March 2026: BIAC Care Across the Ages Conference

Brain Injury Through the Tiers:

Unlocking the Potential of Early Concussion Identification

Presented by:
Kiki Grenning, M.S., OTR/L, CPRCS & **Karen McAvoy, PsyD**

Get Schooled on Concussions

COLORADO Department of Education

Kiki Grenning M.S., OTR/L, CPRCS, is a Board-Certified Occupational Therapist and Certified Primitive Reflex Integration Clinical Specialist who currently serves as the Senior Brain Injury Consultant for the Colorado Department of Education. Kiki has over 12 years of experience in the field, bringing a deep commitment to client-centered, holistic, and evidence-based intervention. Her clinical expertise centers on vision, brain injury, and reflex integration– areas that have shaped her professional focus and passion. Her mission is to continue to advocate for functional, inclusive practices that support meaningful outcomes for all learners.

Learning Objectives

Participants will be able to:

1. **Utilize** the Landscape of Wellbeing and Belonging within Colorado's Multi-Tiered System of Supports (COMTSS) framework to identify and support students with brain injury.
2. **Analyze** resources customized for Colorado Schools, such as the Teacher Acute Concussion Tool (TACT), REAP (Remove/Reduce, Educate, Adjust, Pace), and Colorado Kids with Brain Injury Building Blocks for Brain Development.
3. **Demonstrate** how the Building Blocks can be utilized for skill deficit interventions across the Colorado Multi-Tiered System of Supports (CO-MTSS).
4. **Examine** how early identification and intervention of brain injury potentially reduce negative social/emotional outcomes and the lingering impact of concussion.

Karen McAvoy, PsyD, is dually credentialed as a clinical and school psychologist. She practiced as a Pediatric Psychologist at Seattle and Denver Children's Hospitals and as the Director of the Center for Concussion with Rocky Mountain Hospital for Children. She also practiced as a School Psychologist for 20 years serving as Coordinator of Mental Health, Coordinator of Manifestation Determinations and Coordinator of the Brain Injury Team at Cherry Creek School District. For the past 15 years, Dr McAvoy has served as a consultant to the Colorado Department of Education – providing trainings to multi-disciplinary school teams across the state of Colorado on the impact of brain injury and neuro-diversity on learning and behavior. In 2025, Dr McAvoy retired from clinical practice after 42 years.

Dr. McAvoy is the author of REAP (*Remove/Reduce* Educate*Adjust/Accommodate and Pace)* – a community-based, interdisciplinary team approach to concussion management customized in 16+ states: www.REAPconcussion.com. She is also one of the founders of GetSchooledOnConcussions.com; Return to Learn resources BY educators, FOR educators.

“Jake Snakenberg Youth Concussion Act” Senate Bill 11-040

Athlete suffered trauma to head

By David Montero
ROCKY MOUNTAIN NEWS

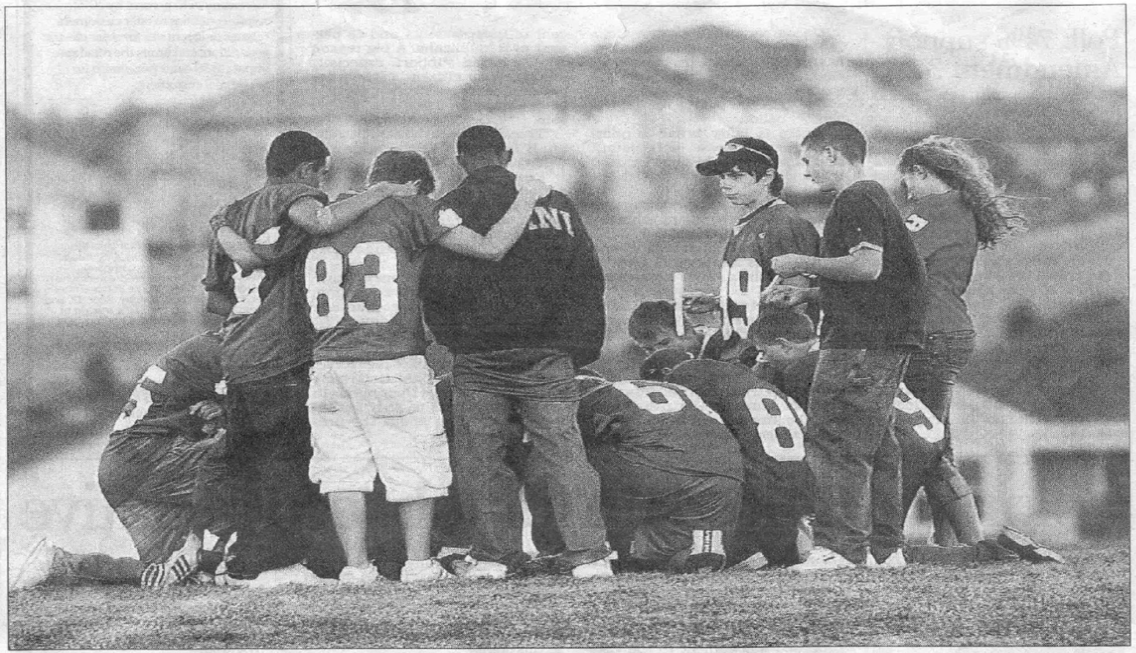
The high school football player who collapsed and died on the field during a game in Aurora this weekend suffered a closed-head injury, an autopsy revealed Monday.

However, officials with the Arapahoe County Coroner's Office said the full results will not be known until all laboratory testing is complete.

Jacob Snakenberg, a 15-year-old freshman fullback for Grandview High School, had just carried the ball during the game against Denver's Thomas Jefferson High School on Saturday when he suddenly collapsed. He died Sunday at Swedish Medical Center.

Dr. John McVicker, the neurosurgeon who operated on Snakenberg, said the teenager's injury was fatal because of another recent trauma to his head. McVicker said Snakenberg suffered from second-impact syndrome and that symptoms often include forgetfulness, difficulty concentrating or learning and mild headaches.

The Snakenberg family seemed to



ment Monday evening.

"Jake died playing football with all his heart and may not have listened to his body telling him he was hurt," the statement read. "Probably as a consequence of a second head injury with subsequent rapid brain swell-

spite of optimal treatment."

Snakenberg's mother also addressed the football team Monday morning, according to Cherry Creek School District spokeswoman Tustin Amole.

Grandview High School students gather Monday at the spot on the football field where freshman fullback Jacob Snakenberg, left, collapsed Saturday. Doctors said the teen suffered from second-impact syndrome.

BARRY GUTIERREZ/ROCKY MOUNTAIN NEWS

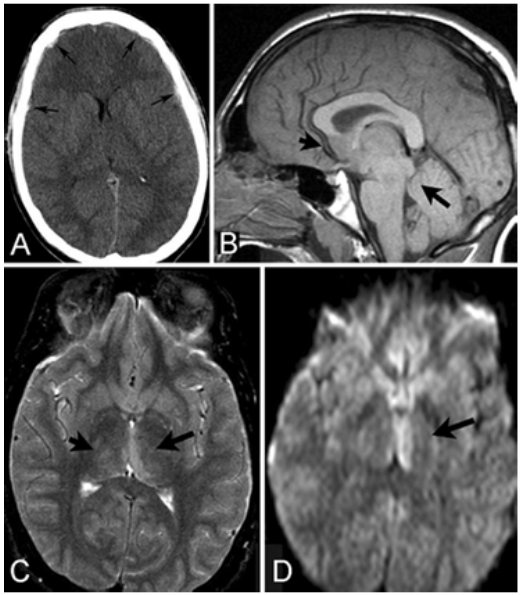
Second Impact Syndrome (SIS)

SIS is a rare, but life-threatening phenomenon of getting a concussion, receiving another blow to the head while still symptomatic from the first hit to the head, and having a cascade of metabolic events that can result in serious brain damage or death.

That is why the one non-negotiable of concussion management is to prevent the individual from hitting their head again while still symptomatic from the first concussion:

- Athletes are removed from sports
- Students are removed from PE and recess play

until they are asymptomatic and can safely, progressively be put back to play.



New national survey shows public misconceptions about brain injuries persist and highlights the need for education - March 2025 Brain Injury Association of America

Survey Highlights:

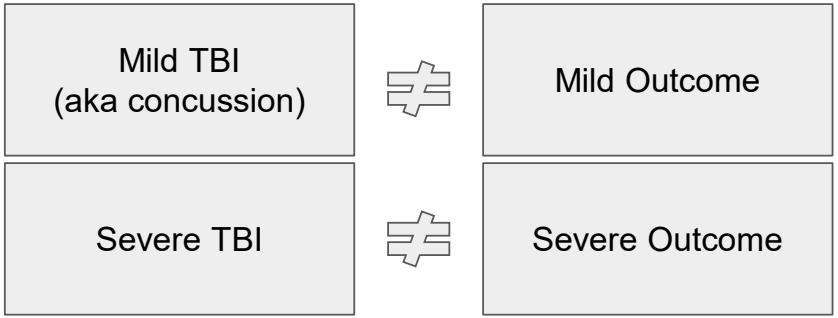
- 81% of adults in the U.S. do not recognize concussions as traumatic brain injuries.
- While 70% of Americans say they are familiar with concussions, only about half report similar awareness of brain injury.
- Fewer than one in five know that falls are the leading cause of brain injuries.

What is a Traumatic Brain Injury?

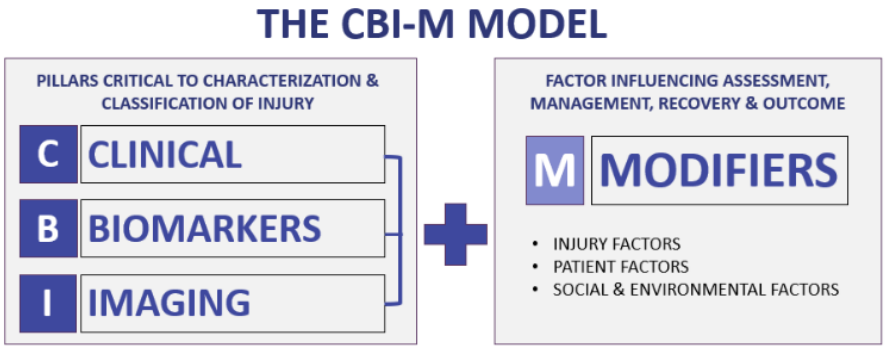
For 51 years, trauma centers have used the Glasgow Coma Scale (GCS) to assess and categorize TBI patients. This TBI classification system categorizes patients as having sustained

- ➔ “Mild”
- ➔ “Moderate”
- ➔ “Severe” TBI

and has been criticized as outdated, inaccurate, and ineffective.



The CBI-M Model

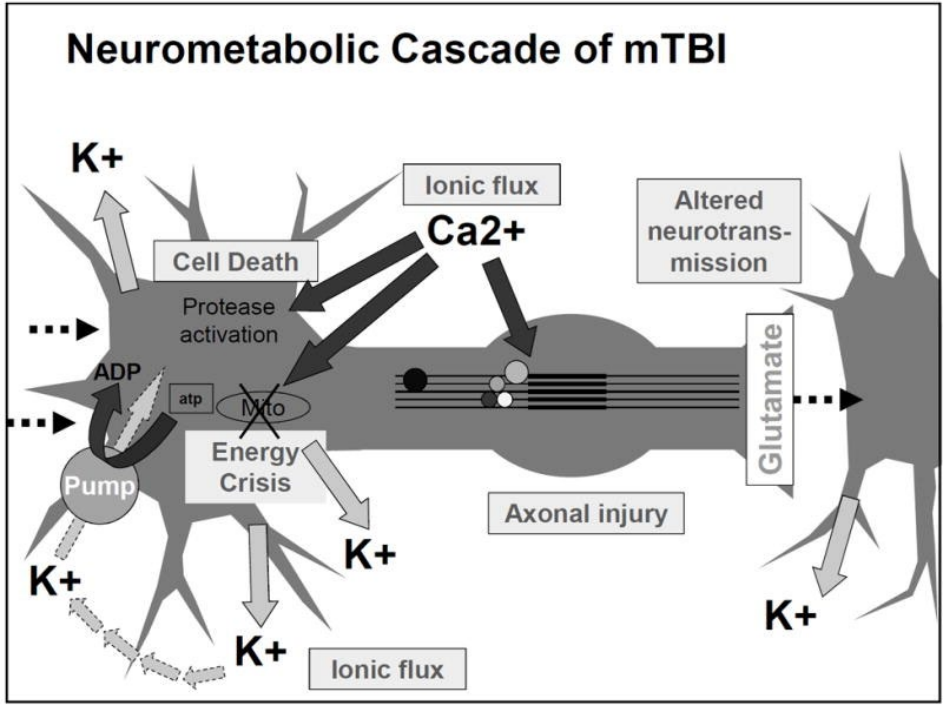


The new TBI classification framework, called CBI-M, consists of four pillars:

- Clinical
- Biomarker - there are no biomarkers for concussion
- Imaging - concussions do not show up on imaging because they are cellular injuries
- Modifiers

The New Neurometabolic Cascade of Concussion.

