



# **CNS Vital Signs Advancing Pain Care Management**

**Adding Value to Your Practice by Providing Solutions for Measuring,  
Monitoring and Managing Neurocognitive and Behavioral Health...**

**[www.CNSVS.com](http://www.CNSVS.com)**

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*The following pages have been assembled from various sources and publications and is meant to be a reference or roadmap guide to assist and inform how CNS Vital Signs can be used to improve clinical insight and care management, enable current guidelines, be integrated into a clinic or practice, and help improved practice revenues and performance.*



# Why CNS Vital Signs?

*CNS Vital Signs strives to provide clinicians a valid, reliable, and affordable, 'research quality' assessment platform. The CNS Vital Signs assessment platforms helps to support a practices comprehensive, state-of-the-art clinical assessment, and evidence-based treatment services for children, adolescents, and adults across the lifespan by:*

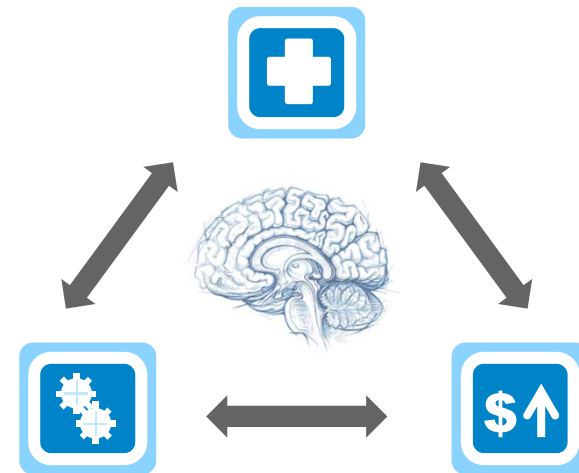
- Accurately measuring and characterizing a patient's neurocognitive function based on his or her status or effort
- Facilitating the thinking about the patient's condition (50+ well known medical and health rating scales) and helping to explain the patient's current difficulties
- Optimizing serial administration which helps to monitor and guide effective intervention and enables evidence-based medicine and outcomes

CNS Vital Signs offers multiple assessment platform options that can be easily configured and deployed depending on each practices goals and needs. *Systematically collect brain function, behavioral, symptom, and comorbidity data **enabling outcomes and evidence-based medicine.***



## Enhanced Brain & Behavior Evaluation and Care Management

*OBJECTIVE, PRECISE, and STANDARDIZED... Customizable Toolboxes or Test Panels Supporting many Neurological, Psychiatric, & Psychological Clinical Guidelines*



### Extend Practice Efficiency

*Objective and Evidence-Based Assessments, Auto-Scored and Systematically Documented.*

*(HIPAA Enabled)*

### Enhanced Revenue Streams

*Expanded Services with Well Established Billing Codes to Improve Practice Performance*



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# About Chronic Pain

- 80% of all physician visits are for the complaint of pain  
Gatchell & Turk 1996
- The most expensive 20% of the population accounts for 88% of all healthcare costs  
Ashe 2001
- **Neurocognitive** difficulties are often reported by chronic pain patients  
Hart, Martelli, & Zasler, 2000
- *Chronic high dose opioids can produce significant sedating and **neurocognitive** effects.*  
Vainio 1995, Fishbain 2002

## What are Secondary Conditions?

*"Those physical, medical, **cognitive**, emotional, or psychosocial consequences to which persons with disabilities are more susceptible by virtue of an underlying condition, including adverse outcomes in health, wellness, participation, and quality of life"*  
Hough, 1999



# Chronic Pain = Chronic Illness Paradigm

*Is it a Symptom... or is it a Disease... it is Complex*

## **NEUROCOGNITION:**

Memory,  
Processing Speed,  
Attention,  
Cognitive Flexibility,  
Executive Control, etc.

## **CONTEXT:**

Beliefs,  
Expectations,  
Placebo, etc.

## **INJURY:**

Peripheral,  
Central  
Sensitization



## **PSYCH:**

Catastrophizing,  
Depression,  
Anxiety, etc.

