requiring voice is rarely affected in low-vocal demand activities, but is occasionally affected in high-vocal demand activities.
- LEVEL 6:** Voice sounds normal most of the time across all settings and situations. Self-monitoring is consistent when needed. The individual's ability to participate in vocational, avocational, and social activities requiring voice is not affected in low-vocal demand activities, but is rarely affected in high-vocal demand activities.
- LEVEL 7:** The individual's ability to successfully and independently participate in vocational, avocational, and social activities requiring high-or low-vocal demands is not limited by voice. Self-monitoring is effectively used, but only occasionally needed.

Voice following Tracheostomy

Note: This FCM should be used for individuals who have undergone tracheostomy tube placement as a result of a temporary or stable medical condition and are considered candidates for oral communication. Application of this FCM assumes appropriate sizing and placement of tracheostomy tube and includes individuals on mechanical ventilation.

Voicing can be achieved using digital occlusion of the tracheostomy tube, placement of a speaking valve, tracheostomy tube cap or via a talking tracheostomy tube. Scoring on this FCM does not include ability to independently set up and manage equipment.

LEVEL 1: The individual cannot produce voice as a result of tracheostomy. Alternate means for communication (e.g. writing, mouthing, gestures, alphabet board, electronic device, etc.) are used all of the time. The individual cannot participate in vocational, avocational and social activities requiring oral communication.

LEVEL 2: With consistent, maximal cueing/assistance, the individual can produce short intervals of phonation/vocalization and/or consonant-vowel combinations. However, voice is not functional for communication with alternate means for communication required all of the time. Participation in vocational, avocational and social activities requiring oral communication is significantly limited all of the time.

LEVEL 3: The individual usually requires moderate cueing/assistance to produce simple words and short phrases, although accuracy may vary. Participation in vocational, avocational and social activities requiring oral communication is limited most of the time and alternate means of communication may be needed.

LEVEL 4: The individual occasionally requires minimal cueing/assistance to produce simple sentences/messages during structured conversations with familiar communication partners and usually requires moderate cueing/assistance to produce simple sentences/messages with unfamiliar partners, although accuracy may vary. Spontaneous conversation is not consistent and the individual rarely produces complex sentences/messages that are understood by others. Participation in vocational, avocational and social activities requiring oral communication is limited some of the time and alternate means of communication may be needed.

LEVEL 5: The individual is successfully able to communicate using voice via the tracheostomy tube during structured conversations with familiar and unfamiliar partners. The individual occasionally requires minimal cueing/assistance to intelligibly produce more complex sentences/messages with unfamiliar partners. He/she occasionally self-monitors communication effectiveness when encountering difficulty.

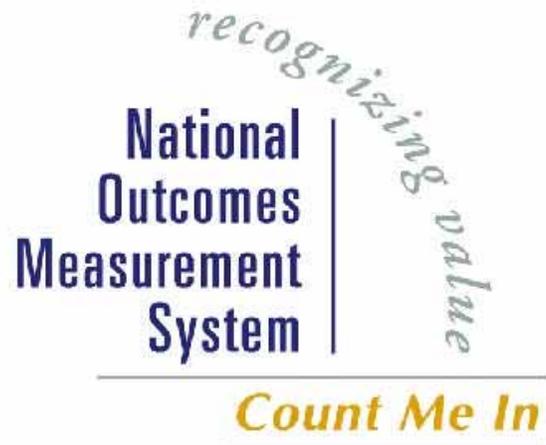
LEVEL 6: The individual is successfully able to communicate using voice via the tracheostomy tube in most situations, but some limitations are still apparent in vocational, avocational and social activities. The individual rarely requires minimal cueing/assistance to intelligibly produce complex sentences/messages and usually self-monitors communication effectiveness when encountering difficulty.

LEVEL 7: The individual's ability to successfully and independently participate in vocational, avocational and social activities is not limited by the tracheostomy, or use of the tracheostomy tube. The individual independently self-monitors communication effectiveness when encountering difficulties.

Writing

Note: This FCM should not be used for individuals using an augmentative-alternative communication system. References made here to the writing of words assume that the words are spelled correctly.

- LEVEL 1:** The individual attempts to write, but doesn't produce recognizable single letters or common words.
- LEVEL 2:** The individual writes single letters and common words with consistent maximal cueing.
- LEVEL 3:** The individual writes single letters and common words, and with consistent moderate cueing, can write some words that are less familiar, longer, and more complex.
- LEVEL 4:** The individual writes words and phrases related to routine daily activities and words that are less familiar, longer, and more complex. The individual usually requires moderate cueing to write sentences of approximately 5–7 words.
- LEVEL 5:** The individual writes sentence-level material containing some complex words. The individual occasionally requires minimal cueing to write more complex sentences and paragraph-level material. The individual occasionally uses compensatory strategies.
- LEVEL 6:** The individual is successfully able to write most material, but some limitations in writing are still apparent in vocational, avocational, and social activities. The individual rarely requires minimal cueing to write complex material. The individual usually uses compensatory strategies when encountering difficulty.
- LEVEL 7:** The individual's ability to successfully and independently participate in vocational, avocational, and social activities is not limited by writing skills. Independent functioning may occasionally include use of compensatory strategies.



For more information about ASHA's National Outcomes Measurement System (NOMS) please visit our website at www.asha.org/members/research/noms/

Galveston Orientation and Amnesia Test (GOAT)

Type of Administration: Standard _____ Modified _____

- _____ 1. *What is your name?* (2) _____; *When were you born?* (4) _____
Where do you live? (4) _____
- _____ 2. *Where are you now?* (unnecessary to state name of hospital) city (5) _____
hospital (5) _____
- _____ 3. *On what date were you admitted to the hospital?* (5) _____; *How did you get to the hospital?*
(5) _____
- _____ 4. *What is the first event you can remember after the injury?* (5) _____;
Can you describe in detail (e.g., date, time, companions) the first event you recall after the injury? (5)

- _____ 5. *What is the last event you can recall before the injury?* (5) _____;
Can you describe in detail (e.g., date, time, companions) the last event you can recall before the injury?
(5) _____
- _____ 6. *What time is it now?* _____: _____ am pm (1 point for each ½ hour off, max of 5 points)
- _____ 7. *What day of the week is it?* _____ (1 point for each day off, max of 3 points)
- _____ 8. *What day of the month is it?* _____ (1 point for each day off, max of 5 points)
- _____ 9. *What is the month?* _____ (5 points for each month off, max of 15 points)
- _____ 10. *What is the year?* _____ (10 points for each year off, max of 30 points)
- _____ Total error points

***GOAT Test Completion Code (circle one):** 0 1 2 3 4 5 6 9

***Test Completion Codes:** 0=Standard Administration, 1=Arousal Impairment Code – Inability to complete item/test due to inability to stay alert, 2=Motor Impairment Code – Inability to give ANY motor response or patient was restrained, 3=Visual Impairment Code – Inability to see test stimuli (e.g., blind), NOT perceptual impairment, 4=Phonation Impairment Code=Gives NO speech at ANY time, too dysarthric to give intelligible response, or intubated, 5=Aphasia Code – Profound language impairment that COMPLETELY interferes with ability to participate in task, 6=Agitation Code – Patient extremely agitated and thus non-cooperative with test administration, 9=Test Not Administered.

If more than one applies, use the code that interfered most with administration of the test.

