The Virginia Concussion Initiative

Supporting all Minds

An interdisciplinary approach to protecting and supporting all minds.

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GEORGE MASON UNIVERSITY

VDH VIRGINIA DEPARTMENT OF HEALTH

Virginia Concussion Initiative

Objectives

- What is VCI
- Background on Concussion
- Why is Pediatric Concussion Important
- Supporting All Minds
- VCI Resources
- How can we help each other

Supporting all minds

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McGill Neuropsychology

Children's Hospital of The King's Daughters

VDH Virginia Department of Health

Virginia Tech

MedStar Health

MGH 1811 Massachusetts General Hospital

University of New Hampshire

Fairfax County Public Schools
ENGAGE • INSPIRE • THRIVE

Loudoun County Public Schools
Established in 1870

VASN Virginia Association of School Nurses

EVMS Eastern Virginia Medical School

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Harvard Medical School

University of Essex

University of Virginia

Children's Hospital of Richmond at VCU

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Educational Success Alliance

Virginia Athletic Trainers' Association

S.M.A.R.T. Sports Medicine Assessment Research & Testing Lab

George Mason University

Special Olympics

Sweet Briar College

VCU

Interdisciplinary Approach

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Concussion - the Basics

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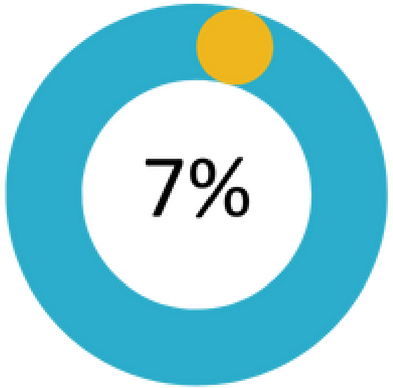
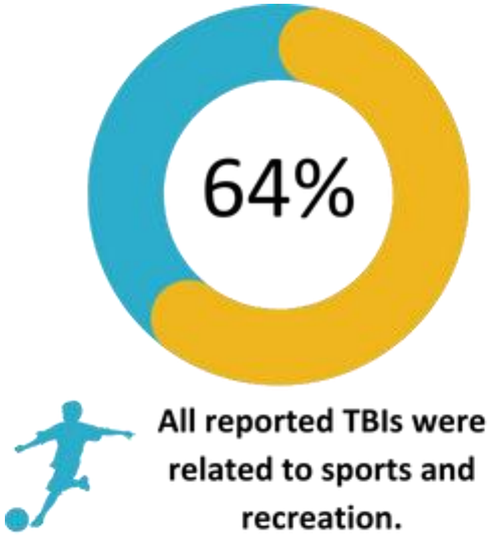
Concussion in School Age Children

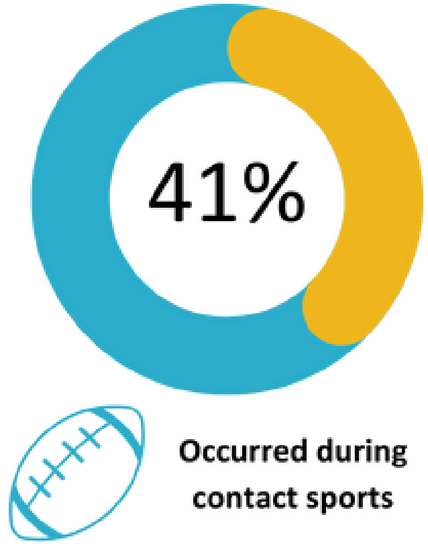
Peterson AB, Waltzman D, Daugherty J, Chen J, Breiding M. Sport and Recreation Related Concussion in Children: National Concussion Surveillance System. *American Journal of Preventive Medicine*. 2024;67(3):370-379. doi:10.1016/j.amepre.2024.05.003



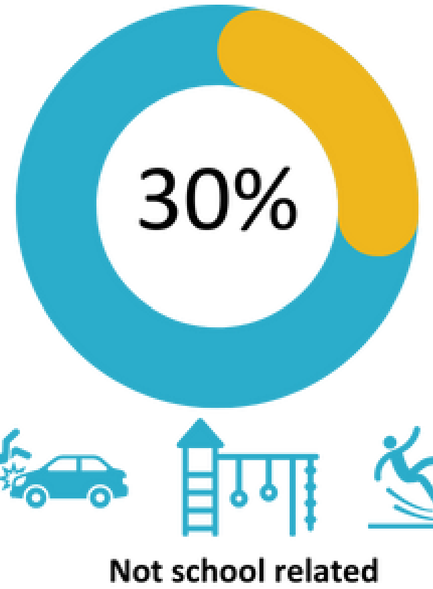
Ages 5 to 17 reported at least one concussion past 12 months



All reported TBIs were related to sports and recreation.



Occurred during contact sports



Not school related

Females two times risk of concussion compared with males

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Concussion – the basics

Blow or hit to the head/body which results in significant movement/strain of the brain

Cause changes in neurometabolism and neurotransmission

Depletes the body's energy

SIGNS
(what you observe)

Symptom
(what they report)

Patricios JS, Schneider KJ. Consensus statement on concussion in sport - the 6th International Conference on Concussion in Sport, Amsterdam 2022. 2023

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Concussion – the basics

Signs (What you observe)	Symptoms (What they report)
Cognitive	
Dazed	Mentally foggy
Slow to respond	Difficulty concentrating
Unable to recall events	Difficulty remembering
Repeated questioning	Feeling slowed down
Physical	
Vomiting	Nausea/vomiting
Balance problems	Balance problems
Fatigue/drowsiness	Fatigue/drowsiness
	Visual problems
	Dizziness
	Sensitivity to light/noise
	Numbness/tingling
Emotional	
Increased irritability	Irritable
Sadness	Sad
Nervousness	Nervous
Emotional reactivity	More emotional
Sleep	
Sleeping more/less	Sleeping more/less
Daytime fatigue/drowsiness	Fatigue/drowsiness
	Trouble falling asleep or staying asleep

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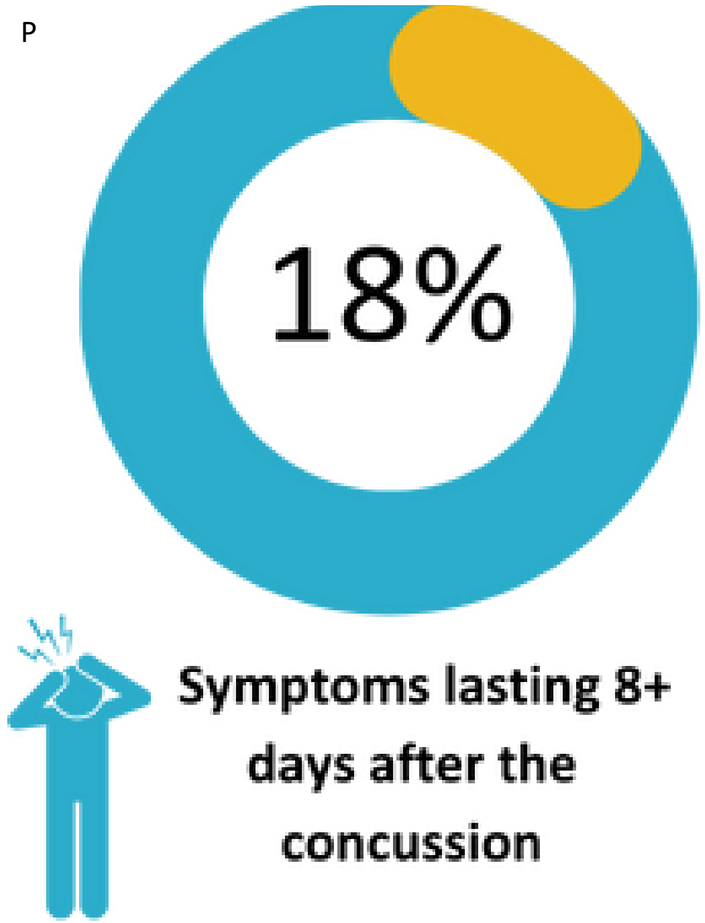

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Typical Recovery Expectations

- The number and severity of concussion symptoms are typically greatest within hours of the injury and gradually improve over days
- **The initial symptom burden is the greatest predictor for return to school**
- Most concussion symptoms improve significantly within one month in youth
- 70-80% of children will demonstrate functional recovery by 1-3 months

No Two Concussions are Alike!