## **STRUCTURAL- BIOCHEMICAL:**

Dopaminergic -  
Opioidergic  
Dysfunction,  
Atrophy

## **GENETICS**

Adapted from: Irene Tracey. Imaging pain. British Journal of Anaesthesia 101 (1): 32-9 (2008)



# Pain and Negative Outcomes

## ■ Pain is associated with:

- depressive symptoms
- functional limitations
- unemployment rate
- frequent use of opioid analgesics
- frequent pain-related doctor visits
- worse self-rated health

Von Korff M. Grading the severity of chronic pain. *Pain* 1992; 50:133-149

## ■ Depression is associated with

- ↑ pain complaints and intensity
- ↑ disability
- ↑ functional limitations
- ↑ utilization (office visits, hospitalizations)
- ↑ costs
- ↑ risk of nonrecovery

Bair MJ, et al. *Arch Intern Med*. 2003;163(20):2433-2445



# Chronic Pain Care Management Approach

## GOALS -

**PRIMARY: Alleviating Pain**

**SECONDARY: Restoring Function**

**Intake**

↓ Measure

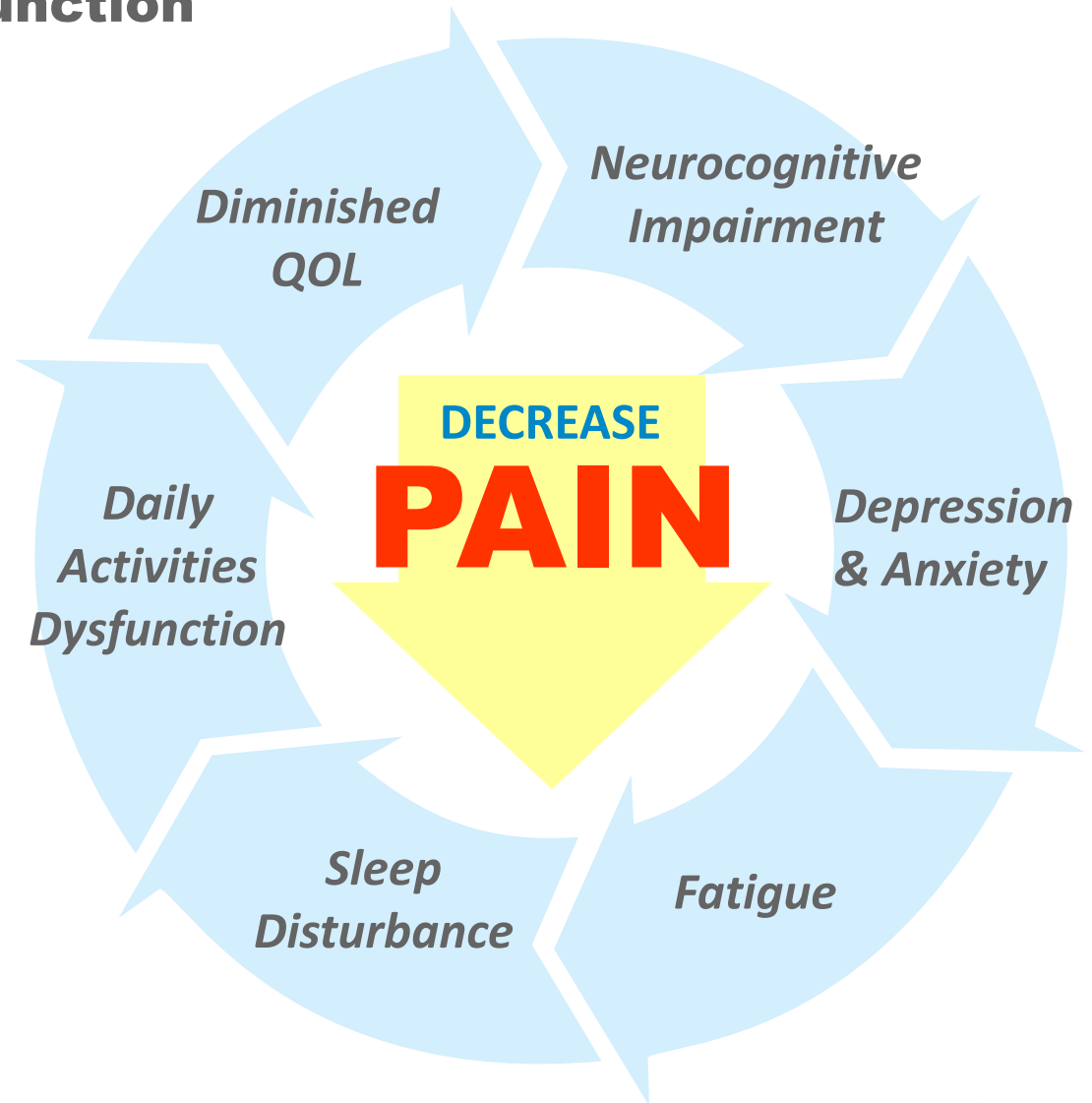
**Re-Visit(s)**

↓ Monitor

**Follow-Up**

**Outcomes**

*The CNS Vital Signs Testing procedure can add efficiency, validity, and standardization to the assessment of brain functions, symptoms, and treatment effects.*



