

The **REAP** Project

**R**educe  
**E**ducate  
**A**ccommodate  
**P**ace

A Partnership  
between:

Rocky Mountain  
Hospital For Children  
at Sky Ridge Medical  
Center

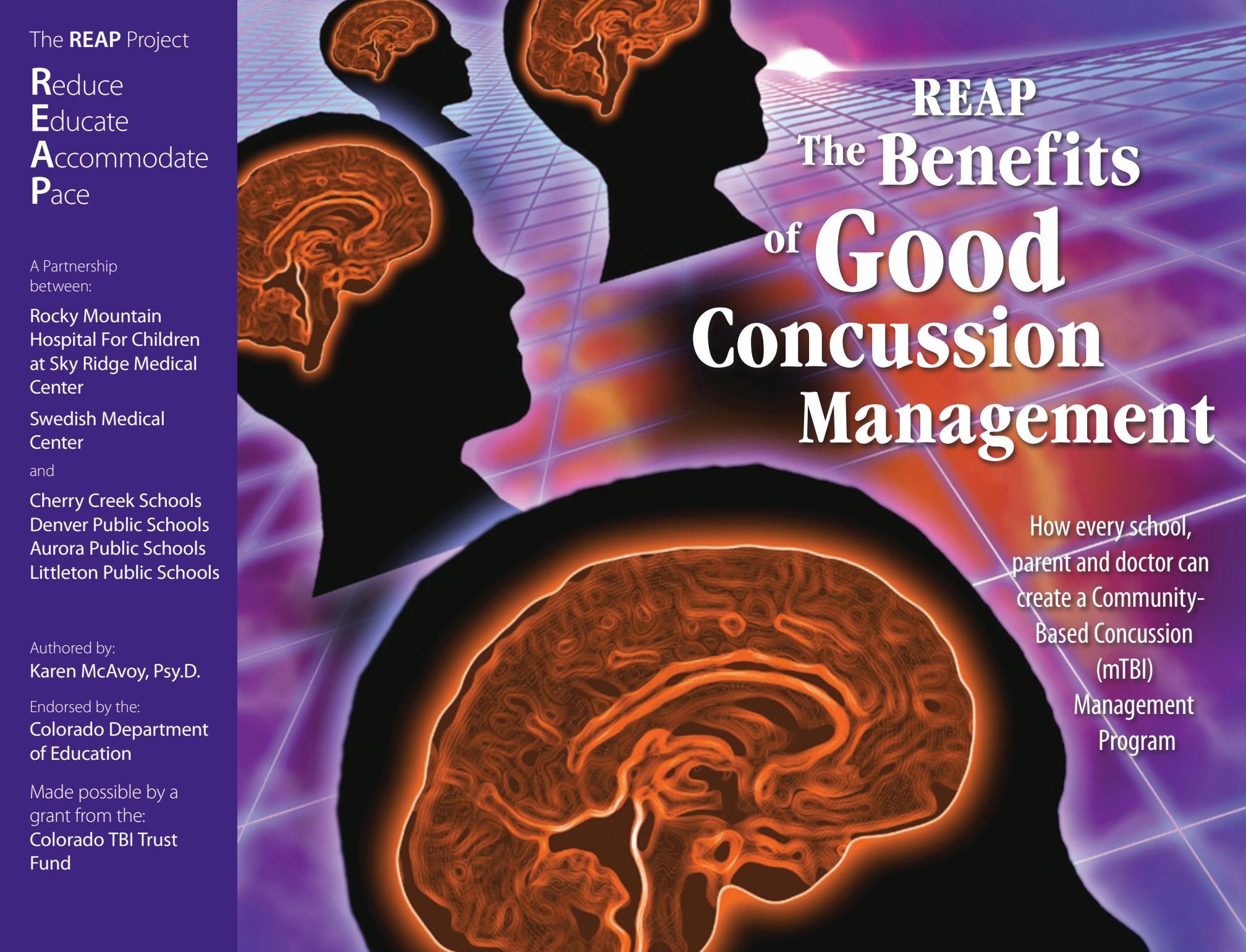
Swedish Medical  
Center  
and

Cherry Creek Schools  
Denver Public Schools  
Aurora Public Schools  
Littleton Public Schools

Authored by:  
Karen McAvoy, Psy.D.

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# REAP The Benefits of **Good Concussion Management**

How every school,  
parent and doctor can  
create a Community-  
Based Concussion  
(mTBI)  
Management  
Program

The REAP Project is a TBI Trust Fund Education grant between Rocky Mountain Hospital for Children/Health One Emergency Departments and four school districts. The REAP Project is the culmination of a study funded by the Center for Disease Control (CDC) from 2004 to 2007. Originally, the study was designed to focus on the efficacy of a new baseline/post-concussion neurocognitive screening tool. More than one thousand student athletes at Grandview High School, in the Cherry Creek School District, were given baseline screening over three years. Ninety-two students went on to suffer at least one concussion (from sports and non-sports related activities). The researchers compared the 92 concussed students with typical peers, matched for the same sport, grade and gender. The results of the study were enlightening... the researchers found that the two most essential factors to good concussion management are: Education and Collaboration – essentially, good communication between a School Team, a Family Team and a Medical Team. As a result, the REAP Project has compiled all of the lessons learned into this manual to promote a Community-Based Approach to Concussion Management.