Scoring Guide: Sum the error points. Score = 100- total error points.
76-100 is normal, 66-75 is borderline, <66 is impaired

SCORE: _____

Spaulding Rehabilitation Hospital Operational Definitions for Limb Movement Protocol

Instructions: Prior to administering the limb movement protocol, the patient should be positioned upright (in bed, on edge of mat or in wheelchair) and the patient's hands should be placed on his/her lap in resting position. Target stimuli (hand/object) should be positioned 12 inches in front of the patient's chest. Present each stimulus at midline (adjust to within the patient's known visual field as needed). Prior to starting each command trial, the examiner will complete a non-scored practice trial by physically assisting the patient through the motion while providing verbal instruction. The examiner will state "This is what I want you to do "Touch my hand." Each command is given 3 times. Allow patient 10 seconds to respond to each command. The command can be **repeated once during the 10** seconds. After patient responds, **wait 10 seconds before proceeding** to next command.

Perseverative response: a movement pattern that is the same on the current trial as in the preceding trial should be indicated with √ only (no points given).

Objects Needed: cup, ball, comb, toothbrush, tape measure

Command: "Touch my hand"

Full execution/complete movement: Any part of the patient's hand or fingers reach forward and touch therapist's hand which is held 12 inches from patient's chest. Therapist's hand remains stationary and verbal cues are provided.

Partial execution/correct movement: Patient's hand reaches forward at least 3 inches from its starting point and moves toward the therapist's hand but does not make contact with target. Therapist's hand remains stationary and verbal cues are provided.

Incorrect movement: Patient initiates movement but hand fails to move toward the examiner's hand.

No response: No movement.

Command: "Touch your nose"

Full execution/complete movement: Patient's hand or fingers move from resting position and makes direct contact with the nose.

Partial execution/correct movement: Patient's hand or fingers move at least 3 inches toward head but fail to make contact with the nose.

Incorrect movement: Movement is initiated but hand fails to move toward the patient's nose.

No response: No movement.

Command: “Take the ball”

Full execution/complete movement: Patient’s arm extends and grasps the ball with hand/thumb and holds it in hand for at least 3 seconds. Therapist’s hand remains stationary.

Partial execution/correct movement: Patient’s arm extends at least 3 inches toward the ball but contact is not made or patient is unable to grasp ball for 3 seconds. Therapist’s hand remains stationary and verbal cues are provided.

Incorrect movement: Movement is initiated but hand fails to move toward the ball.

No response: No movement.

Command: “Comb your hair”

Full execution/complete movement: After comb is placed in patient’s hand, arm lift’s comb to within 3 inches of hair area and initiates at least 1 combing stroke.

Partial execution/correct movement: After comb is placed in patient’s hand, patient’s arm extends at least 3 inches toward the head/hair but comb fails to make contact with hair area.

Incorrect movement: After comb is placed in patient’s hand, movement is initiated but patient fails to move comb toward hair or after comb is placed in patient’s hand.

No response: After comb is placed in patient’s hand, no movement occurs.

Command: “Brush your teeth”

Full execution/complete movement: After toothbrush is placed in patient’s hand, patient’s arm lift’s toothbrush to within 3 inches of mouth, mouth opens appropriately, and initiates at least 1 upward and 1 downward (or 1 right and 1 left) brushing stroke (contact between brush and teeth not required).

Partial execution/correct movement: After toothbrush is placed in patient’s hand, patient’s arm lifts toothbrush to greater than 3 inches from the mouth, and/or mouth does not open appropriately and/or brushing strokes do not occur.

Incorrect movement: After toothbrush is placed in patient’s hand, movement is initiated but patient fails to move toothbrush toward mouth after placement of toothbrush in patient’s hand.

No response: After toothbrush is placed in patient’s hand, no movement occurs.

Command: “Drink from cup”

Full execution/complete movement: After placement of cup in patient’s hand, arm lifts cup to within 3 inches of mouth.

Partial execution/correct movement: After placement of cup in patient’s hand, arm lifts cup to greater than 3 inches of mouth.

Incorrect movement: After placement of cup in patient’s hand, movement is initiated but patient fails to move cup toward mouth after placement of cup in patient’s hand.

No response: No movement occurs.

Command: “Shake my hand”

Full execution/complete movement: After therapist extends hand toward patient, patient grasps any part of therapist’s hand with fingers and initiates at least 1 upward and 1 downward pumping movement. Therapist’s hand remains stationary.

Partial execution/correct movement: After therapist extends hand toward patient, patient’s arm moves at least 3 inches toward therapist’s hand but does not grasp hand and/or fails to initiate pumping movement. Therapist’s hand remains stationary.

Incorrect movement: After therapist extends hand toward patient, movement is initiated but patient fails to move arm toward therapist’s hand after therapist extends hand toward patient.

No response: No movement occurs.

Command: “Wave good-bye”

Full execution/complete movement: Patient lifts arm at least 6 inches off lap and initiates at least 1 upward and 1 downward (or 1 rightward and 1 leftward) movement of arm. Therapist can provide visual and verbal cues.

Partial execution/correct movement: Patient initiates arm movement but arm moves < 6 inches off lap and/or does not complete 1 upward/downward or right/left waving movement.

Incorrect movement: Movement is initiated but patient fails to make upward or downward movement or right/left movement.

No response: No movement.

Spaulding Rehabilitation Hospital

Limb Movement Scoring Sheet

Name: _____ Hand Dominance: _____ Date: _____ Time: _____

Directions: For each command presented, check boxes that characterize the nature of the patient's motor response. **Score 3 trials** for each command.

Response Characteristics

Command	Full Execution Correct Movement 3	Partial Execution Correct Movement 2	Incorrect Movement 1	Perseverative (✓)	No Response 0	Not Assessed 00	Comments	Total for each of the 8 items (x/9)
Touch my hand								
Touch your nose								
Take the ball								
Comb your hair								
Brush teeth								
Drink from cup								
Shake hands								
Wave goodbye								

Physical/Visual Modifications: _____

Total (___ /72)

NCS-R

NOCICEPTION COMA SCALE-REVISED

Administration and scoring guidelines

C. Schnakers and C. Chatelle

Coma Science Group
University of Liège, Belgium



www.coma.ulg.ac.be

Contact :

c.schnakers@ulg.ac.be

camille.chatelle@ulg.ac.be

NOCICEPTION COMA SCALE-REVISED (NCS-R)

Record form

Aim: assessing severely brain-injured patients who are in a vegetative state/unresponsive wakefulness syndrome or in a minimally conscious state and who present a documented potential pain (e.g., fracture, decubitus ulcers, spasticity).

Context: administration of a (potentially) painful care and/or stimulation of a (potentially) painful area.

Scoring: indicate a cross for all the behaviors observed. The highest score obtained for each subscale will be considered. These subscores will then be summed in order to have the total score. A total score equal or above 4 suggests the presence of pain.

Notice: before starting a (potentially) painful care and/or stimulating a (potentially) painful area, it is advised to administer the NCS-R at rest in order to observe the spontaneous behaviors presented by the patient (assessed with eyes opened) during at least one minute. The total score should be below the total score observed during care and/or stimulation.