Students with concussions require school supports that vary in duration and intensity

Putukian, (2023); CDC Clinical Guidance for Pediatric mTBI (2024)

Pediatric Concussion

Supporting all minds

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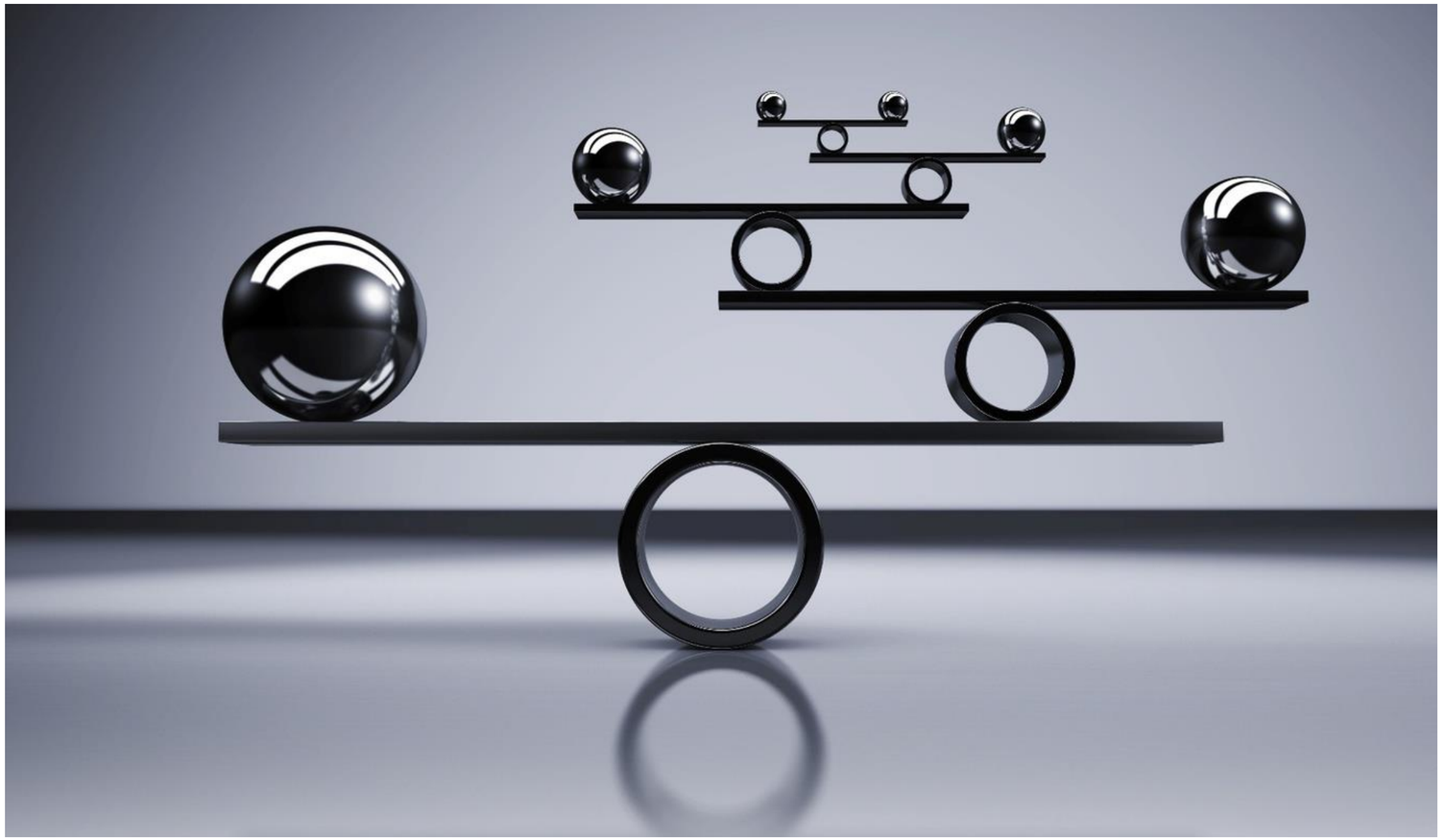
VCI: Supporting *all* Minds

Lifespan

Symptoms (What they report)
Cognitive
Mentally foggy
Difficulty concentrating
Difficulty remembering
Feeling slowed down
Physical
Nausea/vomiting
Balance problems
Fatigue/drowsiness
Visual problems
Dizziness
Sensitivity to light/noise
Numbness/tingling
Emotional
Irritable
Sad
Nervous
More emotional
Sleep
Sleeping more/less
Fatigue/drowsiness
Trouble falling asleep or staying asleep



Exertional Effects Are Important

Increasing symptoms

May arise from increased cognitive or physical activity

A valuable tool for guiding recovery

Ignoring may lead to prolonged recovery

In Young Children or Individuals With Greater Communication Challenges:

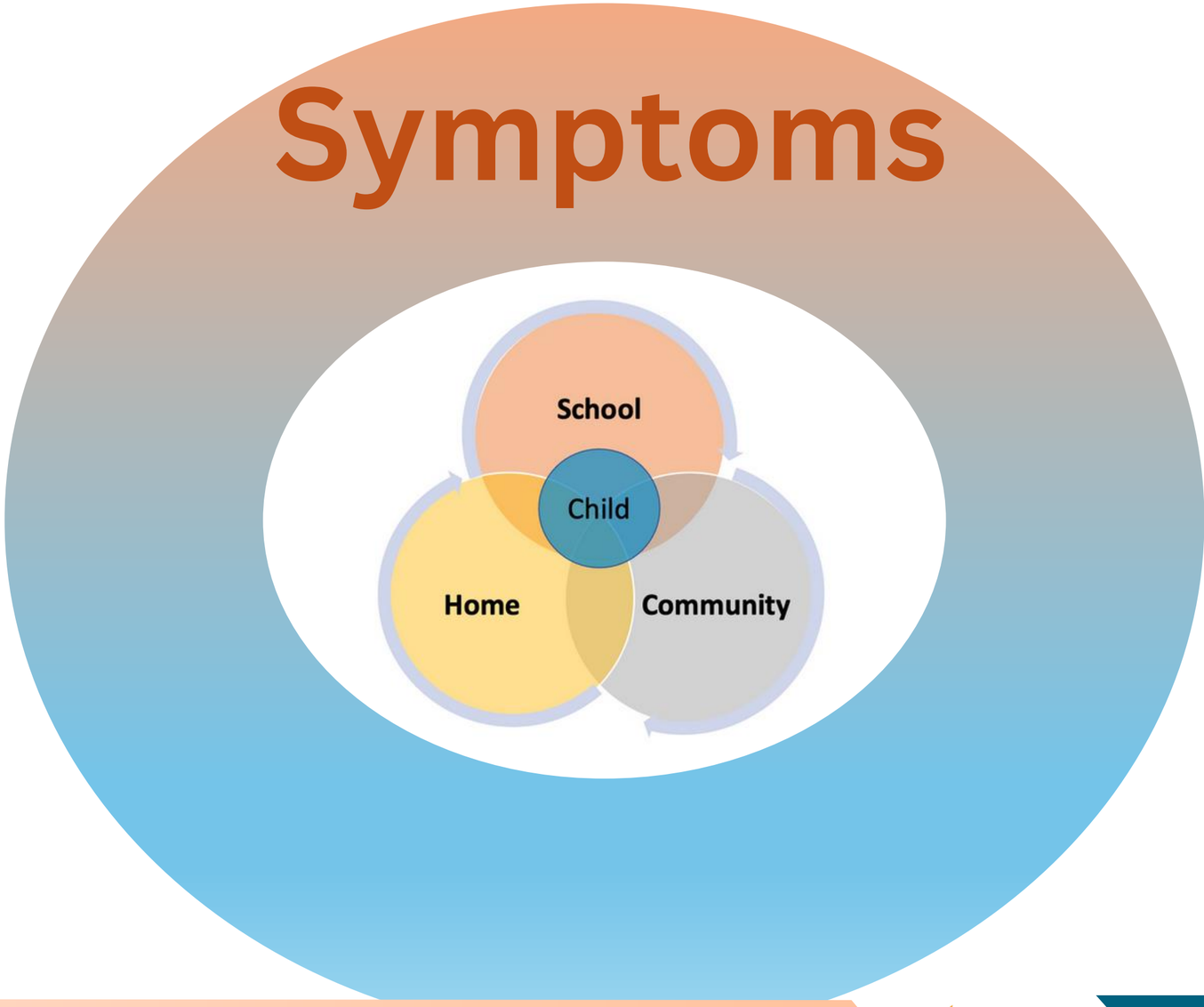
Look for unusual changes in a young child's behavior.

- More "clingy" or fussy
- Avoid their favorite activities or toys- sensitive to noises / lights
- Seem to have less energy or stamina to engage in their normal routines
- Changes in their sleep routine

Concussion symptoms impact children in many ways and in all settings

Healthcare Providers

- Pediatrician
- Athletic Trainer
- Physical Therapist
- Neuropsychologist
- Optometrist
- Pain Medicine
- Psychologist
- Neurologist
- School Nurse
- Sports Medicine Physician



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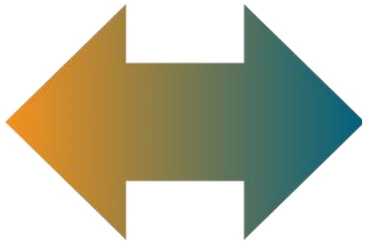
Concussion Effect in School (Due to Neurochemical Change)

- Fatigue, headaches, dizziness interfering with attendance
- Difficulty concentrating
- Trouble with new learning or remembering information
- Sensitive to lights/noises
- Trouble reading (visual tracking, headaches)
- Processing information slowly
- Assignments take longer
- Increased stressed: Amount of work feels overwhelming & feeling isolated

Direct impact of concussion in the school setting

Concussion Effect (Due to Neurochemical Change)



Demand / Effect of School

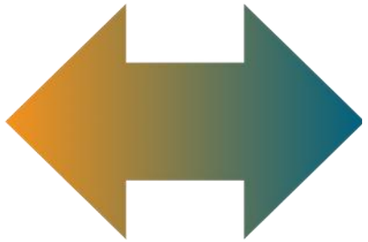
Demands:

- Amount or pace of work
- Balancing make-up & current work
- May or may not permit rest breaks
- Consistent application of accommodations / supports across the day
- Physical requirements: PE
- Stress management
- Continual increased cognitive exertion (can increase symptoms leads to stress…and more increased symptoms)