C. Giza, D. Hovda • Published in Neurosurgery 1 October 2014 • Medicine



The primary elements of the pathophysiologic cascade following concussive brain injury includes abrupt neuronal depolarization, release of excitatory neurotransmitters, ionic shifts, changes in glucose metabolism, altered cerebral blood flow, and impaired axonal function.

It is an Energy Crisis.

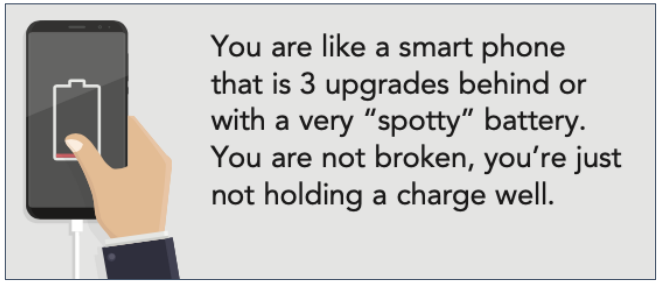
Structural Damage vs. Functional Disruption

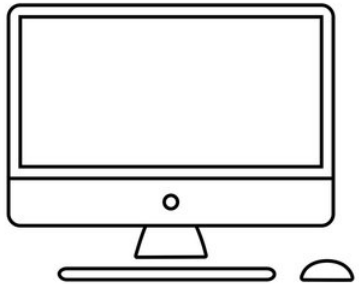
A concussion will not appear as structural damage in the brain as it is a cellular injury. You will not see a concussion on a CT scan or MRI.

While you cannot see the injury, there will be **“functional”** deficits:

- Physically
- Cognitively
- Emotionally
- Sleep/Energy

It’s a *software* problem, not a hardware problem.





Concussion Statistics

AMERICAN BRAIN FOUNDATION

1.6–3.8 million
The estimated number of people who experience a concussion each year

50%
The number of concussions that go unreported or undetected

75%
The percentage of traumatic brain injuries that are considered mild, like a concussion, in the U.S.

Concussion/mTBI facts:

- Young children, teenagers and people aged 65 and older have the highest risk of mTBI
- Most common causes of concussion: car accidents, falls and sports injuries
- Males have a higher risk of mTBI than females
- People in the military and athletes who play contact sports have a higher risk of repeat concussions
- Individuals with a history of multiple concussions have a greater risk for a longer recovery, more severe symptoms and long term problems with memory loss, headache, or issues with balance and concentration

Even one concussion can lead to longer functional recovery, just as one severe TBI may still lead to a positive, minor outcome.

Modifiers … → have a great impact on ***functional*** outcome - both positive and negative

Brain Injury in the School Setting

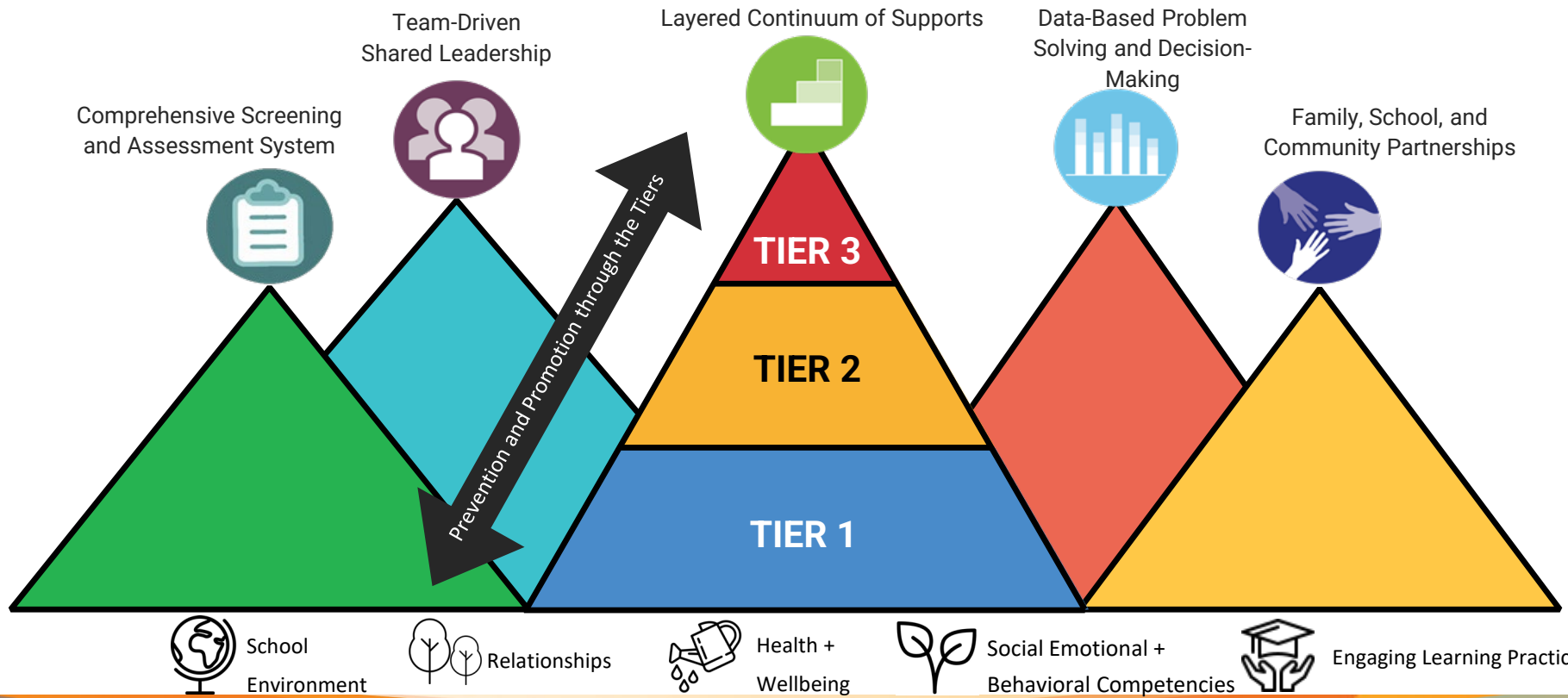
Incidence/Prevalence of Brain Injury in School-Aged Populations is **not clear**:

- 2.2% of children receive diagnosis of brain injury within 1 year, self reported (Waltzman, D., et al, 2025)
- 3.2% children and adolescents aged ≤17 years had ever received a lifetime diagnosis of a brain injury including concussion (CDC, 2022)
- 4.2% of children based on parent report had received a diagnosis of brain injury in their lifetime (Haarbauer-Krupa, J., et al., 2024)
- 16.5% of High Schoolers reported a concussion within 1 year per the Healthy Kids Colorado Survey ("Healthy Kids," 2023)

According to national surveys, about 10% of children have experienced a TBI/concussion in the past 12 months while self-reported overall youth lifetime prevalence ranges from 6-14%, depending on survey methodology. (Daugherty, J., et al, 2025)

What is clear: Students typically spend most of their time in schools. In order to support students with brain injury, we want to make sure we're providing the **right amount** of support in schools **in partnership with clinical settings**.

The Landscape of Wellbeing + Belonging in Colorado's Multi-Tiered System of Supports

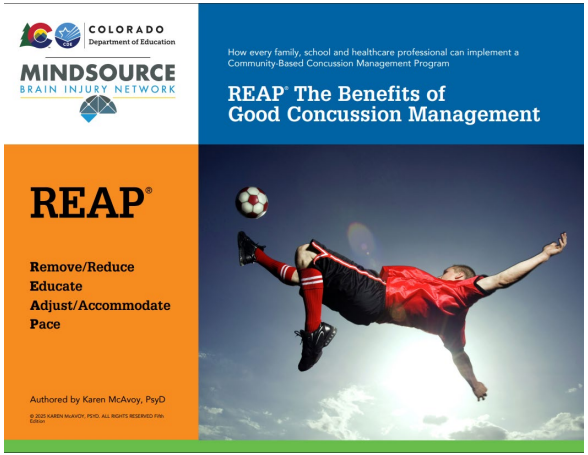


Colorado REAP Concussion Management Guidelines

REAP ® is a community-based model for Concussion Management that was developed in Colorado.

- **R**emove/Reduce
- **E**ducate
- **A**djust
- **P**ace

Aligned with the Amsterdam Guidelines 2022 and endorsed by both the National Association of State Head Injury Administrators (NASHIA) & The American Academy of Pediatrics (AAP), REAP empowers schools to develop a practical, sustainable, universal **Tier 1** approach to support **all** students recovering from concussion.



Teacher Acute Concussion Tool (TACT)

The TACT is a Return to Learn Tool that automates the **Tier 1** Return to Learn process.

- Return to Learn initiator submits a TACT
- TACT is immediately sent out to educators notifying them of a student with a concussion **AND** provides education on adjustments that can be made in the classroom.
- TACT is automatically sent weekly for 4 weeks, unless "stopped" (e.g. student recovers)
- Suggestions for **Tier 2** are also incorporated in the final email in the series.

TACT™

CDE provides **FREE** access this tool to any district in Colorado.

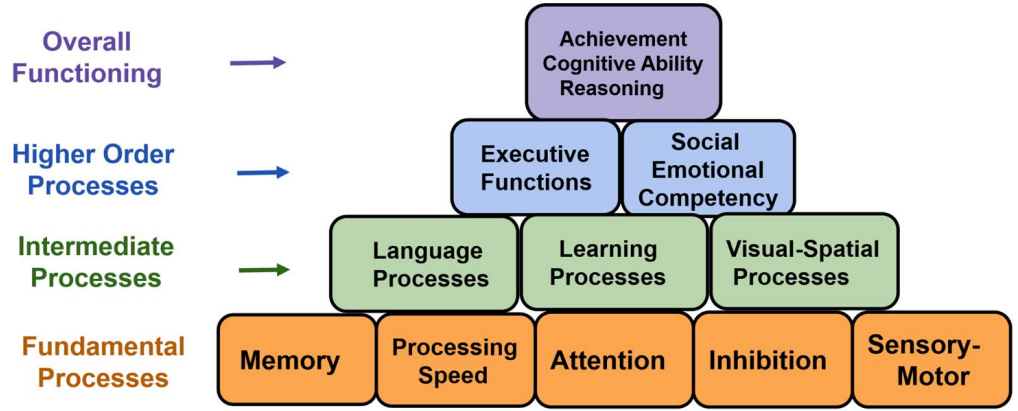
CDHS

MINDSOURCE BRAIN INJURY NETWORK

Building Blocks of Brain Development

The Building Blocks of Brain Development framework is provided as a general guideline for educators and professionals.