**Good concussion management requires school/family/medical collaboration.**

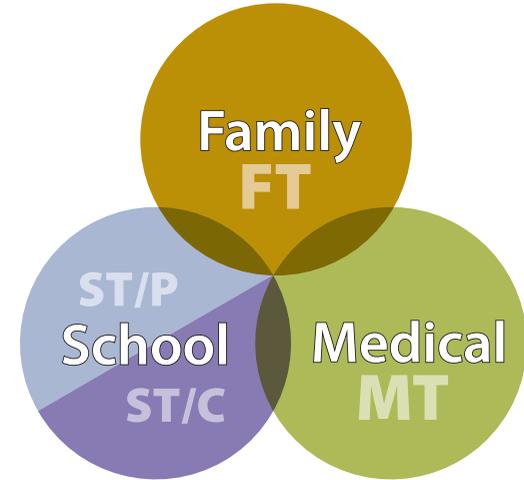
- » More than 80% of concussions resolve very successfully if managed well within the first three weeks post-injury.<sup>1</sup> The first three weeks after the injury is our “window of opportunity”.
- » The day of the injury is considered Day 1 of the concussion. Recovery *also* starts on Day 1. The Reduce/Educate/Accommodate/Pace (REAP) Project will help the School Team, Family Team and Medical Team maximize recovery during the entire three weeks post-injury. Research shows that the average recovery time for a child/adolescent is longer than for an adult.<sup>2</sup>
- » If your child/student suffers a concussion, the REAP project will educate your school teams, family team and medical teams (at no charge) in an effort to maximize the 3 week “window of opportunity”. The REAP Project can be accessed by calling 720-554-4252. Rocky Mountain Hospital for Children/HealthOne Emergency Departments can also access the REAP project by faxing a Head Injury Follow-Up Form to ATTN: REAP @ 720-554-4272.

**TRUE or FALSE?**

***Loss of consciousness (LOC) is necessary for a concussion to be diagnosed.***

**False!** According to the American Academy of Neurology (AAN), a concussion is any “traumatically induced alteration in mental status that may or may not involve a loss of consciousness”. CDC reports that an estimated 1.6 to 3.8 million sports and recreation related concussions occur in the United States each year.<sup>3</sup> 90% of concussions do not involve a loss of consciousness. While many students receive a concussion from sports-related activities, numerous other concussions occur from falls and from motor vehicle, bicycle and playground accidents.

**Community-Based Concussion Management Team**



<b>FT</b>	<b>Family Team</b>	Student, Parents; may include Friends, Grandparents, Primary Caretakers, and others...
<b>ST/P</b>	<b>The School Physical Team</b>	Coaches, Certified Athletic Trainers (ATC), Physical Education Teachers, Playground Supervisors, School Nurses, and others...
<b>ST/C</b>	<b>The School Cognitive Team</b>	Teachers, Counselors, School Psychologists, School Social Workers, Administrators, and others...
<b>MT</b>	<b>Medical Team</b>	Emergency Department, Primary Care Physician, Family MD, Physician’s Assistant, Nurse, Concussion Specialist, and others...

Medical note from Sue Kirelik, MD.  
 Director of Pediatric Emergency  
 Medicine, Sky Ridge Medical Center,  
 REAP Medical Advisor.

Newer recommendations are that children and teens should be treated much more conservatively than adults when it comes to a head injury. The developing brain is very different from the adult brain; it is much more likely to manifest symptoms later and have longer term problems when injured, especially if the child is not allowed to rest and recover. Because each concussion and each child is different, grading scales are no longer recommended. Care for each child and each concussion must be individualized.



## How to use this Manual

Because it is important for each member of the Concussion Management Team to know and understand their part and the part of others members, this manual was written for the entire team. However, as information is especially pertinent to a certain group, it is noted by a color.

Pay close attention to the sections in **YELLOW**.

FT	Parents, Students, Guardians, Grandparents, Friends	For more specific information for parents, download parent fact sheets from the <i>Heads Up Toolkit: For Coaches and For Physicians</i> from the CDC website: <a href="http://www.cdc.gov/ConcussionInYouthSports/english/toolkit_parents_factsheet.htm">www.cdc.gov/ConcussionInYouthSports/english/toolkit_parents_factsheet.htm</a>
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Pay close attention to the sections in **BLUE**.

ST/P	Coaches, Certified Athletic Trainers (ATC), Physical Education Teachers, Playground Supervisors, School Nurses.	For more specific information, download the free <i>Heads Up Toolkit for Coaches</i> from the CDC website: <a href="http://www.cdc.gov/ncipc/tbi/Coaches_Tool_Kit.htm">www.cdc.gov/ncipc/tbi/Coaches_Tool_Kit.htm</a>
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Pay close attention to the sections in **PURPLE**.

ST/C	Teachers, Counselors, School Nurses, School Psychologists, School Social Workers, Administrators	The REAP manual places more emphasis on tips for educators as there are few resources available detailing specific concussion guidelines for educators. General information can be found on the CDC website: <a href="http://www.cdc.gov/ncipc/duip/spotlite/SafeYouthSafeSchools.htm">www.cdc.gov/ncipc/duip/spotlite/SafeYouthSafeSchools.htm</a>
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Pay close attention to the sections in **GREEN**.

MT	Pediatricians, Family Doctors, Primary Care Physicians (PCP), Physician Assistants (PA), Nurses, School Nurses	For more specific information for medical professionals, download <i>Heads Up: Brain Injury in your Practice, Toolkit For Physicians</i> from the CDC website: <a href="http://www.cdc.gov/ncipc/tbi/physicians_tool_kit.htm">www.cdc.gov/ncipc/tbi/physicians_tool_kit.htm</a>
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### TRUE or FALSE?