Direct impact of concussion in the school setting

Concussion Effect (Due to Neurochemical Change)

- Fatigue, headaches, dizziness interfering with attendance
- Difficulty concentrating
- Trouble learning or remembering information Symptoms (e.g., headache) worsen with concentration
- Processing information slowly
- Work takes longer
- Amount of work feels overwhelming



Demand / Effect of School (Amount or Pace of Work)

- Continual increased cognitive exertion (can increase symptoms and leads to stress)
- Balancing make-up & current work
- Availability for *meaningful* rest breaks
- Consistent application of accommodations / supports across the day
- Physical requirements: PE
- Stress management

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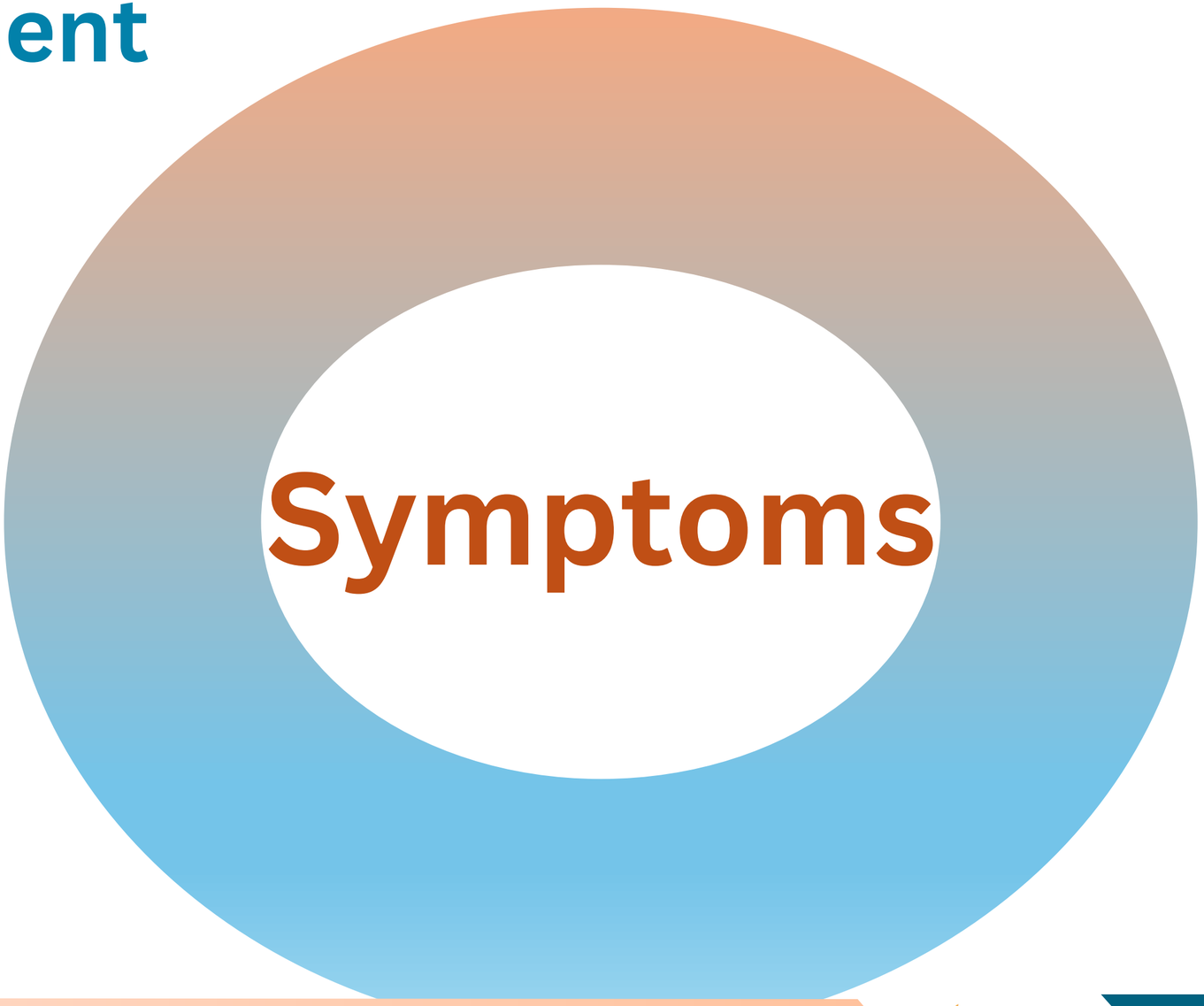
Concussion Management

Healthcare Providers

- Pediatrician
- Athletic Trainer
- Physical Therapist
- Neuropsychologist
- Optometrist
- Pain Medicine
- Psychologist
- Neurologist
- School Nurse
- Sports Medicine Physician



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Managing exertional effects will support recovery

Educational consequences can be profound from concussion

- Multidisciplinary team is critical (Concussion Management Team, or CMT)
- Moderate student activity level
- Establishing clear, individualized plans
- Goal (Academic and Clinical): Gradual return to activity

Long-Term Risks

- Increased risk of mental health issues, psychiatric hospitalization, and self-harm
- Metabolic and structural neurological changes
- Previously concussed children have four times the risk of sustaining a concussion compared with those with no previous concussion history
- Negatively influence cardiovascular function and the autonomic nervous system
- Can show neurocognitive variability in processing speed, fluid reasoning, aspects of executive functioning (working memory), attention, and long-term retrieval

Neurodiversity and Concussion

ACCESS TO CARE

ASSESSMENT

INJURY MANAGEMENT

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ACCESS TO CARE

Disparities within Concussion Care

- Concussion knowledge
- Symptom recognition
- Cognitive post-injury symptoms
- Baseline testing scores
- Number of reported SRC
- Lower incident rates
- Diagnosis and management in ED

Barriers to Receiving Concussion Care

- Insufficient workforce (athletic trainers)
- Lack of training in allied health professionals
- Days since injury to first clinical care appointment

17% of children and adolescents diagnosed with a neurodevelopmental disorder

(CDC & HRSA 2009-2017 data)

More likely to sustain a concussion

(Gunn, Broglio, McCrea, 2019; Iverson, Wojtowicz, Brooks, et al., 2020)

ACCESS TO CARE

Additional Basic Communication Barriers in Healthcare

- Knowing where to start
- Rigidity of healthcare environment
- Relying on others as advocates
- Additional appointment time needed for person-centered care
- Practicing through lens of uncertainty
- Nature of neurodiversity is rejected

(Cashin, Morphet, Wilson, & Pracilio, 2024)

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Concussion in para sport: the first position statement of the Concussion in Para Sport (CIPS) Group

Richard Weiler [1,2,3] Cheri Blauwet [4,5] David Clarke,[6] Kristine Dalton [7]
Wayne Derman [8,9] Kristina Fagher [10] Vincent Gouttebarge [1,11]
James Kissick [12,13] Kenneth Lee [14] Jan Lexell [10] Peter Van de Vliet [15]
Evert Verhagen [1] Nick Webborn [16] Osman Hassan Ahmed [3,17,18]

Guidance for those with Intellectual Impairment

Concussion suspected—remove athlete from play	Brief period of physical and cognitive rest	Gradual and progressive increase in activity while staying below their cognitive and physical exacerbation thresholds (activity should not worsen symptoms)	Graduated return to activities. Return to school should come before return to sport.	Return to school strategy: 1. activities at Home that do not produce symptoms, 2. School activities at home, 3. Return to school part time, 4. Return to school full time	Return to sport strategy: 1. symptom limited activity, 2. Light aerobic exercise, 3. Sport specific exercise, 4. Non-contact drills, 5. Return to sport	Management of persistent symptoms (symptoms which persist beyond 10–14 days in adults, or beyond 4 weeks in children)
al nt	No variation from standard management	No variation from standard management; may have difficulty with understanding instructions and compliance	No variation from standard management; may have difficulty with understanding instructions and compliance	No variation from standard management; may have difficulty with understanding instructions and compliance	Specific/unique strategies may be needed depending on degree of intellectual impairment and symptoms post-concussion	No variation from standard management; may have difficulty with understanding instructions and compliance	CBT can be performe individuals with II bu to be adapted[17 18]; ma difficulty with unders instructions and comp

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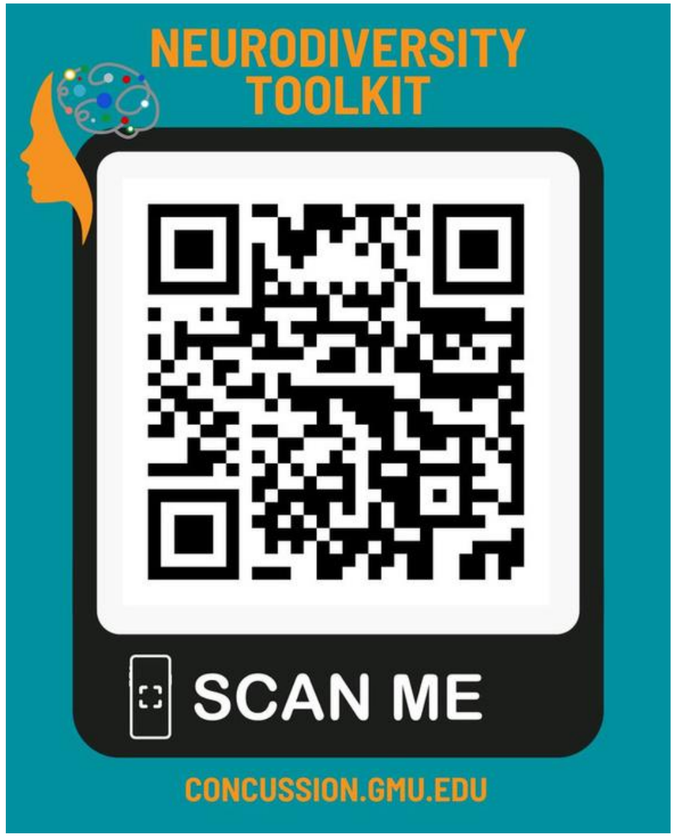
Stakeholder Attitudes and Perceptions Regarding Concussion in Athletes with Intellectual Disabilities

- Although coaches generally felt prepared to recognize (95%) and remove (95%) athletes with SRC symptoms, management strategies to recognize (34%) or treat (39%) SRC athletes with ID was low.
- Coaches described feeling less confident to manage these return-to-play decisions following injury (76%).
- Non-healthcare professionals were first responders for injuries during non-competition (68%) events and competition (14%).