Patient : _____ **Date :** _____

Condition (R = rest ; S = stimulation) : _____

MOTOR RESPONSE

3 – Localization to noxious stimulation							
2 – Flexion withdrawal							
1 – Abnormal posturing							
0 – None							

VERBAL RESPONSE

3 – Intelligible verbalization							
2 – Vocalization							
1 – Groaning							
0 – None							

FACIAL EXPRESSION

3 – Cry							
2 – Grimace							
1 – Oral reflexive movement							
0 – None							

TOTAL SCORE _____

MOTOR RESPONSE		
Score	Item	Response
3	Localization to noxious stimulation	During a (potentially) painful care, the patient locates and makes contact with the (potentially) painful area and/or pushes away the caregiver's hand, particularly, when this one makes contact with this area.
2	Flexion withdrawal	During a (potentially) painful care, the patient removes the (potentially) painful area, particularly, when this one is stimulated.
1	Abnormal posturing	Stereotyped flexion or extension of the upper and/or lower extremities occurs during a (potentially) painful care and, particularly, during the stimulation of a (potentially) painful area.
0	None	Absence of movements during a (potentially) painful care, even, during the stimulation of a (potentially) painful area. Notice that this behavior could be due to hypertonic or flaccid muscle tone.

VERBAL RESPONSE

Score	Item	Response
3	<i>Intelligible verbalization</i>	At least one clearly intelligible negative verbalization such as « stop » or « it hurts » is observed during a (potentially) painful care and, particularly, during the stimulation of a (potentially) painful area.
2	<i>Vocalization</i>	At least one vocalization such as « ah » or « ouch » is observed during a (potentially) painful care and, particularly, during the stimulation of a (potentially) painful area.
1	<i>Groaning</i>	Groanings are observed during a (potentially) painful care and, particularly, during the stimulation of a (potentially) painful area.
0	<i>None</i>	None of the responses described above are observed during a (potentially) painful care and, particularly, during the stimulation of a (potentially) painful area.

FACIAL EXPRESSION

Score	Item	Response
3	<i>Cry</i>	Cries (with tears) are observed at least once during a (potentially) painful care and, particularly, during the stimulation of a (potentially) painful area.
2	<i>Grimace</i>	At least one grimace (e.g., facial distortion, eyebrows frown, etc.) is clearly observed during a (potentially) painful care and, particularly, during the stimulation of a (potentially) painful area.
1	<i>Oral reflexive movement</i>	Oral reflexive movements (such as clamping of jaws, tongue pumping, yawning or chewing movements) are observed during a (potentially) painful care and, particularly, during the stimulation of a (potentially) painful area.
0	<i>None</i>	No changes in facial expression are observed during a (potentially) painful care, even, during the stimulation of a (potentially) painful area.

SPECIALIZED MEASURES AND PROTOCOLS

- Arousal Monitoring
- Auditory Localization
- Command Following (Eye Gaze)
- Command Following (Vocalization)
- Hemispatial Neglect/Hemianopsia
- Object Recognition
- MCS Aphasia Assessment
- Yes/No Comprehension

INDIVIDUALIZED QUANTITATIVE BEHAVIORAL ASSESSMENT PROTOCOL

AROUSAL MONITORING

Patient: _____ Therapist: _____

Date: _____ Therapy: _____

Time: _____ Medication/Dose: _____

Procedure: This protocol is designed to determine whether there is a discernible difference in the frequency of episodes of underarousal before, during and after use of neurostimulant medications. This protocol can also be used to monitor arousal in the absence of neurostimulant medications. Arousal level should be monitored during the first, middle and last five minutes of each therapy session. Routine therapeutic activities should be conducted during the monitoring intervals, however, the Arousal Facilitation Protocol (AFP) should not be administered during these time periods.

Operational Definition of Underarousal: An episode of underarousal begins when contact between the upper and lower eyelids is maintained continuously for longer than 3 seconds and ends when contact is released for longer than 3 seconds.

Instructions: During the first, middle and last 5 minutes of the treatment session, observe the status of the eyelids. Any time the eyelids are observed to close for at least 3 seconds, begin timing the length of time they remain closed. Stop timing when the eyelids remain open for at least 3 seconds. Continue recording episodes of sustained eye closure in this manner during the first, middle and last 5 minutes of the session. At the end of each 5 minute interval, record the *total length of time* the eyelids were closed during that period and enter it in the appropriate time block. Next, record the *total length of time* the eyes remained closed within and across each 5 minute interval. Finally, place an asterisk in each time block in which there is sustained eyelid closure (ie, > 3 seconds) *without* loss of behavioral responsiveness. Note the patient's position (eg, in bed or in chair) for each 5-minute observation window.

	First 5 mins of tx session (0-5 mins)	Middle 5 mins of tx session (25-30 mins)	Last 5 mins of tx session (55-60 mins)	Total duration of eyelid closure
	Duration of eyelid closure	Duration of eyelid closure	Duration of eyelid closure	
Position				
1-60 seconds				
61-120 seconds				
121-180 seconds				
181-240 seconds				
241-300 seconds				
Total duration of eyelid closure				

INDIVIDUALIZED QUANTITATIVE BEHAVIORAL ASSESSMENT PROTOCOL

AUDITORY LOCALIZATION

Patient:

Protocol Description: Remove any obvious auditory and/or visual distracters from the patient's immediate environment. Record pt's positioning (laying in bed, upright in bed, in wheelchair, on tilt table) and position pt's head at midline. Standing out of pt's line of sight, on R or L as indicated, present auditory stimuli for 5 seconds. Allow 5 seconds response time per stimuli and note **first** eye and/or head movement made. Eye/head movement must be enough to clearly determine direction of movement; otherwise, record as No Response. To record a response, circle the direction of movement as indicated in data sheet attached. In the Comments column, record type of response (head movement, eye movement, or both) as well as any relevant behavioral observations.

Please administer one run at the beginning of the therapy hour and a second run at the end.

Auditory Stimulus: Clap your hands together while saying: "Look over here, __(*name*)__. Look at me." Present stimulation for 5 seconds per trial.

Individualized Quantitative Behavioral Assessment – Data Tracking Log

Patient: _____ Date: _____ Therapist: _____

Administration 1: START OF SESSION

Positioning (circle): Laying in Bed / Upright in Bed / Upright in WC / Tilt Table

	LEFT Auditory Stimulus	RIGHT Auditory Stimulus	Comments
	(Circle Response)	(Circle Response)	(record type of mvmt)
1	L (+) / R (-) / NR	---	
2	---	R (+) / L (-) / NR	
3	---	R (+) / L (-) / NR	
4	L (+) / R (-) / NR	---	
5	---	R (+) / L (-) / NR	
6	L (+) / R (-) / NR	---	
7	L (+) / R (-) / NR	---	
8	---	R (+) / L (-) / NR	
9	L (+) / R (-) / NR	---	
10	---	R (+) / L (-) / NR	
TOTAL	Mvmt LEFT (+): __/5	Mvmt RIGHT (+): __/5	
	Mvmt RIGHT (-): __/5	Mvmt LEFT (-): __/5	
	No Response: __/5	No Response: __/5	

Administration 2: END OF SESSION

Positioning (circle): Laying in Bed / Upright in Bed / Upright in WC / Tilt Table

	LEFT Auditory Stimulus	RIGHT Auditory Stimulus	Comments
	(Circle Response)	(Circle Response)	(record type of mvmt)
1	---	R (+) / L (-) / NR	
2	---	R (+) / L (-) / NR	
3	L (+) / R (-) / NR	---	
4	L (+) / R (-) / NR	---	
5	---	R (+) / L (-) / NR	
6	L (+) / R (-) / NR	---	
7	L (+) / R (-) / NR	---	
8	---	R (+) / L (-) / NR	
9	L (+) / R (-) / NR	---	
10	---	R (+) / L (-) / NR	
TOTAL	Mvmt LEFT (+): __/5	Mvmt RIGHT (+): __/5	
	Mvmt RIGHT (-): __/5	Mvmt LEFT (-): __/5	
	No Response: __/5	No Response: __/5	

INDIVIDUALIZED QUANTITATIVE BEHAVIORAL ASSESSMENT PROTOCOL

EYE GAZE COMMAND FOLLOWING

Pt. Name: _____ Pt. #: _____

Date: _____

This protocol is designed to determine whether the patient is capable of upward eye movement to command. During each therapy session the therapist will monitor upward eye movement under three conditions (i.e., contingent stimulus, alternate stimulus, no stimulus). A tracking sheet will be utilized to gather data and analyze the responses to differentiate reflexive and/or random eye movements from contingent eye movements. Prior to running the protocol, the patient should be adequately aroused and positioned to maximize comfort.