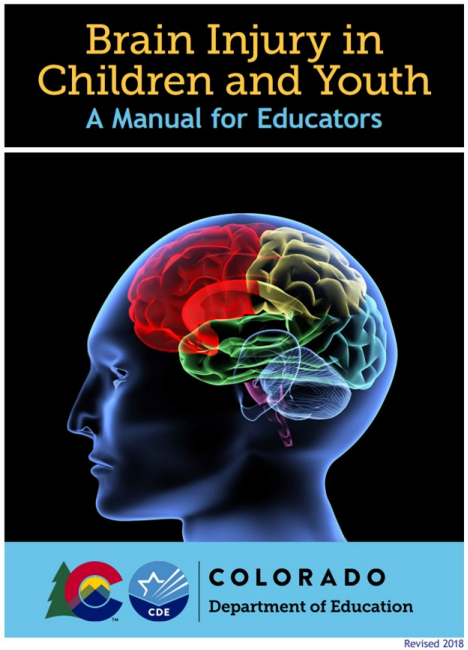
- Serves as a **general guideline** for educators and professionals
- Developed as an **initial reference point** when a brain injury is suspected or identified
- Designed to support students with **brain injury and other neurocognitive impacts**
- Includes a **broad range of assessment tools and intervention strategies**



CDE Brain Injury in Children & Youth Manual

Brain Injury in Children and Youth: A Manual for Educators is an online manual that provides a detailed explanation of how each building block may be affected in the school setting if a brain injury occurs.

- Accommodations
- Strategies/Interventions



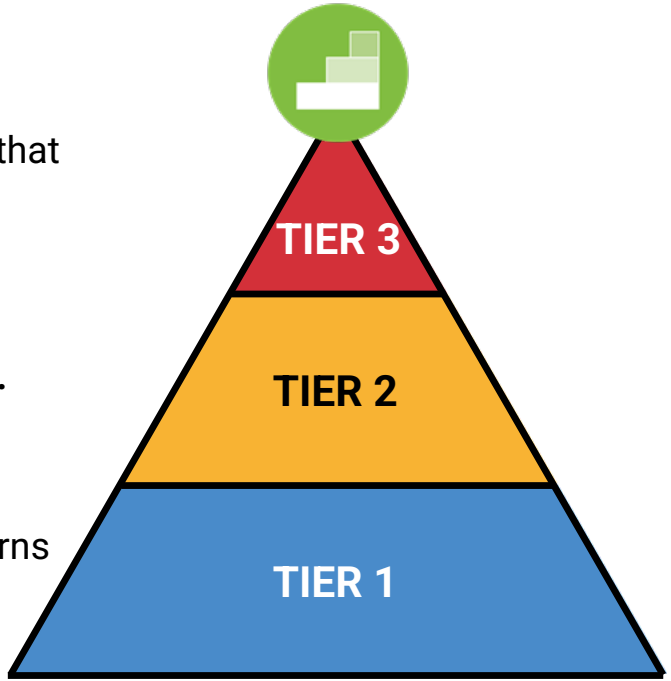
Brain Injury Through the Tiers

Layered Continuum of Supports:

Ensuring that every student receives equitable whole child supports that are evidence based, culturally responsive, matched to need, and developmentally appropriate through layered supports.

Multi-Tier Systems of Support (MTSS) follow a public health model.

Tier 1: Promotion & Prevention
Tier 2: Preventing risk factors or early onset problems from progressing
Tier 3: Individual interventions addressing more serious concerns that can impact daily functioning.

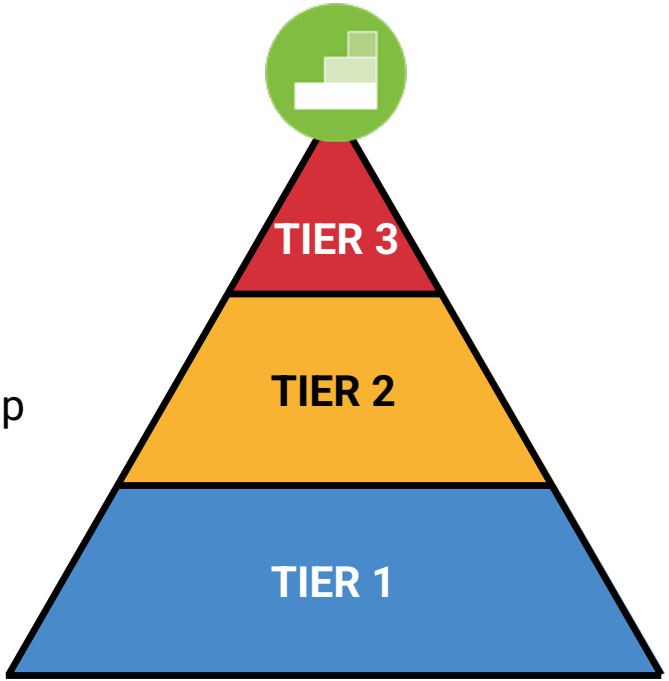


Language Matters

Language around Layered Continuum of Support matters:

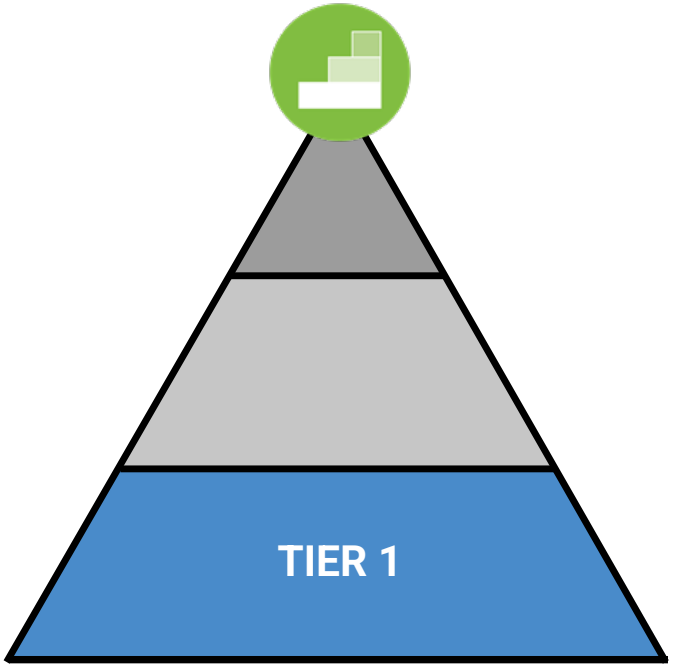
Tier 1: academic **adjustments**
Tier 2: academic **accommodations**
Tier 3: academic **modifications**

As clinicians, understanding the language in schools will help with streamlined support.



Tier 1: Universal Support

Who:	**All** Students
What:	High-quality, research-based instruction in the **general education** classroom
Focus:	**Prevention** and early identification of academic and behavioral challenges
Instruction:	**Differentiated teaching** that meets the needs of most learners
Assessment:	**Universal screening** of all students and ongoing progress monitoring
Goal:	**80–85%** of students meet grade-level expectations through effective core instruction



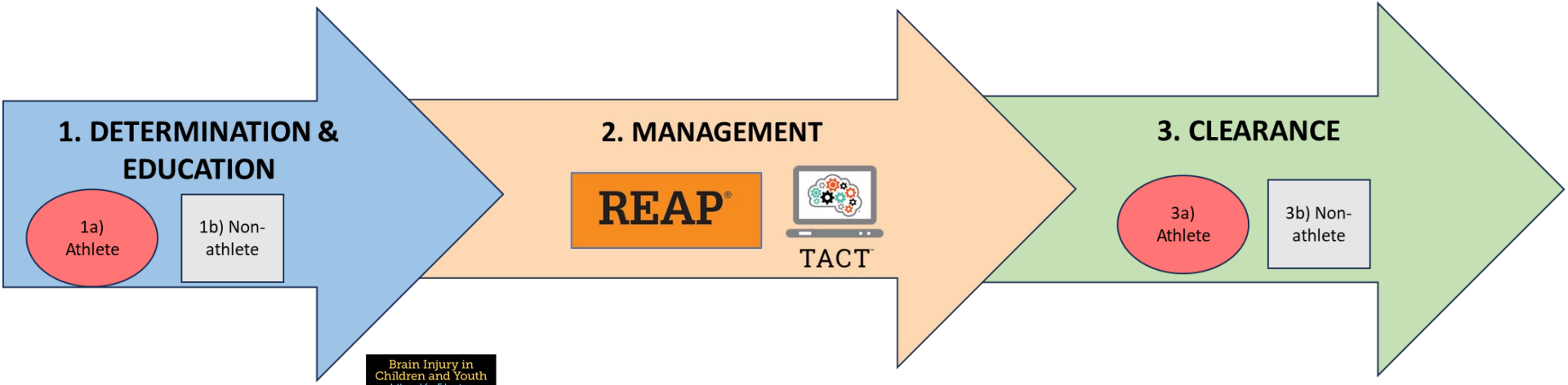
Tier 1 is Key for Concussion Management

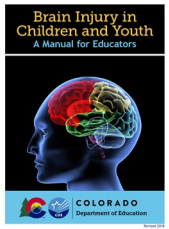
Most school aged students with concussion recover within 4+ weeks.

This is before the supports for Tier 2 would ever take place.

It is crucial to provide early and adequate support for students with brain injury, regardless of level of support needed. However, with concussion, Tier 1 is the ideal approach.

Tier 1 Resources: REAP & TACT





Get Schooled on Concussions

Supporting Brain Injury in Tier 1: **Student Benefits**

Foundational Early Support & Early Identification

Tier 1 intervention provides immediate, consistent classroom supports for students recovering from mild brain injuries in schools.

Universal Strategies and Adjustments

Universal strategies like workload and environment adjustments help meet diverse student needs effectively, reducing symptom aggravation and promoting smoother recovery.

Proactive Monitoring and Communication, and Coordination

Tier 1 promotes early symptom monitoring, detailed documentation*, and streamlined communication between teachers, families, and clinicians, which allows for timely escalation to Tier 2 or 3 supports when needed.

*This documentation can help tremendously with Criteria Toward Clearance

Supporting Brain Injury in Tier 1: **Educator Benefits**

Empowered Classroom Teachers
Clear concussion processes empower teachers to support students confidently without feeling overwhelmed.

Collaborative Framework
Clear Tier 1 expectations build trust and collaboration between educators and healthcare providers for better student outcomes.

Shared Staff Responsibility = Reduced Specialist Burden
At Tier 1, everyone has a role– distributing concussion management tasks across staff. This reduces unnecessary referrals to Tier 2 and 3, and builds system resilience against educator burnout in an already understaffed and overworked population.

Tier 1 Promotes **Sustainability**

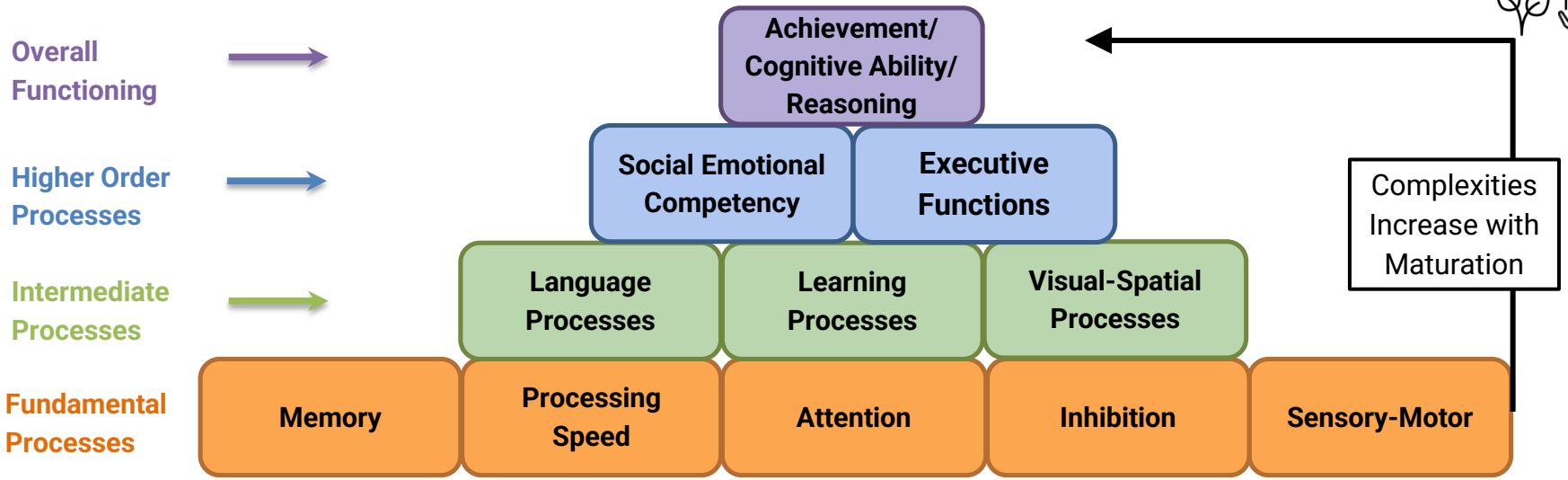
Supporting brain injury at the **Tier 1 level** creates a sustainable, collaborative, school-wide system that reduces reliance on dedicated concussion teams and embeds effective practices into everyday instruction.

