Why CNS Vital Signs in Substance Abuse?

Benefits for Substance Use Disorder Clinics

Elements of a Comprehensive Patient Assessment:
Mental Status: *Cognition* (e.g., attentional capacity, memory), Mood, Suicidal ideation and behavior, Medication focused, Somatic preoccupation *Co-Occurring Conditions* and Disorders: Psychological conditions (e.g., depression, anxiety, post-traumatic stress disorder [PTSD], Medical conditions, *Cognitive impairments*; Function: Activities of daily living/ability to care for oneself, Sleep, Mood, Sex . Heavy drinking can cause psychiatric symptoms such as *depression, anxiety, insomnia, cognitive dysfunction...*

Substance Abuse and Mental Health Services Administration (SAMHSA)

Treating Substance Use Disorders: A Quick Reference Guide...
Address factors that may be more likely to influence treatment adherence in individuals with *co-occurring disorders* (e.g., concern about medication interactions, *cognitive impairment*, *limited motivation*, lack of peer and social support).
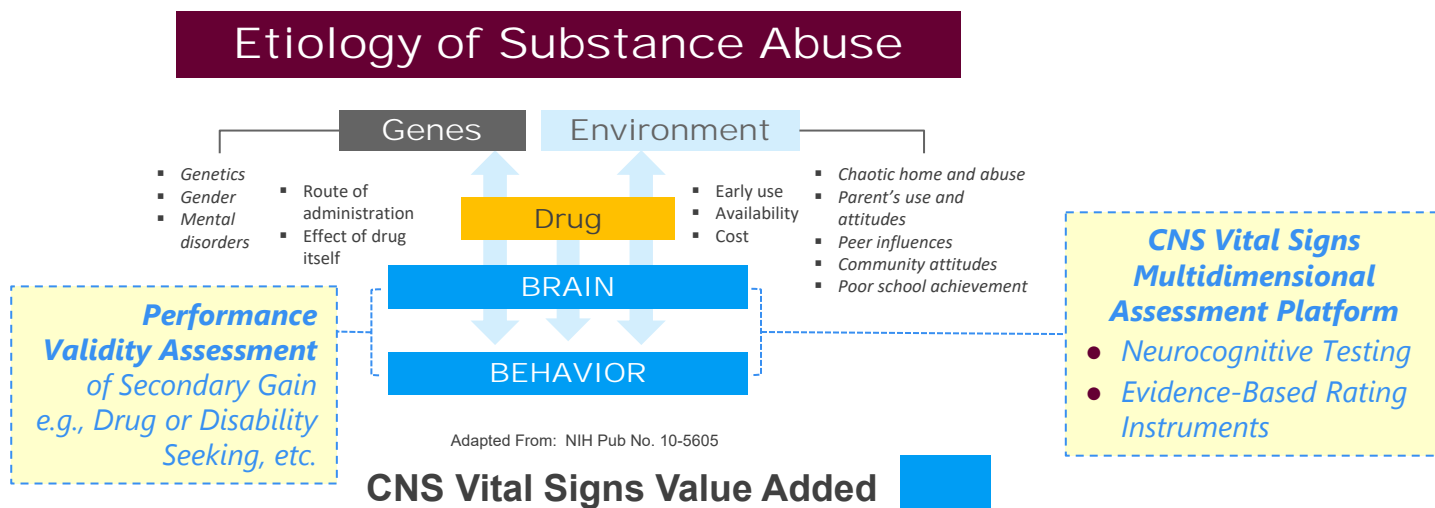
American Psychiatric Association (APA)

Assessment and Management of Cognitive Impairment in Substance Abuse
"Assessment is the beginning of the therapeutic process. A *comprehensive biopsychosocial assessment* covers physical, *cognitive, behavioral, emotional*, and environmental domains. The guidelines do not exclusively endorse the use of any particular instrument as the basis for a comprehensive assessment."

VA/DoD Clinical Practice Guideline For Management of Substance Use Disorders

CNS Vital Signs Tools:

Etiology of Substance Abuse

Genes **Environment**

- Genetics
- Gender
- Mental disorders
- Route of administration
- Effect of drug itself

Drug

- Early use
- Availability
- Cost

- Chaotic home and abuse
- Parent's use and attitudes
- Peer influences
- Community attitudes
- Poor school achievement

BRAIN

BEHAVIOR

Performance Validity Assessment of Secondary Gain e.g., Drug or Disability Seeking, etc.