Target behavior: Upward eye movement to command: criteria is met when the sclera of the eye is visible beneath the iris.

C1 (contingent stimulus): “Look up at the ceiling.”

C2 (alternate stimulus): “Open your mouth.”

C3 (no stimulus): Rest

Procedure: Begin by conducting one cycle of deep pressure stimulation for arousal, if needed. Administer the three conditions in the order indicated on the tracking sheet. The patient has 10 seconds to perform the command. If there is no response within 5 seconds, repeat the command. Administer each condition approximately 20 seconds apart, unless upward eye gaze from the prior trial persists beyond the 10 second response window. Under these circumstances, the examiner should defer the next trial until 20 seconds have elapsed without upward eye gaze. *Remember, you are monitoring the target behavior only in all three conditions.*

- + : Target behavior observed during response window
- : Target behavior not observed during response window

EYE GAZE COMMAND FOLLOWING TRACKING SHEET

Pt. Name: _____

Therapist: _____

Date: _____

Time: _____

Target behavior: *Upward eye movement to command. Criteria is met when sclera of the eye is visible beneath the iris.*

Trial	Condition	Response
1	1	
2	3	
3	2	
4	3	
5	1	
6	2	
7	1	
8	3	
9	2	

+ : Target behavior observed during response window

- : Target behavior not observed during response window

Total “ + “ for C1: _____

Total “ + “ for C2: _____

Total “ + “ for C3: _____

INDIVIDUALIZED QUANTITATIVE BEHAVIORAL ASSESSMENT PROTOCOL

VOCALIZATION COMMAND FOLLOWING

Pt. Name: _____ Pt. #: _____

Date: _____

This protocol is designed to determine whether _____ is capable of vocalizing to command. During each therapy session the therapist will monitor vocalizations under three conditions (i.e., contingent stimulus, alternate stimulus, no stimulus). A tracking sheet will be utilized to gather data and analyze the responses to differentiate reflexive and/or random vocalizations from contingent vocalizations. Prior to running the protocol, _____ should be adequately aroused and positioned to maximize comfort.

Operational definition of target behavior:

C1 (contingent stimulus):

C2 (alternate stimulus):

C3 (no stimulus):

Procedure: Begin by conducting one cycle of deep pressure stimulation for arousal, if needed. Administer the three conditions in the order indicated on the tracking sheet. The patient has 10 seconds to perform the command. If there is no response within 5 seconds, repeat the command. Administer each condition approximately 20 seconds apart, unless vocalization from the prior trial persists beyond the 10 second response window. Under these circumstances, the examiner should defer the next trial until 20 seconds have elapsed without vocalization. *Remember, you are monitoring the target behavior only in all three conditions.*

- + : Target behavior observed during response window
- : Target behavior not observed during response window

VOCALIZATION COMMAND FOLLOWING TRACKING SHEET

Pt. Name: _____

Therapist: _____

Date: _____

Time: _____

Target behavior: _____

Trial	Condition	Response
1	1	
2	3	
3	2	
4	3	
5	1	
6	2	
7	1	
8	3	
9	2	

+ : Target behavior observed during response window

- : Target behavior not observed during response window

Total “ + “ for C1: _____

Total “ + “ for C2: _____

Total “ + “ for C3: _____

INDIVIDUALIZED QUANTITATIVE BEHAVIORAL ASSESSMENT PROTOCOL

HEMISPATIAL NEGLECT/ HEMIANOPSIA

Patient: _____

Date: _____

Time: _____

Therapist: _____

Objective: Determine the probability of hemispatial neglect and/or hemianopsia

Protocol Description:

Remove any obvious visual distracters from the patient's line of sight. Stand directly in front of the patient, positioning yourself at the midline of the face. If the head is turned to one side, reposition the head so it is at midline (use head strap, if needed). Stand about 3 feet in front of the patient and present the stimuli (by raising either one or both hands) in the order shown below in the chart. The stimuli should be presented approximately 2 feet in front of the eyes and about 18" apart. Record the *first eye movement made* within 5 seconds by circling the word or mark in the corresponding table cell. To record a response, the eyes must move enough to clearly determine the direction of the movement. If there is no response within 5 seconds, place a check in the No Response column. Note any relevant behavioral observations in the Comments column.

Please administer one run at the beginning of the therapy hour and a second run at the end.

Stimuli:

Neutral stimulus – White card with black cross or circle

Salient stimulus- Photo of family member

*Neutral and salient stimuli should be approximately the same size

Stimulus Conditions:

- 1- No stimuli presented in either hemispace (gaze preference?)
- 2- Neutral visual stimulus with unilateral presentation (field cut/neglect?)
- 3- Salient visual stimulus with unilateral presentation (field cut/neglect?)
- 4- Salient visual stimulus paired with neutral stimulus (neglect/field cut?)
- 5- Salient visual stimulus paired with identical salient stimulus (neglect/field cut?)

HEMISPATIAL NEGLECT/ HEMIANOPSIA TRACKING SHEET

TRIAL 1

Left Visual Field	Right Visual Field	No Response	Comments
(Right Hand)	(Left Hand)		
CARD	---		
---	PHOTO		
---	CARD		
PHOTO	CARD		
CARD	PHOTO		
---	---		
PHOTO	PHOTO		
PHOTO	---		

Condition	Looks Right	Looks Left	No Response
No Target			
Neutral Target Only Right			
Neutral Target Only Left			
Salient Target Only Right			
Salient Target Only Left			
Salient and Neutral Targets- Salient Right			
Salient and Neutral Targets- Salient Left			
Salient Target Right & Left			

HEMISPATIAL NEGLECT/ HEMIANOPSIA TRACKING SHEET

TRIAL 2

Left Visual Field	Right Visual Field	No Response	Comments
(Right Hand)	(Left Hand)		
CARD	---		
---	PHOTO		
---	CARD		
PHOTO	CARD		
CARD	PHOTO		
---	---		
PHOTO	PHOTO		
PHOTO	---		

Condition	Looks Right	Looks Left	No Response
No Target			
Neutral Target Only Right			
Neutral Target Only Left			
Salient Target Only Right			
Salient Target Only Left			
Salient and Neutral Targets- Salient Right			
Salient and Neutral Targets- Salient Left			
Salient Target Right & Left			

INDIVIDUALIZED QUANTITATIVE BEHAVIORAL ASSESSMENT PROTOCOL

OBJECT RECOGNITION

Patient:

Date: _____

Time: _____

Therapist: _____

Objective: To determine the probability that eye movements that occur following command reflect object recognition.

