**Concussion Vital Signs Purpose**

Concussion Vital Signs is a free web-based neurocognitive assessment platform for schools developed by CNS Vital Signs to help health professionals, certified athletic trainers, school nurses, and coaches meet the public health needs of the growing number of individuals affected by a mild traumatic brain injury (mTBI) or concussion. Concussion Vital Signs provides a brief, web based neurocognitive testing solution (baseline and post-concussion), as well as a self-reported history, and post-concussion symptom rating scales. Neurocognitive evaluation assists qualified health professionals in collecting important information used in evaluating, monitoring, and managing concussions.

Concussion Vital Signs is a product of CNS Vital Signs, a world leader in the design and development of standardized neurocognitive assessment tools. As a clinical instrument, the CNS Vital Signs neurocognitive battery has been used to evaluate and manage patients by more than 6000 clinicians in 52 countries.

“Neurocognition” refers to brain functions such as learning, remembering, concentrating, problem solving, and decision making. These processes are active in virtually all of our day-to-day activities. Neurocognitive testing helps clinicians evaluate and describe their patient’s neurocognitive health, such as impairments seen in concussion. Concussion Vital Signs is practical and scientifically robust. The practical advantages reflect the affordability and efficiency of the platform. Concussion Vital Signs is accurate, and is noted for being relatively easy and quick to administer.

**Why use Concussion Vital Signs?**

Each year more than 300,000 sports-related traumatic brain injuries or concussions occur in the United States. Concussions can happen to any athlete of any age, male or female, in any sport. While such injuries may not always be preventable, clinicians and athletic trainers are able to use valid and reliable tools to recognize and treat concussions to make sure athletes are fully recovered before resuming play.

Sideline examinations, medical consults and even scans may miss subtle but significant problems impacting performance in the classroom, as well as the playing field. Across the spectrum of concussion management, Concussion Vital Signs helps clinicians collect objective evaluation and management endpoints for athletes of all ages.

Functionally, baseline (pre-season) neurocognitive testing utilizing the Concussion Vital Signs tests provides valuable information about an athlete. Should an athlete sustain a suspected concussion/head injury, this pre-season baseline testing provides the clinicians with valuable information to help assist in return to play decisions. Concussion Vital Signs is designed to give the athletic trainer and sports medicine staff maximum ease-of-use, assessment flexibility, and system reliability.
Why use Concussion Vital Signs?

**Athlete Health:** Concussions are not always easy to assess (like a sprained ankle or broken bone). Concussions are sometimes referred to as the invisible injury. Returning-to-play to soon after a first concussion can have devastating consequences e.g. second impact syndrome on an athletes brain. *Concussion Vital Signs provides Valid & Reliable tools that can help a qualified health professional assess a athletes status e.g., neurocognitive, symptoms, history, and sideline status.*

**New Advances:** Advancing medical knowledge has led to consensus guidelines supporting the proper management of sports related concussions (e.g., SCAT 3). *Concussion Vital Signs is optimized to assist every school and clinical practice in the longitudinal management of sports concussion.*

**Risk Management:** Many state legislatures and sports governing bodies (e.g. NCAA) have passed mandates or guidelines related to the proper management of sports related concussions. *Concussion Vital Signs is optimized to assist every school and clinical practice in the compliance of sports concussion mandates, policies, and plans e.g. flexible and efficient assessment platform that enables a systematic documentation.*

**The Right Thing To-Do:** With the recent growth in scientific knowledge about the possible effects of sports concussions many administrators are realizing the need for a more effective and reasoned approach to sports concussion management. *Concussion Vital Signs helps provide schools and club teams, in coordination with qualified health professionals, a platform to make the management (policy and plan) more efficient and coordinated.*

1. **Baseline & Education**
   - Pre-Participation or Pre-Season Exam & Activity

2. **Sideline**
   - Immediate Concussion Assessment
   - Collect your sideline exam information on a handheld device or a clipboard (transfer the data when convenient).

3. **Post-Injury**
   - Evaluation & Management of Concussed Athlete
   - Follow-up / Ongoing Management
   - Return-to-Play Decision
How can Concussion Vital Signs Help?

Sport-related concussion is a “hot topic” in the media and in medicine. It is a common injury that is likely underreported by pediatric and adolescent athletes. Football has the highest incidence of concussion, but girls have higher concussion rates than boys do in similar sports. A clear understanding of the definition, signs, and symptoms of concussion is necessary to recognize it and rule out more severe intracranial injury. Concussion can cause symptoms that interfere with school, social and family relationships, and participation in sports. Recognition and education are paramount, because although proper equipment, sport technique, and adherence to rules of the sport may decrease the incidence or severity of concussions, nothing has been shown to prevent them. Appropriate management is essential for reducing the risk of long-term symptoms and complications. Cognitive and physical rest is the mainstay of management after diagnosis, and neuropsychological testing is a helpful tool in the management of concussion. Return to sport should be accomplished by using a progressive exercise program while evaluating for any return of signs or symptoms. This report serves as a basis for understanding the diagnosis and management of concussion in children and adolescent athletes." *Pediatrics* 2010;126:597–615

Concussions are complicated pathophysiological processes affecting the brain, caused by a traumatic force. Concussion assessment is many times difficult because of the complexity and multifactorial nature of the condition and usually requires a multidimensional approach to collecting important clinical endpoints. The Concussion Vital Signs assessment platform aids Athletic Trainers, coaches, players and qualified health professionals in the multistep process (baselining and post-injury) of collecting important information necessary to make a well-informed return-to-play decision.

**Concussion Management Example**

- **Pre-Participation or Pre-Season Exam & Activity**
- **Immediate Concussion Assessment** e.g. Sideline
- **Evaluation & Management of Concussed Athlete**

**Multifactorial Multidimensional Multistep**

**How Concussion Vital Signs can help...**

- **Athlete Education**
- **Neurocognitive Testing**
- **Athlete Information & Medical History**
- **Concussion Symptom Scale**
  - **Balance Testing** e.g. NeuroCom, BESS, Biodex
- **Athletic Contest Sideline Assessment Evaluation**
- **Informant Reports** e.g. Coach, Players, ATC, Parent, etc.
  - **Thorough History & Physical:** e.g. Head and Neck Exam, Neurological Exam, Gait and Balance Assessment
- **Previous History of Head Injuries** (From Baseline)
- **Concussion Symptom Scale** (Baseline and Post-Injury)
- **Neurocognitive Test** (Baseline and Post-Injury)
- **Balance Testing** e.g. BESS, NeuroCom, Bidex, etc.
- **Possibly Neuroimaging**
How to Become a Concussion Vital Signs User?

Users can access the Concussion Vital Signs assessment platform by registering and...