- Improves continuity of care
- Strengthens clinical decision-making
- Supports staff wellbeing by distributing responsibility across the entire school community

When schools implement Tier 1 interventions well, they are better able to identify needs early, provide immediate support, and more efficiently connect students with Tier 2 and Tier 3 services when necessary.

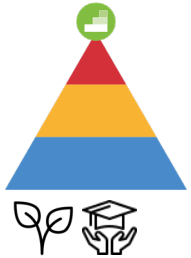
This approach not only enhances overall school support systems but also helps make concussion care a predictable and **integrated part of school culture**.

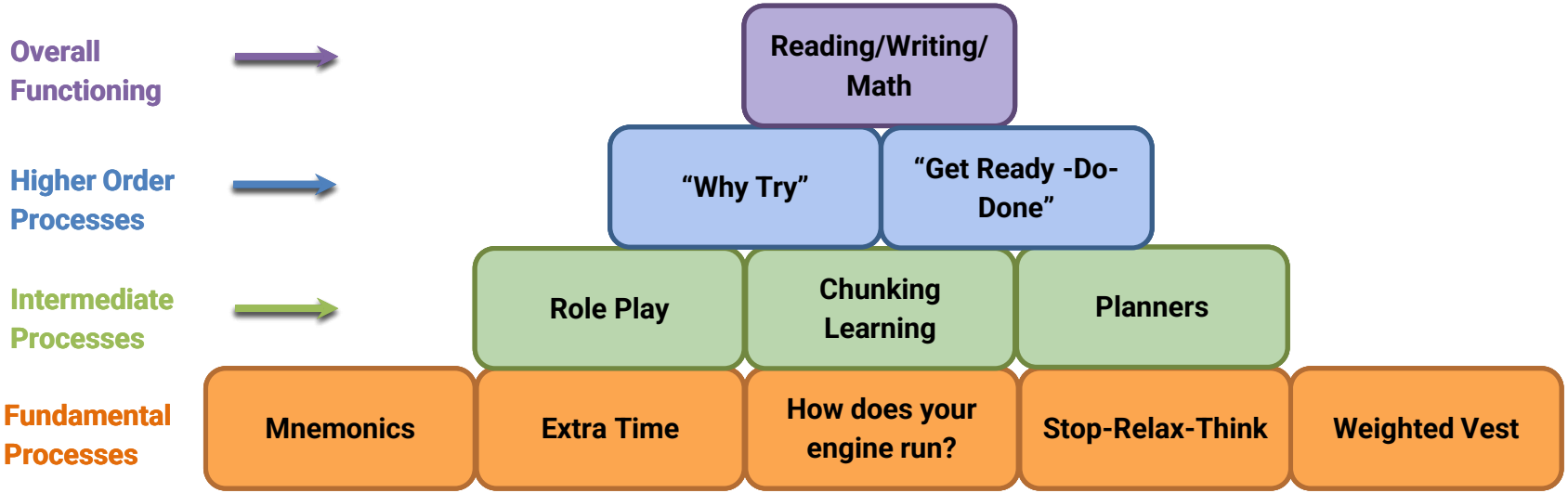
Building Blocks of Brain Development



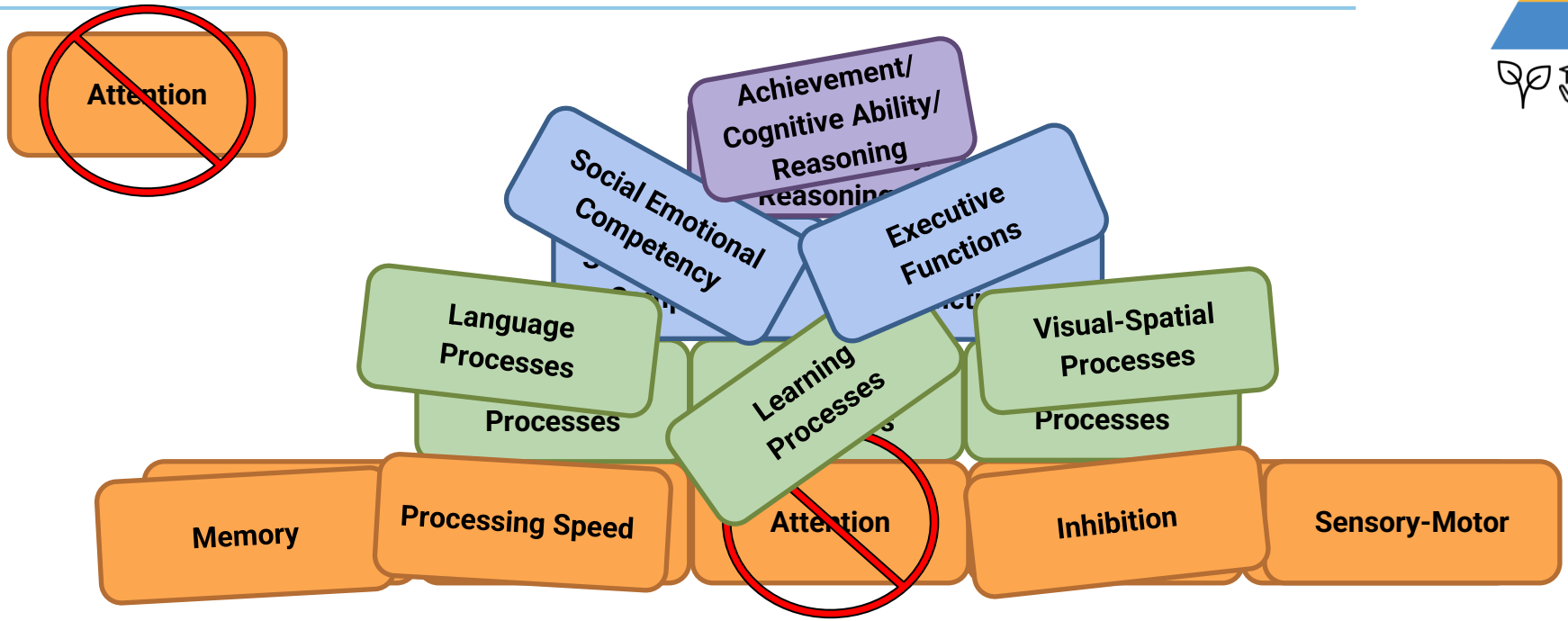
The Building Blocks were developed by brain injury experts, affiliates and partners of CDE based upon a Neurodevelopmental Hierarchy - then applied to schools. Fundamental building blocks develop first in childhood with learning and high order processes layering on top of foundational skills.

Building Blocks of Brain Development Continued





Building Blocks Collapse

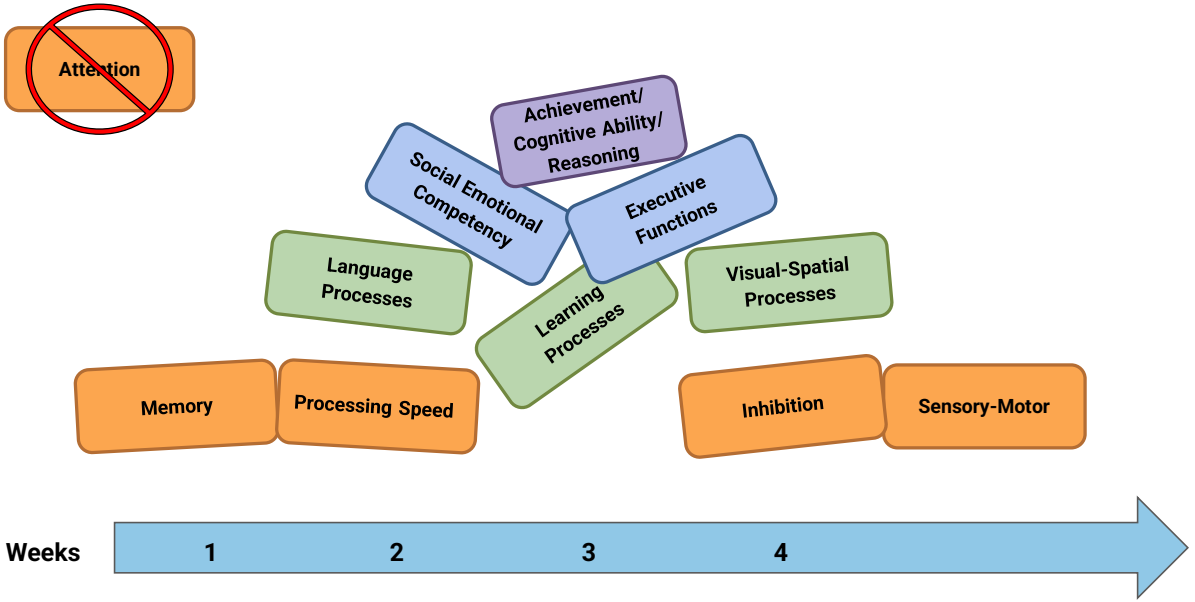


Building Blocks at Tier 1

When 1 or more of the Foundational Blocks gets knocked out of place (even temporarily for 1-4 weeks, as with a concussion or trauma or flu):

- "functional" issues can be a problem
- Learning can be difficult
- Higher order skills may be impacted

TACT™



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Tier 2: Supplemental Support

Who: Students who are not making adequate progress with Tier 1 instruction alone (typically 10–15% of students) "***some***" students

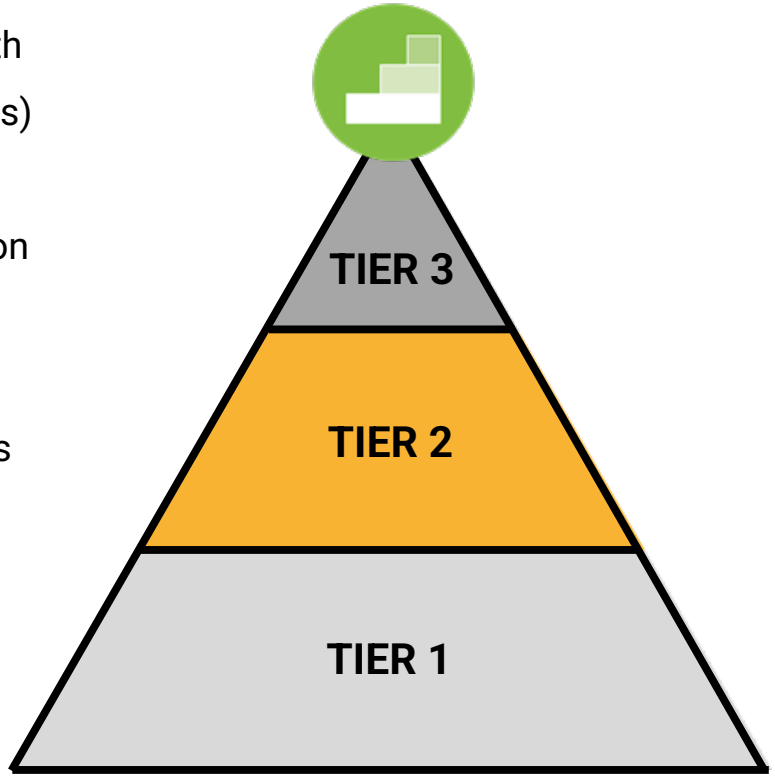
What: **Targeted** interventions in addition to Tier 1 instruction

Focus: Address **specific skill gaps** or needs through small group instruction

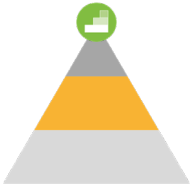
Instruction: Evidence-based **interventions** provided several times per week, often in small groups

Assessment: **More frequent progress monitoring** to track growth and adjust interventions as needed

Goal: Accelerate learning to close skill gaps and help students catch up



Supporting Brain Injury in Tier 2



Tier 2 Supports:

- ➔ Need for longer support
- ➔ Need for more tailored support
- ➔ Need for Problem-Solving Teams, Student Assistance Teams, or BrainSTEPS Teams
- ➔ Need for medical-home-school coordination

Formal processes for Tier 2 can be on a **504 Plan** (Office of Civil Rights OCR/American Disabilities Act ADA) or **Individualized Health Plan (IHP)** or other.