CNS Vital Signs Multidimensional Assessment Platform
- *Neurocognitive Testing*
- *Evidence-Based Rating Instruments*

Adapted From: NIH Pub No. 10-5605

CNS Vital Signs Value Added

Custom Configure Test Panels to Meet the Needs of your Practice... Enabling Systematic Documentation of Clinical, Quality and Outcomes Measures.

How can CNS Vital Signs Help?

(1) Automating the Rapid, Systematic, and Standardized collection of CLINICAL AND QUALITY 'SUD' Substance Use Disorder measures; and (2) providing the Addiction and Substance Abuse Professionals with a hospital and clinic-based solution to measure and monitor cognition and psychosocial or mental health symptoms, behaviors and comorbidities.

Measuring & Monitoring Cognition is a Key & Important Component

CNS Vital Signs computerized neurocognitive testing system is an objective, valid and reliable instrument used in the evaluation and management of patients with SUD Substance Use Disorder. *Clinicians and researchers have found CNS Vital Signs sensitive in assessing cognitive function following the use of illicit and abused substances e.g., marijuana, alcohol, benzodiazepines, etc.*

Tools to Measure Cognition

CNS Vital Signs computerized neurocognitive testing allows clinicians to **assess cognition** by comparing patients to a 'PEER REVIEWED' normative data set across the lifespan from **ages 8 to 89** e.g., level of impairment. Certain DOMAIN Scores can be informative in confirming possible clinical condition(s) e.g., frontal lobe tests for AD/HD, and helping provide insight on possible cognitive issues and barriers a therapist may encounter as they treat the patient.

Just a few BENEFITS:

- **Objective Performance Based Neurocognitive Tests** – 10 Neurocognitive Tests and over 50 Rating Instruments
- **Helps Assess Drug Seeking, Feigning, Malingering, etc. -** Embedded Performance Validity Indicators for each test
- **Efficient** - Rapid Assessment and Immediate Auto-Scored Reports, Systematic & Standardized Auditable Logs and Documentation
- **Easy to Interpret Reports** - Generates a Cognitive Domain Dashboard (see example in following pages)
- **Optimized for Continuum of Care** - Easy to Longitudinally Graph and Export to Excel for Outcomes Evaluation
- **Telemedicine Enabled** – Remote Testing and Follow-up
- **Secure** – Encrypted 21CFR 11 & HIPAA Compliant

Tools to Measure Comorbidities, Symptoms, Behaviors

CNS Vital Signs assessment platform also contains over 50 well-known patient and informant rating instruments.

Easily Custom Configure a Solution

The CNS VS advanced assessment platform integrates multiple testing platforms and applications e.g., Web, Local Software that can be used on standard hardware e.g., Laptops, Desktop computers and Tablets (rating instruments). All these tools can be custom configured to a practices needs. Currently used by over 12K Clinicians and Researchers in 52 countries.

Compromised Cognitive Function in Addiction...

- **Cocaine**: deficits in cognitive flexibility (Kelley et al., 2005);
- **Amphetamine**: deficits in attention and impulse control (Dalley et al., 2005);
- **Opioids**: deficits in cognitive flexibility (Lyvers and Yakimoff, 2003);
- **Alcohol**: deficits in working memory and attention (Moriyama et al., 2006);
- **Cannabis**: deficits in cognitive flexibility and attention (Pope, Gruber, and Yurgelun-Todd, 2001)
- **Nicotine**: deficits in working memory and declarative learning (Kenney and Gould, 2008).

Source: Thomas J. Gould, PhD; Addiction Science & Clinical Practice; December 2010; Vol. 5 No. 2; DHHS - NIH

Evidence-Based Rating Instrument Examples

SBIRT Assessments:

- **AUDIT** - Alcohol Use Disorders Identification Test and
- **DAST** - Drug Use Questionnaire

50+ Rating Instruments Available:

- **SF – 36** Medical Outcomes
- **PHQ-9, Zung** Anxiety and Depression
- **Pain Catastrophizing**
- **The PTSD Checklist** (PCL-5)
- **Adult and Vanderbilt** AD/HD Scales
- **Epworth Sleepiness & Pittsburgh Sleep Quality Index**

CNS Vital Signs is Sensitive to Drug Effects

Medications and drugs with central nervous system (CNS) effects are widely prescribed and used. Their mechanism of actions, often poses particular risks including addiction, sedation, balance instability, slowed reaction times, etc. Neurocognitive testing can add value to the evaluation and management of patients through their assessment value in determining individual differences in drug response. Additional example of CNS Vital Signs capability in measuring drug and medication effect can be found in the Publications section at www.CNSVS.com.