**Following these 3 Simple Steps:**

1. **Go to [www.CONCUSSIONVITALSIGNS.com](http://www.CONCUSSIONVITALSIGNS.com) and CLICK on the ‘REGISTER’ button**

2. **Complete the Application and CLICK the Register button.**
   After registering an email will be sent to you with your login information, instructions on test administration, and instructions on how to request a free training webinar. **Make Yourself a copy and/or Print of the Registration Letter for future reference.**

3. **You will be sent an activation email (check your junkemail if you don’t see the activation email). Once your account is activated you can BEGIN TESTING ATHLETES! Following your registration you can immediately begin using the Concussion Vital Signs assessment platform and begin baselining athletes.**

Note: The only charge you will incur is if you need the Concussion Vital Signs support services (see pricing webpage.). Most questions can be answered by the webpage information, FAQ’s or support PDF’s found at the Concussion Vital Signs website.
Concussion Vital Signs User Guide

Concussion Vital Signs is used by clinicians to assess (measure) the neurocognitive status (baseline) of athletes and to serial test (measure and monitor) to evaluate a subject’s condition or outcome. The Concussion Symptom Scale and Concussion History help clinicians identify and track a patient or study subject’s symptoms status. Managing and making the return-to-play decision for an athlete following a sports concussion is complex and requires the analysis of a number of sources of data. The decision should be determined by a team physician; ideally within the context of a multidisciplinary team.

Concussion Vital Signs provides a concussion management toolset and system that supports a clinician(s) evaluation and monitoring activities.

**Concussion Vital Signs provides:**

- **Unlimited Neurocognitive Baselining** (computerized neuropsychological assessment)
- **Unlimited Post-Injury Neurocognitive Testing** (computerized neuropsychological assessment)
- **Unlimited Concussion Symptom Scales** (self-reported)
- **Unlimited Concussion History** (self-reported)
- **Unlimited Automated Sideline Assessments**

Baseline neurocognitive testing can be conducted by technicians or proctors under the supervision or guidance of a clinician e.g. athletic trainer, school official, neuropsychologist, or team physician.

**NOTE:** Neuropsychologists have the training necessary to provide unique expertise in the assessment of neurocognitive functioning, testing, and post-injury neurocognitive and psychological assessment if additional expertise is needed.

**Assessment Types**

The BASELINE TESTING default is to have the athlete complete all seven neurocognitive tests, followed by a concussion symptom scale, and a concussion history. If the Symptom Scale is selected, the athlete will only be presented with a concussion symptom scale. Athletic Trainers will many times do the post injury neurocognitive testing only after the symptoms have been resolved.

One of the most unique features of the Concussion Vital Signs assessment is its auto-randomization of stimuli into an almost unlimited number of alternate forms. This allows for retesting patients without the confounding of significant content-related practice effects.
HOW TO TEST: Baseline and Post-Concussion Assessment

Testing Environment:
The testing environment should be free of distraction and quiet. Concussion Vital Signs is a performance test and the testing environment should maximize the athlete’s ability to focus and concentrate on doing their best! The athlete’s responses will be recorded for both their **SPEED** and **ACCURACY**. Concussion Vital Signs is designed to be a challenging test.

Testing Tips:
Check the athlete’s vision of the computer screen e.g. do they wear glasses... are they wearing them? **Is the athlete comfortable during testing** - seating, arm positions, recent restroom visit. Check for any hand or arm injuries or seating challenges that might impede testing. Make sure the testing environment is free from distraction - quiet room, closed door, need ear plugs, possibly headphones. **Turn off all cell phones, PDA’s, etc. Remember it is important for the athlete to give their BEST EFFORT!**

To Begin ATHLETE TESTING:
1. Go to **www.CONCUSSIONVITALSIGNS.com** then... have the Athlete’s CLICK the “Athlete Testing” button.

   To BEGIN the assessment ENTER the **USERNAME** and **PASSWORD** provided by your SPONSOR and CLICK the **ATHLETE ASSESSMENT LOGIN** button.

The initial Concussion Vital Signs testing screen will appear.
**HOW TO TEST: Baselining and Post-Concussion Assessment**

**Athlete Identification:**

3) **ENTER the Athlete Reference/ID** (Athletes Unique Identifier) and **CLICK the Test Button**.

**IMPORTANT:** The Athlete Reference /ID is generally assigned based on school policy and should be a unique identifier used throughout the athlete’s career. *The baseline testing and post-concussion testing is enabled into a longitudinal report by the accurate recording of the Athlete Reference/ID.*

**Testing Selection and Information:**

4) **RE-ENTER Athlete Reference/ID** and **ENTER BIRTHDATE** using pull-downs, and **Enter Full Name** (Optional use to enable roster by name)

Then **SELECT the:**

- **Type of Assessment** (testing protocol) either Baseline or Post-Injury
- **The Assessments:** Concussion Vital Signs neurocognitive test, Athlete Information & Medical History, Concussion Symptom Scale, & Automated Sideline Assessment
- **Test Supervision Type**
- **Testing Environment**

**CLICK OK**

Concussion Vital Signs allows **FLEXIBLE TESTING: (Select One or More) and can be Easily Adapted to your Concussion Management Plan**

**KEY Concussion Vital Signs ADVANTAGE:**

Besides the scientific validity of the Concussion Vital Signs tests, one of the key advantages of the Concussion Vital Signs Platform is the ability to easily customize a testing procedure. Clients can use the platform in numerous ways: (1) as a Baseline and selecting all three assessments, (2) systematically document the athlete’s symptoms as part of the protocol e.g. use JUST the symptom scales as a way to confirm the resolution of symptoms, (3) If the athlete cannot remember their concussion history they can complete the history with the help of their parents by logging in at home and completing just the history information, and (4) Collect sideline concussion information using Sideline Assessment app “automated tool” using an internet connected tablet device e.g., iPad, Droid, etc.
HOW TO TEST: Baselining and Post-Concussion Assessment

Confirm Test Settings:
5. A Confirm Test Settings box will appear to confirm the settings and allow you to select a language.

CLICK OK to begin the test.

Testing Begins:
6. FIRST TEST WILL PRESENT ON THE COMPUTER SCREEN
The selected neurocognitive test will present in your browser. For example in this scenario, the Verbal Memory Test presents first as part of the selected Baseline Assessment. The athlete will continue to take the test until its conclusion.

For the best possible results it is important for the athlete give their best effort. The test subject should read the instructions carefully. It is important to point out the computer keys in use. Be sure the subject is familiar with the location of the space bar, the Enter key, the shift keys, the arrow key and the number row. The baseline assessment will take approximately 30 minutes to complete. Scales and history will take additional time.
Taking the Concussion Vital Signs Assessment

The Default Baseline Testing Sequence is:
6) Neurocognitive Tests (Page 13)
7) Con VS Concussion History
8) Con VS Concussion Symptom Scales. Each Symptom is recorded as ‘0’ NONE and a Severity Index of 1 = MILD to 6 = Severe
9) Test Completion the athlete can now logout (NOTE: Viewing of the report can be made from the SUPERVISOR or ADMINISTRATOR account in the ‘VIEW REPORTS’ section (see page 15, section A).