# Chronic Pain Care Management Approach

Medical professionals and researchers know that good health has many dimensions; one of the most important and yet least measured is the health of a person's brain. "Neurocognition" refers to the higher brain functions: learning, remembering, concentrating, solving problems and making decisions. Neurocognitive processes are active in virtually all of our day-to-day activities — Neurocognitive Health Matters!

Proper neurocognitive function is a major factor in determining a person's quality of life. Computerized neurocognitive testing helps clinicians and researchers quantitatively and objectively evaluate the health of these higher functions of the brain. The brain and central nervous system (CNS) have "vital signs," but they have never been easy to objectively measure or monitor. Until now...

CNS Vital Signs is a clinical procedure that utilizes scientifically validated objective tests to evaluate the neurocognitive status of patients and covers a range of mental processes from simple motor performance, attention and memory, to executive functions. The CNS Vital Signs tests are computerized versions of established tests used by experts in neuropsychology, cognitive psychology, clinical psychology and clinical research. CNS Vital Signs provides clinicians and researchers with leading edge neurocognitive and behavioral health assessment technologies that efficiently collect valid and reliable brain & behavioral clinical endpoints for a more objective view of a patient's functional status, disease progression, and outcomes. The CNS Vital Signs Assessment platform supports a lifespan chronic care model and helps enable productive interactions between the family, caregivers, and a specialist practice team.

CNS Vital Signs can help your patients and help your practice by: Assisting with Evaluation and Management , Evaluating Cognitive and Functional Status, Measuring Change, Establishing a Baseline Measurement, and Evaluating Treatment e.g. Medication. One of the most robust features of the CNS Vital Signs assessment is its randomization algorithm allowing for an almost infinite number of alternate forms. This allows for retesting patients and minimal practice effects. Clinicians establish a baseline and upon re-test, compare the results to assist in decision-making regarding the observed change in the patient's condition, monitor disease or recovery progress, measure treatment results, compliance, and outcomes e.g., Rehabilitation, Medication Optimization, Etc. Often Patients and families benefit from seeing testing results allowing the understanding of the status and nature of their or a loved one's neurocognitive function. CNS Vital Signs is one of many tools clinicians use in evaluating changes in a patient's condition.

If you have question or would like to register for a free in-service webinar go to [www.CNSVS.com](http://www.CNSVS.com) or email [support@cnsvs.com](mailto:support@cnsvs.com) or call 1.888.750.6941.



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# Managing Chronic-Pain Patients in the New Millennium:

*Initial treatment plan and periodic reviews designed to address these components.*

*The initial psychological examination generally should go beyond a mental status examination and carefully address intellectual capacity, **concentration, attention, immediate and delayed memory, reasoning, and executive functioning skills that are generally measured by a neurocognitive examination.** The application of the treatment plan relies upon the patient's ability to participate in its development and to understand and carry out its directives. Chronic pain often disrupts neurocognitive functioning. **Without careful scrutiny, inaccurate assumptions may be made concerning the patient's neurocognitive abilities, resulting in suboptimal treatment.***

One of the more important criteria used by regulatory medical boards is the outcome measure that documents the success or failure of a treatment plan in general and the use of opioid treatment in particular.

## CLINICAL GUIDELINES

Managing Chronic-Pain Patients in the New Millennium: Clinical Basis and Regulatory Viewpoint from Texas, U.S.A.