At Tier 2, ADA accommodates access to learning but not modification of curriculum.

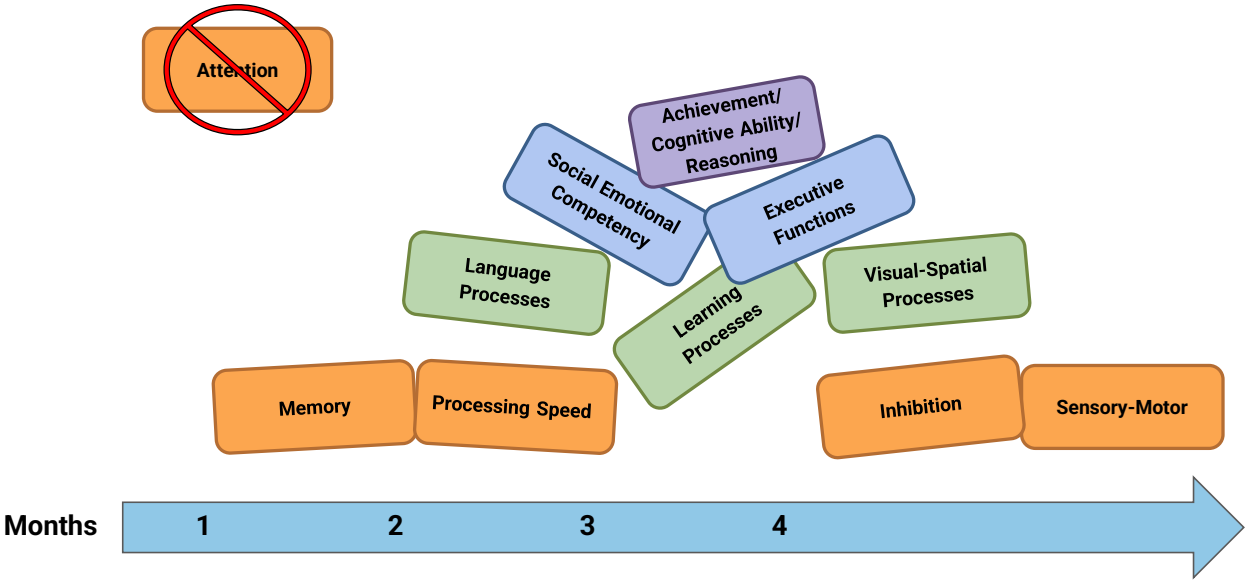
Building Blocks at Tier 2

Remember, an mTBI or Concussion

≠

minor academic, behavioral, emotional or physical impact.

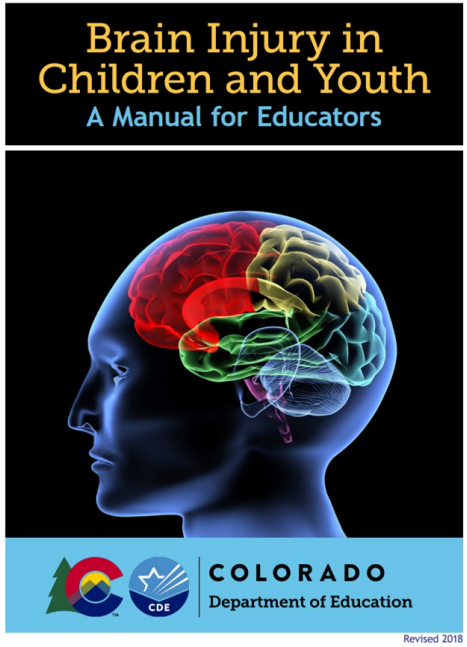
Skill deficits can last for months, and may need concussion rehabilitation, but the outcome is still hopeful and promising.

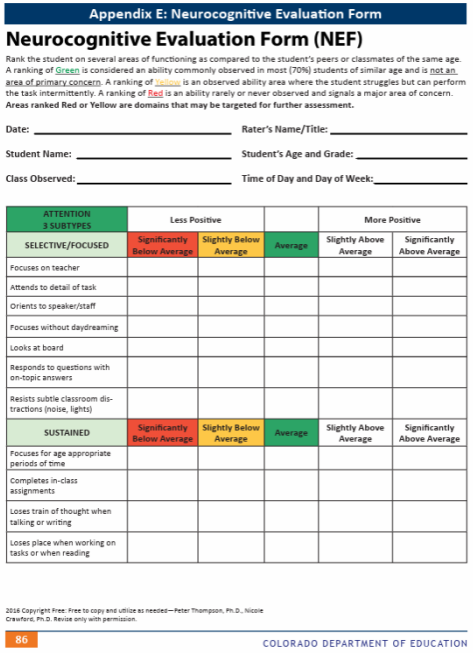


Neurocognitive Evaluation Form (NEF)

The NEF is available in the **Brain Injury in Children and Youth: A Manual for Educators** as a way to drill down to a specific skill deficit(s).

The NEF allows parents and/or teachers to meet ***informally*** and determine where a student falls on any building block compared to other students in the classroom &/or to their own baseline.





Appendix E: Neurocognitive Evaluation Form

Neurocognitive Evaluation Form (NEF)

Rank the student on several areas of functioning as compared to the student's peers or classmates of the same age. A ranking of Green is considered an ability commonly observed in most (70%) students of similar age and is not an area of primary concern. A ranking of Yellow is an observed ability area where the student struggles but can perform the task intermittently. A ranking of Red is an ability rarely or never observed and signals a major area of concern. **Areas ranked Red or Yellow are domains that may be targeted for further assessment.**

Date: _____ **Rater's Name/Title:** _____

Student Name: _____ **Student's Age and Grade:** _____

Class Observed: _____ **Time of Day and Day of Week:** _____

ATTENTION 3 SUBTYPES	Less Positive			More Positive	
SELECTIVE/FOCUSED	Significantly Below Average	Slightly Below Average	Average	Slightly Above Average	Significantly Above Average
Focuses on teacher					
Attends to detail of task					
Orients to speaker/staff					
Focuses without daydreaming					
Looks at board					
Responds to questions with on-topic answers					
Resists subtle classroom distractions (noise, lights)					
SUSTAINED	Significantly Below Average	Slightly Below Average	Average	Slightly Above Average	Significantly Above Average
Focuses for age appropriate periods of time					
Completes in-class assignments					
Loses train of thought when talking or writing					
Loses place when working on tasks or when reading					

Behavioral Impacts in the Manual

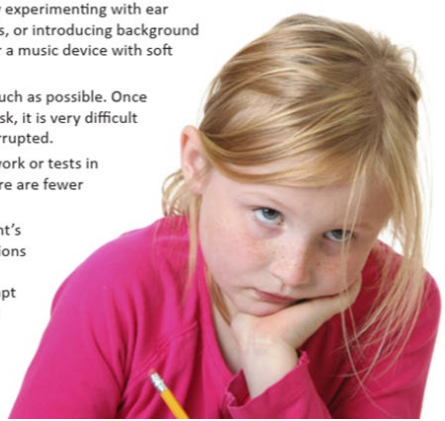
Attention and Concentration: Changes that may be Observed

- Difficulties concentrating or focusing on one task. Easily distracted.
- Disorganized and loses things.
- Appears spacey and forgetful.
- Jumps from one activity to another without finishing.
- Has inconsistent performance at school.
- Can't keep up with the rest of the class.
- Gives up on tasks and hands in incomplete assignments or homework.
- Does not turn in assignments.
- Appears to have memory difficulties.
- Struggles with following instructions or comprehending lessons.
- Difficulties following multi-step instructions.
- Makes careless mistakes with schoolwork.

Interventions from the Manual

Attention and Concentration: Strategies for Intervention

- Specifically teach and practice what it looks like to pay attention. What is our body language? What are our eyes doing? Our mouths?
- Provide clear expectations for what the student is expected to accomplish during the activity.
- Schedule most important work during times when the child has displayed the greatest concentration.
- Position student nearest to location of instruction and away from distractions (e.g. doors, windows, high traffic areas, and other off-task children).
- Seat next to positive peers with age-appropriate attention abilities to help with redirection and understanding of instructions.
- Clear desk and area of everything except for what is needed for task at hand.
- Reduce background noise by experimenting with ear plugs, ear muffs/headphones, or introducing background sound such as white noise or a music device with soft music.
- Eliminate interruptions as much as possible. Once students are focused on a task, it is very difficult to get them restarted if interrupted.
- Allow student to complete work or tests in alternate settings where there are fewer distractions.
- Make sure to gain the student's attention when giving directions or cue when information is particularly important. Prompt the student with statements such as "I am going to tell you something very important and when I am done you will repeat it back to me."
- Use verbal and visual cues to refocus student as well as frequent checks for understanding.
- Provide opportunities for the student to take breaks throughout the day.
- Alternate classroom activities to provide movement and hands-on learning opportunities after periods of sitting, listening and working at their desks. Increase interest with new, stimulating activities. Alternate preferred and non-preferred tasks.
- Connect new learning to prior knowledge or with areas of interest.
- Break assignments into smaller and shorter steps. Present information in short and concise segments.



Colorado Kids with Brain Injury Building Blocks

Learn about the Building Blocks

Fundamental Processes

Learn About Fundamental Processes

Attention

Inhibition

Processing Speed

Memory

Sensory and Motor (over stimulation)

Sensory and Motor (under stimulation)

Motor - Fine

Motor - Gross

Intermediate Processes

Learn About Intermediate Processes

New Learning

Language - Receptive

Language - Expressive

Language - Social Pragmatic

Visual-Spatial

Higher Order Processes

Learn About Higher Order Processes

Executive Function - Initiation

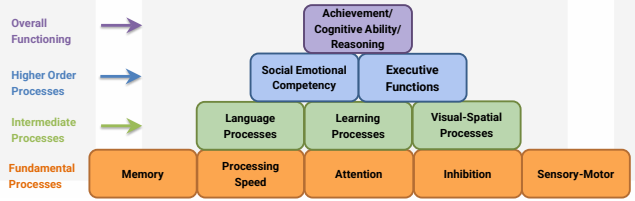
Executive Function - Planning

Executive Function - Organizational Skills

Executive Function - Mental Flexibility

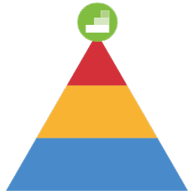
Executive Function - Reasoning

Social/Emotional Competency



Get Schooled on Concussions

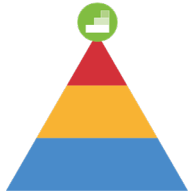
Colorado Kids with Brain Injury Building Blocks



Jump to a Fundamental Processes section:

- Attention
- Inhibition
- Processing Speed
- Memory
- Sensory & Motor (Over Stimulation)
- Sensory & Motor (Under Stimulation)
- Motor - Fine
- Motor - Gross

Colorado Kids with Brain Injury Building Blocks



Attention

To learn more about the Fundamental Process of Attention click on the topic area to see a complete list.