*A concussion is benign; it is just a "bump on the head".*

**False!** Actually, a concussion is a mild traumatic brain injury (mTBI). The symptoms following a concussion can range from mild to severe and usually involve: confusion, disorientation, memory loss, slow reactions and extreme emotional reactions. The severity of the symptoms cannot be predicted at the time of the injury. The terms *concussion* and *mTBI* will be used interchangeably throughout the rest of this manual.

REDUCE

EDUCATE

ACCOMMODATE

PACE

SPECIAL  
CONSIDERATIONS

RESOURCES

APPENDIX

## *After your child/student has been evaluated and diagnosed for their concussion,* **There is One Immediate and Essential Focus.**

**1 Reduce** the potential of further injury to the brain! Second Impact Syndrome (SIS) is the phenomenon in which a person sustains a second blow to the head before the first concussion has healed. SIS is known to cause permanent damage and/or even death.<sup>4</sup> It takes minimal impact to cause the second concussion. Therefore, it is imperative that until a concussion is 100% resolved, a student must be removed from any activity that can potentially cause further injury.

In the Fall of 2004, Jake Snakenberg was a freshman football player at Grandview High School. He likely sustained a concussion in a game the week prior, but his symptoms were mild and he did not fully understand that he had experienced a concussion. One week later, Jake took a typical hit in a game, he collapsed on the field and never regained consciousness. Jake passed away from “Second Impact Syndrome” on September 19, 2004



**2 Reduce** physical and cognitive demands! Typically when an athlete is injured, physical demands on that injured area are immediately decreased (in REAP, this is REDUCE) and then slowly returned during rehabilitation (in REAP, this is PACE). If an athlete is running a marathon and sprains an ankle, the immediate action is removal from the race. With proper management and recovery from the injury, the athlete may be allowed to run again in a later race. Athletes know, failure to immediately reduce the physical demands following injury can have serious and long-term effects.

In the marathon of life, a concussion is like the sprained ankle – it is an injury to the brain. Since the brain is the organ responsible for managing all physical and cognitive functions of the body, both physical and cognitive demands on the brain must be reduced during recovery from concussion. Failure to reduce both physical and cognitive demands will hamper recovery. School is the place where cognitive demands are the highest. Providing strategies for cognitive reduction in school (in REAP, this is ACCOMMODATE) is essential to the recovery process.

### Message to Parents

If you want to maximize your child’s recovery from concussion, double up on your R’s. REDUCE and REST! Insist that your child rest, especially for the first few days post-concussion and throughout the three week recovery period.

Don’t let your child convince you he/she will rest “later” (after the prom, after finals). Rest must happen immediately! The school team will help your child reduce cognitive load (see ACCOMMODATE). However, it is your job at home to help to reduce sensory load – i.e., it is advised that teens avoid loud group functions (games, dances), limit video games and text messaging. Because a concussion will almost universally slow reaction time, driving should be limited/restricted pending medical clearance.

Plenty of sleep and quiet, restful activities post-concussion maximizes your child’s chances for a great recovery!

### Message to Educators

Message to Educators – REAP cannot stress enough, management of concussion requires that there is an equal partnership between the members of the school team who manage the physical reduction and members of the school team who manage cognitive reduction. See ACCOMMODATE for how to reduce cognitive load.

# Once the injury happens, the treatment of choice is to EDUCATE and MANAGE!

**Did you know...** a doctor cannot predict the course of recovery at the time of the injury?. The course of recovery depends 100% on the on-going (sometimes daily!) monitoring, management and resolution of symptoms. Symptoms tell the story!

## STEP 1: Know the Symptoms

Knowing *if* the student is recovering from the symptoms of concussion and *how* the student is recovering from his/her symptoms is still the best measure of recovery. Therefore, it is essential that everyone understand, recognize and be mindful of ALL symptoms related to concussion. Every symptom is important. The common symptoms of concussion cluster in general categories:

PHYSICAL		COGNITIVE	
Headache/Pressure	Nausea	Feel in a "fog"	
Blurred vision	Vomiting	Feel "slowed down"	
Dizziness	Numbness/Tingling	Difficulty remembering	
Poor balance	Sensitivity to light	Difficulty concentrating/easily distracted	
ringing in ears	Sensitivity to noise	Slowed speech	
Seeing "stars"	Disorientation	Easily confused	
Vacant stare/Glassy eyed	Neck Pain		
EMOTIONAL		MAINTENANCE	
Inappropriate emotions	Irritability	Fatigue	Drowsiness
Personality change	Sadness	Excess sleep	Sleeping less than usual
Nervousness/Anxiety	Lack of motivation	Trouble falling asleep	
Feeling more "emotional"			

Thorough symptom monitoring is the key to good management. Therefore, REAP strongly suggests that all Concussion Team members, especially the child/student, learn to rate symptoms on a scale of 0 to 6. Assigning numbers to symptom intensity provides an objective measure and a common language for all team members to understand (see the Graded Symptom Checklist (GSC) and the Post-Concussion Symptom Scale in the Appendix).

**EDUCATE**

### IMPORTANT!

All symptoms of concussion are important; monitoring of physical symptoms is critical. If physical symptoms worsen, especially headache, confusion, disorientation, vomiting, difficulty awakening, within the first 48 to 72 hours, it is often a sign that a more serious medical condition is developing in the brain.