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■ **Abstract:** Chronic pain is a very significant health care problem. It is estimated that 9% of the US adult population suffers from moderate to severe noncancer-related pain. It is very difficult to objectively and quantitatively measure a patient's pain and response to treatment. This routinely results in under or overtreatment of pain in these patients. The authors' goal is to provide physicians with practical recommendations and guidelines for the treatment of the chronic-pain patient. This article also summarizes the neurobiology of pain and contrasts acute vs. chronic pain, and it explores the complex interplay between the physical manifestations of chronic pain and its emotional ramifications. In addition, this article offers clinician guidelines for the evaluation and treatment of chronic pain; treatment recommendations based on the current neurobiological understanding of pain; and numerous guidelines and position statements published by various physician associations, physician licensing boards, and local, state, and federal laws. A "Patient Pain Management Contract" and "Pain Treatment Functional Outcome Scale" are exhibited. ■

**Key Words:** chronic pain, neurobiology, clinical guidelines

### MANAGING CHRONIC-PAIN PATIENTS IN THE NEW MILLENNIUM: A BALANCING ACT FOR PHYSICIANS

Chronic pain is a very significant public health problem. Twenty-two percent primary care patients report pain. Eighty-three million adults in the United States state that pain affects their participation in some activities. A total of 4.5 million patients die in pain each year. Twenty-six percent of nursing home residents experience pain daily. One-third of chronic-pain patients reported that they received little or no relief from any past therapies. Twenty-eight percent believe that there is no solution to their pain. Less than half (42%) of pain patients believe that their physician completely understands how their pain makes them feel.<sup>1-4</sup>

To complicate the matter further, chronic pain is a complex interaction between the individual and environment. As is the case in all chronic illnesses, it exerts a profound effect on the patient and their biological systems. The biological and psychological functions of the individual are intertwined and revealed through the patient's quality of life. The concept of disease is more

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© 2004 World Institute of Pain, 1130-768-0948/04 \$15.00  
*Pain Practice*, Volume 4, Issue 2, 2004 105-129

Source: Managing Chronic-Pain Patients in the New Millennium: Clinical Basis and Regulatory Viewpoint from Texas, U.S.A.; Anand W. Mehendale, MD; Donald Patrick, MD, JD, Mark Goldman, PhD; *Pain Practice*, Volume 4, Issue 2, 2004 105-129



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# Chronic Pain: Neurocognitive Testing

ANESTHESIA  
& ANALGESIA



## *Disruption of Attention and Working Memory Traces in Individuals with Chronic Pain*

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**BACKGROUND:** Research has found that chronic pain disrupts attention and that this disruption can lead to significant functional impairment and decreased quality of life. We conducted the present study to examine how attention and memory are disrupted by chronic pain.

**METHODS:** Computerized tests of working memory were given to participants with chronic pain along with a neuropsychological test of attention before and after procedures resulting in analgesia.

**RESULTS:** Two-thirds of participants with chronic pain had scores in the clinically impaired range on attentional tasks. These results were independent of age, education level, sleep disruption, and pain relief. Medication use was also recorded and is reported to account for potential effects of medication on task performance. Those participants with the highest level of impairment had significantly greater difficulties in maintaining a memory trace during a challenging test of working memory.

**CONCLUSIONS:** These findings point to a specific cognitive mechanism, the maintenance of the memory trace, that is affected by chronic pain during task performance. Cognitive function was not improved by short-term local analgesia.

Anesth Analg 2007;104:1223-1229  
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# Advancing Pain Care

## CNS Vital Signs Pain Toolbox



### Clinician Expertise

Brain Function: Memory, Attentional, Executive, Psychomotor Speed & more

Behaviors, Symptoms, and Comorbidities

#### Computerized Neurocognitive Testing

- Nine Neurocognitive Domains Measured
- Memory – Immediate and Delayed
- Frontal Lobe / Executive Control Tests
- Processing and Psychomotor Speed
- Immediate Auto – Scored Reports
- Rapid Assessment - 30 Minute Initial Assessment/Baseline, 15 Minute Follow-up for Treatment Effect
- Easy to Interpret
- Systematic & Standardized Documentation for Patient Registry/Research
- HIPAA Compliant

#### Computerized Medical and Health Rating Scales\*

- Pain Catastrophizing Scale
- Medical Outcomes Survey SF-36
- Neurobehavioral Symptom Inventory (NSI)
- NeuroPsych Questionnaire NPQ-207 & NPQ-45 both Child & Adult

*\*Used with permission... Free use of rating scales*

*“...as cognitive impairment can be a symptom of FM/CFS and often includes poor concentration, poor memory, learning difficulties, brain fog, and poor problem solving capabilities, the CNS Vital Signs assessment (CNSVS) which comprise a number of well researched and reliable computerized tests of neuro-cognitive function is undertaken.”*

