

The CNS Vital Signs Neurocognitive Testing Report

...is auto-scored from computerized versions of **VENERABLE NEUROPSYCHOLOGICAL TESTS**. The results measures the **MILLISECOND PRECISE SPEED** and **ACCURACY** of a patient's response. **TOTAL TESTING TIME** depends on the number of tests and rating instruments selected.

CNS Vital Signs Report					Test Date: March 28, 2015 11:20:03				
Patient ID: PatientExample					Administrator: Technician				
Age: 50					Language: English (United States)				
Total Test Time: 34:07 (min:secs)			CNSVS Duration: 26:16 (min:secs)			Version 4.0.86			
Patient Profile:	Percentile Rank	2	1	> 74	25 - 74	9 - 24	2 - 8	< 2	
	Standard Score	> 109	90 - 109	80 - 89	70 - 79	< 70			
Domain Scores	Subject Score	Standard Score	Percentile	VI**	Above	Average	Low Average	Low	Very Low
Neurocognition Index (NCI)	NA	78	7	Yes				X	
Composite Memory	94	93	32	Yes		X			
Verbal Memory	52	99	47	Yes		X			
Visual Memory	42	90	25	Yes		X			
Psychomotor Speed	127	69	2	Yes					X
Reaction Time*	751	87	19	Yes	3		X		
Complex Attention*	16	70	2	Yes		X		X	
Cognitive Flexibility	22	70	2	Yes				X	
Processing Speed	29	64	1	Yes					X
Executive Function	28	77	6	Yes				X	
Simple Visual Attention	40	107	68	Yes		X			
Motor Speed	98	84	14	Yes			X		
Domain Dashboard: Above average domain scores indicate a standard score (SS) greater than 109 or a Percentile Rank (PR) greater than 74, indicating a high functioning test subject. Average is a SS 90-109 or PR 25-74, indicating normal function. Low Average is a SS 80-89 or PR 9-24 indicating a slight deficit or impairment. Below Average is a SS 70-79 or PR 2-8, indicating a moderate level of deficit or impairment. Very Low is a SS less than 70 or a PR less than 2, indicating a deficit and impairment. Reaction times are in milliseconds. An * denotes that "lower is better", otherwise higher scores are better. Subject Scores are raw scores calculations generated from data values of the individual subtests.									
VI** - Validity Indicator: Denotes a guideline for representing the possibility of an invalid test or domain score. "No" means a clinician should evaluate whether or not the test subject understood the test, put forth their best effort, or has a clinical condition requiring further evaluation.									
Verbal Memory Test (VBM)				Score	Standard	Percentile			
Correct Hits - Immediate				13	104	61	The VBM test measures how well a subject can recognize, remember, and retrieve words e.g. exploit or attend literal representations or attribute. Subjects have to remember 15 words and recognize them in a field of 15 distractors. There are two parts to this test, Immediate and Delayed. The delayed part is presented at the end of the battery. "Correct Hits" refers to the number of target words recognized. Low scores indicate verbal memory impairment.		
Correct Passes - Immediate				14	96	40			
Correct Hits - Delay				9	93	32			
Correct Passes - Delay				15	110	75			
Visual Memory Test (VIM)				Score	Standard	Percentile			
Correct Hits - Immediate				12	101	53	The VIM test measures how well a subject can recognize, remember, and retrieve geometric figures e.g. exploit or attend symbolic or spatial representations. Subjects have to remember 15 geometric figures, and recognize them in a field of 15 distractors. There are two parts to this test, Immediate and Delayed. The delayed part is presented at the end of the battery. "Correct Hits" refers to the number of target figures recognized. Low scores indicate visual memory impairment.		
Correct Passes - Immediate				11	98	45			
Correct Hits - Delay				9	86	18			
Correct Passes - Delay				10	95	37			
Finger Tapping Test (FTT)				Score	Standard	Percentile			
Right Taps Average				50	86	18	The FTT is test of motor speed and fine motor control ability. There are three rounds of tapping with each hand. The FTT test measures the speed and the number of finger-taps with each hand. Low scores indicate motor slowing. Speed of manual motor activity varies with handedness. Most people are faster with their preferred hand but not always.		
Left Taps Average				48	85	16			
Symbol Digit Coding (SDC)				Score	Standard	Percentile			
Correct Responses				29	64	1	The SDC test measures speed of processing and draws upon several cognitive processes simultaneously, such as visual scanning, visual perception, visual memory, and motor functions. Errors may be due to impulsive responding, misperception, or confusion.		
Errors*				0	110	75			
Stroop Test (ST)				Score	Standard	Percentile			
Simple Reaction Time*				231	102	55	The ST measures reaction times, inhibition / disinhibition, mental flexibility or directed attention. The ST is a classic test of impulsivity and inhibitor control. Prolonged reaction times indicate cognitive slowing / impairment. Errors may be due to impulsive responding, misperception, or confusion.		
Complex Reaction Time Correct*				542	91	27			
Stroop Reaction Time Correct*				568	87	19			
Stroop Commission Errors*				6	33	1			
Shifting Attention Test (SAT)				Score	Standard	Percentile			
Correct Responses				38	77	6	The SAT measures executive function or how well a subject reacts to set shifting (mental flexibility) and manages multiple tasks simultaneously. Subjects have to adjust their responses to randomly changing rules. The best scores are high correct responses, few errors and a short reaction time. Normal subjects may be slow but accurate, or fast but not so accurate. Attention deficit may be apparent.		
Errors*				10	84	14			
Correct Reaction Time*				1360	77	6			
Continuous Performance Test (CPT)				Score	Standard	Percentile			
Correct Responses				40	103	58	The CPT measures sustained attention or vigilance and choice reaction time. Most normal subjects obtain near-perfect scores on this test. A long response time may suggest cognitive slowing and/or impairment. More than 2 errors (total) may be clinically significant. More than 4 errors (total) indicate attentional dysfunction.		
Omission Errors*				0	103	58			
Commission Errors*				0	107	68			
Choice Reaction Time Correct*				491	83	13			