(Madden, McGill, & Klima, 2022)

Supporting ALL Students



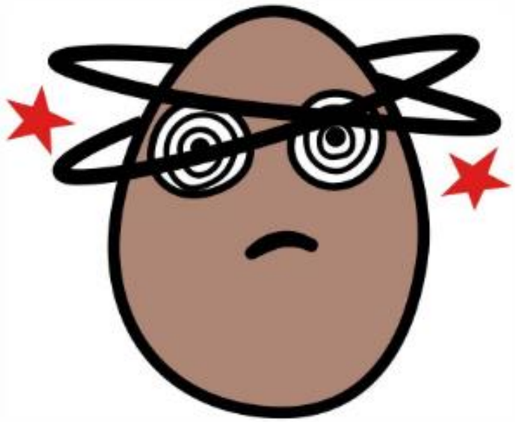
FALL

BUMP

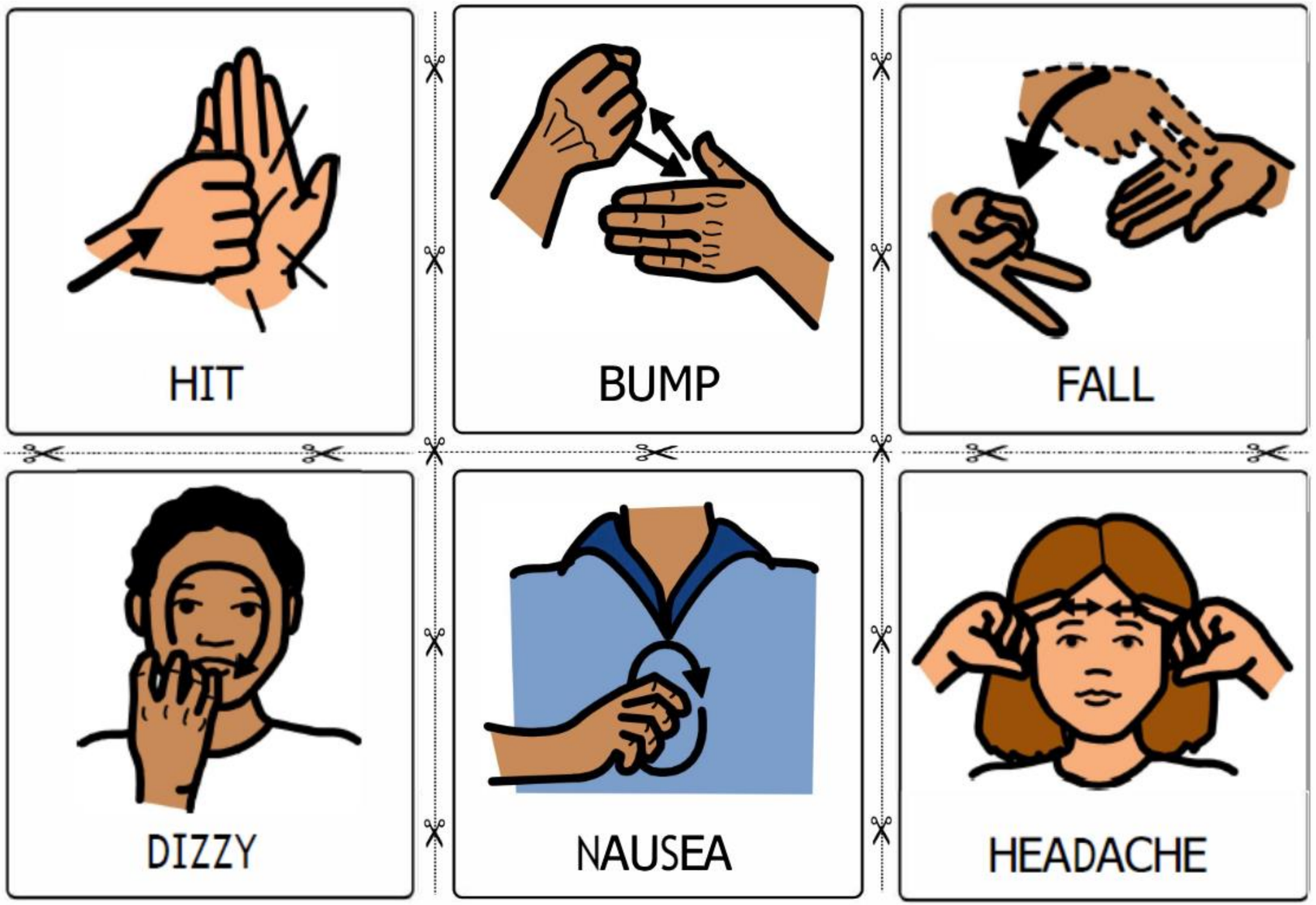
HIT/TACKLE

HEADACHE

NAUSEA



DIZZY


HIT
BUMP
FALL
DIZZY
NAUSEA
HEADACHE

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CONSIDERATIONS FOR CONCUSSION MANAGEMENT IN NEURODIVERSE INDIVIDUALS

For use by the healthcare provider to gather information from the patient and informant (e.g., caregiver or coach) to provide equitable care.

Reduce Risk *For prolonged recovery* → **Recognize** *Changes* → **Respond** *With individualized care* → **Recover** *Gradually* → **Return** *Safely*

BASELINE PREFERENCES

Best communication
- ☐ Verbal
- ☐ Visual
- ☐ Assistive communication device

Language structure
- ☐ Whole sentences
- ☐ Short phrases
- ☐ Single words

Eye contact
- ☐ With
- ☐ Without

Discuss these preinjury patient factors
- ☐ Independence level
- ☐ Calming strategies
- ☐ Interests
- ☐ Hobbies
- ☐ Existing exercise routines
- ☐ Social / support network

CHANGES IN PRESENTATION

Recognize symptom pattern
- ☐ Assess for concussion signs and symptoms in the context of the patient's baseline symptoms

Look for changes in
- ☐ Levels of independence
- ☐ Stamina
- ☐ Appetite
- ☐ Sleep routines
- ☐ Preferences for hobbies/activities
- ☐ Behavior, which may include avoiding their favorite activities/toys
- ☐ Emotions (increased irritability or clinginess)

MANAGEMENT STRATEGIES

Treatment plan should
- ☐ Use the preferred calming strategies for the individual for breaks
- ☐ Avoid known triggers of typical stress (e.g., routine changes or eliminating *all* screens)
- ☐ Increase the frequency of medical monitoring
- ☐ Decrease sensory stimuli as needed in environment (e.g., school, home, work, or medical appointments)

RETURNING TO BASELINE

Define patient recovery
- ☐ Support confidence to return to activities in a safe manner
- ☐ Address questions and worries about the current injury and future care
- ☐ Monitor for return to preferred daily activities
- ☐ Consider their baseline may not be "symptom-free"
- ☐ Define recovery by return to baseline signs and symptoms

Created by the Virginia Concussion Initiative | concussion.gmu.edu | ND2023-07

Establish a Baseline

Neurodiversity Toolkit
Baseline Concussion Assessment Tool

Virginia Concussion Initiative

Your Logo Here

PRINT

Often concussion symptoms can be similar to what neurodiverse (ND) individuals experience at baseline. Also, ND individuals who sustain a concussion may have trouble identifying and communicating changes in the way they feel. Because of this, the Virginia Concussion Initiative (VCI) has created the Baseline Assessment Tool to assist families, school teams, and sports staff in the recognition of concussions in ND individuals.

The following form should be completed by caregivers, healthcare professionals, or school/sports staff who are most familiar with the individual being assessed. Efforts should be made to ensure the assessment interview is modified to be at the appropriate verbal and cognitive level of the individual. For best results, VCI recommends that the baseline assessment should be performed annually, or prior to the start of each contact sports season.