Protocol:

- Perform 1 run (ie; 12 trials) in the middle of each session with pt. seated in wheelchair or on tilt table.
- Administer the arousal facilitation protocol from CRS-R before each run
- Remove any obvious visual distracters from pts line of sight
- Stand midline relative to pts. head position
- Stand about 3 ft in front of patient and present stimuli in the order shown in the chart.
- Present the stimuli side by side simultaneously about 18” apart and approximately 12” in front of the eyes.
- Administer the commands in the order shown in the record sheet.
- In the chart below, circle the word/symbol that reflects the direction of the first eye movement that occurred within 10 seconds of presenting the stimuli
- If there is no response within 10 seconds, please place a check in the No Response column

Stimuli:

- Cup
- Ball

Stimulus Conditions:

- Stimuli should be presented in a horizontal array and presented simultaneously

OBJECT RECOGNITION TRACKING SHEET

Trial #	Right Visual Field	Left Visual Field	No Response	Comments <i>Indicate if first eye movement differs from options</i>
1 CUE: look at the ball	BALL	CUP		
2 CUE: look at the ball	CUP	BALL		
3 CUE: look at the cup	BALL	CUP		
4 CUE: look at the cup	CUP	BALL		
5 CUE: look at the ball	BALL	CUP		
6 CUE: look at the ball	CUP	BALL		
7 CUE: look at the cup	BALL	CUP		
8 CUE: look at the cup	CUP	BALL		
9 CUE: look at the ball	BALL	CUP		
10 CUE: look at the ball	CUP	BALL		
11 CUE: look at the cup	BALL	CUP		
12 CUE: look at the cup	CUP	BALL		
Total:	AR: /6 TR: /12	AR: /6 TR: /12	TR: /12	

*AR= accurate responses

*TR= total responses (look for false positives)

INDIVIDUALIZED QUANTITATIVE BEHAVIORAL ASSESSMENT PROTOCOL

MCS APHASIA ASSESSMENT

INSTRUCTIONS:

Administration:

Present trials in the following order- command only, command with object , command with object and gestural demonstration.

- Command Only: Stand to the right of midline and verbally administer the command listed. Repeat the command once. Do not expose the object or provide any gestural cues.
- Command + Object: Stand directly in front of the patient, present the object in the patient's field of view and verbally administer the command listed. Repeat the command once while the object is exposed. Do not provide any gestural cues.
- Command + Object + Gesture: Stand directly in front of the patient, verbally administer the command listed while demonstrating the appropriate movement sequence. Repeat the command and gesture once. Place the object in the patient's right hand and administer the command.

Scoring:

For each trial administered, place a check under the column that best reflects the patient's response. Responses must occur within 10 sec of the repeated command to be counted:

- Movement Sequence Matches Command: The movement sequence is consistent with the verbal command.
- Movement Sequence Does Not Match Command: Active movement is elicited but the movement sequence is not consistent with the object's use or command administered.
- No Response: No active movement occurs within 10 seconds of the repeated command *or* there is no discernible difference in the movement pattern before and after the command is administered.

YES/NO COMPREHENSION ASSESSMENT PROTOCOL

Directions: Administer runs of 6 paired yes/no questions, as outlined below, within the domains of personal information, orientation information and/or general knowledge. Please attempt administration of at least *one set* per tx session. Record pt's arousal as noted below, and record response (if any) occurring within 10 seconds of auditory stimulus.

Date: _____

Positioning during administration: _____

Did eyes remain open throughout administration (circle): YES / NO

Was deep pressure stimulation provided (circle): YES / NO

Did pt benefit from deep pressure (circle): YES / NO / NA

Personal Information Questions:

Stimulus:	Response? (+/-)	Accurate? (+/-)
Are you a man/male?		
Are you _____* years old?		
Are you a _____**?		
Are you _____*** years old?		
Are you a woman/female?		
Are you a _____****?		
TOTAL:	/ 6	/ 6

* enter age of patient

** enter an occupation other than patient's occupation

*** enter a number other than patient's age

**** enter patient's occupation

Orientation Information Questions:

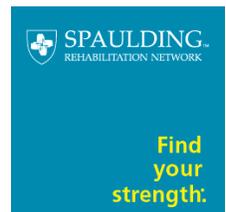
Stimulus:	Response? (+/-)	Accurate? (+/-)
Are we at a shopping mall?		
Is the year 2002?		
Are we in a hospital?		
Are you sitting in a bathtub?		
Is the year _____*?		
Are you sitting in a chair?		
TOTAL:	/ 6	/ 6

* enter current year

General Knowledge Questions:

Stimulus:	Response? (+/-)	Accurate? (+/-)
Is grass green?		
Is ice hot?		
Is a rock hard?		
Is grass red?		
Is ice cold?		
Is a rock soft?		
TOTAL:	/ 6	/ 6

SAMPLE CASE ILLUSTRATION



Spaulding Rehabilitation Network Disorders of Consciousness Program

Neurobehavioral Profile Summary

Patient Name:
Date of Admission:

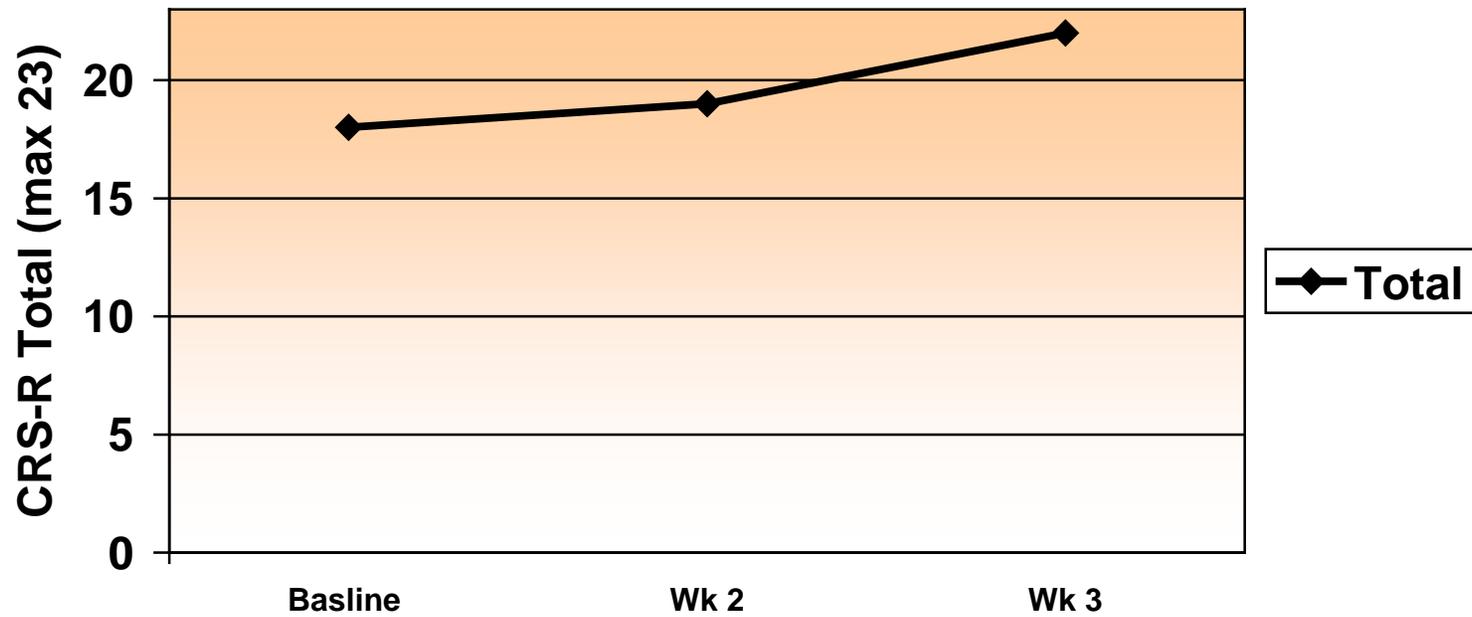
Date of Injury:
Date of Report:

The Neurobehavioral Profile Summary provides a snapshot of patient performance across multiple domains, including medical, physical, cognitive, linguistic and behavioral functions. Scores on each measure are compiled weekly by the interdisciplinary neurorehabilitation team and monitored across the length of stay.