CNS Vital Signs neurocognitive testing is a non-invasive, reimbursable clinical procedure to efficiently and objectively assess a broad-spectrum of brain function domain performances under challenge. Testing enables the measuring of important clinical symptoms, behaviors, and comorbidities salient to the evaluation and ongoing management of many neurological, psychiatric and other conditions. The colorful auto-scored reports are designed to present and share with patients and families. Computerized testing and serial evaluation of neurocognition provide a basis for patient and family feedback and can help patients and caregivers navigate problems related to daily living, school or vocational work environment.

The CNS VS reports are logical and intuitive making the interpretation by a qualified health professional relatively straightforward. CNS Vital Signs measures the severity of impairment based on a large lifespan age-matched normative comparison from ages **8 to 89**. Other clinical views such as testing validity, brain domain pattern and a longitudinal view are all auto-scored in seconds following testing. Standardized evaluation of neurocognitive and behavioural issues provides a systematic and efficient method of collecting valid and reliable clinical measures currently recommended by most neuro-psych guidelines.. The results are presented in a **DOMAIN DASHBOARD** and **DETAILED TEST** report format immediately following the brief testing session.

1

Evaluate Validity: The Validity Indicator (VI) helps identify the possibility of an invalid test.

Embedded measures helps evaluate whether the patient is manipulating testing performance for a secondary gain or they simply did not read the test instructions. Examples of secondary gain include: drug or disability seeking, academic accommodation, malingering, symptom feigning, etc.

2

Evaluate Severity: The scores help identify cognitive deficits and their level of impairment.

Assess even slight cognitive impairment (millisecond precision) providing immediate clinical insight into a patient’s cognitive deficits and level of impairment. This gives patients, family members and caregivers knowledge of cognitive domains that underpin the ability to conduct activities of daily living.

3

Evaluate Pattern: Impairment pattern helps identify pathologies and possible comorbidities.

The CNS VS cognitive pattern profiles (interpretation guide) may assist clinicians in the evaluation of neurological, psychiatric, and developmental disorders. CNS Vital Signs cognitive testing procedure provides valid and reliable clinical endpoints to help in the evaluation and management of patients.

4

Evaluate Longitudinally: Track disease progression, outcomes, or treatment effects.

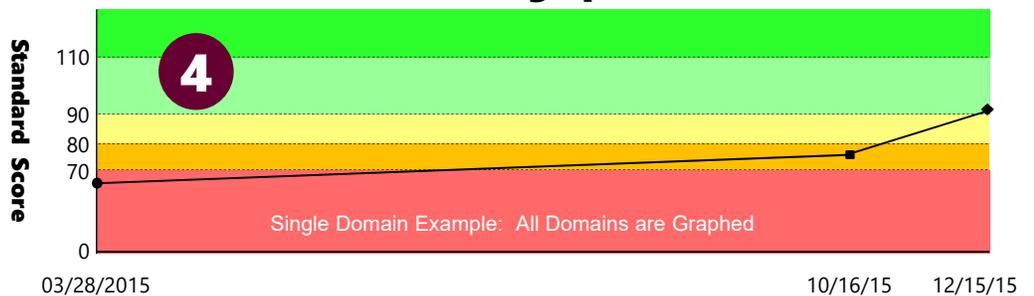
Establish a baseline and serially assess cognitive clinical endpoints to aid in the monitoring and management of many clinical conditions and treatments e.g., measure the response to disease and treatment like MCI, MS, AD/HD & stimulants, rehabilitation efforts, and used to measure outcomes.

One Key Difference - Measuring Cognitive Speed...

“CNS Vital Signs is sensitive in detecting cognitive impairment ...uses computerized forms of traditional tests such as Symbol Digit Modalities and Stroop ...are easy to use, require significantly less time to administer, produce instant scoring and can incorporate alternate forms, necessary to minimize learning effect on follow-up. ...also the capacity to accurately-automatically quantify

“speed factor” via multiple parameters such as reaction time, psychomotor speed, and processing speed, increasing their sensitivity in detecting even subtle changes in information processing speed.” **

Easily Graph Longitudinal Results Processing Speed



** Cognitive Impairment in Relapsing Remitting and Secondary Progressive Multiple Sclerosis Patients: Efficacy of a Computerized Cognitive Screening Battery; ISRN Neurology, 2014 Mar 13



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