Cannabis Example:

Measure Treatment Outcomes

Roten, Baker, Gray; Addictive Behaviors 45 (2015) 119–123

Cognitive performance in a placebo-controlled pharmacotherapy trial for youth with marijuana dependence

- Cognitive performance was measured using CNS Vital Signs®.
- Abstinence was significantly associated with increased composite memory scores.
- Abstinence was significantly associated with increased verbal memory scores.
- Abstinence was significantly associated with modest increase in psychomotor speed.
- No significant differences in cognitive performance between placebo and control.

Conclusions: These findings suggest that some domains of cognitive performance improve significantly even in the early stages of treatment-associated abstinence.

Lorazepam Example:

Benzodiazepines

Acute Lorazepam Effects on Neurocognitive Performance

"These data demonstrate a strong LOR effect on computerized cognitive performance, with effect sizes comparable to our previous study using traditional measures of neuropsychological function... In conclusion, this study demonstrates comparable sensitivity of CNS Vital Signs to traditional neuropsychological testing after acute administration of LOR (2 mg orally) that occurs largely independent of plasma concentrations for the range of levels ..."
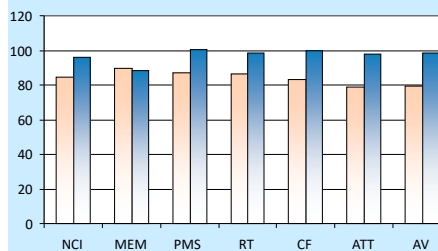
AD/HD Stimulant Example:
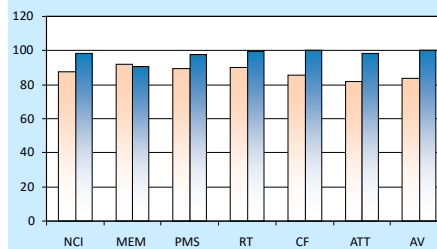
PRE
POST

ADD PATIENTS ON NO MEDICATIONS
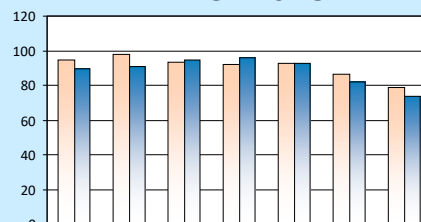
PRE & POST ADL 0.15 MG/KG

...absence of a learning curve (after 2 administrations)

PRE & POST MPH 0.15 MG/KG

NCI MEM PMS RT CF ATT AV

PRE & POST MPH 0.30 MG/KG

NCI MEM PMS RT CF ATT AV

...sensitivity to drug effects

Ketamine Example:

The main aims of this study were: (i) to assess the effect of low-dose ketamine on pain responses and cognition during and following a 2-h infusion; and (ii) to get an estimate of the contribution of norketamine to ketamine effect In healthy subjects.

······●······ S-ketamine after placebo

━━■━━ S-ketamine after rifampicin

- - ■ - - Placebo after rifampicin or placebo

NCI-Neurocognitive Index
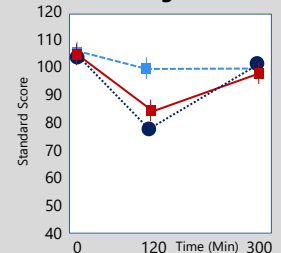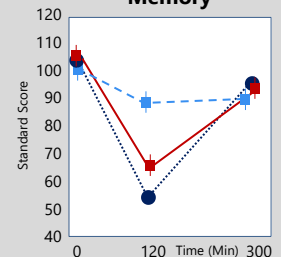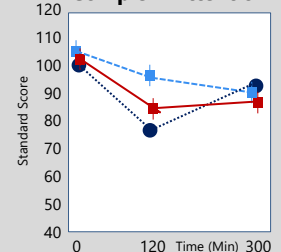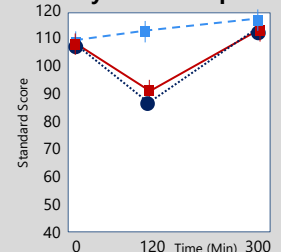
Standard Score
Time (Min)