+ **Behavioral Impacts**

+ **Cognitive Academic Impacts**

+ **Assessment Suggestions**

  These assessments are used to look at attention impacts secondary to brain injury, not to diagnose ADHD/ADD

+ **Environmental Supports and Accommodations**

+ **Resources and Intervention**

Contributors to Protracted Recovery

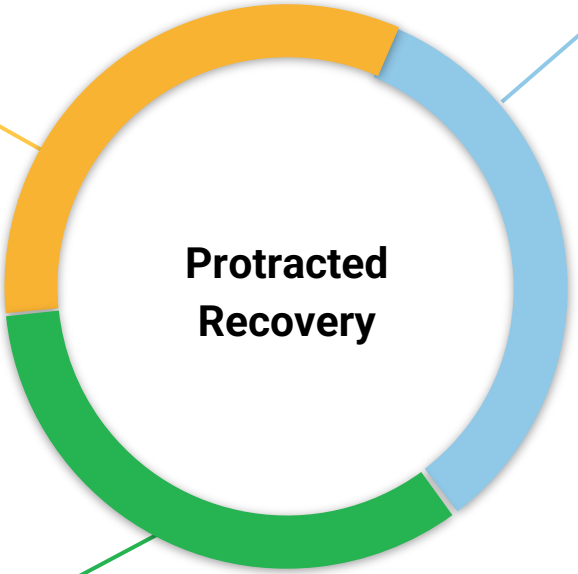
Concussion Originated:

- Oculomotor
- Vestibular
- Auditory Processing
- Postural Intolerance
- Convergence Insufficiency
- Neck/Headache

Concussion Exacerbated:

Pre-existing:

- Headache
- Learning Problems
- Mental Health
- Eye Problems



Misattribution of Symptoms:

Student:

- Anxiety
- Depression
- School Avoidance
- Social issues
- Bullying/Safety
- Secondary Gain

Parent:

- Parent Mental Health
- Parent distressed by child's distress
- Need for student to be caregiver at home
- Secondary gain

Tier 3: Intensive Support

Who: Students with **significant** or persistent learning and/or behavioral difficulties (typically **few** students (1-5%))

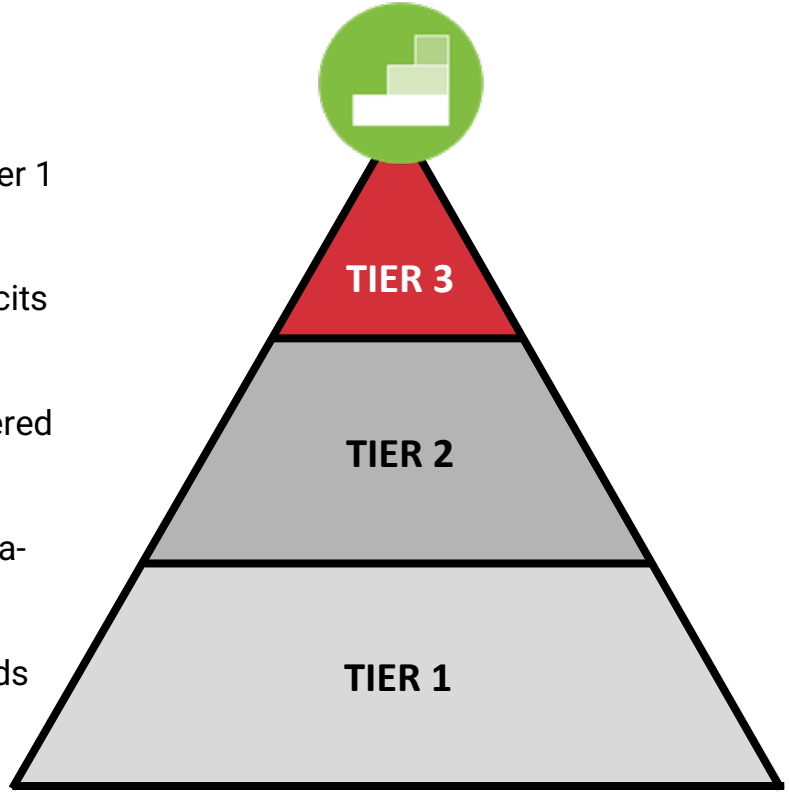
What: **Highly** individualized, **intensive** interventions beyond Tier 1 and Tier 2

Focus: Narrow and **deepen support** to address major skill deficits or needs

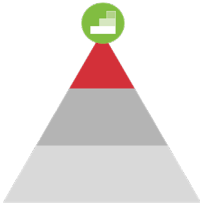
Instruction: Customized, **evidence-based interventions** often delivered one-on-one or in very small groups

Assessment: Very frequent progress monitoring and data-based decision making

Goal: Achieve meaningful growth toward grade-level standards and determine if additional supports are needed



Supporting Brain Injury in Tier 3



Tier 3 most widely connected to Special Education or Specially Designed Instruction but not exclusive. It requires:

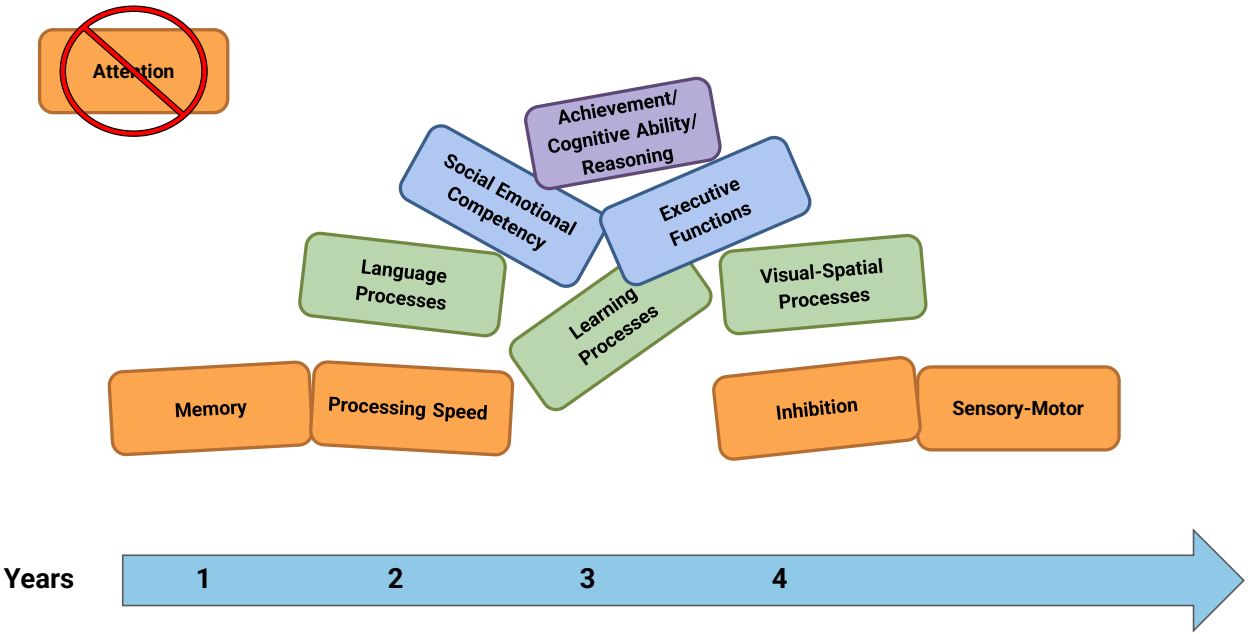
- ➔ A Child Find process of evaluation that includes a multi-disciplinary team
- ➔ Formal processes for Tier 3 can be on an Individual Education Plan (IEP) overseen by Individuals with Disabilities Education Act (IDEA)
- ➔ Students with an IEP may have modification of curriculum (instead of just accommodations to access learning)
- ➔ Annual progress monitoring
- ➔ Triennial re-evaluations

Building Blocks at Tier 3

Behaviors and Executive Dysfunctions that emerge after a TBI can be analyzed and treated as a skill deficit instead of willful disobedience.
This allows for “teaching” instead of just “consequencing”.

- Can’t vs Won’t
- Skill vs Will

It is based on the Collaborative Problem Solving premise that children will do well if they can do well.



Behavioral Impacts in the Manual

Appendix E: Neurocognitive Evaluation Form

Neurocognitive Evaluation Form (NEF)

Rank the student on several areas of functioning as compared to the student's peers or classmates of the same age. A ranking of Green is considered an ability commonly observed in most (70%) students of similar age and is not an area of primary concern. A ranking of Yellow is an observed ability area where the student struggles but can perform the task intermittently. A ranking of Red is an ability rarely or never observed and signals a major area of concern. **Areas ranked Red or Yellow are domains that may be targeted for further assessment.**

Date: _____ **Rater's Name/Title:** _____

Student Name: _____ **Student's Age and Grade:** _____

Class Observed: _____ **Time of Day and Day of Week:** _____

ATTENTION 3 SUBTYPES	Less Positive			More Positive	
SELECTIVE/FOCUSED	Significantly Below Average	Slightly Below Average	Average	Slightly Above Average	Significantly Above Average
Focuses on teacher					
Attends to detail of task					
Orients to speaker/staff					
Focuses without daydreaming					
Looks at board					
Responds to questions with on-topic answers					
Resists subtle classroom distractions (noise, lights)					
SUSTAINED	**Significantly Below Average**	**Slightly Below Average**	**Average**	**Slightly Above Average**	**Significantly Above Average**
Focuses for age appropriate periods of time					
Completes in-class assignments					
Loses train of thought when talking or writing					
Loses place when working on tasks or when reading					

Executive Function: Mental Flexibility

Mental flexibility is the ability to easily shift from one idea, train of thought, activity or way of looking at things to another (Dise-Lewis, Calvery, & Lewis, 2002). Mental flexibility also involves being able to change the approach to problem solving as the task changes or being able to successfully transition from one task to another. As part of the process, one needs to be able to consider new information as well as feedback from mistakes and setbacks (Dawson & Guare, 2004). Mental flexibility allows us to adapt to changing conditions and unfamiliar or unexpected situations (Meltzer, 2010). Mental flexibility also enables us to understand the perspective of others.

Controlling the thoughts and actions of the brain falls under the function of the frontal lobe. Although there are different brain areas that also help with initiation, organization, planning and flexibility, these four "executive functions" are primarily regulated by the upper brain areas located behind the forehead. Individuals with damage to the frontal lobe may become more rigid in their thinking and less adaptable to change.

Mental Flexibility: Changes that may be Observed

- Rigid and/or concrete thinking. Difficulties with abstract thought.
- Difficulties with transitions or with deviating from a schedule.
- Struggles with thinking on his/her feet.
- Perseveration. Gets stuck on one train of thought.
- Difficulty with feedback and doesn't appear to learn from mistakes.
- Resistant to try new things.
- Difficulties coming up with solutions.
- Struggles with switching tasks or activities.
- Difficulties following directions or doing what was asked.
- Appears stubborn and/or argumentative.
- Emotional meltdowns.
- Difficulties making friends and can appear socially awkward.
- Appears to lack empathy and has difficulties seeing others' points of view.

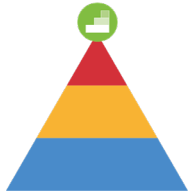
Interventions from the Manual

Mental Flexibility: Strategies for Intervention

- Develop and practice schedules and routines when possible.
  - Plan ahead and prepare student for changes in these routines.
  - Use written or picture schedule. Prepare student ahead of time if schedule is changed and update their written or picture schedule accordingly.
  - Rehearse or do a dry run of unfamiliar situations or schedules.
- Warnings and timers can be helpful tools to prepare for transitions.
- Plan for situations that require mental flexibility and avoid introducing too much novelty at once.
- Teach student how to analyze directions, break down problems, self-check and self-correct.
- Allow for previewing of class notes or materials.
- If the student's writing skills allow, a guided self-reflection journaling activity can provide an opportunity to reflect on how he/she was able to be mentally flexible in certain scenarios.
- Break tasks down into smaller steps. Make sure directions are clear and concrete.
- Provide choices of two appropriate options.
- Evaluate assignments, worksheets and tests to see if there are too many shifts in the type of questions the student is required to complete. Reduce the different types of questions required, chunk the same type of questions together, or help support the student as the task demands change.
- Use social narratives to help teach solutions or coping strategies to different situations.
- Structure social skills groups to help identify, practice and learn more flexible coping and problem solving strategies.
- Help student understand why strategies used in one setting or for one task may not work for another (and why some strategies can work in multiple situations). Role-play situations ahead of time to help generate more than one outcome or potential solution.
- Help student understand the importance of listening to different perspectives and points of view.
- Use games to build mental flexibility. See Harvard University's Center on the Developing Child website for their *Activities Guide: Enhancing and Practicing Executive Function Skills with Children from Infancy to Adolescence.*
- Teach "Stop and Think" executive functioning skills and relaxation or coping strategies (e.g., taking deep breaths, calming self-talk, leaving the situation until calm, etc.).
- Teach coping strategies, belly breathing, mindfulness, meditation, and relaxation techniques.
- See Curriculum Resources (page 49) for available intervention programs/materials.
- See Reasoning, Problem Solving and Judgment (page 48) and Inhibition (page 27) building blocks for additional strategies.
- See Social/Emotional Competency (page 50).