**SEEK IMMEDIATE  
MEDICAL ATTENTION!**



### Medical Box

*"It is not appropriate for a child or adolescent athlete with concussion to Return-to-Play (RTP) on the same day as the injury, regardless of the athletic performance."<sup>5</sup>*

Consensus Statement on Concussion in Sport: the 3rd International Conference on Concussion in Sport, Zurich 2008

## STEP 2: Managing Your Concussion Management Team

The CDC/Grandview High School study demonstrated that symptom frequency and intensity are typically highest Days 1 through 4, continue throughout Week 1 and begin to wane throughout Weeks 2 and 3. You will notice that REAP has developed a suggested timeline by which symptoms are checked and monitored – and REAP has assigned responsibilities to certain team members/certain teams to manage specific symptoms. As every mTBI is different and unique, your team will need to be fluid and flexible.

Within the guidelines set forth in the REAP timeline, it is recommended that the Concussion Management Team decide (case by case):

- » Who will be the School Team – Physical **ST-P** point person,
- » Who will be the School Team – Cognitive **ST-C** point person,
- » Who from the school will communicate with the Family Team **FT**
- » Who will communicate with the Medical Team **MT**.

During the CDC/Grandview study, the ATC often acted as the ST-P; other times the School Nurse acted as the ST-P. The School Psychologist or Counselor usually acted as the ST-C. Frequently, a teacher was the point person for cognitive symptoms. The REAP model suggests that one person take responsibility for meeting with the student (daily or at specified intervals) to objectively rate symptoms. That one point person is assigned the duty of helping the student complete, in writing, the symptom rating scale. Areas of symptom concern/improvement are then shared with other point people managing various symptoms so that accommodations/decisions can be made. REAP suggests that if resources allow for only one point person at the school, that person must be equally capable of managing cognitive/emotional symptoms as well as physical symptoms. The majority of the communication in the CDC/Grandview study happened via phone, email or one-on-one. Meetings were infrequent.

**Ciera was 15 years old when she suffered a concussion while playing basketball.** Her symptoms of passing out, constant headaches and fatigue plagued her for the remainder of her freshman year. One of the most helpful accommodations for Ciera has been:

*“It really helped me when my teachers had class notes already printed out. That way I could just highlight what the teacher was emphasizing and focus on the concept rather than trying to take notes. Since having a brain injury, I don’t really see words on the board, I just see letters. Therefore, having the notes beforehand takes some of the frustration off of me and I am able to concentrate and retain what is being taught in class. Being able to rest in the middle of the day is also very important for me. I become very fatigued after a morning of my rigorous classes, so my counselors have helped me adjust my schedule which allows me some down time so I can keep going through my day. Lastly, taking tests in a different place such as the conference room or teacher’s office has helped a great deal.”*

CIERA LUND



**TRUE or FALSE?**

**A concussion is usually diagnosed by neuroimaging tests (ie. CT scan or MRI).**

**False!** Concussions cannot be detected by neuroimaging tests; a concussion is a functional, not structural injury. Concussions are typically diagnosed by careful examination of the signs/symptoms of concussion at the time of injury and the resolution of symptoms afterwards. While a CT scan or an MRI is often used to rule out more serious bleeding in the brain, it is not a diagnostic test for concussion. A “negative” scan does not mean that a concussion did not occur.

# REAP suggests the following timeframe:

TEAM		WEEK 1	WEEK 2	WEEK 3
FT	<b>Family Team</b> Help child understand he/she must be a “honest partner” in the rating of symptoms	<ul style="list-style-type: none"> <li>Impose rest.</li> <li>Assess symptoms daily – especially monitor maintenance symptoms and emotional symptoms.</li> </ul>	<ul style="list-style-type: none"> <li>Continue to assess symptoms (at least 3X week or more as needed), monitor if symptoms are improving.</li> <li>Increase demands and assess symptoms.</li> </ul>	<ul style="list-style-type: none"> <li>Continue with all assessments (at least 2X week or more as needed).</li> <li>Increase or decrease demands based upon outcome (see PACE).</li> </ul>
ST/P	<b>School Team – Physical Coach/ATC/SchoolNurse</b> (1 point person to oversee/manage physical symptoms)	<ul style="list-style-type: none"> <li>REAP suggests immediate removal from play/physical activities!</li> <li>Assess physical symptoms daily, use objective rating scale.</li> <li>ATC/Coach: assess postural-stability (see NATA reference in RESOURCES).</li> <li>School Nurse: monitor visits to school clinic If symptoms at school are significant, contact parents and send home from school.</li> </ul>	<ul style="list-style-type: none"> <li>Continue to assess that symptoms are improving (at least 3X week or more as needed).</li> <li>Step-wise increase in physical demands (see PACE).</li> <li>ATC/Coach: postural-stability assessment.</li> </ul>	<ul style="list-style-type: none"> <li>Continue with all assessments (at least 2X week or more as needed).</li> <li>Increase or decrease demands based upon outcome (see PACE).</li> <li>ATC/Coach: postural-stability assessment.</li> </ul>
ST/C	<b>School Team – Cognitive Educators, School Psychologist, Counselor, Social Worker</b> (1 point person to oversee/manage cognitive/emotional symptoms)  *Get a Release of Information signed immediately to talk to MD	<ul style="list-style-type: none"> <li>Reduce all cognitive demands (reduce, do not eliminate cognitive demands).</li> <li>Meet with student individually to create academic accommodation plan for cognitive/emotional reduction no later than Day 2/3 &amp; then assess again.</li> <li>Educate all teachers on the symptoms of concussion (see “Concussion is More Than a Bump to the Head” in Appendix).</li> <li>Make immediate academic accommodations.</li> <li>See ACCOMMODATE section.</li> </ul>	<ul style="list-style-type: none"> <li>Continue to assess that symptoms are improving (at least 3X week or more as needed).</li> <li>Slow increase in cognitive demands (see PACE).</li> <li>Continue academic accommodations as needed.</li> </ul>	<ul style="list-style-type: none"> <li>Continue with all assessments (at least 2X week or more as needed).</li> <li>Increase or decrease demands based upon outcome (see PACE).</li> <li>Continue academic accommodations as needed.</li> <li>Assess if longer term academic accommodations are needed (504 Plan, IEP, etc.).</li> </ul>
MT	<b>Medical Team</b>	<ul style="list-style-type: none"> <li>Assess and diagnose concussion.</li> <li>Monitor that symptoms are improving throughout Week 1 - not worsening in the first 48 to 72 hours.</li> </ul>	<ul style="list-style-type: none"> <li>Continue to consult with school and home teams.</li> <li>Follow-up medical check including: comprehensive history, neurologic exam, detailed assessment of mental status, cognitive function, gait and balance.</li> </ul>	<ul style="list-style-type: none"> <li>Continue to consult with school and home teams.</li> </ul> <p>It is best practice that a medical professional be involved in the management of each and every concussion.</p>