Name:	**Likes to be called:**
Sex at birth: ☐ Male ☐ Female	Preferred pronoun:
Date of birth:	Age at time of this assessment:
Emergency contact name:	
Relationship:	Phone number:
Current activity level (complete all that apply)	
Attends school at:	
Current grade:	
Works at:	
Current job duties:	
Volunteers at:	
Current volunteer duties:	
Plays a team sport:	
Participates in recreational activities:	
Exercises regularly:	
Medical History	
Primary care physician (PCP):	PCP phone number:
Diagnosed medical history: *Example: Diabetes, cardiac arrhythmias, cerebral palsy, vision or hearing loss…*	
Neurodevelopmental history: *Example: ADHD, Autism Spectrum Disorder, learning disability…*	
Mental health history: *Also describe signs of distress (meltdowns)*	
Sensory sensitivity history: *Example: auditory - loud noises*	
Current medications and reason for taking:	
Concussion history: ☐ None ☐ Yes. Year/s:	
Managed by a healthcare provider?	
Average time to recover:	
Are there any communication and learning needs or preferences? *Example: Braille, ASL, communication board*	

Baseline Symptom Assessment

To be used with the VCI ND Toolkit Concussion Assessment Cards when needed.

Ask the individual if they have the symptom below. (*Present the corresponding baseline symptom assessment card when indicated.)*

- **If they respond no**, select 0 for frequency and severity both, and proceed to the next symptom
- **If they respond yes**:
  - Ask how often they have this symptom and how bad is the symptom
  - Point to the visual analogue scales below *(also included with the VCI Concussion Assessment Cards)* and ask the individual to rate their symptom accordingly
- Enter the responses in the corresponding boxes below

Symptom	Frequency 0 = Never 1 = Sometimes 2 = Often	Rating 0 = Good 10 = Worst I have ever felt
Read the prompt, and when needed, present symptom card.	*How often do you have this symptom?*	*If you have this symptom, how bad is it?*
Do you get **headaches?**	0	0
Do you get **nausea or an upset tummy?**	0	0
Do you ever feel **dizzy or lightheaded?**	0	0
Do you ever have **blurry vision** or things look fuzzy/unclear?	0	0
Do **bright lights** bother you?	0	0
Do **noises** bother you?	0	0
Do you have **muscle pain,** tightness, or spasms in your **neck/shoulders?**	0	0
Do you have trouble with **balance and fall easily?**	0	0
Do you have trouble with **coordination,** like hand-eye or walking?	0	0
Do you feel **tired** or don't have a lot of **energy?**	0	0
Do you have trouble **concentrating or paying attention?**	0	0
Is it hard for you to **follow instructions?**	0	0
Do you have trouble **remembering things?**	0	0
Do you feel **sad?**	0	0
Do you feel **anxious or nervous?**	0	0
Do you feel **moody,** or your **emotions** change easily?	0	0
Do you get easily **upset or annoyed?**	0	0
Do you have trouble with **sleep,** like falling or staying asleep?	0	0
Total # of baseline symptoms: *(18 max)*		***Baseline symptom severity score:*** *(180 max)* 0

Printed name of the individual performing the baseline assessment:

Signature: **Date:**

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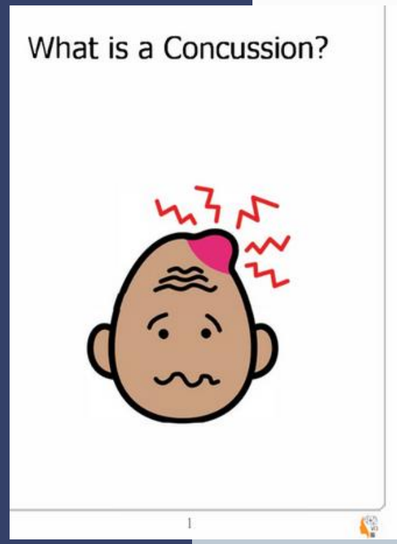

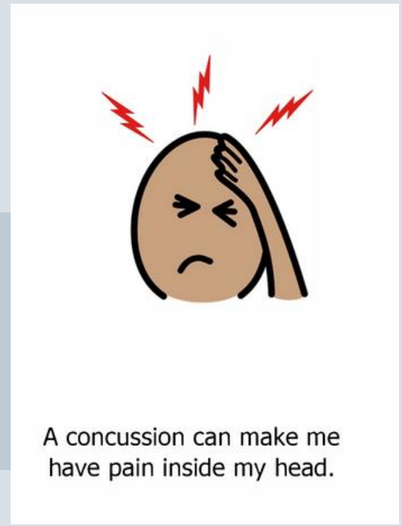

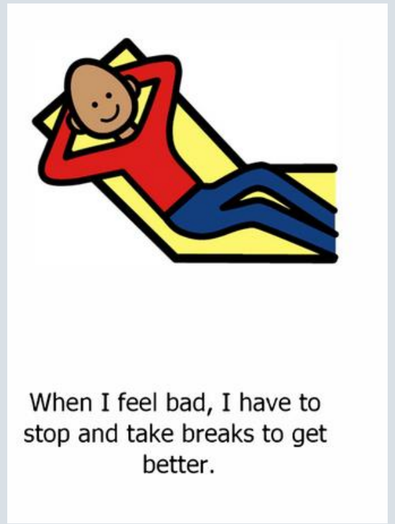

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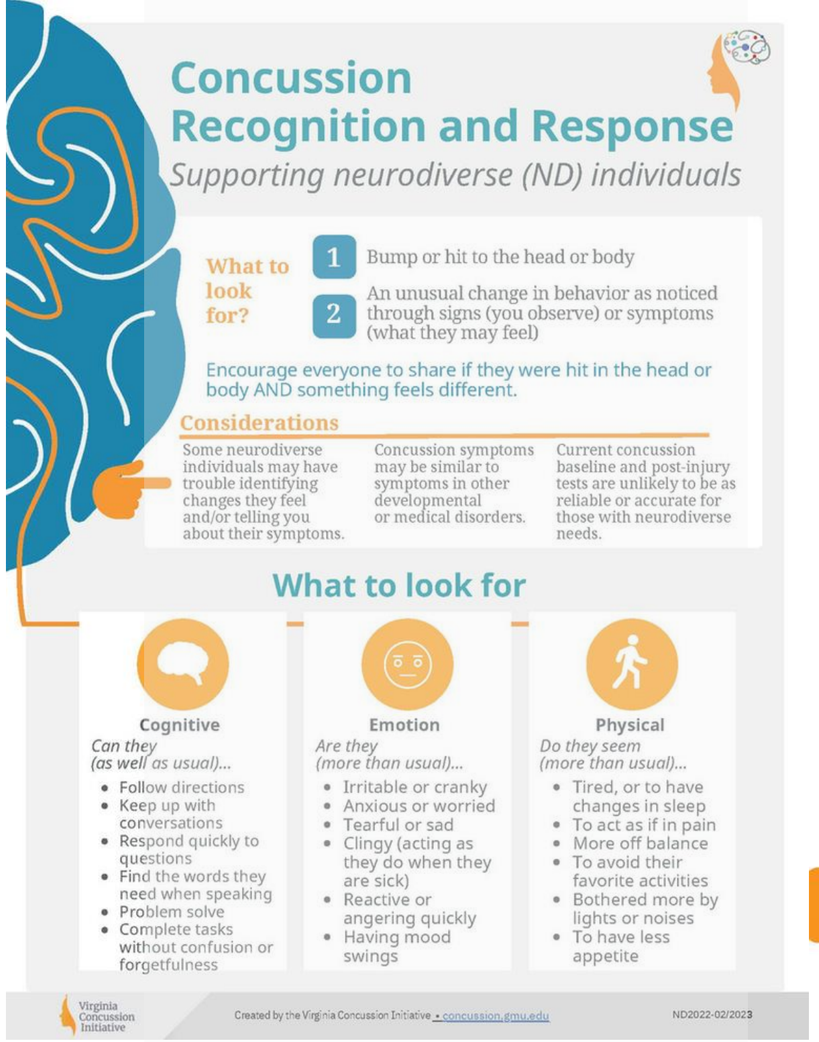
Education