Notes for the ATHLETE Test Administrators
The Concussion Vital Signs Battery uses a standard algorithm (scoring less than chance) to assess testing effort by the athlete. The examiner should emphasize the fact that the Concussion Vital Signs test has embedded indicators of effort and if the athlete does not give their best effort they will be required to retake the test. Each test, except for the first two memory tests and the continuous performance test (which comes at the end of the test) will have a practice period to allow the athlete to get comfortable with the format of each test.

Again... Reinforce that each athlete should carefully read the test instructions that precede each test. They should be encouraged not to take a break during testing, if they do so during one of the instruction pages the browser may time-out depending on the browser settings.

Other Testing Tips:
Ask the subject to take a seat and make themselves comfortable understanding it might take 45 minutes to complete the test. Check that the athlete can read the computer screen e.g. do they wear glasses, are they wearing them? Is the athlete comfortable during testing - seating, arm positions, recent restroom visit. Check for any hand or arm injuries or seating challenges that might impede testing. Make sure the testing environment is free from distraction – e.g. quiet room, closed door, minimize window view distractions. Turn off all cell phones, PDA’s. Concussion Vital Signs is user-friendly and easily administered.
To ACCESS Your ADMINISTRATOR Account:
A. Go to www.CONCUSSIONVITALSIGNS.com then... CLICK the “Administrator Login” button.

B. To ACCESS the athletes assessment reports ENTER the Administrator USER NAME and PASSWORD provided by Concussion Vital Signs and CLICK the ADMINISTRATOR LOGIN button.

C. After LOGIN the ACCOUNT FOLDER will be presented. The account folder will allow the ADMINISTRATOR to VIEW REPORTS, view a LOG of account activity, an assessment HISTORY, Develop and access ROSTERS, and enable the EDIT of the ACCOUNTS profile, set-up rosters, retire athletic records, and an athletes demography.
D. VIEW REPORTS:
Clients can view reports by highlighting the desired athletes Subject ID and CLICKING the VIEW REPORT button at the bottom of the application. The selected report will open in a PDF format.

E. VIEW LOG:
Clients can view a LOG of their testing activity including the Testing Time, User Name, and a Log Entry of each activity.
F. ACCOUNT HISTORY or EDIT DEMOGRAPHY:
Clients can view the HISTORY of testing including the Testing Time, Test Administrator, Athlete or Subject ID, Type of Test, what ASSESSMENTS were selected, and whether the assessment was completed.

G. EDIT DEMOGRAPHY:
Clients can view or change their ATHLETES’ DEMOGRAPHY information by CLICKING the EDIT DEMOGRAPHY Button. The Edit Demography window allows Account Administrators to edit the demography of a given testing report. The accuracy of the Subject Reference/ID and DOB is important for enabling the longitudinal view of an athlete’s record. This window allows you to change the Subject Reference/ID and/or Birth Date as needed. CLICK “save changes” to make the necessary edits.
**Account Administration Information: Manage ROSTERS**

**H. EDIT ACCOUNT:**
Clients can view or change their ACCOUNT Information by CLICKING the EDIT Button from the Admin Account.

**I. DEVELOP ROSTERS:**
Clients can develop rosters by naming the roster and selecting the team members that have been tested.

**J. MANAGE ROSTERS:**
Clients can access and manage team rosters.
K. RETIRE ATHLETES:
Clients can RETIRE ATHLETE FILES following graduation, a trade to another team, etc.

L. ATHLETE SEARCH:
Clients can add efficiency to their testing process by using the search function at the top of several of the administration pages. The search function allows clients to identify incomplete and invalid tests for retesting purposes. These tests may need to be re-administered to have a valid testing performance.
Clinician Portal: Enabling a Continuity of Concussion CARE

The Clinician Portal advances sports concussion care by enabling a seamless continuity of CARE between the athlete and their desired clinician.

Schools and school systems can now better serve their athletes and parents. The CLINICIAN PORTAL allows athletes and parents to take their Concussion Vital Signs reports to any qualified health care professional whereby the provider can enter information from the report and obtain the concussion history for the athlete real-time.

The Clinician Portal will:

• Allow any qualified healthcare professional to easily access the available set of tests, scales and questionnaire records from Concussion Vital Signs, as well as administer a post-injury assessment if a post-injury assessment is warranted.
• Allow athletes the option of taking their Concussion Vital Signs records to their personal healthcare or alternatively, to the provider of record for the school.
• Allow sports medicine clinics, concussion clinics, neuropsychology clinics, and other healthcare institutions, to quickly, gather concussion history. Such a flexible robust system allows management and coordination of multiple patients from any number of schools or entities using Concussion Vital Signs for their concussion management platform.
• The CLINICIAN PORTAL supports clinical professionals and Concussion Vital Signs users by providing a better coordinated concussion management system.

Collaboration between athletes, parents and clinicians is vital for effective concussion management. (A) CLICK the Clinician Portal Button

Qualified Health Professionals can LOG IN to View an athletes concussion records or administer Post-Injury assessments as part of their evaluation and management process.
Using the Clinician Portal:

### Concussion Vital Signs Baseline Report

<table>
<thead>
<tr>
<th>Athlete Reference ID</th>
<th>Test Date Local: September 17, 2014 15:39:55</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Name: John Doe</td>
<td>Age: 18</td>
</tr>
<tr>
<td>Administrator: Athlete Assessment</td>
<td>Language: English (United States)</td>
</tr>
<tr>
<td>Total Test Time: 31:12 (min:sec) for all tests in this report</td>
<td>Test Date GMT: September 17, 2014 22:39:55</td>
</tr>
<tr>
<td>Testing Supervisor: Supervised by athletic trainer or school personnel</td>
<td>Testing Environment: Group 16 or More</td>
</tr>
</tbody>
</table>

**Concussion Reference Code:** 2T47GER8

**Administer Post-Injury Concussion Assessment**

**View Most Recent Concussion Assessment**

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### A. ACCESS ATHLETE RECORDS:
Clinicians can view account records by using the two reference codes below on the Concussion Vital Signs Report.

### B. REGISTER TO VIEW ATHLETE TEST RESULTS AND DO POST-INJURY TESTING:
Clinicians can view test results by REGISTERING and logging into the athletes account.

### C. VIEW ATHLETE TEST RESULTS
Clinicians can view test results.

### D. DO POST-INJURY TESTING:
Clinicians can CLICK and Administer Post-Injury Assessments.

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**Using the Clinician Portal:**

**Clinic Post-Injury Assessment Portal**

**Email Address:** clinician@clinic.com

**Password:** **********

**Concussion Reference Code:** 2T47GER8

**Athlete Reference:** athletetest

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**Details**

At no cost, clinicians can test, manage and coordinate care for multiple patients from anynumber of locations using Concussion Vital Signs.