Don't be alarmed that there are symptoms, there are going to be symptoms - symptoms are the hallmark of concussion. The goal is to be watching for a slow and steady improvement in ALL symptoms over time. If symptoms persist into Week 4, see SPECIAL CONSIDERATIONS.

**EDUCATE**

# ACCOMMODATE

## Most Common Cognitive Problems Post-Concussion and suggested accommodations

Areas of concern	Suggested Accommodations
<b>Fatigue, specifically Mental Fatigue</b>	“Strategic rest” – strategic rest is scheduled. Do not wait until the student is so over-tired that he/she has a “meltdown”. Adjust the schedule to incorporate a 15-20 rest period mid-morning and a rest period mid-afternoon. Missing recess or reading quietly does not constitute a rest period.
<b>Difficulty concentrating</b> <i>Feels like being in a “fog”</i>	Reduce the cognitive load. Smaller amounts of learning will take place during the recovery. Since learning during recovery is compromised, you must decide: What is the most important concept for the student to learn? Do not tax them cognitively.
<b>Slowed processing speed</b> <i>Feels like being converted from high speed internet to dial up internet</i>	Extra time on tests and projects. Assess whether the student has large tests or projects due during the 3 week recovery period. Remove or adjust due dates. Provide copies of teacher’s notes or a peer note taker.
<b>Difficulty with working memory</b> <i>The ability to temporarily store and manage information during complex cognitive processes such as learning and reasoning</i>	Initially exempt from routine work/tests. During recovery, the student has limited working memory: What is the most important concept(s) you want them to know? Work toward comprehension of a smaller amount of material versus rote memorization.
<b>Difficulty converting new learning into memory</b>	Allow student to “audit” the material during this time. Remove “busy” work that is not essential for comprehension. Making the student accountable for all of the work missed during the recovery period (3 weeks) places undue cognitive and emotional strain on them and may hamper recovery. Ease student back into full load.
<b>Emotional symptoms</b>	Be mindful of emotional symptoms throughout! Students are often scared, overloaded, frustrated, irritable, angry and depressed as a result of mTBI. They respond well to education and support during recovery.

### School Team Educators

When an athlete is injured, the coaches keep the athlete “engaged” with the team (by attending practices, traveling with the team) even when the athlete cannot play. This concept of keeping the student involved and engaged in academics, in spite of the concussion, is very important. While cutting back on the cognitive load, the school team must devise a plan to keep the student “academically conditioned and engaged in learning” throughout the entire three week recovery period.

#### Interesting research note:

The CDC/Grandview Study demonstrated that concussed students were minimally absent from school during their recovery and yet recovered well. This finding is reinforced by a 2008 study showing that concussed students who maintained moderate levels of activity (not 100% bed rest and not 100% on-the-go) had the most positive recovery!<sup>6</sup>

More in-depth information and recommendations can be found in the BrainSTARS Manual (see RESOURCES)