BRAIN INJURY MANUAL 47

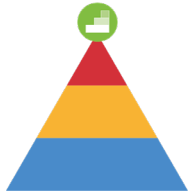
Colorado Kids with Brain Injury Building Blocks



Jump to a Higher Order Processes section:

- Executive Functioning - Initiation
- Executive Functioning - Mental Flexibility
- Executive Functioning - Planning
- Executive Functioning - Reasoning
- Executive Functioning - Organizational Skills
- Executive Functioning - Social Emotional Competency

Colorado Kids with Brain Injury Building Blocks



Executive Functioning - Mental Flexibility

To learn more about the Executive Functioning - Mental Flexibility, Higher Order Process, click on the topic area to see a complete list.

+ **Behavioral Impacts**

+ **Cognitive Academic Impacts**

+ **Assessment Suggestions**

+ **Environmental Supports and Accommodations**

+ **Resources and Intervention**

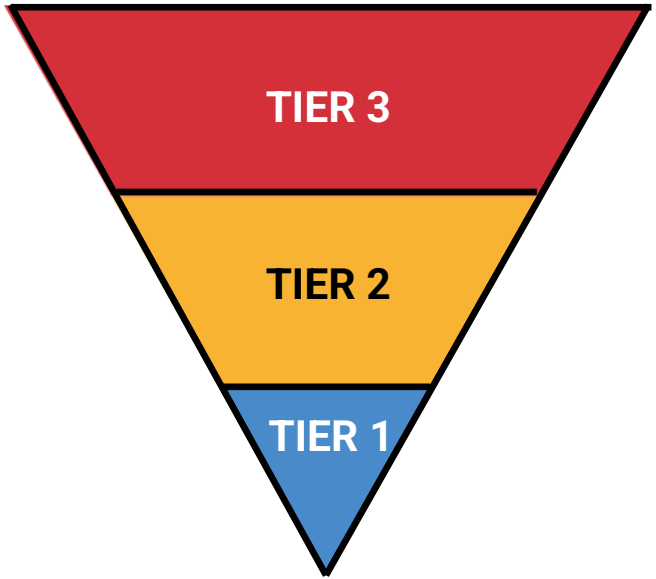
Early Identification & Support of TBI is Critical

Prevention and **early identification** is key in supporting students with brain injuries.

Tier 1 concussion support appears to be an area of tremendous potential.

If we are able to catch these concussions as they happen, we can support these students, and likely **increase their chances of recovery, and reduce the chances of longer, more negative outcomes** including with mental and behavioral health.

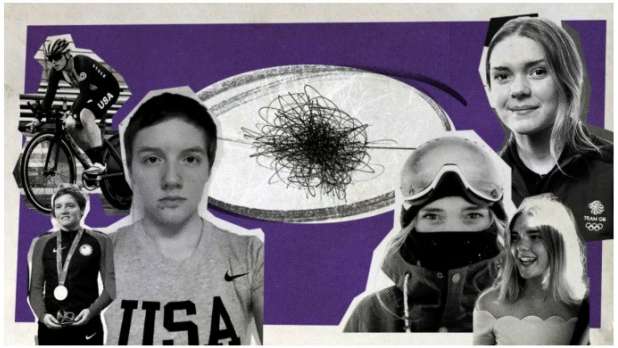
As we know, each Tier builds upon one another. Without solid Tier 1 support, the caseload and workload of Tier 2 & 3 service providers will increase, leading to burnout/overwhelm, and inability to meet students needs effectively.



Increased Risk of Suicidal Ideation

Risk of suicidal behaviors following sport-related and non-sport-related concussion: a systematic review and meta-analysis

Mingyu Liao [1,✉], Enliang Hu [1], Keyin Liu [1]



CNN

These young female athletes died by suicide. They all had head injuries in common

Association of Concussion With the Risk of Suicide
A Systematic Review and Meta-analysis

Michael Fralick, MD, SM[1,2]; Eric Sy, MD, MPH[3,4]; Adiba Hassan, MSPH, MPH[5]; et al

Research Article

Association Between Concussion and Risk of Suicide Among Youth and Young Adults

Jingzhen Yang PhD [1], Guy N. Brock PhD [2], Danielle L. Steelesmith PhD [3 4], Amanda J. Thompson PhD [3], Elyse N. Llamocca PhD [3], Jeffrey A. Bridge PhD [3 5], Cynthia A. Fontanella PhD [3 4]

Self-Reported History of Concussions is Associated with Risk Factors for Suicide Completion among Middle School Students: A Cross-Sectional Study

Dale S Mantey [1], Onyinye Omega-Njemnobi [1], Steven H Kelder [1]

Get Schooled on Concussions

CDE

Increased Risk of Youth Justice Involvement

Mild Traumatic Brain Injury and Criminal Charges and Convictions in Mid and Late Adolescence

Ea Hoppe Blaabæk [1,2], Daniel Juhász Vigild [1,3], Felix Elwert [4,5,6], Peter Fallesen [1,7,✉], Lars H Andersen [1]

Mild Traumatic Brain Injury in Justice-Involved Individuals and Executive Function Consequences on Transition and Reintegration into the Community

Alaina L. Randerson
University of St. Augustine for Health Sciences

Traumatic brain injury: a potential cause of violent crime?

W Huw Williams [1], Prathiba Chitsabesan [2], Seena Fazel [3], Tom McMillan [4], Nathan Hughes [5], Michael Parsonage [6], James Tonks [7]

Over-Representation of Brain Injury in Adult and Juvenile Criminal Justice Populations

Traumatic Brain Injury in Criminal Justice

About the Project

This research team oversees a large portfolio of brain injury related research. Dr. Kim Gorgens has lectured extensively on those issues around the world. She has a 2010 TED talk on youth sports concussion and a 2018 TED talk on brain injuries in criminal justice with 3.5M views. She has been interviewed on CNN with Anderson Cooper, NPR, and on 20/20 and the work of this team with brain injuries has been featured in USNews, Newsweek, the Economist, People Magazine, and more. The team is devoted to applied research, education, and legislative and policy development around best practices in brain injury. Our research studies the reported injury history, cognitive function, and brain biomarkers of all vulnerable populations including young and older athletes, probationers and inmates, persons who are unhoused, and women who have been exposed to interpersonal violence.

Online Brain Injury Screening and Support System (OBISSS)

The Online Brain Injury Screening and Support System (OBISSS) is a free and confidential screening tool available to anybody in Colorado 13 and older. This tool helps you see if you've ever had a brain injury and gives you tips to deal with any challenges you might be facing.

OBISSS is a national program provided by the National Association of State Head Injury Administrators (NASHIA).

OBISSS Login Information:

State/Subscriber: Colorado
Password/Subscriber Code: c123

TACT: Data that Educates

The TACT provides a plethora of data that can be used to inform decision making from year to year:

- Legitimate real-time concussion incidents
- Educators trained and notified around concussion incidences
- TACTs stopped (e.g. students recovered prior to 4 weeks)
- Mechanism of Concussion
  - Sport Breakdown if under Return to Play
- Return to Learn Initiator & Role
- Grade & Schools
- Training

The data used for today's presentation is from 7/2024-2/2026 (1.5 years).

TACT™

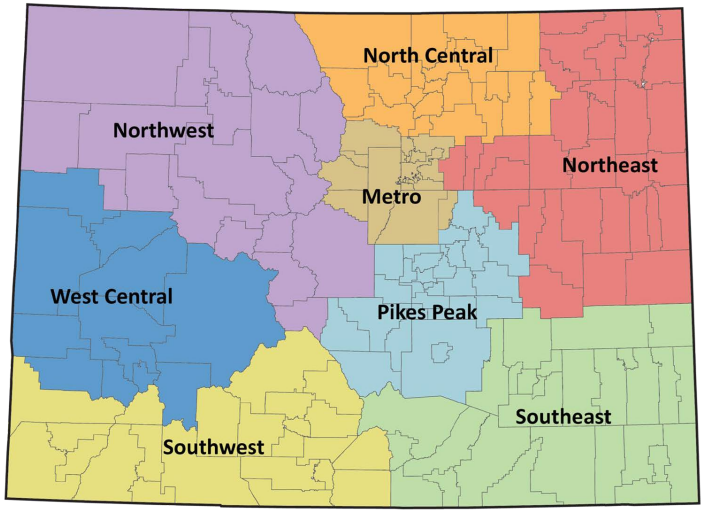
Colorado State Data & Concussion Incidence Data

CDE School Data Snapshot

- **179 School Districts**
  - 84% of districts are small (<6,500 enrolled)
  - 1,927 schools
    - 881,065 students
  - 262 Charter Schools
    - 136,218 students
  - ~ 57,000 educators (including administrators)

Incidence of Concussion:

- Today, we will use the average national incidence of **10%.**

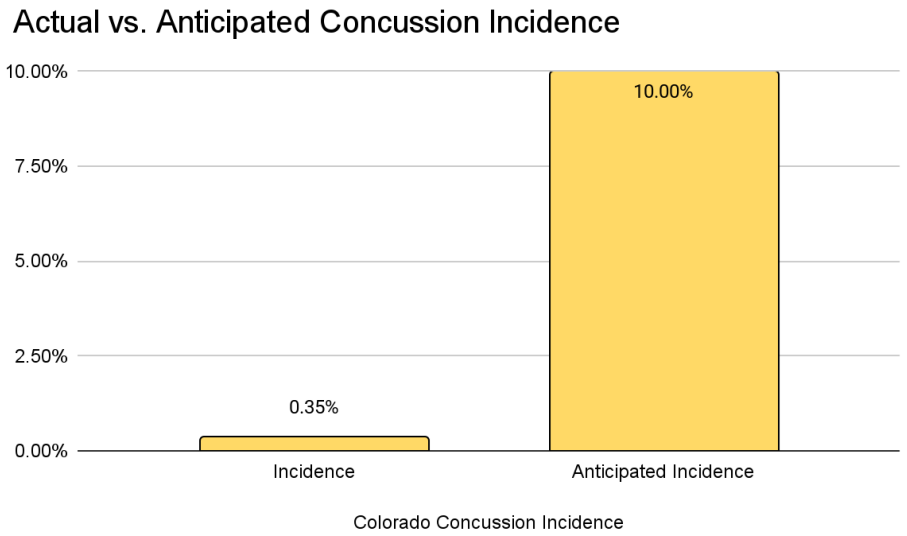


TACT State Data: **Concussion Incidence**

3,042 Concussions were managed in real time (**0.35% incidence**)*

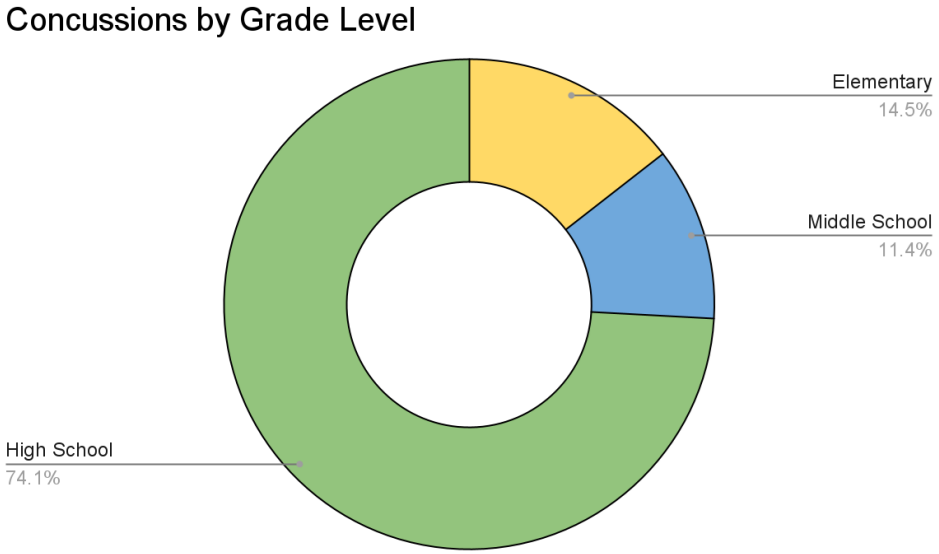
19,221 Teachers were exposed to TACT in real time

* Anticipated incidence at 10% is around 88,065 students per year.