**Key points**
- No cost post injury testing for clinicians supporting schools using Concussion Vital Signs
- No need to buy a concussion system for the practice.
- With Concussion Vital Signs you will have registration.
- Inform athletes to bring copy of their report to the event where the clinician can see a longitudinal chronology of all test scores to date.

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**A. ACCESS ATHLETE RECORDS:**
Clinicians can view account records by using the two reference codes below on the Concussion Vital Signs Report.

**B. REGISTER TO VIEW ATHLETE TEST RESULTS AND DO POST-INJURY TESTING:**
Clinicians can view test results by REGISTERING and logging into the athletes account.

**C. VIEW ATHLETE TEST RESULTS**
Clinicians can view test results.

**D. DO POST-INJURY TESTING:**
Clinicians can CLICK and Administer Post-Injury Assessments.

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**Using the Clinician Portal:**

**Clinic Post-Injury Assessment Portal**

**Email Address:** clinician@clinic.com

**Password:** **********

**Concussion Reference Code:** 2T47GER8

**Athlete Reference:** athletetest
Neurocognitive Report Information Backgrounder

There are two types of Concussion Vital Signs neurocognitive testing reports depending on the test administered. One of course, is the Baseline report. The second is the Post Injury report. Concussion Vital Signs reports are scored from seven venerable computerized neuropsychological tests measuring the speed and accuracy of an athlete’s neurocognitive performance.

Each neurocognitive testing report, both Baseline and Post Injury, presents the testing results as:

‘Subject Scores’ or raw scores computed from raw score calculations using the data values of individual subtests and are simply the number of correct responses, incorrect responses, and reaction times.

‘Compared to Peers’ or an index of how the athlete scored compared to other subjects (NORMATIVE) of the same age. The ‘Compared to Peers’ is based on percentiles rank and should be interpreted in conjunction with Subject Scores. Percentiles Scores may help by suggesting an improvement or decline from baseline to post-injury, but, this can only be confirmed by comparing the Subject Scores.

‘Valid Score’ is a computed measure of an athletes likely testing effort. Testing results on all neuropsychological tests (computerized and paper & pencil) like Concussion Vital Signs can be considered invalid if the testing subject does not put forth good effort during the testing process. Testing subjects may also misunderstand or not read the instructions and score abnormally low on a particular test. If a testing subject tests abnormally low (NO on the Valid Score) then that would be a reason for retesting the individual. If they again score low (NO on the Valid Score) with what you perceive as the subject putting forth a good effort then you should refer the subject for further clinical evaluation (this is rare). The test proctor should reinforce the need for the athlete to give a good testing effort and use the VALID SCORE (embedded indicators of effort) as a tool to help with the reinforcement. NOTE: To learn more about the Valid Score calculations go to the FAQ section of the Concussion Vital Signs website.

The Post-Injury report first page will display the Baseline scores along with current Post-Injury scores as well as whether or not current Post-Injury scores for the athlete returned to baseline, or within 5% of baseline.

The second page of the Post Injury report will produce graphs of all scores to date such that you have a longitudinal view of the testing performance, for all testing to date. For clinician, the report can be printed if needed as part of a patient chart and the PDF format typically can be uploaded to EMRs.

In addition, a Concussion Symptom Severity Scale and a Concussion History are reported when completed as part of the testing protocol.
Neurocognitive Report Evaluation Backgrounder

Evaluating the Baseline Report

Check that all test domains are valid. Test validity can be found in the column labeled ‘Validity Score’. If there is a "NO" listed for any of the domains, it is suggested the test be re-administered until the athlete scores valid scores on all domains.

Note that Concussion Vital Signs is a subset of the clinical battery CNS Vital Signs and as such may identify athletes with a cognitive deficit. Athletes with extremely low scores that cannot improve upon retest may need to see a qualified healthcare provider for a more comprehensive workup. Low scores will be described in the "Compared to Peers" column on the report.

There are three possible groups in the Compared to Peers column, Below Average, Average and Above Average. Athletes scoring Above Average are scoring greater than one standard deviation higher than their student peers. Athletes scoring Below Average are score less than one standard deviation than their student peers. Average score fall between Above Average and Below Average. About 2/3 of students peers will score Average.

Repeat baseline testing is encouraged if it is felt the athlete did not do their best or if the scores seem much lower than expected.

Evaluating the Post-Injury Report.

The athlete might be experiencing a deficit such that they are unable to register a valid score. This may be of clinical significance and if the athlete cannot score valid tests a referral to a qualified healthcare provider for a more comprehensive workup should be considered.

Check that the athlete has returned to “At Baseline or Better” and act accordingly per your concussion monitoring protocol. If an athlete is unable to return to baseline a referral to a qualified healthcare provider for a more comprehensive workup should be considered.

Concussion Vital Signs is not a substitute for a neurological workup or comprehensive neurocognitive testing. Similarly, the Concussion Vital Signs testing is not exhaustive and performance within normal limits should not be taken as lack of evidence for cognitive disorders.

Clinician Portal: Enabling Coordinated Care with Qualified Health Professionals

It is important to understand that the report displays a ‘Concussion Reference Code’ allowing clinicians assisting post-injury evaluation decisions to better access an athletes test reports and administer an in-office post-injury test at no cost.

To access just CLICK the Clinical Portal button on the right-handed side of the Concussion Vital Signs homepage. In those cases where testing is administered in clinician offices the report will be available for printing at the office as well as being archived in the school Concussion Vital Signs account.
Neurocognitive Report Evaluation Backgrounder

Concussion Vital Signs Neurocognitive Domain Dashboard BASELINE Example:

<table>
<thead>
<tr>
<th>Concussion Vital Signs Baseline Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Athlete Reference/ID: athlete00121</td>
</tr>
<tr>
<td>Full Name: John Doe</td>
</tr>
<tr>
<td>Administrator: Head ATC</td>
</tr>
<tr>
<td>Total Test Time: 23:01:15 (min:sec) for all tests in this report</td>
</tr>
<tr>
<td>Testing Supervisor: Supervised by athletic trainer or school personnel</td>
</tr>
<tr>
<td>Concussion Reference Code: 2T47GERB Used to view the most recent report or administer post-injury assessment at <a href="http://www.concussionvitalsigns.com">www.concussionvitalsigns.com</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Domain Scores</th>
<th>Subject Score</th>
<th>Compared to Peers</th>
<th>Valid Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neurocognitive Index (NCI)</td>
<td>Average</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Verbal Memory</td>
<td>51</td>
<td>Average</td>
<td>Yes</td>
</tr>
<tr>
<td>Visual Memory</td>
<td>52</td>
<td>Average</td>
<td>Yes</td>
</tr>
<tr>
<td>Psychomotor Speed</td>
<td>100</td>
<td>Average</td>
<td>Yes</td>
</tr>
<tr>
<td>Executive Function</td>
<td>43</td>
<td>Average</td>
<td>Yes</td>
</tr>
<tr>
<td>Cognitive Flexibility</td>
<td>40</td>
<td>Average</td>
<td>Yes</td>
</tr>
<tr>
<td>CPT Correct Responses</td>
<td>40</td>
<td>Average</td>
<td>Yes</td>
</tr>
<tr>
<td>Reaction Time*</td>
<td>538</td>
<td>Above</td>
<td>Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reaction Time Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple Reaction Time*</td>
</tr>
<tr>
<td>Choice Reaction Time Correct*</td>
</tr>
<tr>
<td>Shifting Attention Correct RT*</td>
</tr>
</tbody>
</table>

