

ORGANIZATION NEWS

Highlights From the Rehabilitation Measures Database

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Measurement Characteristics and Clinical Utility of the Coma Recovery Scale-Revised Among Individuals With Acquired Brain Injury

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The Coma Recovery Scale-Revised¹ (CRS-R; 23 items) requires common items and straightforward instructions from the CRS-R manual (<http://www.tbims.org/combi/crs/CRS%20Syllabus.pdf>) to administer the 25-minute test. The CRS-R is a clinical measure for adults with disorders of consciousness (DOC) from acquired brain injury. It was first developed as the JFK Coma Recovery Scale in 1991,² but feedback from users of the scale and Rasch analysis led to revision.¹ Standardized sensory stimuli including visual, motor, auditory, oromotor, and communication domains are tested, with responses consistent with coma, vegetative state, minimally conscious state, or emergence from the minimally conscious state. The standard approach of the CRS-R reduces the likelihood of DOC misdiagnosis.^{1,3,4}

CRS-R items demonstrate excellent content validity.⁵ Total scores demonstrate excellent internal consistency and interrater and test-retest reliability.^{1,3} Validity of the CRS-R is good, with expected relationships shown with the Glasgow Coma Scale⁶ and the Disability Rating Scale.^{1,3} Experience in working with patients with DOC increases reliable interpretation of results,³ but the use of the CRS-R by a range of health professionals is appropriate. Of the measures recommended by the American Congress of Rehabilitation DOC Task Force, the CRS-R was the only one recommended with minor reservations,⁵ and is the only measure that attends to all aspects of the Aspen Workgroup Criteria.⁷

A full review of the CRS-R and reviews of nearly 200 other instruments can be found at www.rehabmeasures.org.


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BIBLIOGRAPHY

1. Giacino JT, Kalmar K, Whyte J. The JFK Coma Recovery Scale-Revised: measurement characteristics and diagnostic utility. *Arch Phys Med Rehabil* 2004;85:2020-9.
2. Giacino JT, Kezgarsky MA, DeLuca J, Cicerone KD. Monitoring rate of recovery to predict outcome in minimally responsive patients. *Arch Phys Med Rehabil* 1991;72:897-901.
3. Lovstad M, Frøslie KF, Giacino JT, Skandsen T, Anke A, Schanke AK. Reliability and diagnostic characteristics of the JFK Coma Recovery Scale-Revised: exploring the influence of rater's level of experience. *J Head Trauma Rehabil* 2010;25:349-56.
4. Schnakers C, Vanhaudenhuyse A, Giacino J, et al. Diagnostic accuracy of the vegetative and minimally conscious state: clinical consensus versus standardized neurobehavioral assessment. *BMC Neurol* 2009;9:35.
5. Seel RT, for the American Congress of Rehabilitation Medicine, Brain Injury—Interdisciplinary Special Interest Group, Disorders of Consciousness Task Force. Assessment scales for disorders of consciousness: evidence-based recommendations for clinical practice and research. *Arch Phys Med Rehabil* 2010;91:1795-813.
6. Schnakers C, Majerus S, Giacino J, et al. A French validation study of the Coma Recovery Scale-Revised (CRS-R). *Brain Inj* 2008;22:786-92.
7. Giacino J, Whyte J. The vegetative and minimally conscious states: current knowledge and remaining questions. *J Head Trauma Rehabil* 2005;20:30-50.

This instrument summary is designed to facilitate the selection of outcome measures by trained clinicians. The information contained in this summary represents a sample of the peer-reviewed research available at the time of this summary's publication. The information contained in this summary does not constitute an endorsement of this instrument for clinical practice. The views expressed are those of the summary authors and do not represent those of authors' employers, instrument owner(s), the Archives of Physical Medicine and Rehabilitation, the Rehabilitation Measures Database, the United States Department of Education, or the Retirement Research Foundation. The information contained in this summary has not been reviewed externally.

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	Measure Name:	Acronym:	Summary Author:																
	Coma Recovery Scale-Revised	CRS-R	Donnelly E, McCulloch K																
Population Reviewed:	Admin Time:	Items:	Score:	Training:															
ABI; others reviewed at www.rehabmeasures.org	25 minutes	23	0/23 (min / max)	None required															
Purpose and Administration Instructions:																			
<ul style="list-style-type: none"> To assist with differential diagnosis, prognostic assessment, and treatment planning in patients with DOC 																			
Required Equipment:																			
Instruction manual, scoring sheet, 2 common objects (cup, comb, etc.), an object that produces a loud noise, ADL objects (toothbrush, phone, etc.), hand mirror, brightly colored object, baseball sized ball, pencil, tongue depressor																			
Validity:		Reliability:																	
<ul style="list-style-type: none"> Criterion Validity: <ul style="list-style-type: none"> Excellent concurrent validity with original CRS and DRS^{1,2} Adequate concurrent validity with GCS⁴ Construct Validity: The use of the CRS-R standardizes assessment and identifies misclassified patients who have greater levels of consciousness than recognized by medical consensus² 		<ul style="list-style-type: none"> Test-Retest Reliability: <ul style="list-style-type: none"> Excellent for total scores and visual, motor, and communication subscales¹ Adequate for auditory subscale¹ Poor for oromotor subscale¹ Interrater Reliability: <ul style="list-style-type: none"> Excellent for total score and auditory, motor, oromotor, and communication subscales¹ Adequate for visual subscale¹ Internal Consistency: <ul style="list-style-type: none"> Excellent for total score¹ 																	
Scoring:																			
<ul style="list-style-type: none"> Scoring is standardized and based on the presence or absence of operationally-defined behavioral responses to specific sensory stimuli The lowest item on each subscale represents reflexive activity while the highest items represent cognitively-mediated behaviors A lower score indicates decreased consciousness; a higher score indicates increased consciousness 																			
Considerations:		Abbreviations:																	
<ul style="list-style-type: none"> Ratings performed by the same rater were slightly more stable than those performed by different raters⁵ Extended or repeat assessment with a DOC scale is likely to improve diagnostic accuracy⁵ Clinicians should have training and experience with the DOC population to facilitate diagnostic accuracy when using a DOC scale³ The use of CRS-R may identify patients in MCS who were previously thought to be vegetative as well as patients who have emerged from MCS where consensus medical diagnosis may miss these changes² 		ABI: Acquired Brain Injury ADL: Activities of Daily Living CRS: Coma Recovery Scale DOC: Disorder of Consciousness DRS: Disability Rating Scale GCS: Glasgow Coma Scale MCS: Minimally Conscious State																	
		<table border="1"> <thead> <tr> <th colspan="3">Cut-off Criteria:</th> </tr> <tr> <th></th> <th><i>r</i></th> <th>ICC</th> </tr> </thead> <tbody> <tr> <td>Excellent</td> <td>≥ 0.6</td> <td>≥ 0.75</td> </tr> <tr> <td>Adequate</td> <td>0.31-0.59</td> <td>0.40-0.74</td> </tr> <tr> <td>Poor</td> <td>≤ 0.3</td> <td>< 0.4</td> </tr> </tbody> </table>			Cut-off Criteria:				<i>r</i>	ICC	Excellent	≥ 0.6	≥ 0.75	Adequate	0.31-0.59	0.40-0.74	Poor	≤ 0.3	< 0.4
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