Memory

Standard Score
Time (Min)

Complex Attention

Standard Score
Time (Min)

Psychomotor Speed

Standard Score
Time (Min)

CNS Vital Signs is Sensitive to Drug Effects

Cannabis Example: The relationship between urine cannabinoid concentration and choice reaction time in chronic marijuana users. Participants with higher urine cannabinoid concentrations had slower reaction times. This finding suggests tests that precisely measured reaction times may identify subtle levels of marijuana-related impairment not observable using routine methods.
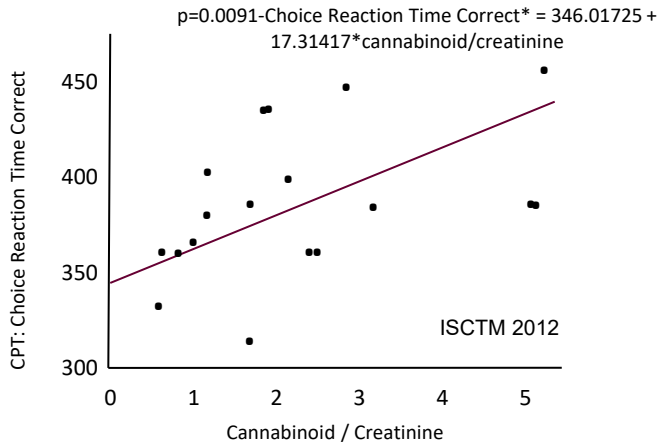
Alcohol Example: Recovery to Neurocognitive Baseline After Acute Ethanol Intoxication

p=0.0091-Choice Reaction Time Correct* = 346.01725 + 17.31417*cannabinoid/creatinine

ISCTM 2012

ISCTM 2012
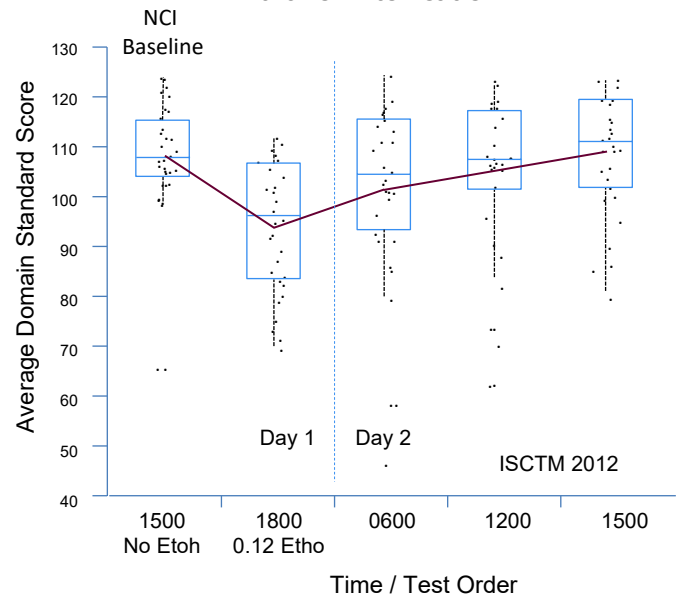
Addiction Clinical Use: Helping Practices and Patients

CNS Vital Signs contains a set of tools that enables an Addiction, Substance Abuse and Pain practices to simplify and efficiently implement clinical guidelines and quality measure protocols (ACA) in an easy-to-use computerized assessment platform. CNS Vital Signs assessment platform enables clinicians to efficiently collect objective, valid and reliable **BRAIN** (cognitive stimulus response tests) and **BEHAVIORAL** clinical and quality measures e.g., MIPS with evidence-based medical, psychological, and outcome rating scales.