SOURCE: Assessment of Fibromyalgia & Chronic Fatigue Syndrome: A New Protocol Designed to Determine Work Capability – Chronic Pain Abilities Determination (CPAD); Ir Med J. 2008 Oct;101(9):277-8



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# CNS Vital Signs Pain Toolbox

## Pain Catastrophizing Scale... Widely Used Measure

*Catastrophizing is currently defined as: “an exaggerated negative mental set brought to bear during actual or anticipated painful experience” (Sullivan et al., 2001).*

*Catastrophizing not only contributes to heightened levels of pain and emotional distress, but also increases the probability that the pain condition will persist over an extended period of time.*

### Rumination

*“I can’t stop thinking about the pain”*

### Magnification

*“I worry they’ve missed something serious”*

### Helplessness

*“There’s nothing I can do”*

*Thirteen statements describing different thoughts and feelings that may be associated with pain. Using the scale, please indicate the degree to which you have these thoughts and feelings when you are experiencing pain.*



# Mind–body interactions in pain: the neurophysiology of anxious and catastrophic pain-related thoughts

*The well-accepted biopsychosocial model proposes that the experience of pain and responses to it result from a complex interaction of biological, psychological, and social factors. However, the separation of these constructs is substantially artificial, and we presume that psychological processes have biological effects, that biological processes affect an individual's psychosocial environment, and so on...*

*In general, the **cognitive and affective processes** captured within the construct of **catastrophizing** may exert effects on the neuromuscular, cardiovascular, immune, and neuroendocrine systems, and on the activity in the pain neuromatrix within the brain.*

Claudia M. Campbell Department of Psychiatry and Behavioral Sciences, Johns Hopkins University School of Medicine, Baltimore, Md; and Robert R. Edwards Department of Anesthesiology, Perioperative and Pain Medicine, Harvard Medical School, Brigham & Women's Hospital, Chestnut Hill, Mass



# Pain Memory - Pain Catastrophizing Scale

- Recall of pain is poorly correlated with actual pain ratings.
- Patients with chronic pain with high reported pain at the time of recall tend to over-report the level of pain previously recorded.
- Pain catastrophizing is positively correlated with the accuracy of pain memories.

Lefebvre & Keefe, 2002

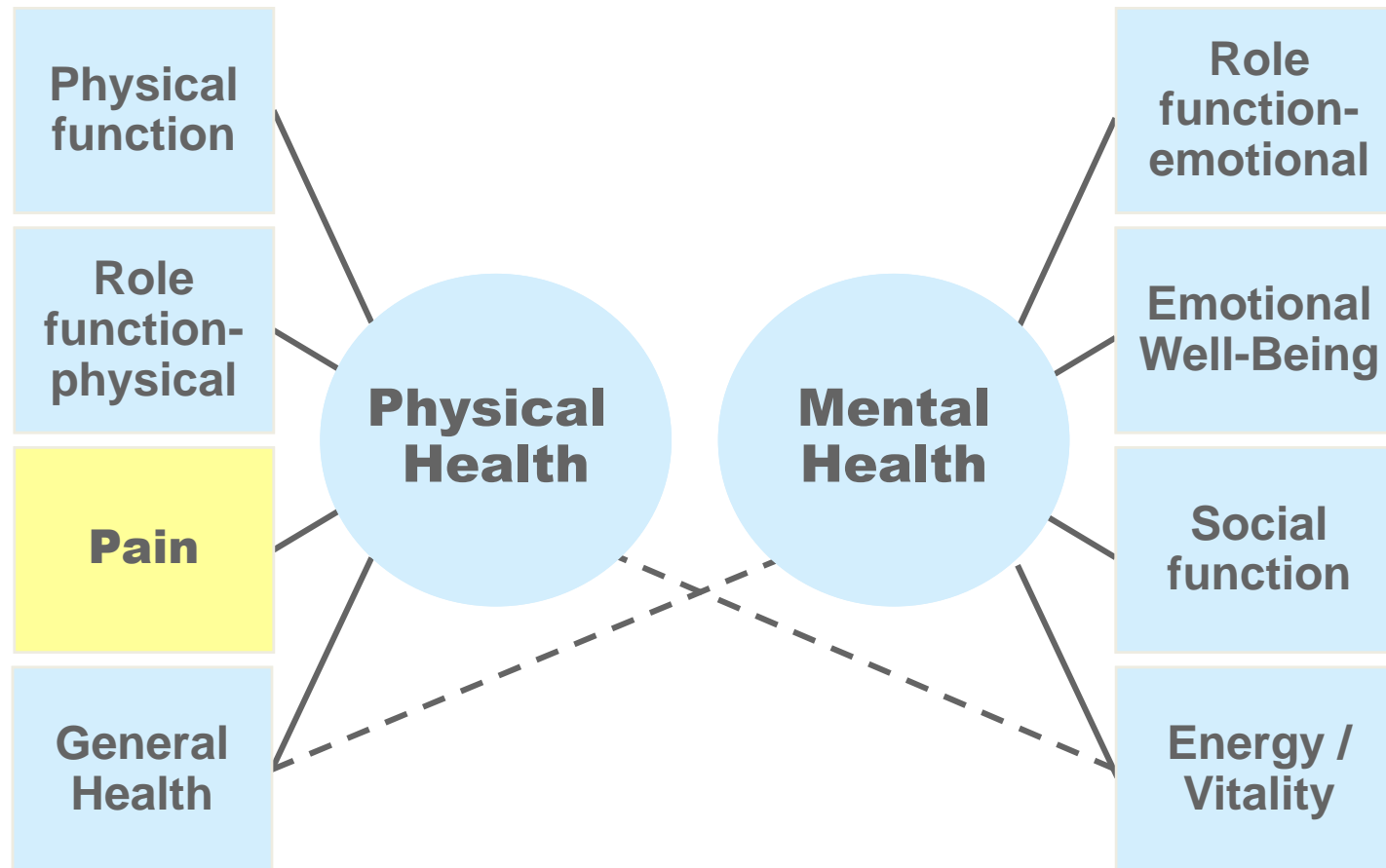
- Predict pain scores at a later period of time (PC is a primary cause of chronic pain)?
- PC scores can be higher in chronic pain populations.
- Is associated with higher levels of pain behaviors, frequency and duration of hospital and admissions and outpatient visits.
- Scores are correlated with measures of depression, state anxiety, and trait anxiety.
- But do appear to offer independent predictive power to ratings of pain and, less so, pain-related disability.