The Concussion Vital Signs BASELINE Report presents testing results in:

1. Subject (raw) Scores
2. Compared to Peers Results can be used to evaluate or monitor an athlete’s condition.
3. Valid Score results help clinicians know if the athlete gave an acceptable effort during testing.

Neurocognitive Domain Dashboard Post-Injury Example:

<table>
<thead>
<tr>
<th>Concussion Vital Signs Post-Injury Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Athlete Reference/ID: athlete00121</td>
</tr>
<tr>
<td>Full Name: John Doe</td>
</tr>
<tr>
<td>Administrator: Head ATC</td>
</tr>
<tr>
<td>Total Test Time: 23:01:15 (min:sec) for all tests in this report</td>
</tr>
<tr>
<td>Testing Supervisor: Supervised by athletic trainer or school personnel</td>
</tr>
<tr>
<td>Concussion Reference Code: 2T47GERB Used to view the most recent report or administer post-injury assessment at <a href="http://www.concussionvitalsigns.com">www.concussionvitalsigns.com</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Domain Scores</th>
<th>Baseline (Oct 7, 2014)</th>
<th>Post Injury</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neurocognitive Index (NCI)</td>
<td>Average</td>
<td>Yes</td>
</tr>
<tr>
<td>Verbal Memory</td>
<td>51</td>
<td>Average</td>
</tr>
<tr>
<td>Visual Memory</td>
<td>52</td>
<td>Average</td>
</tr>
<tr>
<td>Psychomotor Speed</td>
<td>100</td>
<td>Average</td>
</tr>
<tr>
<td>Executive Function</td>
<td>43</td>
<td>Average</td>
</tr>
<tr>
<td>Cognitive Flexibility</td>
<td>40</td>
<td>Average</td>
</tr>
<tr>
<td>CPT Correct Responses</td>
<td>40</td>
<td>Average</td>
</tr>
<tr>
<td>Reaction Time*</td>
<td>538</td>
<td>Above</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reaction Time Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple Reaction Time*</td>
</tr>
<tr>
<td>Choice Reaction Time Correct*</td>
</tr>
<tr>
<td>Shifting Attention Correct RT*</td>
</tr>
</tbody>
</table>

Notice in the example above that the athlete (1) had many average scores at his/her baseline, (2) the verbal and visual memory scores are still slightly impaired post-injury as compared to baseline, and (3) most of the scores have returned to baseline. A qualified health professional would refer to other clinical endpoints (symptom resolution, balance testing, neurological exam, etc.) before concluding that the athlete is able to return-to-play.

www.CONCUSSIONVITALSIGNS.com.
LONGITUDINAL POST-INJURY REPORT EXAMPLE:

Each Concussion Vital Signs Report presents the POST-INJURY results in a graphic format that provides clinicians with a longitudinal view. To enable a longitudinal view of the athlete’s condition, the ATHLETE REFERENCE/ID must remain consistent across all their testing (Baseline and Post-Injury). The entire test must be re-administered if the athlete has any "No" values in the Valid Score column.

NOTE: Athletes suffering from a concussion may display low scores or deficits in different domains depending on the direction and force of the blow to the head. Not all athletes that suffer from a concussion provide clear demonstration of neurocognitive deficits. Concussion Vital Signs does not assess the cause of changes in cognitive performance. Testing results should be interpreted by a qualified health professional. Remember, it is better to be safe. Any athlete suspected of having a concussion should be removed from play, and then seek medical evaluation. Consult a doctor after a suspected concussion. Medical clearance should be given before return-to-play.
1. **Who should interpret the Concussion Vital Signs neurocognitive test results?** 
   **Answer:** State legislation and medical guidelines generally require a medical or physician release for athletes to return-to-play. Interpretation of the Concussion Vital Signs neurocognitive test results should be done by a qualified health professional. As expressed in the Consensus statement on concussion in sport held in Zurich, November 2008. “Neuropsychologists are in the best position to interpret NP tests by virtue of their background and training. However, there may be situations where neuropsychologists are not available and other medical professionals may perform or interpret NP screening tests.”

2. **What does NCI (Neurocognitive Index) mean?** 
   **Answer:** The Neurocognition Index – NCI, reflects the overall neurocognitive functioning of the athlete test taker. It is an average of all the domains into a global summary score. Because many concussions are complex and diagnosis is difficult, it usually requires clinicians to take a multidimensional approach to their assessment. Therefore, the NCI and the other neurocognitive domain scores should be taken in context with the symptom scores, history and physical, as well as other tests and relevant clinical endpoints.

3. **What is “Executive Functioning”?** 
   **Answer:** Executive Functioning, sometimes called executive control system, is generally considered a frontal lobe (see blue section of the brain) cognitive system that controls and manages other cognitive processes. It is considered a higher-order brain function which includes attention, behavioral planning and response inhibition, and the manipulation of information in problem-solving tasks. Sometimes referred to as the “command and control” function (frontal lobe), the executive function can be viewed as the “conductor” of many cognitive skills. The SAT - Shifting Attention Test (rules, categories, rapid decision-making) results are used to calculate this frontal lobe domain.

4. **Since Concussion Vital Signs has tests that measure frontal lobe cognitive function, is it a good assessment tool for attention deficit or AD/HD?** 
   **Answer:** YES! CNS Vital Signs is used throughout the world as a clinical and research tool to evaluate and manage AD/HD. The tests used in AD/HD clinics are similar to the ones in the Concussion Vital Signs battery. Should an athlete score poorly after giving their best effort, in the frontal lobe domains (Executive Function, Cognitive Flexibility, CPT Correct Responses), it may be prudent to refer the student for further evaluation. CNS Vital Signs Neurocognitive tests are used extensively to help assess conditions such as AD/HD. Helping student athletes identify and effectively address their cognitive challenges can have dramatic benefits for them personally and can help them be more successful academically, athletically, and vocationally.