1. Screen for Opioid Issues – AUDIT & DAST Scales.
2. EXPEDITE and STANDARDIZE Psychosocial Evaluations.
3. Add an OBJECTIVE and STANDARDIZED view into a patient's neurocognitive status and assisting in the EVALUATION and MANAGEMENT of pain and substance use disorders.
4. Help evaluate the possibility of manipulating a secondary gain e.g., academic accommodation, drug or disability seeking, malingering, symptom feigning etc. with embedded cognitive performance validity indicators.
5. Aiding in the MONITORING and MANAGEMENT of clinical conditions or disease progression by establishing a neurocognitive baseline for each patient to use in later treatment decisions and to help patients and families understand the neurocognitive status and progress of the patient.
6. Objectively measuring the response to treatments and helping to OPTIMALLY MANAGE MEDICATION.
7. Efficiently and quickly identifying and tracking possible symptoms, behaviors, and possible comorbidities and collecting important clinical and quality data e.g., MIPS.
8. Helping identify cognitive domains needing additional investigations or full neuropsychological evaluations.

The use of the CNS Vital Signs platform can also benefit the practices bottom line.
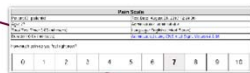
HOW? Using CNS Vital Signs in my Practice...

Efficient Psychosocial Evaluations and Care Management

1 Efficient In-Clinic & Telehealth Testing

Assessment & Interpretation

Pain Catastrophizing Scale

Numeric Pain Scale

Neurocognitive Test

Technician Administered Testing

SF-36 QOL

DASS - Depression, Anxiety, Stress

Sleep

SBIRT
AUDIT & DAST

Custom configure test panels (cognitive tests and rating instruments) to optimize your clinical and quality care activities.

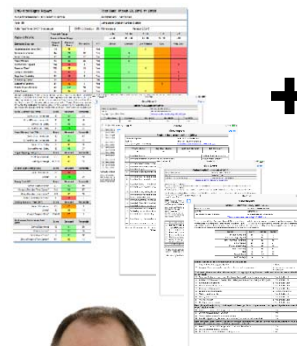### 2 Report Integration

Integrated Psychosocial Assessment Report

Other Clinical Data e.g., MRI, Labs, Genetic Testing, Conventional psych testing, etc.

+

PDF

Add Test AND Psychosocial Report(s) into EMR

3 Longitudinal Testing

Patient Retention and Outcomes

Serial Assessment
To track treatment, disease progression and/or outcomes.

Many neurological and psychiatric practice guidelines recommend serial testing, evaluation and management of clinical conditions.

"Serial evaluation of neurocognition can help patients and caregivers navigate problems related to their daily life and their work environment. When carried out reliably, such evaluation can detect cognitive decline and serve as a guide to disease progression and treatment failure." **

Widely Reimbursed... Well Established Billing Codes

See Reimbursement Info at CNSVS.com or a full Reimbursement Guide in your account.

For more information refer to the CNS Vital Signs Reimbursement guide at CNSVS.com or schedule a webinar by emailing support@cnsvs.com.

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

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 Range ②	①			> 74	25 - 74	9 - 24	2 - 8	< 2
	Standard Score Range				> 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	③			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			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 clinical procedure to efficiently and objectively assess a broad spectrum of brain function performance under challenge (cognition stress test) and enable the measuring of important clinical symptoms, behaviors, and comorbidities. The colorful auto-scored reports are designed to present and share with patients and families. The results are presented in a **DOMAIN DASHBOARD** and **DETAILED TEST** report immediately following the brief testing session.

1 **Evaluate Valid Effort:** **The Validity Indicator (VI) identify an invalid test or effort.**
Helps evaluate the possibility of manipulating a secondary gain e.g., academic accommodation, drug or disability seeking, malingering, symptom feigning etc. with embedded cognitive performance validity indicators. Helps validate effort and identify patient testing issues e.g., understand directions?

2 **Evaluate Severity:** **Are the scores suggestive of a deficit or evaluate level of impairment?**
Assess even slight cognitive impairment (millisecond precision) providing immediate clinical insight into a patient's current status 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:** **Is the pattern suggestive of a condition or pathology?**
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 MS, AD/HD & stimulants, rehabilitation efforts, and used to measure clinical outcomes.

The CNS VS reports are logical and intuitive making the reports interpretation by a qualified health professional relatively straightforward. CNS Vital Signs has taken a LIFESPAN approach collecting a large neurocognitive normative reference group from **ages 8 to 89**. The normative comparison helps clinicians grade the level of neurocognitive impairment that can help rule-in or rule-out certain clinical conditions and/or determine the level of impairment.