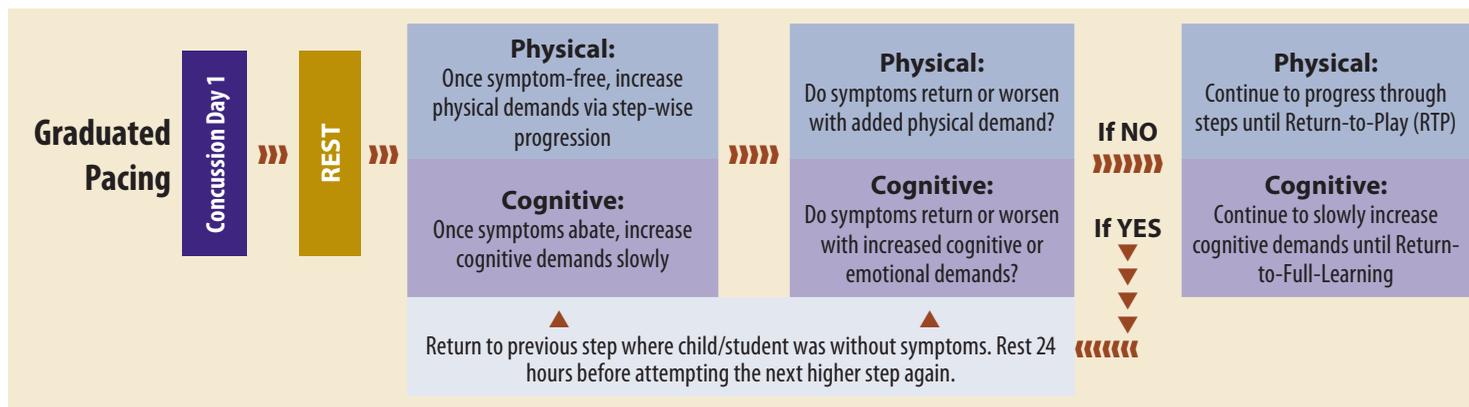
### Medical Box

The newest research shows that neuropsychological testing has significant clinical value in concussion management, especially with children and especially when baseline scores are available. The addition of neuropsychological tests is emerging best practice. However, limited resources and training are a reality for school districts. An extensive list of paper and pencil neurocognitive tests known to be sensitive to mTBI can be found at [Cokidswithbraininjury.com](http://Cokidswithbraininjury.com). Whether or not a school district chooses to

include any type of neurocognitive testing, REAP is still the foundation of the Concussion Management program. Data gathered from serial post-concussion testing (by Day 2/3, by Day 7, by Day 14 and by Day 21, until asymptomatic) can only serve to provide additional information. No test score should ever be used in isolation. All ethical guidelines of test administration and interpretation must be adhered to.

# The 2008 Zurich Consensus Statement on Concussion in Sport Recommends A Graduated Return-to-Play (RTP)

STAGE	ACTIVITY	FUNCTIONAL EXERCISE	CHILD/STUDENT EQUIVALENT	OBJECTIVE OF STAGE
1	No physical activity as long as there are symptoms <i>(This step could take days or even weeks)</i>	Complete physical rest	Quiet time with maximum rest	Recovery
	<i>When 100% symptom free for 24 hours proceed to Stage 2. (Younger children may need a longer symptom-free period.) ▼</i>			
2	Light aerobic activity	Walking, swimming, stationery cycling, 10-15 minutes of exercise, no resistance	Solitary play or quiet play alone or with parent	Increase heart rate <i>(light to moderate workout not requiring cognitive attention or high degree of coordination)</i>
	<i>If symptoms reemerge with this level of exertion then return to the previous stage. If the student remains symptom free for 24 hours after this level of exertion then proceed to the next stage. ▼</i>			
3	Sport-specific exercise	Skating /running drills, 20-30 minutes - no weightlifting, no head contact	Supervised play, low risk activities	Add movement <i>(increased attention and coordination required)</i>
	<i>If symptoms reemerge with this level of exertion then return to the previous stage. If the student remains symptom free for 24 hours after this level of exertion then proceed to the next stage. ▼</i>			
4	Non-contact training drills	Progression to more complex training drills, may start progressive resistance training	May run/jump as tolerated	Exercise, coordination <i>(mimics athlete's sport without risk of head injury)</i>
	<i>If symptoms reemerge with this level of exertion then return to the previous stage. If the student remains symptom free for 24 hours after this level of exertion then proceed to the next stage. ▼</i>			
5	Full-contact practice	Following medical clearance, participate in normal training activities; full exertion	Normal participation with parental/ adult supervision	Restore confidence and assess functional skills by coaching staff <i>(or family)</i>
	<i>If symptoms reemerge with this level of exertion then return to the previous stage. If the student remains symptom free for 24 hours after this level of exertion then proceed to the next stage. ▼</i>			
6	Return to Play	Normal game play	Normal playtime	No restrictions

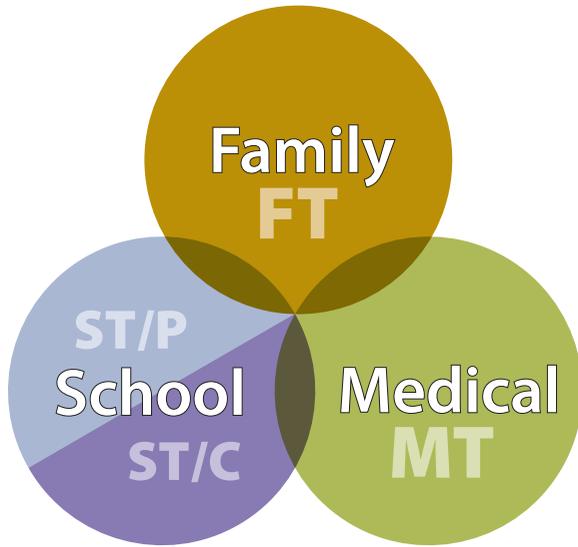


**PACE**

## Graduated Return-to-Learning/Cognitive Return

Resumption of normal cognitive activity follows the same principles as the resumption of graduated physical activity with mental rest until symptom free and then a gradual increase of cognitive demands. Unless a child/student is acutely ill from the concussion, he/she may return to school without significant delay as long as academic accommodations are in place. Cognitive activity is gradually increased as long as the student remains symptom free. If symptoms emerge with mental exertion, then the cognitive activity is again reduced until the student is able to complete that level of cognitive load without symptoms.

# Management of Concussion is Difficult Because it is a *Moving Target*



A medical doctor, whether in the Emergency Department or at your follow-up clinic, cannot predict the length and the course of recovery from concussion. The *best* assessment of whether a student is ready to return 100% to play or to learning is:

- » are symptoms resolving?
- » do symptoms worsen or return upon exertion?