5. **If the student athlete does not have a baseline can he/she be given a post-injury test?** 
   **Answer:** YES! Baseline testing can serve as a valuable “premorbid” (state prior to condition) point of comparison for the testing that is conducted after the concussion injury. However, even if baseline neuropsychological testing has not been performed, post-injury neurocognitive testing can still be a very useful source of information about the effects of the concussion. Using standardized PERCENTILE scores can help clinicians identify poor cognitive function performance which can be an important indicator that the brain is not working normally. However, there are many reasons test performance can be abnormal, including concussion.

6. **What combinations of what test scores should cause school personnel/clinicians to pause and look for some underlying condition?** 
   **Answer:** Every student athlete is different; there is no “one-size fits all” answer to assessing concussion. Neurocognitive domain score performance may vary depending on a number of factors that include testing effort, type of blow to the head, location or site of the blow, and the patient’s individual history. The Consensus statement on concussion in sport held in Zurich, November 2008 states “…the assessment of cognitive function should be an important component in any return to play protocol. It must be emphasized, however, that NP assessment should not be the sole basis of management decisions; rather it should be seen as an aid to the clinical decision-making process in conjunction with a range of clinical domains and investigational results.”
# Neurocognitive Clinical Domains Measured

Concussion Vital Signs valid and reliable clinical domains assist in the evaluation and management of sports related concussions. The percentile scores come from 1900+ peer norms from ages 8 to 90.

<table>
<thead>
<tr>
<th>Clinical Domains</th>
<th>Clinical Domain Score Calculations</th>
<th>Clinical Domain Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Neurocognitive Index (NCI)</strong></td>
<td>The average of the Composite Memory, Psychomotor Speed, Cognitive Flexibility, Reaction Time, and Complex Attention Domains.</td>
<td><strong>Measure:</strong> An average score derived from the domain scores or a general assessment of the overall neurocognitive status of the patient. <strong>Relevance:</strong> Summary views tend to be most informative when evaluating a population, a condition category, and outcomes.</td>
</tr>
<tr>
<td><strong>Verbal Memory</strong></td>
<td><strong>Verbal Memory</strong> is the score for the Verbal Memory Test. VBM Correct Hits Immediate + VBM Correct Passes Immediate + VBM Correct Hits Delay + VBM Correct Passes Delay</td>
<td><strong>Measure:</strong> How well subject can recognize, remember, and retrieve words. <strong>Relevance:</strong> Remembering a scheduled test, recalling an appointment, taking medications, and attending class.</td>
</tr>
<tr>
<td><strong>Visual Memory</strong></td>
<td><strong>Visual Memory</strong> is the score for the Visual Memory Test. VIM Correct Hits Immediate + VIM Correct Passes Immediate + VIM Correct Hits Delay + VIM Correct Passes Delay</td>
<td><strong>Measure:</strong> How well subject can recognize, remember and retrieve geometric figures. <strong>Relevance:</strong> Remembering graphic instructions, navigating, operating machines, recalling images, and/or remember a calendar of events.</td>
</tr>
<tr>
<td><strong>Psychomotor Speed</strong></td>
<td><strong>Psychomotor Speed</strong> is the combined score for both the Finger Tapping and the Symbol Digit Coding Test. FTT Right Taps Average + FTT Left Taps Average + SDC Correct Responses</td>
<td><strong>Measure:</strong> How well a subject recognizes and processes information i.e., perceiving, attending/responding to incoming information, motor speed, fine motor coordination, and visual-perceptual ability. <strong>Relevance:</strong> Distractibility, fitness-to-drive, occupation issues, obsessive concern with accuracy and detail.</td>
</tr>
<tr>
<td><strong>Executive Functioning</strong></td>
<td><strong>Executive Function</strong> reflects performance on the Shifting Attention Test. SAT Correct Responses - SAT Errors</td>
<td><strong>Measure:</strong> How well a subject recognizes set shifting and manages multiple tasks simultaneously. <strong>Relevance:</strong> Ability to sequence tasks and manage multiple tasks simultaneously as well as tracking and responding to a set of simple instructions.</td>
</tr>
<tr>
<td><strong>Cognitive Flexibility</strong></td>
<td><strong>Cognitive Flexibility</strong> reflects performance on the Shifting Attention and Stroop Tests. SAT Correct Responses - SAT Errors - Stroop Commission Errors</td>
<td><strong>Measure:</strong> How well subject is able to adapt to rapidly changing and increasingly complex set of directions and/or to manipulate the information. <strong>Relevance:</strong> Reasoning, switching tasks, decision-making, impulse control, strategy formation, attending to conversation.</td>
</tr>
<tr>
<td><strong>CPT Correct Responses</strong></td>
<td><strong>CPT Correct Responses</strong> is the number of correct responses on the Continuous Performance Test.</td>
<td><strong>Measure:</strong> Ability to track and respond to information over lengthy periods of time and/or perform mental tasks requiring vigilance quickly and accurately. <strong>Relevance:</strong> Self-regulation and behavioral control.</td>
</tr>
<tr>
<td><strong>Reaction Time</strong>*</td>
<td><strong>Reaction Time</strong>* is the average reaction time on parts 2 and 3 of the Stroop Tests. (ST Complex Reaction Time Correct + Stroop Reaction Time Correct) / 2</td>
<td><strong>Measure:</strong> How quickly the subject can react, in milliseconds, to a simple and increasingly complex direction set. <strong>Relevance:</strong> Driving a car, attending to conversation, tracking and responding to a set of simple instructions, taking longer to decide what response to make.</td>
</tr>
</tbody>
</table>

**Reaction Time Detail**

<table>
<thead>
<tr>
<th><strong>Simple Reaction Time</strong>*</th>
<th><strong>Simple Reaction Time</strong>* is the average reaction time on part 1 of the Stroop Tests. Time required to press the spacebar from the time a word first appears on the display. Average Reaction Time on Part 1 of the Stroop Test</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Choice Reaction Time Correct</strong>*</td>
<td><strong>Choice Reaction Time Correct</strong>* is the average correct reaction time on the Continuous Performance Test. Time required to press the spacebar from the time a B first appears on the display.</td>
</tr>
<tr>
<td><strong>Shifting Attention Correct RT</strong>*</td>
<td><strong>Shifting Attention Correct RT</strong>* is the average correct reaction time on the Shifting Attention Test.</td>
</tr>
</tbody>
</table>

An * denotes that "lower is better" in the Subject Score column, otherwise higher scores are better. With Percentile scores, higher is always better.
## Concussion Vital Signs Neurocognitive Test Descriptions

Concussion Vital Signs contains seven venerable neuropsychological tests and the clinical domains, scored from the tests, measures the speed and accuracy of an athlete’s brain or neurocognitive function.