Easily Graph Longitudinal Results

Processing Speed

Single Domain Example
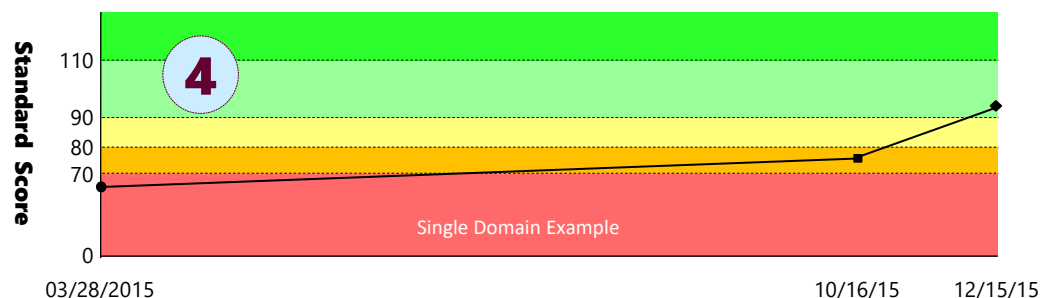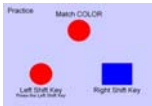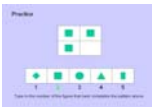
The Difference... "CNS Vital Signs is sensitive in detecting cognitive impairment ...uses computerized forms of traditional tests such as Symbol Digit Modalities and Stroop ...are easy to use, require significantly less time to administer, produce instant scoring and can incorporate alternate forms, 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 ."* **