That information is only available on a daily basis to the student, the family and the school team. Even the most involved medical doctor will likely not be able to see the student on a daily basis, therefore, the assessment and monitoring of symptoms must be collected by the school team, the family team and must be shared with the medical doctor. The key to success is *communication and collaboration!*

In the spirit of teamwork, the decision for the child/student to return to full 100% activities (or play) cannot or should not be made by any one single member of the team. For example, an ATC should not return a child/student to contact play without educator/family/medical professional input and support. Likewise, an outside medical professional should not make a RTP decision without the school and family input. In other words, the RTP/R-to-Learning decision must be made by consensus of the Concussion Management Team, in consultation with medical professionals.

## When Symptoms do not Resolve as Expected

Approximately 10% to 20% of concussions do not resolve in 3 weeks. When and if symptoms (physical, cognitive, emotional or maintenance) do not resolve as expected, it is suggested that the child/student work with their medical professional to pursue a more specialized outpatient evaluation (medical or psychiatric).

As stated throughout the manual, an uncomplicated concussion will generally resolve within three weeks. It is extremely rare and not advised for students to be absent from school (other than the first day or two when the concussion is most acute). However, if the long-term symptoms of the concussion cause or require an extended absence from school and/or results in the need for specialized assessment and/or programming (IDEA or 504 Plan), it would be wise to classify the student as having a traumatic brain injury and staff through “Traumatic Brain Injury” services. It is beyond the focus of this manual to direct the scope of assessment and programming for a brain injury, however, many school districts have Brain Injury Teams for consultation and support. Guidelines to help educators consider brain injury in schools can be found on the [COkidswithbraininjury.com](http://COkidswithbraininjury.com) website. Other brain injury resources are listed in the **RESOURCES** section.

## TRUE or FALSE?

*A parent should awaken a child who falls asleep after a head injury.*

**False!** Current medical advice is that it is not dangerous to allow a child to sleep after a head injury, once they have been medically evaluated. The best treatment for a concussion is sleep and rest.



## Medical Box

Students who have Attention Deficits, Learning Disabilities, a history of migraine headaches, sleep disorders, depression or other psychiatric disorders may have more difficulty recovering from a concussion. Students who have had multiple concussions, a recent prior concussion or who are getting symptomatic after less impact may be at risk for long term complications. Research supports the fact that a person who sustains one concussion is at higher risk for sustaining a future concussion.<sup>7</sup>



# Special Considerations...

## Long-Term Monitoring

Studies have not been able to estimate the numbers of children/students who initially recover well from a mTBI/concussion but suffer later from learning, emotional, behavioral issues. Are those problems related to the earlier mTBI/concussion? No one can say for sure but educators suspect there may be some connection, especially in the case of multiple concussions. The REAP Project provides a template by which schools, parents and medical professionals can manage the short-term, three week recovery post-injury. However, the second phase of the REAP Project is to hand off the long term monitoring of concussed children/students to the Brain Injury Teams in the four participating school districts – Cherry Creek, Denver, Aurora and Littleton Public Schools. The REAP Project and the Colorado Department of Education thank these 4 school districts for their willingness to follow these children/students over time - to better assess the long-term picture of mTBI/concussion. It is not necessary to have a Brain Injury Team in a school district to follow a child/student long-term post-REAP. Any caring educator or knowledgeable parent can watch over a child/

student through the lens of mTBI and is encouraged to express concern to the school team if problems emerge later in the school career.

## CDC/Grandview Study

The most important lesson learned from the CDC/Grandview study is that good concussion management goes beyond neurocognitive screening and the RTP decision. Although gaining in popularity at this time, no one single assessment (computerized, paper/pencil or otherwise) should ever be used in isolation to make a RTP/RTL decision. In fact, good concussion management, also known as good mTBI management, involves *exceptional communication* and *collaboration* among a School team, a Family team and the Medical team. When making a serious decision about the health and well-being of a child/student, it is best practice to consider multiple data points, collected from multiple sources. That is the richness of the Community-Based Concussion Management REAP Project.

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SPECIAL  
CONSIDERATIONS

## RESOURCES

RESOURCES		
Center for Disease Control (CDC):	<a href="http://www.CDC.gov">www.CDC.gov</a>	1-800-CDC-INFO
Colorado TBI Trust Fund:	<a href="http://www.tbicolorado.org">www.tbicolorado.org</a>	303-866-4779
CO Child/Adolescent Brain Injury website	<a href="http://www.COkidswithbraininjury.com">www.COkidswithbraininjury.com</a>	
Brain injury Association of Colorado (BIAC)	<a href="http://www.biacolorado.org">www.biacolorado.org</a>	303-355-9969
Brain Injury Association of America (BIAA)	<a href="http://www.biausa.org">www.biausa.org</a>	1-800-444-6443
Colorado Department of Education	<a href="http://www.cde.state.co.us">www.cde.state.co.us</a>	303-866-6779
BrainSTARS	<a href="http://www.lapublishing.com">www.lapublishing.com</a>	
National Association of Athletic Trainers (NATA)	<a href="http://www.nata.org/">www.nata.org/</a> <a href="http://www.journalofathletictraining.org">www.journalofathletictraining.org</a>	

All questions or comments can be directed to:

**Karen McAvoy, Psy.D.**

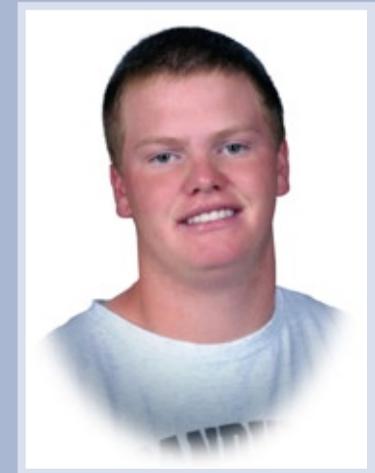
Coordinator of Mental Health Services  
Coordinator of the Brain Injury Team  
Cherry Creek School District