Enhance Knowledge



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https://vci.gmu.edu

Leadership

Become a VCI member to contact the VCI team

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Meredith Madden

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Erin Maughan

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Jordan Nougaret

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David Pawlowski

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Paul Peterson

Contact

Gina Piccolini

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Krupa Playforth

Contact

Jacob Resch

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John Reynolds

Contact

Devon Serrano

Contact

Sam Walton

Contact

Angela White

Contact

Martin Grimm

Contact

Daniel C. Herman

Contact

Sanja Avramovic

Contact

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VCI Resources

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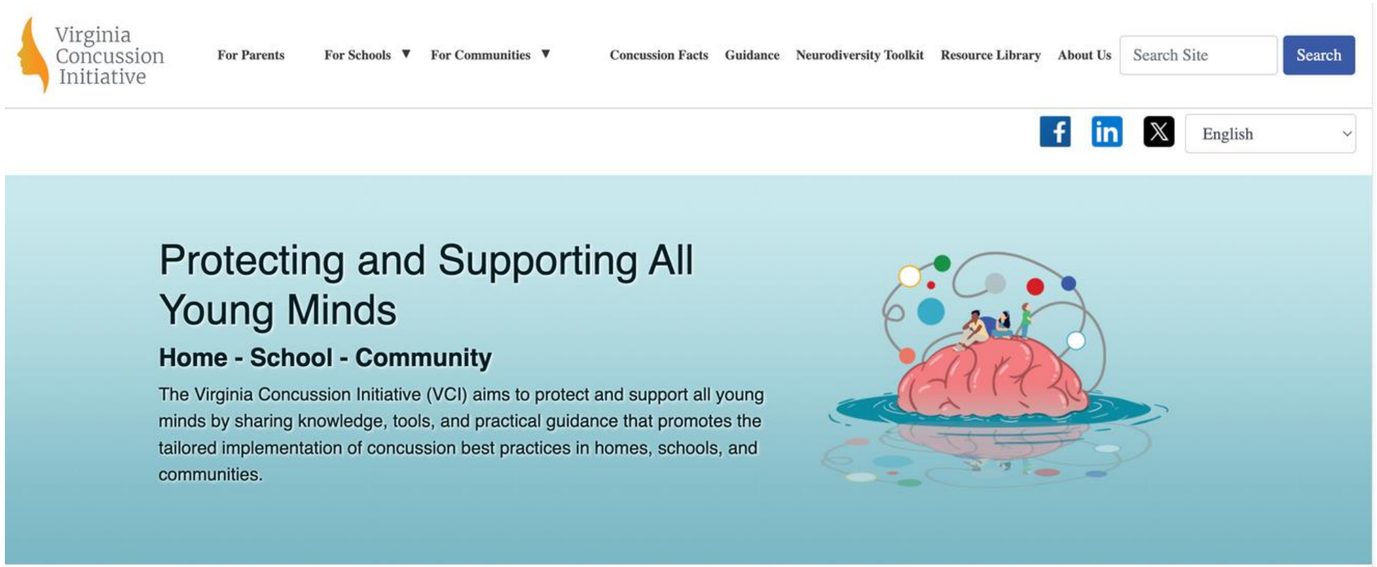
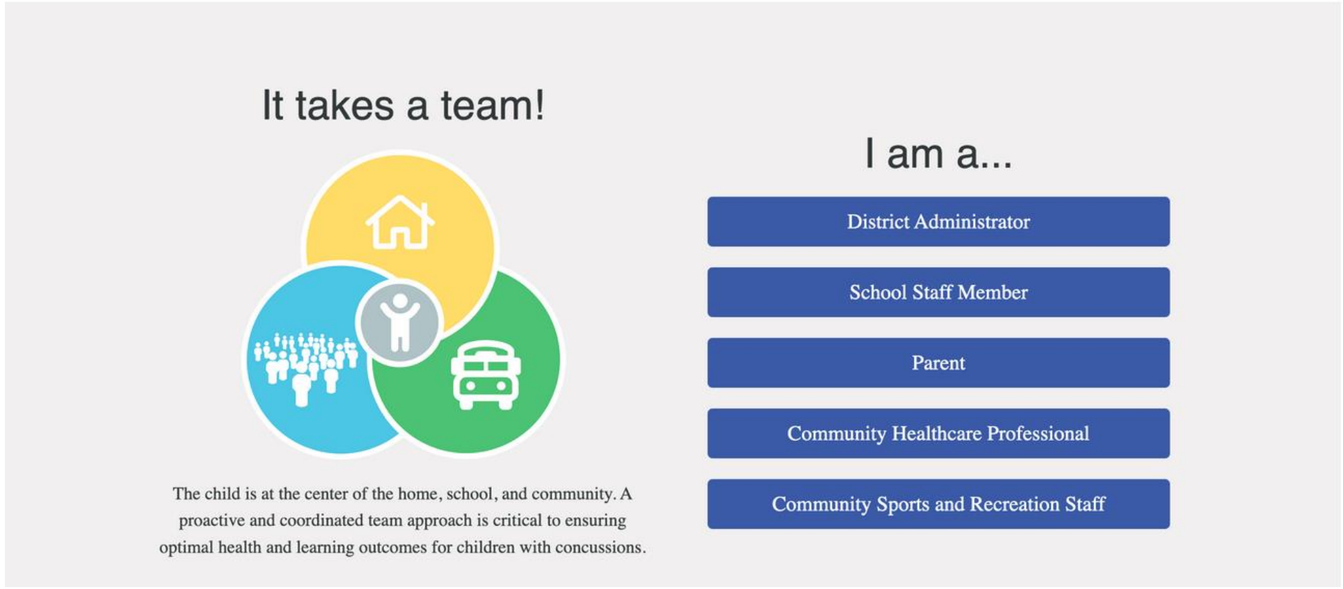
VCI WEBSITE

Disseminate Knowledge

SCAN ME





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Supporting ALL Students

Student Support Plan (SSP)

Recommendations to support a students recovery

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PRINT

A student in your class or activity has been suspected of or diagnosed with a concussion. To best support this student's recovery, please follow the individualized SSP below, and contact your Concussion Management Team (CMT) with any questions or concerns.

The CMT appreciates your input. Please assist in monitoring the student for symptom return or exacerbation as he or she returns to normal activities and report to the CMT lead as indicated.

Student Name:		Date of Birth:	
*Athletic Trainer:		Grade:	
Date of Injury:		Today's date:	

**when indicated*

Below is a list of common signs and symptoms following a concussion.
Please check any symptoms reported by this student in the

- ☐ Headaches
- ☐ Pressure in head
- ☐ Neck pain
- ☐ Nausea or vomiting
- ☐ Dizziness
- ☐ Blurred vision
- ☐ Balance problems
- ☐ Sensitivity to light
- ☐ Sensitivity to noise
- ☐ Feeling slowed down
- ☐ Feeling "in a fog"
- ☐ Difficulty concentrating
- ☐ Difficulty remembering
- ☐ Fatigue or low energy
- ☐ Confusion
- ☐ Drowsiness

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Classroom Symptom Management Strategies

Short-term classroom supports to facilitate recovery

Headaches

CLASSROOM STRATEGIES

- Allow the student to put their head down on their desk or take a quick break outside of the classroom when symptoms begin to worsen.
- Allow student to listen to the teacher, without producing notes or written work.
- Allow the use of audiobooks when needed

Feeling Mentally Foggy or Thinking Slowly

- Simplify tasks, give concise instructions and allow the student to submit an abridged version of the assignment.
- Reduce the overall volume of in-class assignments and homework.
- Provide a copy of the teacher's notes or give permission for the student to record lectures.
- Allow the student to put their head down on their desk or take a quick break outside of the classroom when symptoms begin to worsen.

Talk to your Concussion Management Team (CMT) about:

Reducing in-class and homework **assignments**, and focus only on the essential assignments needed to demonstrate mastery.

Building breaks into the student's schedule. Allow the student to take breaks outside of the classroom when in-classroom breaks, such as

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Concussion Management Team Guide

Supporting all young minds

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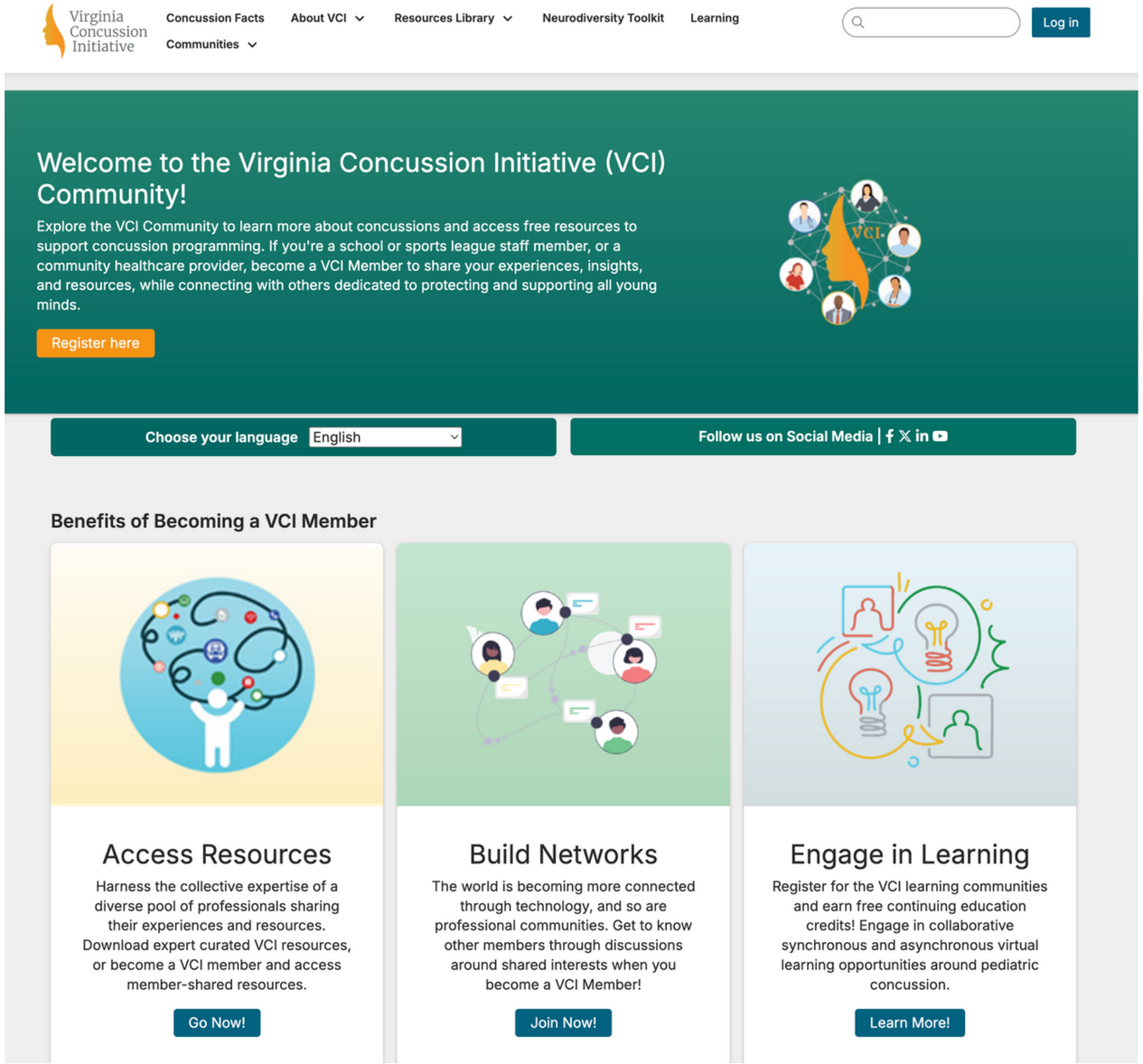
VCI COMMUNITY