Normed Neurocognitive Tests

Test		Measures	Description
Verbal Memory (VBM) *Approx. 3 Minutes*	joker Remember this word	■ Learning Words ■ Memory for Words ■ Word Recognition ■ Immediate and Delayed Recall	VBM measures recognition memory for WORDS. Fifteen words are presented, one by one, on the screen every two seconds. For immediate recognition (learning phase), the participant must identify those words nested among fifteen new words. Then, after six more tests, there is a delayed recognition memory trial. ***Subjects respond using the SPACE BAR.***
Visual Memory (VIM) *Approx. 3 Minutes*	⊡ Press the Space Bar if you were asked to remember this image	■ Learning Shapes ■ Memory for Shapes ■ Shapes Recognition ■ Immediate and Delayed Recall	VIM measures recognition memory for ABSTRACT FIGURES or SHAPES. Fifteen geometric figures are presented, one by one, on the screen. For immediate recognition (learning phase), the participant must identify those figures nested among fifteen new figures. Then, after five more tests, there is a delayed recognition memory trial. ***Subjects respond using the SPACE BAR.***
Finger Tapping (FTT) *Approx. 2 Minutes*	PRACTICE 4 Tap until you see stop	■ Motor Speed ■ Fine Motor Control	FTT test has ***subjects respond by pressing the SPACE BAR*** with their right index finger as many times as they can in 10 seconds. They do this once for practice, and then there are three test trials. The test is repeated with the left hand.
Symbol Digit Coding (SDC) *Approx. 4 Minutes*	PRACTICE ANSWER KEY GRID 2 3 4 5 6 7 8 9 TEST GRID Type in the numbers from the ANSWER KEY GRID into the blank spaces in the TEST GRID. The current response is highlighted in the ANSWER KEY GRID	■ Complex Information Processing Accuracy ■ Complex Attention ■ Visual-Perceptual Speed ■ Information Processing Speed	SDC test consists of serial presentations of screens, each of which contains a bank of eight symbols above and eight empty boxes below. ***The participant types in the number on the NUMBER ROW that corresponds to the symbol that is highlighted.*** Only the digits from 2 through 9 are used; this is to avoid the confusion between "1" and "I" on the keyboard. ***The computer program does not allow a person to use a numerical pad*** preventing a distinct advantage for those who are skilled at using the numerical pad or for those that are right- versus left-handed.
Stroop Test (ST) *Approx. 4 - 5 Minutes*	PRACTICE Blue Press the Space Bar only when the COLOR of the word MATCHES the NAME of the word.	■ Simple Reaction Time ■ Complex Reaction Time ■ Stroop Reaction Time ■ Inhibition / Disinhibition ■ Frontal or Executive Skills	Stroop test has three parts. In the first part, the words RED, YELLOW, BLUE, and GREEN (printed in black) appear at random on the screen, and the participant presses the space bar as soon as the test subject sees the word. In the second part, the words RED, YELLOW, BLUE, and GREEN appear on the screen, printed in color. The participant is asked to press the space bar when the color of the word matches what the word says. In the third part, the words RED, YELLOW, BLUE, and GREEN appear on the screen, printed in color. ***The participant is asked to press the SPACE BAR*** when the color of the word does not match what the word says.
Shifting Attention (SAT) *Approx. 2.5 Minutes*	Practice Match COLOR ● ● ■ Left Shift Key Right Shift Key	■ Executive Function ■ Shifting Sets: Rules, Categories, & Rapid Decision Making ■ Reaction Time	SAT test is a measure of ability to shift from one instruction set to another quickly and accurately. Participants are instructed to match geometric objects either by shape or by color. Three figures appear on the screen, one on top and two on the bottom. The top figure is either a square or a circle. The bottom figures are a square and a circle. The figures are either red or blue (mixed randomly). The participant is asked to match one of the bottom figures to the top figure. The rules change at random (i.e., match the figures by shape, for another, by color) and ***subject responds by pressing the two SHIFT KEYS.***
Continuous Performance (CPT) *Approx. 5 Minutes*	**B**	■ Sustained Attention ■ Choice Reaction Time ■ Impulsivity	CPT test is a measure of vigilance or sustained attention or attention over time. The test subject is asked to respond to the target stimulus "B" but not to any other letter. The stimuli are presented at random. ***Subject responds by pressing the SPACE BAR.***
Perception of Emotions (POET) *Approx. 2 Minutes*	ANGRY	■ Social Cognition or Emotional Acuity ■ Choice Reaction Time	The POET measures how well a subject can perceive and identify specific emotions. "Social cognition" or "emotional acuity" has been defined as "the way in which people make sense of other people and themselves". It is the ability to perceive and understand social information. The reaction times in POET are much longer than in the other tests, indicating the complexity of central processes governing emotional acuity. ***Subjects respond using the SPACE BAR.***
Non-Verbal Reasoning (NVRT) *Approx. 3.5 Minutes*	Practice ■ ■ ■ ✦ ● ▲ ■ 1 2 3 4 5 Type in the number of the figure that best completes the pattern above	■ Reasoning ■ Reasoning Recognition Speed	The NVRT measures how well a subject can perceive and understand the meaning of visual or abstract information and recognizing relationships between visual-abstract concepts. The NVRT is comprised of 15 matrices, or visual analogies. The matrices are progressively more difficult. Non-verbal or visual-abstract reasoning is the process of perceiving issues and reaching conclusions using symbols or generalizations rather than concrete information. ***Subjects respond using the SPACE BAR.***
4-Part Continuous Performance (FPCPT) *Approx. 7 Minutes*	▲	■ Sustained Attention ■ Working Memory	The 4PCPT test is a four-part test that measures a subject's working memory and sustained attention. PART ONE - is a simple reaction time test, PART TWO - is a variant of the continuous performance test, the reaction times that are generated are "choice reaction times". PART THREE - is a "one back" CPT. The subject must respond to a figure only if the figure immediately preceding was the same. PART FOUR - is a "two-back" CPT. It is a difficult task and is used to measure working memory. Parts two, three, and four of the tests are used to calculate sustained attention domain. ***Subjects respond using the SPACE BAR.***

Physician Testimonial

"

We conducted a large research program in two of our residential treatment locations. We gave CNS Vital Signs at intake to provide a baseline measure of cognition and repeated the test prior to discharge. Patients were very impressed with both how poorly they functioned on admission and by how much they improved with sobriety. When they received a copy of both tests, they were both amazed with their progress in the program and motivated to maintain their sobriety.

As an addiction physician, I have found CNS Vital Signs to be an extremely valuable resource for our Treatment Program.

We have also found it very useful to distinguish the patients with Stimulant Use Disorder who truly had AD/HD and were "self-medicating" from those who had been misdiagnosed with AD/HD in the past and were just using amphetamines to get high."

Addiction Psychiatrist

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