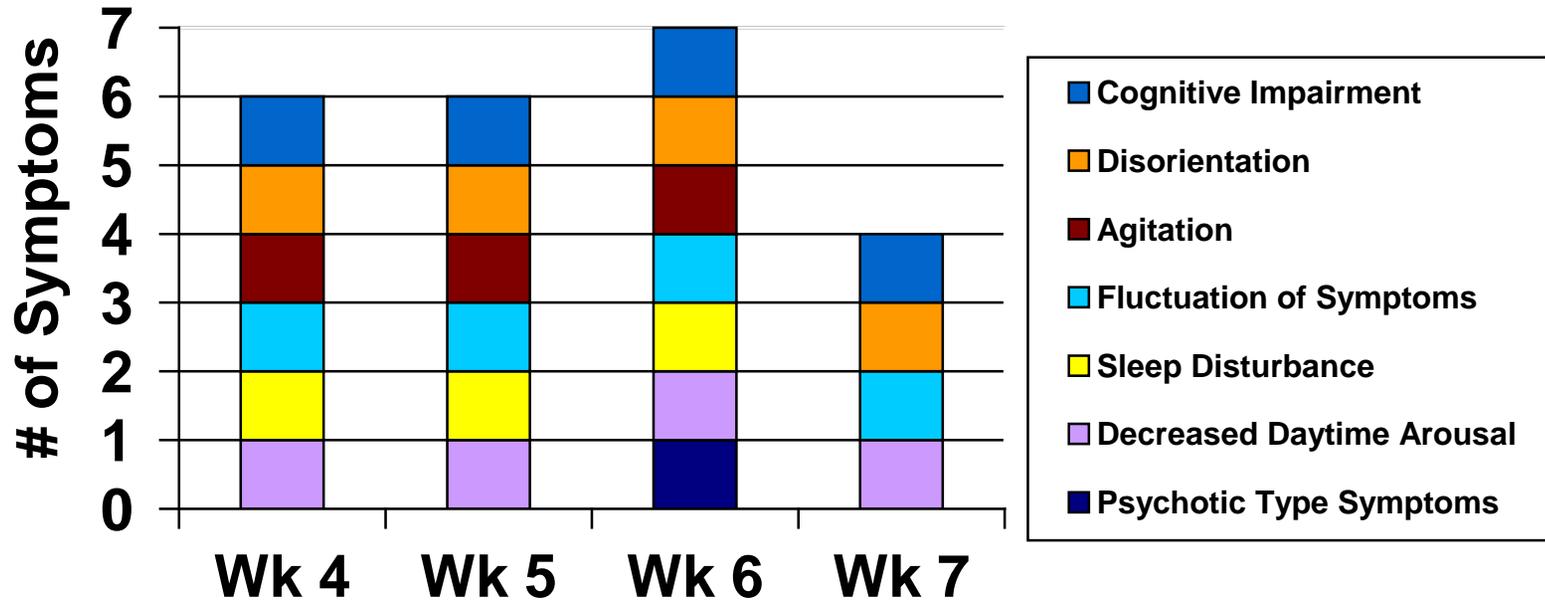
Review of History: Mr. X is a...