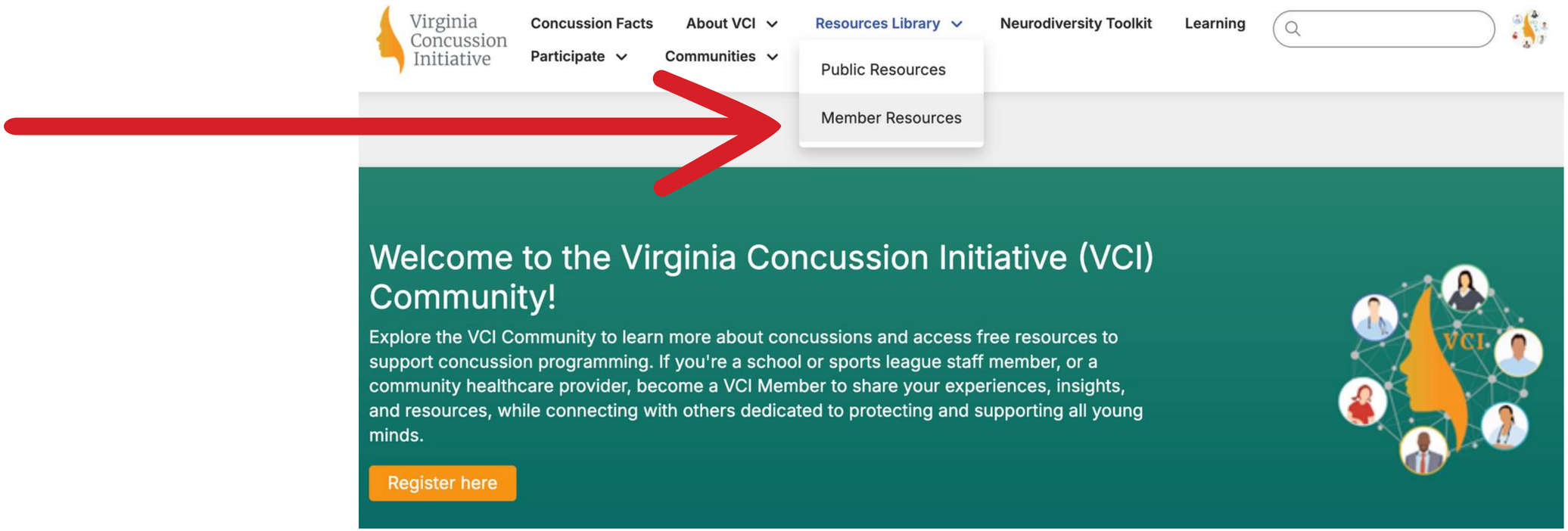
Support Knowledge Translation and Tailored Implementation

SCAN ME



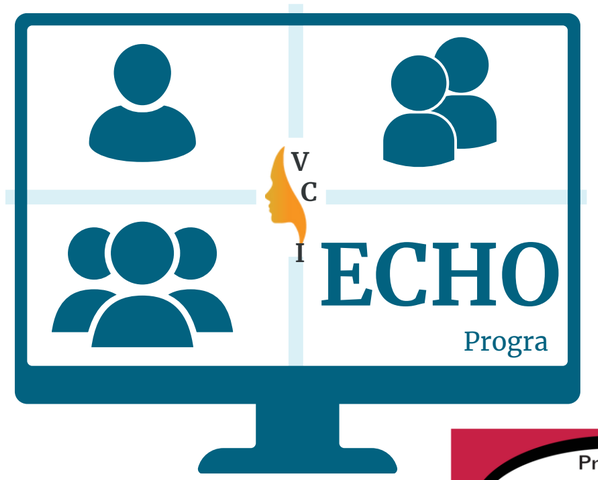
Virginia Concussion Initiative

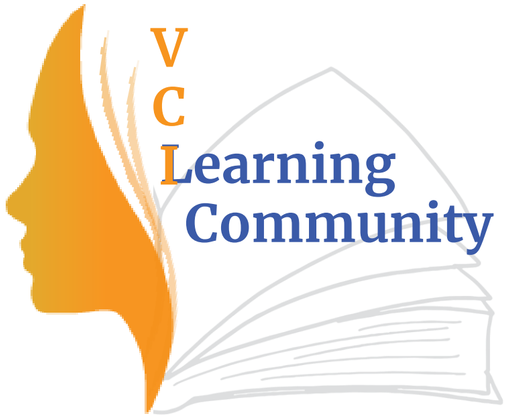
Become a *Member* and access peer resources



VCI LEARNING COMMUNITIES

Support Knowledge Translation and Tailored Implementation





VCI LEARNING COMMUNITIES

VCI ECHO Program

12:00 - 1:00 PM ET | Second Tuesday of Each Month

Free Continuing Education Credits

GEORGE MASON UNIVERSITY | VDH VIRGINIA DEPARTMENT OF HEALTH | VASN VIRGINIA ASSOCIATION OF SCHOOL NURSES | VIRGINIA ATHLETIC TRAINERS' ASSOCIATION | boc

SCAN ME

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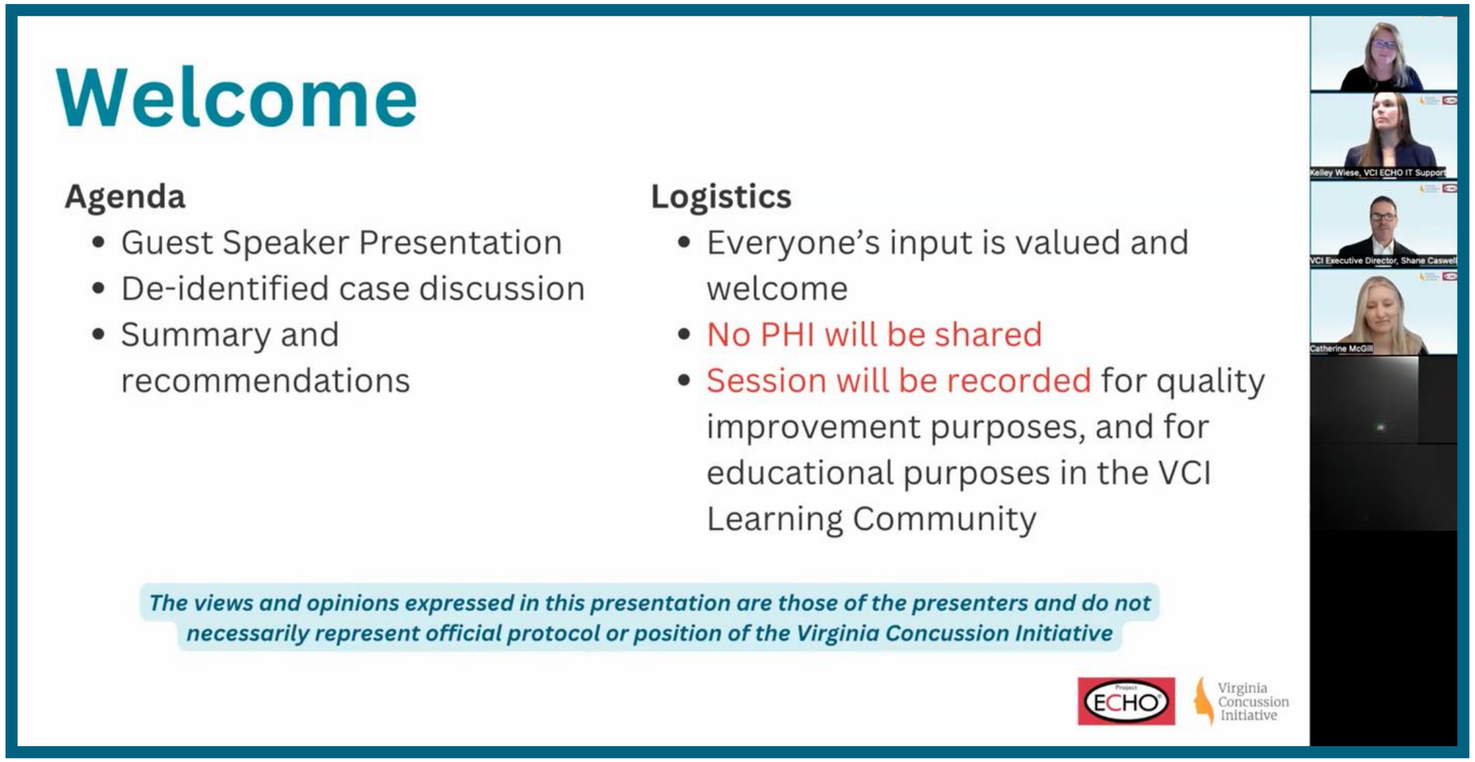
VCI LEARNING COMMUNITIES