Sullivan et al., 2001



# CNS Vital Signs Pain Toolbox

**MOS SF-36... Widely Used Measure**





# Reimbursement Case Study

## Neuro - Spine Institute: Pain Management Protocol

CNS Vital Signs collaborated to do a pilot to evaluate the utility of doing computerized testing to measure patient's neurocognition. The purpose of the pilot study was to demonstrate that CNS Vital Signs computerized tests to measure cognitive function in patients would provide enhanced patient care, improve practice dynamics and operational efficiencies, produce scientific validated outcomes measures AND the impact on revenue from the procedure.

The pilot was conducted in one clinic for a 90 day period. Patients expressing or experiencing cognitive or "brainfog" issues seen by the one of the staff physicians in the pilot study were given the CNS Vital Signs computerized test battery. Patients were administered the assessment during the pilot. The tests take ~30 minutes and were supervised by the physician or medical technician. **The institute generated on average over \$175 per patient in reimbursement for the CNS Vital Signs test, interpretation, and testing data integration. The resulting pilot generated an additional \$11,346.55 in revenue for the doctor that participated in the 3 month pilot.**

10/31/2011 1:02:52PM

### Performance Management Report

Page: 1

██████████ Associates LLC

Service Dates: 08/01/2011 - 10/31/2011

| Month<br>End Date  | Total<br>Visits | Total<br>Units | Total<br>RVUs | Charges  | Pmts     |
|--|-----------------|----------------|---------------|----------|----------|
| <b>Billing Provider:</b> ██████████                                    |                 |                |               |          |          |
| <b>Procedure Code: Neuropsychological testing per hour (96118)</b>     |                 |                |               |          |          |
| Totals for Procedure Code (96118) Neuropsychological testing per hour  | 23              | 24.00          | 0.00          | 7056.00  | 4284.98  |
| <b>Procedure Code: Neuropsychological testing per hour (96119)</b>     |                 |                |               |          |          |
| Totals for Procedure Code (96119) Neuropsychological testing per hour  | 43              | 43.00          | 0.00          | 6598.00  | 3309.03  |
| <b>Procedure Code: Neuropsychological interp and report (96120)</b>    |                 |                |               |          |          |
| Totals for Procedure Code (96120) Neuropsychological interp and report | 22              | 27.00          | 0.00          | 6588.00  | 3752.54  |
| Totals for Billing Provider ██████████                                 | 88              | 94.00          | 0.00          | 20242.00 | 11346.55 |