### CORE Tests

<table>
<thead>
<tr>
<th>Test Description</th>
<th>Neurocognitive Function</th>
<th>CORE Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Verbal Memory (VBM)</strong>&lt;br&gt;Approx. 3 Minutes</td>
<td>■ Verbal Learning&lt;br■ Memory for Words&lt;br■ Word Recognition&lt;br■ Immediate and Delayed Recall</td>
<td>■ Visual Learning&lt;br■ Memory for Geometric Shapes&lt;br■ Geometric Shapes Recognition&lt;br■ Immediate and Delayed Recall&lt;br■ Motor Speed&lt;br■ Fine Motor Control&lt;br■ Information Processing Speed&lt;br■ Complex Attention&lt;br■ Visual-Perceptual Speed&lt;br■ Information Processing Speed&lt;br■ Executive Function&lt;br■ Simple and Complex Reaction Time&lt;br■ Speed-Accuracy Trade-Off&lt;br■ Information Processing Speed&lt;br■ Inhibition / Disinhibition&lt;br■ Sustained Attention&lt;br■ Choice Reaction Time&lt;br■ Impulsivity</td>
</tr>
</tbody>
</table>
Concussion Symptom Scale Report

Concussion Vital Signs Concussion Symptom Scale Post-Injury Example:

<table>
<thead>
<tr>
<th>Post-Injury Concussion Symptom Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Athlete Reference/ID: athletetest</td>
</tr>
<tr>
<td>Test Date Local: October 8, 2014 12:30:45</td>
</tr>
<tr>
<td>Full Name: John Doe</td>
</tr>
<tr>
<td>Age: 18</td>
</tr>
<tr>
<td>Administrator: Head ATC</td>
</tr>
<tr>
<td>Language: English (United States)</td>
</tr>
<tr>
<td>Total Test Time: 23:01 (min:secs) for all tests in this report</td>
</tr>
<tr>
<td>Test Date GMT: October 8, 2014 19:30:45</td>
</tr>
<tr>
<td>Testing Supervision: Supervised by athletic trainer or school personnel</td>
</tr>
<tr>
<td>Testing Environment: Alone</td>
</tr>
</tbody>
</table>

Concussion Reference Code: 2T47GERB Used to view the most recent report or administer post-injury assessment at www.concussionvitalsigns.com

Rates how this symptom is currently experienced, Absent (0 - None) or Present (1 - Mild to 6 - Severe).

**CSI - Symptoms**

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Baseline (Sep 17 2014)</th>
<th>Post-Injury</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Headache</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3 Nausea</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5 Poor balance</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6 Dizziness</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7 Fatigue or loss of energy</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>9 Drowsiness or feeling sleepy</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>14 Feeling like &quot;In-a-fog&quot;</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>15 Difficulty concentrating</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>16 Difficulty remembering</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10 Sensitivity to light</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>11 Sensitivity to noise</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>17 Blurred vision</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>24 Feeling slowed down</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Additional Concussion Symptoms**

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Baseline (Oct 7, 2014)</th>
<th>Post-Injury</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 Difficulty falling or staying asleep</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>12 Irritability, easily annoyed or frustrated</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>13 Sadness</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2 Feeling numbness or tingling</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>18 Ringing in the ear</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>19 Neck pain</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>20 More Emotional</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>21 Feeling Nervous</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>22 Feeling anxious or tense</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>23 Feeling Confused</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4 Vomiting</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Do Symptoms get worse with Physical Activity: No

Do Symptoms get worse with Mental or Academic Activity: No

Acknowledgements: Concussion Vital Signs Symptom Scale contains a representative sample of well recognized sports concussion symptoms similar to those found in the CSI - Concussion Symptom Inventory, SCAT2, and the Neurobehavioral Symptom Inventory.

* (CSI) Concussion Symptom Inventory: An Empirically Derived Scale for Monitoring Resolution of Symptoms Following Sport-Related Concussion; Christopher Randolph, Scott Millis, William B. Barr, Michael McCrea, Kevin M. Guskiewicz, Thomas A. Hammeke, James P. Kelly; Archives of Clinical Neuropsychology 24 (2009) 219-229; Public Domain

** SCAT2 - Sport Concussion Assessment Tool 2: This tool has been developed by a group of international experts at the 3rd International Consensus meeting on Concussion in Sport held in Zurich, Switzerland in November 2008. British Journal of Sports Medicine, 2009, volume 43, supplement 1.

*** Neurobehavioral Symptom Inventory: Cicerone,KD: J Head Tr Rehabil 1995;10(3):1-17

www.CONCUSSIONVITALSIGNS.com.
Concussion History

Demographic and Background Information - Education
- Years of Education Completed (e.g. high school senior is 11 years):
- SAT - ACT (total):
- Received Speech Therapy:
- Attended Special Education Classes:
- Repeated One or More Years of School:
- Diagnosed Attention Deficit Disorder (ADD) or (ADHD):
- Diagnosed Learning Disability:

Demographic and Background Information - Sports
- Primary Sport:
- Primary Sport Position:
- Years you have played this primary sport at current level:
- Total number of years you have played this primary sport:
- Secondary Sport:
- Secondary Sport Position:
- Years you have played this secondary sport at current level:
- Total number of years you have played this secondary sport:

Concussion & Medical History
- Number of times diagnosed with a concussion:
- Injury 1 (Up to 3 Injury's can be reported)
  - Approximate Date of Injury:
  - Days Lost:
  - Was this concussion sports related?
  - Did this concussion result in a loss of consciousness?
  - Did this concussion result in confusion?
  - Difficulty remembering events immediately before injury?
  - Difficulty remembering events immediately after injury?

Indicate whether you have experienced the following:
- Treatment for Headaches by Physician:
- Treatment for Migraine Headaches by Physician:
- Treatment for Epilepsy / Seizures:
- History of Brain Surgery:
- History of Meningitis:
- Treatment for Substance / Alcohol abuse:
- Treatment for Psychiatric Condition (depression / anxiety etc.):
- Current Medications:
Glossary

- **Baseline** – A standard test by which things are measured or compared.
- **Battery** – A selection of tests.
- **Concussion** - A violent collision or shock; an injury to part of the body, most especially the brain, caused by a violent blow, followed by loss of function.
- **Neurocognitive** - a term used to describe cognitive functions closely linked to the function of particular areas, neural pathways, or cortical networks in the brain.
- **Neuropsychology** – A specialty of psychology concerned with the study of the relationships between the brain and behavior, including the use of psychological tests and assessment techniques to diagnose specific cognitive and behavioral deficits.
- **Norms or Normative** – A statistical description of the test performance of a well-defined group that serves as a reference by which to gauge the performance of the other individuals who take the test.
- **Percentile Scores** - indicates the subject’s test performance relative to that of the group on which the test was standardized. It records the percentage of this group whose scores were lower than that obtained by the subject.
- **Raw Scores** – Are the original testing results (data) from the athlete that has not been transformed by calculation.
- **Report** – A formatted output generated from a subject’s test session data.
- **Subject** – A person or patient who takes the test.
- **Subject Reference** – The alphanumeric code that identifies the Subject taking the test.
- **Supervisor or Administrator** - The primary Concussion Vital Signs account holder.
- **Administrator Login** - LOGIN used by the primary Concussion Vital Signs account holder to access testing information. e.g. View Reports.
- **Test** – A single test, such as the Verbal Memory Test.
- **Test Administrator** – Persons who facilitate the process of having the subject take the assessment (e.g. athletic trainer, testing technician, school nurse, clinician, etc.).
- **Athlete Testing Login** - LOGIN used for baseline and post-concussion testing of athletes.
- **Testing Session or Session** – The act of the subject completing one or more tests in succession.
- **Valid Score** - the application of proven methods to arrive at a true score.
Concussion should be suspected in the presence of any one or more of the following: symptoms (such as headache), or physical signs (such as unsteadiness), or impaired brain function (e.g. confusion) or abnormal behavior.