VCI ECHO Program

TUE 08 OCT	**Understanding and Managing Concussion in the School-Aged Child** 12:00 pm - 01:00 pm ET	Completed
TUE 12 NOV	**The Intersection of Concussion and Mental Health** 12:00 pm - 01:00 pm ET	Completed
TUE 14 JAN	**Post-Concussion Headaches and Migraines** 12:00 pm - 01:00 pm ET	Upcoming
TUE 11 FEB	**Sleep Dysfunction Following Concussion** 12:00 pm - 01:00 pm ET	Upcoming



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VCI LEARNING COMMUNITIES

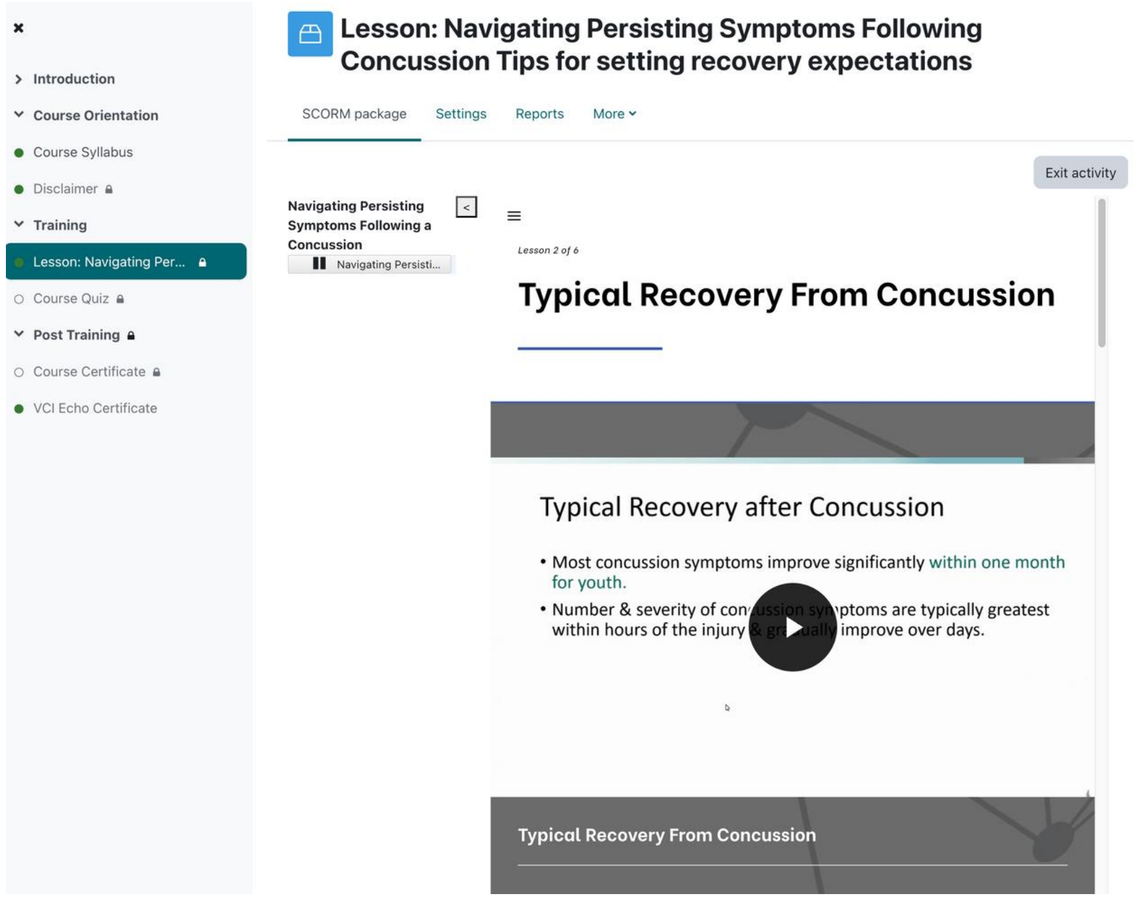
VCI Learning Community

SCAN ME

Virginia Concussion Initiative

VCI LEARNING COMMUNITIES

VCI Learning Community



- Navigating Persistent Symptoms Following a Concussion
- Empowering Equitable Concussion Care
- Exercise Prescription in Concussion: Effective Methods for Recovery
- More than Meets the Eye: Visio-Vestibular Deficits Following Concussion
- Movement is Medicine: Recognition and Management of Balance Dysfunction

COMING SOON

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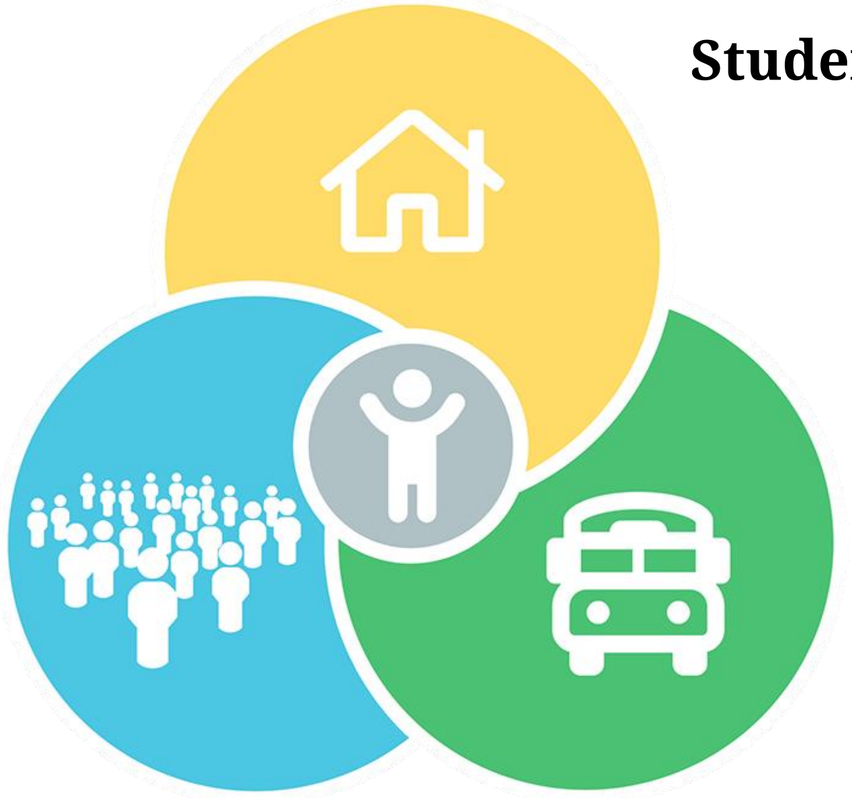
VCI RESOURCES

Supporting Homes, Schools, and Communities

Students, Athletes and Parents

Community Healthcare Providers and Sports & Recreation Program Staff



School Teams

Virginia Concussion Initiative

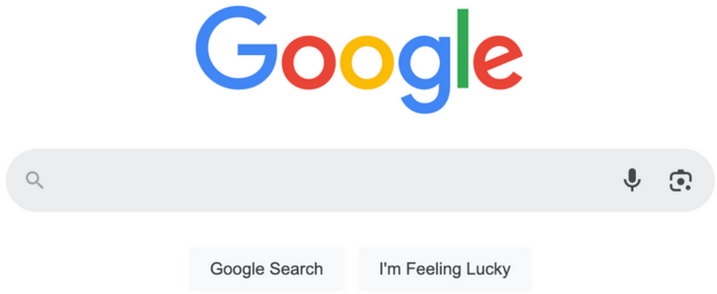
Challenges we face...

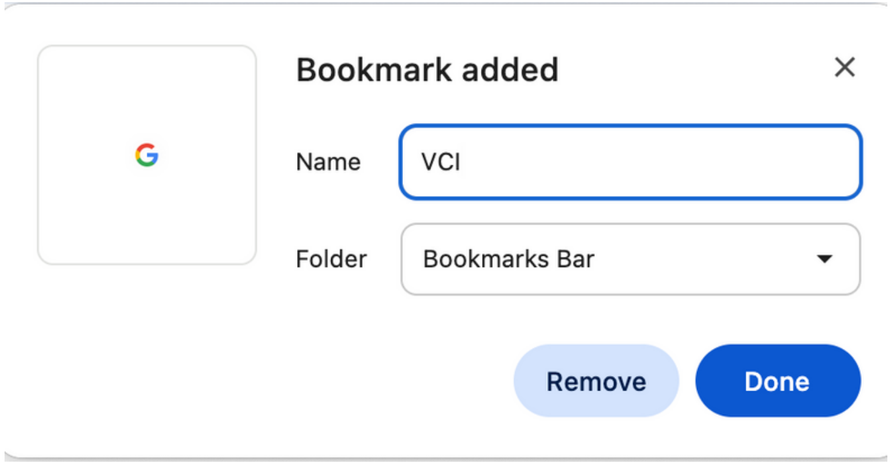
Unfunded Mandate

No Accountability Measures

Historical Support Primarily for Student-Athletes

How can we help each other…





Promote Awareness and Engagement

Virginia Concussion Initiative

Thank you for your time and attention.

Email Contact: [*VCI@gmu.edu*](mailto:VCI@gmu.edu)

Website: [*concussion.gmu.edu*](concussion.gmu.edu)

VCI Community: [*vci.gmu.edu*](vci.gmu.edu)

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