Neurobehavioral and Cognitive Measures

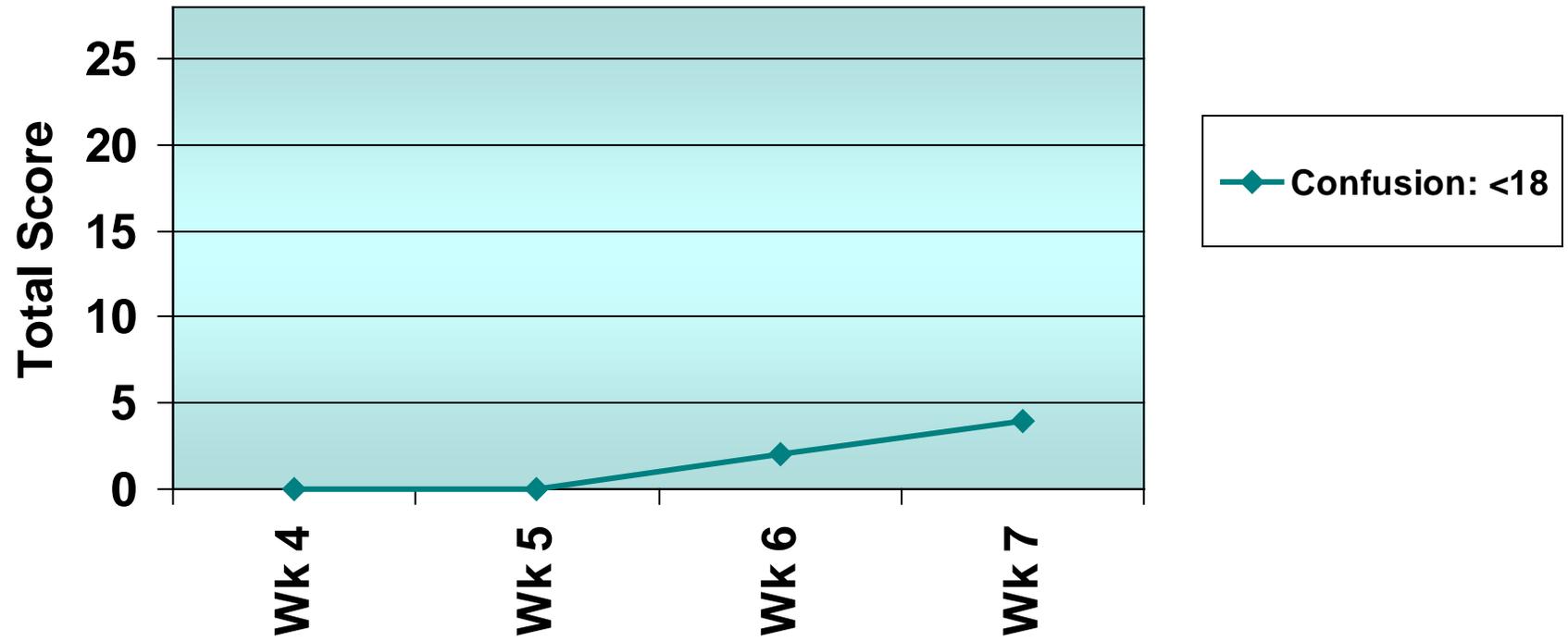
A. Coma Recovery Scale- Revised



B. Confusion Assessment Protocol (CAP) (Confusion >3)

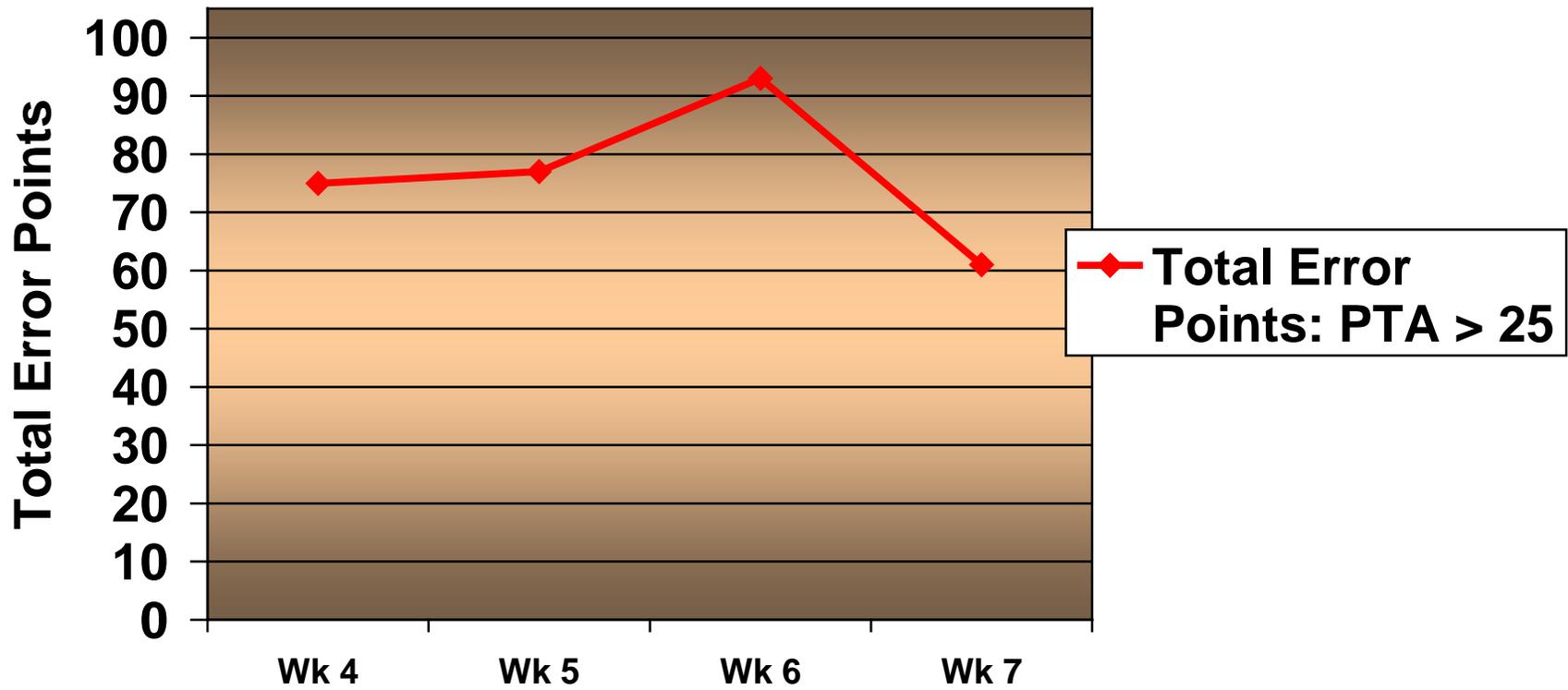


C. CAP-Cognitive Impairment



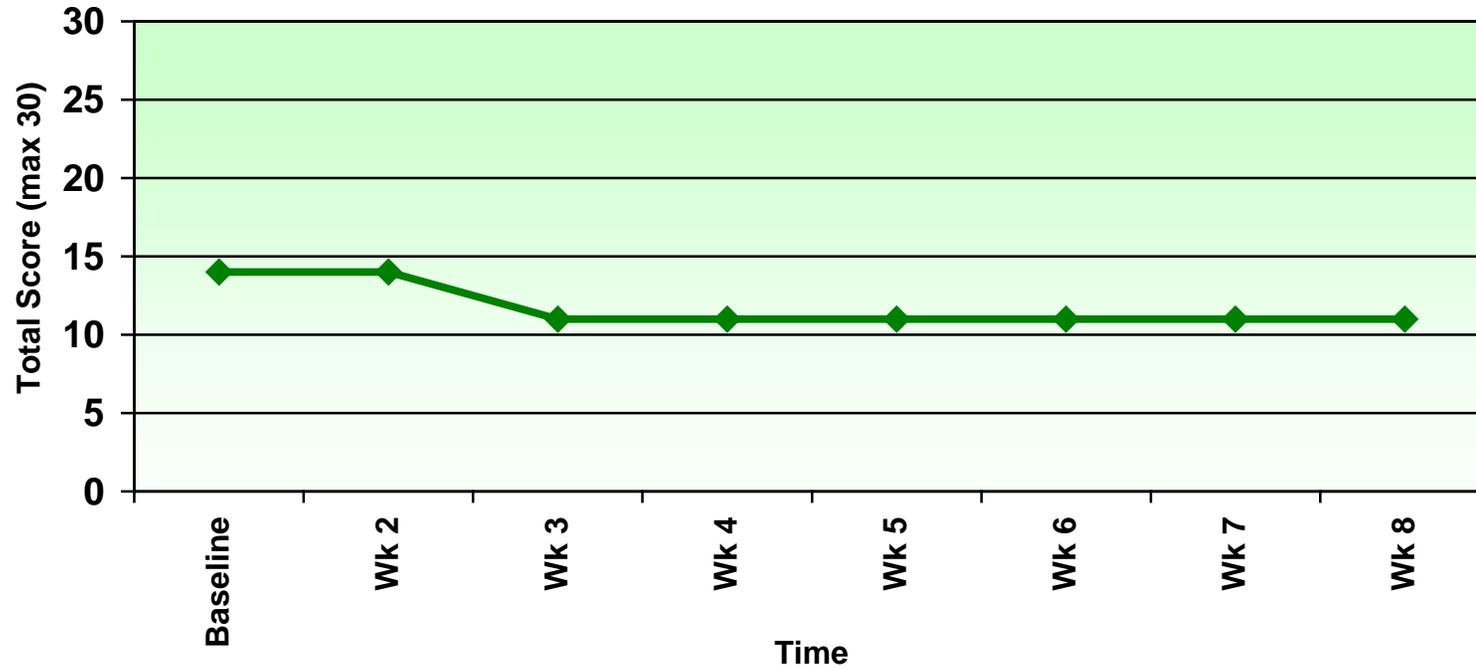
Global Level of Function

D. GOAT Scores

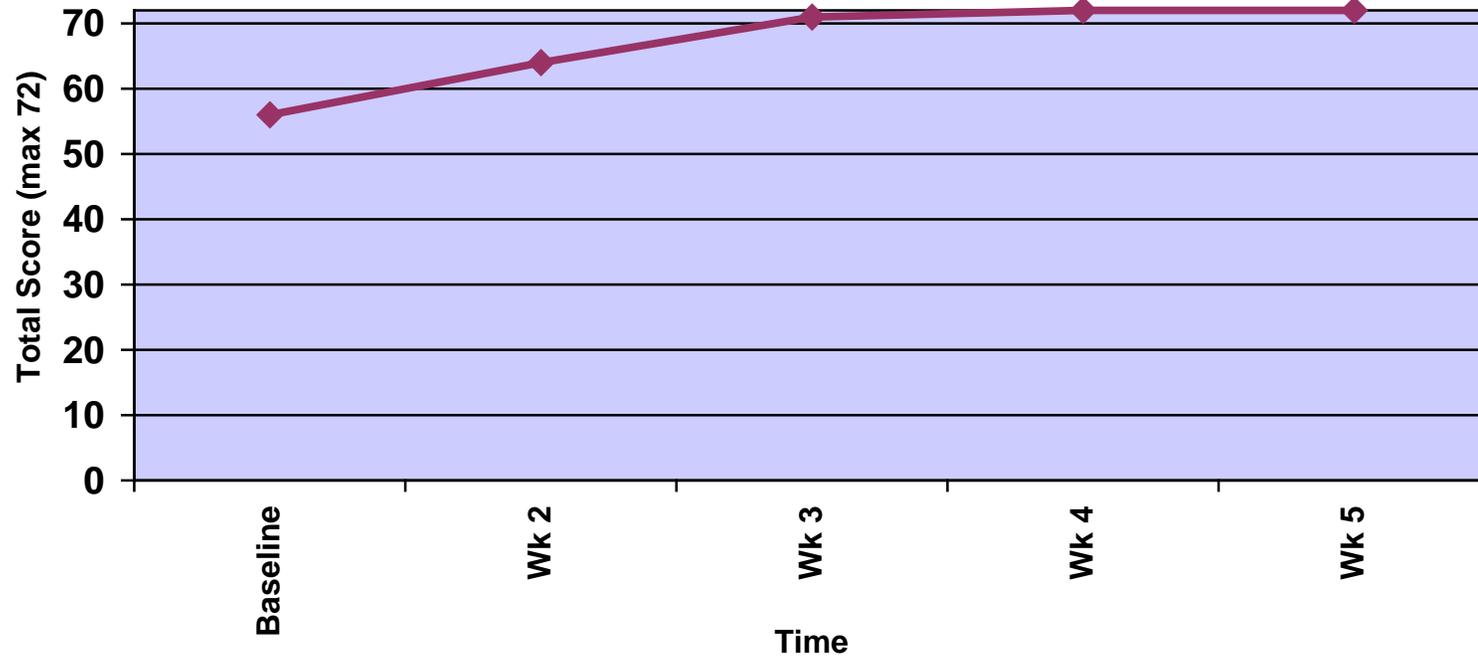


E. Disability Rating Scale

*Note: Lower Scores = Decreasing Disability

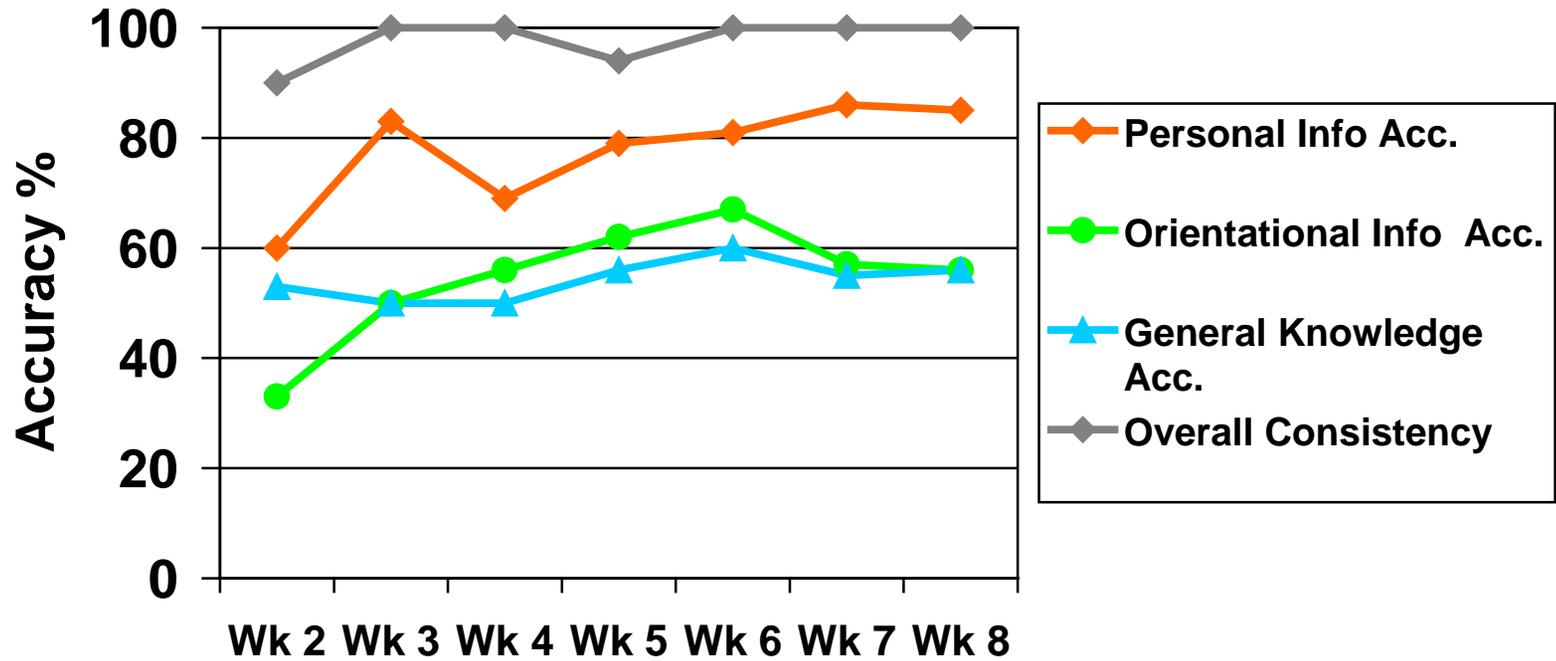


F. Limb Movement Protocol



Specialized Measures

G. Orientation, Knowledge, and Memory Accuracy Protocol



Impression:

Panel A: The Coma Recovery Scale- Revised (CRS-R) is a standardized assessment instrument designed to detect subtle behavioral signs of conscious awareness. The CRS-R is comprised of 6 subscales addressing arousal level, audition and language, visuoperceptual, motor and communication functions. Results show...

Panels B/C: The Confusion Assessment Protocol (CAP) measures a combination of 7 features of confusion, including orientation, cognition, sleep, agitation, symptom fluctuation and psychotic symptoms. Panel B shows the number and type of symptoms of confusion experienced over the last 4 weeks. Panel C depicts the scores of the Cognitive Impairment Index, which determines the cognitive impairment symptom. Results show...

Panel D: The Galveston Orientation and Amnesia Test is a measure of post-traumatic amnesia (PTA). Results show...

Panel E: The Disability Rating Scale (DRS) is a global measure of cognitive and functional disability. Lower scores on the DRS indicate *decreasing disability*, whereas higher scores indicate greater disability. Results show...

Panel F: The Limb Movement Protocol (LMP) assesses complex learned movements (including social gestures and use of common objects) involving the upper extremities. Results show...

Panel G: Panel G depicts the consistency and accuracy of responses to yes-no questions involving personal orientation, situational orientation and semantic knowledge. Results show...

Summary: Assessment findings suggest...

Joseph T. Giacino, PhD
Director, Disorders of Consciousness Program

Date