1. Symptoms: The presence of any of the following signs and symptoms may suggest a concussion. Check ✓ the SYMPTOMS exhibited by the athlete.

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Loss of consciousness</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Seizure or convulsion</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Amnesia</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Headache</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>&quot;Pressure in head&quot;</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Neck Pain</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Nausea or vomiting</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Dizziness</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Blurred vision</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Balance problems</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Sensitivity to light</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Sensitivity to noise</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Feeling slowed down</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Feeling like &quot;in a fog&quot;</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>&quot;Don’t feel right&quot;</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Difficulty concentrating</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Difficulty remembering</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Fatigue or low energy</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Confusion</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Drowsiness</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>More emotional</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Irritability</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Sadness</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Nervous or anxious</td>
<td></td>
</tr>
</tbody>
</table>

2. Memory function: Failure to answer all questions correctly may suggest a concussion. Incorrect Correct Additional comments:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>At what venue are we at today?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Which half is it now?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Who scored last in this game?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What team did you play last week/game?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did your team win the last game?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Balance testing: Instructions for tandem stance “Now stand heel-to-toe with your non-dominant foot in back. Your weight should be evenly distributed across both feet. You should try to maintain stability for 20 seconds with your hands on your hips and your eyes closed. I will be counting the number of times you move out of this position. If you stumble out of this position, open your eyes and return to the start position and continue balancing. I will start timing when you are set and have closed your eyes.”

Athlete was observed for 20 seconds. If they make more than 5 errors (such as lift their hands off their hips; open their eyes; lift their forefoot or heel; step, stumble, or fall; or remain out of the start position for more than 5 seconds) then this may suggest a concussion.

Number of Errors: 

Any athlete with a suspected concussion should be IMMEDIATELY REMOVED FROM PLAY, urgently assessed medically, should not be left alone and should not drive a motor vehicle.

Sideline or abbreviated testing is designed to assist with the immediate assessment or screening of sports related concussion (e.g. SIDELINE) and is not meant to replace computerized or comprehensive neuropsychological testing. The Concussion Sideline Assessment should not be used as a stand alone tool for concussion management. The Concussion Sideline Assessment is designed to be a support for recognizing sports related concussions and to document clinical endpoints that may assist a qualified health professional in their return-to-play decision making.
Do Your Best! Instructions

1. **SPEED and ACCURACY**
   You will be measured based on the speed and accuracy of your responses. This is not an IQ test, it is a measure of your brain function performance.

2. **FOLLOW INSTRUCTIONS**
   Carefully follow the instructions. Failure to understand the instructions can produce an invalid test score requiring a retake.

3. **TURN OFF CELL PHONE**
   Turn off and put away all electronic devices. It is important for you to focus on giving your best effort.

4. **COMFORTABLE?**
   Do you need to use the facilities? Do you have a headache, hand injury? Do you wear glasses? Are you dizzy, drowsy / sleepy?

How to Record your Responses

- **ENTER** key, to start and advance each test or rating scale
- **SPACE BAR** as the primary response key for most of the tests
- **ARROW KEYS** used for the Shifting Attention Test
- **NUMBER ROW** keys for other tests and the medical rating scales (*The keypad is disabled*)
Optimal Baseline and Post-Injury Testing: Concussion Vital Signs is a web-based “video-game” type performance test that measures your neurocognitive function. Neurocognitive testing is a test of brain function and NOT IQ. Baseline testing is an important part of concussion management. The results of the neurocognitive baseline and post-injury testing can help doctors and qualified health professionals in assessing, monitoring, and managing concussion.

It is Important to DO YOUR BEST!

Read and Initial that you understand the following then sign below:

_____ I understand that I should put forth my best effort and that my testing scores are based on the ACCURACY and SPEED of my responses.

_____ I understand that failure to PUT FORTH MY BEST EFFORT can produce invalid test scores and I may have to retake the entire test again to generate a valid assessment.

_____ I understand that I MUST READ and FOLLOW the INSTRUCTIONS carefully and that not reading and following the instructions can produce invalid test scores and I may have to retake the entire test again to generate a valid assessment.

I understand that I will ONLY USE THE KEYS on the KEYBOARD circled below to record my responses and I WILL NOT use the “KEYPAD” as that will cause me to have an invalid test and I may have to retake the entire test again to generate a valid assessment.

_____ I have turned off and put away my cell phone and other electronic devices.

_____ I WII DO MY BEST!

CHECK THE TESTING ISSUES THAT APPLIES TO YOU CURRENTLY: ☐ I have a headache, ☐ I have colorblindness, ☐ I have a hand injury, ☐ I need to wear glasses to read and I am not wearing them, ☐ I am dizzy, ☐ I am drowsy / sleepy.

PRINT Name: __________________________________________________________________________

SIGNATURE: ___________________________________________________________________ DATE: ______________________________
**Parent History Information Instructions**

**Optimal Concussion Information:** Concussion Vital Signs is a web-based concussion management program designed to support the most current sports concussion guidelines. The results of the athlete's concussion history can help doctors and qualified health professionals in assessing, monitoring, and managing concussion. Parents and guardians are generally the best to complete this portion of our concussion information as many times a concussed individual has no memory of the event. **Please follow the instructions:**

**Step 1.** **GO TO** [www.concussionvitalsigns.com](http://www.concussionvitalsigns.com)

**Step 2.** **CLICK** on athlete assessment LOGIN

**Step 3.** **ENTER**

User Name: __________________________

& Password: __________________________

**Step 4.** **Enter ATHLETE ID, SELECT, and ENTER INFORMATION**

Enter Athlete ID: __________________________

And **CLICK** the Test Button

**Re-enter** the student-athlete's ID, Date-of-birth, first and last name... then **CLICK** the Baseline bubble and **CHECK** the box **Athlete Information & Medical History** and **CLICK** the OK Button. Confirm test settings and **CLICK** the OK Button. Complete the medical history and LOGOUT. Results will be sent automatically and securely to the school via the web.