# Reimbursement Case Study

## *Neuro - Spine Institute: Pain Management Protocol*

CPT code 96119 was billed on the date of CNS Vital Signs testing in the clinic. The average reimbursement for 96119 across all payers including Medicare was \$76.95. On a subsequent date when the doctor integrated the patients examination, with the Neurocognitive testing and evidence-based medical and health surveys, questionnaires, and scales results into a final report; for which the doctor billed a professional component 96118 code. The average reimbursement for 96118 was \$99.65. An additional billing code 96150 for administering the evidence-based medical and health scales and questionnaires was also billed with a reimbursement range of \$11- \$21.

***The CNS Vital Signs Testing procedure added efficiency, validity, and standardization to the assessment of brain functions, symptoms, as well as providing an object measurement to the impact of treatment effects.*** The doctor in-charge of the pilot said ***“not only does CNS Vital Signs significantly improve our bottom line it helps us objectively demonstrate outcomes and treatment results. There is strong value also in the medication management component particularly for patient’s to whom we may subscribe controlled substance pain meds.”*** CNS Vital Signs has now been deployed to all 4 clinics. ***“We are very pleased and I highly recommend CNS Vital Signs to my medical colleagues specializing in the treatment of chronic pain, accidents and work injuries, substance abuse and managing muscular, spinal and neurological conditions.”***



# The CNS Vital Signs Advantage:

Assessing Brain Function: CNS Vital Signs is a clinical testing procedure used by clinicians to evaluate and manage the neurocognitive state of a patient. Across the lifetime, serial testing allows ongoing assessments of a patient's condition, disease progression, or clinical outcome.

## About CNS Vital Signs

### Both Neurocognitive Testing and Evidence-Based Functional Ratings Scales in one Platform

The CNS Vital Signs MULTI-MODAL assessment platform enables the *efficient collection* and *systematic documentation* of important brain function and behavioral, symptom and comorbid clinical endpoints using **VALID & RELIABLE** standardized neurocognitive tests and evidence-based symptom, behavioral and functional rating scales.

As a clinical instrument, the CNS Vital Signs neurocognitive testing and evidence-based rating assessment tools have been used to *detect impairment, follow the course of an illness, and monitor response to treatment*; it has also been used as a research tool to screen for cognitive disorders in epidemiological / surveillance and pharmaceutical studies and to follow cognitive changes.

## Clinician Benefits

- **RAPID INSIGHT...** computerized neurocognitive testing helps clinicians evaluate and describe the health of the cognitive or higher functions of the brain in a more granular and standardized fashion.
- **DASHBOARD VIEW...** Neurocognitive domain functions and functional status is presented in a summary view that is easy to interpret.
- **LONGITUDINAL VIEW...** Repeated testing allows clinicians to track disease progress and treatment/rehabilitation effects
- **DETAILED VIEW...** Each report presents the testing data in a detailed view. All results can be easily exported to EMR's or spreadsheets for clinical or research purposes.
- **VALID ACROSS the LIFE SPAN...** Peer reviewed normative data allows clinicians to examine patients from age 8 to 90.



# NEXT STEPS:

Contact Us...

## Getting Started

**Step One:** Register at [www.CNSVS.com](http://www.CNSVS.com)  
After registering download the VSX 'Brief-Core'  
Assessment Software with 5 FREE Test Sessions...  
Take it for a test drive.

**Step Two:** *Schedule a FREE One-on-One In-Service Webinar...* Contact CNS Vital Signs Support [support@cnsvs.com](mailto:support@cnsvs.com) with dates and times that you will be available.

*After the webinar the total CNS Vital Signs Assessment platform (Web & Local) can be configured to meet your practice needs.*

## Learn More

*Contact me to receive report examples, case studies, administration guides etc.*

- **Website:** [www.CNSVS.com](http://www.CNSVS.com)
- **Phone:** 888.750.6941
- **Email:** [support@cnsvs.com](mailto:support@cnsvs.com)
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*"The webinar training was terrific... it covered the Validity & Reliability of the platform, the interpretation of results, billing and coding, testing protocol, and the integration of the CNS Vital Signs platform into our practice." Practice Administrator*



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