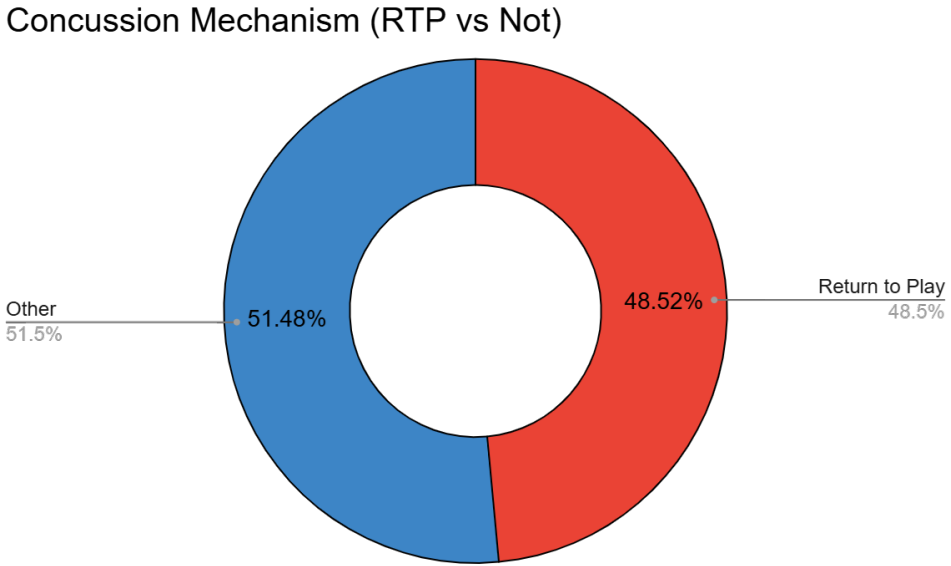
TACT State Data: **Grade Level**

- ❏ 441 Elementary
- ❏ 348 Middle School
- ❏ 2,253 High School



TACT State Data: **Concussion Mechanism**

- ❏ 1,476 Concussions fell under Return to Play Legislation
- ❏ **1,566 Concussions did not**

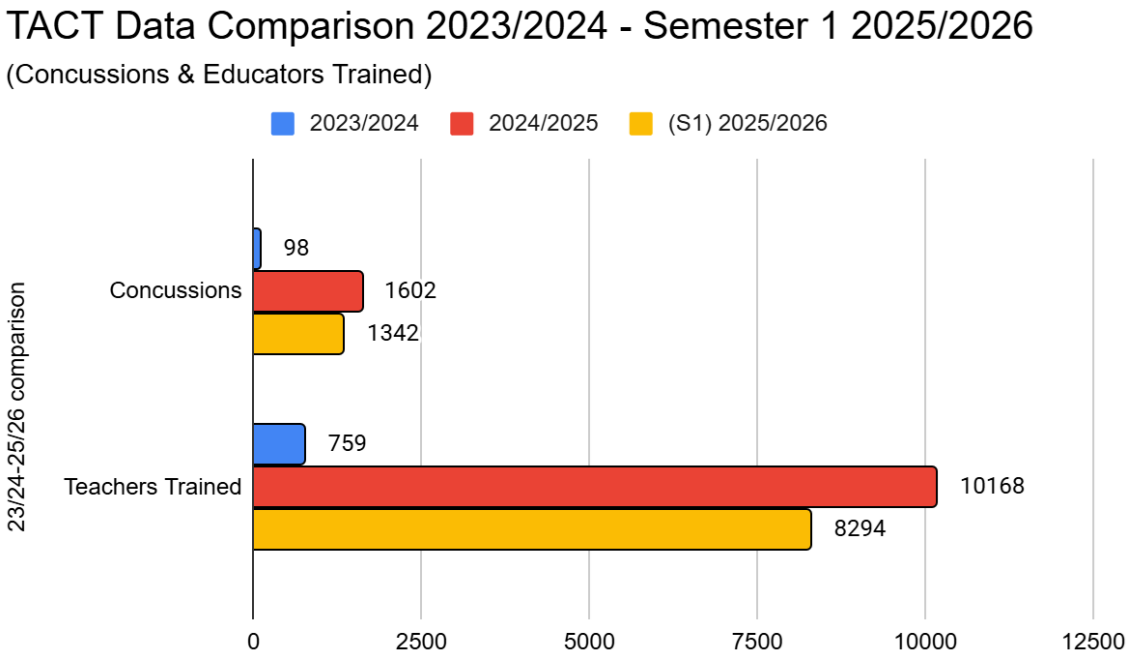


TACT **Longitudinal** State Data: Incidence & Educators Trained

The TACT data shows exponential growth across 3 years.

Semester 1 is nearly the same as the entirety of 2024/2025 school year data.

Note: Data summary from previous slides was only from 2024/2025 through Semester 1 2026.



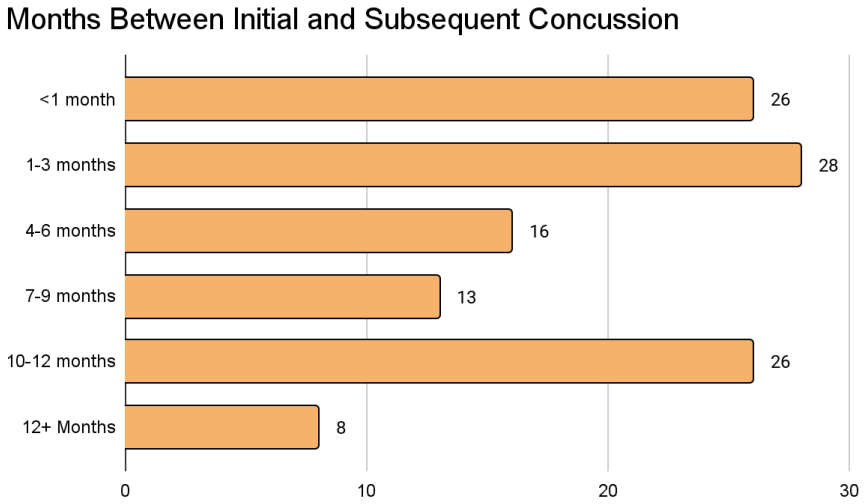
Get Schooled on Concussions

Tracking Concussions Over Time

110 students had repeat concussions

- ❏ 103 had 2 concussions
- ❏ 7 had 3 concussions

59.8% of all repeat concussions happened within 6 months



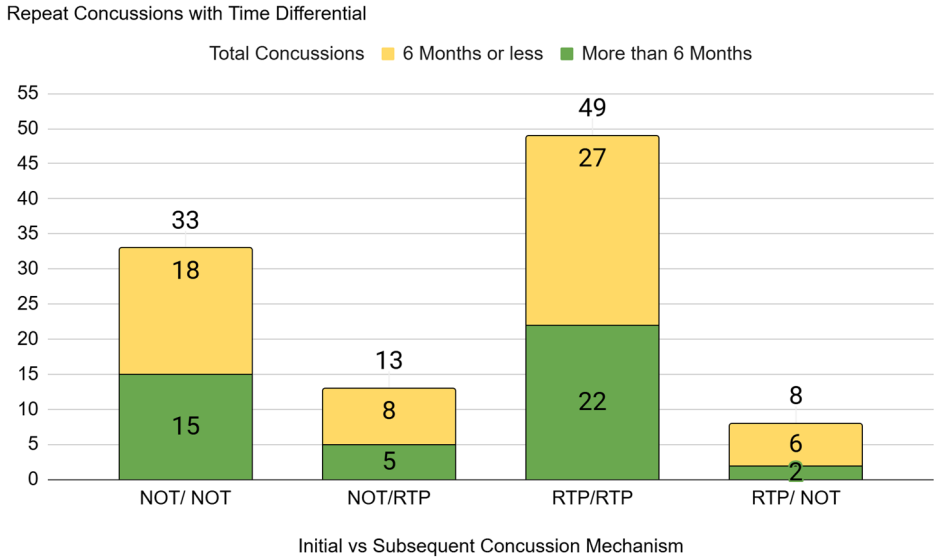
Concussion Data by Initial vs. Subsequent Concussion Mechanism

Return to Play (RTP) was the most common reported activity at the time of both the initial concussion and subsequent concussions.

55% of the RTP/RTP concussion mechanism occurred within 6 months or less.

Non-Return to Play (NOT) also had a notable number for both initial and repeated concussions, with **54%** occurring with in 6 months or less.

Note: This does not include the 3rd concussion data



Get Schooled on Concussions

TACT Data Considerations

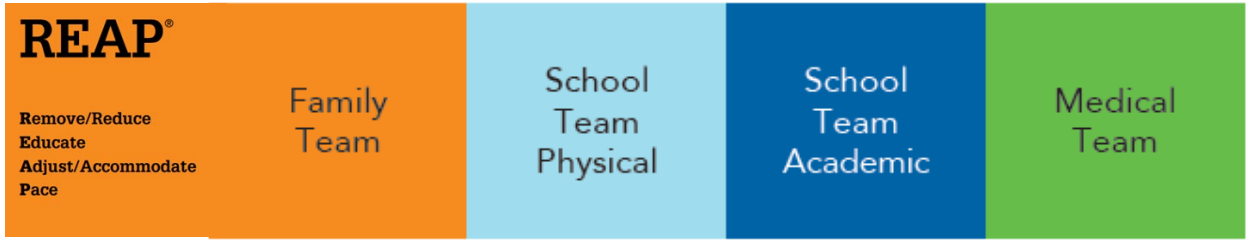
1. Concussions in the school setting remain **underidentified**.
2. **Elementary** concussions are being identified (an area that is not widely studied).
3. **> 50%** of all concussions were from non-athletic means (and/or did not fall under the RTP legislation).
4. The ability to track **repeat concussions**.

Schools' role in concussion management is vital to promoting positive outcomes. Schools are in a position to catch **all concussions** - because all students must return to learn, even if they do not return to sport - and when you track RTL data, it tells us a different story than what we've known before.

Takeaway

Early identification means we can **catch** students with concussion early, support them early, and **follow** them through the Tiers of support. This means these students do not fall off our radar.

Having a sustainable Multi-Tiered system of support for brain injury in place is nothing but beneficial. Lessons learned from Jake's tragedy is that we all have a role in brain injury management. While we all may have different roles, no one role is less important than another.



Jacob Snakenberg
April 19, 1990 — September 19, 2004

Thank you!

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Join the CDE Concussion Support Listserv here:

Colorado Brain Injury Resources

Colorado Department of Education:

- CDE School Concussion Support & Resource Guide
- CDE Exceptional Student Leadership Unit; Traumatic Brain Injury
- Landscape of Wellbeing + Belonging
- Colorado's Multi-Tiered System of Supports
  - The Tiers of Support in Response to Intervention

Brain Injury Support through the Tiers:

- REAP
- Teacher Acute Concussion Tool (TACT)
- Colorado Kids with Brain Injury
- Brain Injury in Children and Youth: A Manual for Educators

Legislation & Position Statements:

- Senate Bill 11-040: The Jake Snakenberg Youth Concussion Act (PDF) REVISED
- Colorado House Bill 19-1208
- Consensus statement on concussion in sport: the 6th International Conference on Concussion in Sport–Amsterdam, October 2022

Additional Resources

- REAP Concussion Website
- Get Schooled On Concussions Website
- Online Brain Injury Screening and Support System (OBISSS)

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