**720-554-4252** or

**[kmcavoy@cherrycreekschools.org](mailto:kmcavoy@cherrycreekschools.org)** or

**720-554-4272** FAX

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**The REAP Project is dedicated in memory of:**

**JACOB SNAKENBERG**

**April 19, 1990 –  
September 19, 2004**

*To prevent future loss of life  
due to concussion*

# Concussion In Children *It's more than just a bump on the head!*

Concussions in children can cause temporary changes in how they act, think, and feel. If your child has had a concussion, he or she might act differently and probably will be more tired for awhile. It's a good idea to let your child have a few days off from school, take more rest and have fewer expectations to meet for the next week or two. Over the next several weeks, watch for these possible changes:

Changes in Behavior and Energy	Changes in Thinking	Changes at School	Changes in Feelings
<ul style="list-style-type: none"><li>» Has lots of headaches</li><li>» Is very tired; sleeps too much or too little</li><li>» Tantrums; impulsive or aggressive at times; "short fuse"</li><li>» Quiet, shy, or talking less than usual</li><li>» Doesn't seem "motivated"; not concerned about performance</li><li>» Doesn't listen when corrected; doesn't seem to care when in trouble</li><li>» Not interested in usual activities</li><li>» Has trouble getting started on work or activities</li></ul>	<ul style="list-style-type: none"><li>» Not organized; doesn't complete tasks</li><li>» Forgets or can't remember things</li><li>» Is upset by noises, lights, crowds, or busy places</li></ul>	<ul style="list-style-type: none"><li>» Forgets assignments or does not hand in work</li><li>» Does well one day and poorly the next; grades are worse</li><li>» Messy, incomplete, or disorganized work</li><li>» Doesn't pay attention in class</li></ul>	<ul style="list-style-type: none"><li>» Big emotional reactions</li><li>» Gets upset easily; more worried or moody</li><li>» Quiet or sad</li><li>» Seems easily overwhelmed</li></ul>



Keep in mind that new problems in acting, thinking, or feeling can be due to your child's concussion. Remember that you can get help for these problems. Tell your child's doctor, your school nurse, school psychologist, and a teacher about the concussion. Ask your school personnel to reduce the demands on your child for the next few weeks. The Colorado Department of Education (CDE), Brain Injury Association of Colorado (BIAC) and [COkidswithbraininjury.com](http://COkidswithbraininjury.com) have helpful information on mTBI management on their websites.

POST-CONCUSSION SYMPTOM SCALE							
SYMPTOMS	SEVERITY RATING						
Headache	0	1	2	3	4	5	6
Nausea	0	1	2	3	4	5	6
Vomiting	0	1	2	3	4	5	6
Balance Problems	0	1	2	3	4	5	6
Dizziness	0	1	2	3	4	5	6
Fatigue	0	1	2	3	4	5	6
Trouble Falling Asleep	0	1	2	3	4	5	6
Sleeping More than Usual	0	1	2	3	4	5	6
Sleeping Less than Usual	0	1	2	3	4	5	6
Drowsiness	0	1	2	3	4	5	6
Sensitivity to Light	0	1	2	3	4	5	6
Sensitivity to Noise	0	1	2	3	4	5	6
Irritability	0	1	2	3	4	5	6
Sadness	0	1	2	3	4	5	6
Nervous/Anxious	0	1	2	3	4	5	6
Feeling More Emotional	0	1	2	3	4	5	6
Numbness or Tingling	0	1	2	3	4	5	6
Feeling Slowed Down	0	1	2	3	4	5	6
Feeling like "In a Fog"	0	1	2	3	4	5	6
Difficulty Concentrating	0	1	2	3	4	5	6
Difficulty Remembering	0	1	2	3	4	5	6
Visual Problems	0	1	2	3	4	5	6
Other	0	1	2	3	4	5	6
<b>TOTAL</b>							

## GRADED SYMPTOM CHECKLIST (GSC)

SYMPTOM	TIME OF INJURY	2-3 HOURS POST-INJURY	24 HOURS POST-INJURY	48 HOURS POST-INJURY	72 HOURS POST-INJURY
Blurred Vision					
Dizziness					
Drowsiness					
Excess Sleep					
Easily Distracted					
Fatigue					
Feel "In a Fog"					
Feel "Slowed Down"					
Headache					
Inappropriate Emotions					
Irritability					
Loss of Consciousness					
Loss of Orientation					
Memory Problems					
Nausea					
Nervousness					
Personality Change					
Poor Balance/Coordination					
Poor Concentration					
Ringing in Ears					
Sadness					
Seeing Stars					
Sensitivity to Light					
Sensitivity to Noise					
Sleep Disturbance					
Vacant Stare/Glassy Eyes					
Vomiting					

NOTE: The GSC can be used not only for the initial evaluation but also for each subsequent follow-up assessment until all signs and symptoms have cleared at rest and during physical exertion. In lieu of simply checking each symptom present, the ATC can ask the athlete to grade or score the severity of the symptoms on a scale of 0–6, where 0 = not present, 1 = mild, 3 = moderate, and 6 = most severe.

## CONTRIBUTORS:



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Craig Hospital



Aurora Public Schools

Cherry Creek Schools

Denver Public Schools

Littleton Public Schools



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Authored by: Karen McAvoy, Psy.D.