Community of Practice on Traumatic Brain Injury

Third Meeting
November 6th, 2013
Today’s Agenda

• Primary Prevention for Traumatic Brain Injury
• Taking Charge of Concussion in Youth Sports
• Q&A
• Task for the Next meeting
● If you are having any technical problems joining the webinar please contact the Adobe Connect hotline at 1-800-416-7640 or email csninfo@edc.org

● Type any additional questions or comments into the Chat box on the left.
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Primary Prevention for Traumatic Brain Injury

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LCDR USPHS Commissioned Corps
CSN TBI Community of Practice
November 6, 2013
Burden of TBI in the US

- In 2009, there were 2.4 million TBI-related emergency department (ED) visits, hospitalizations, and deaths either alone or in conjunction with other injuries.

  - ~2 million
  - ~300 thousand
  - ~53 thousand

Rates of TBI-related ED Visits, Hospitalizations, and Deaths --- United States, 2001--2010

CDC National Hospital Discharge Survey, National Hospital Ambulatory Medical Care Survey, National Vital Statistics System
TBI in the US

- **Sex**
  - Males have highest rates of hospitalizations and ED visits

- **Age Group**
  - Children aged 0-4 years: highest rates of ED visits
  - Adults 65 years and older: highest hospitalization and death rates

CDC National Hospital Discharge Survey, National Hospital Ambulatory Medical Care Survey, National Vital Statistics System
Percent Distributions of TBI-related Emergency Department Visits by Age Group and Injury Mechanism --2006--2010

CDC National Hospital Ambulatory Medical Care Survey
Percent Distributions of TBI-related Deaths* by Age Group and Injury Mechanism ---2006--2010

*Death estimates were derived from the CDC National Vital Statistics System (NVSS) Multiple Cause of Death Data
TBI PREVENTION
Haddon Matrix

- Conceptual model for injury prevention
- Developed by William Haddon Jr.
- Acknowledges that injury occurs on a continuum
- Combines public health concepts
  - Host–Agent (vector)–Environment
  - Primary, Secondary, and Tertiary prevention
- Includes phases where change would have effect
  - Pre-event
  - Event
  - Post-event
# Haddon Matrix Applied to the Problem of Motor Vehicle Crashes

<table>
<thead>
<tr>
<th>Phases</th>
<th>Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Host</strong></td>
</tr>
<tr>
<td><strong>Pre-event (Before the crash occurs)</strong></td>
<td>Driver vision</td>
</tr>
<tr>
<td></td>
<td>Alcohol impairment</td>
</tr>
<tr>
<td></td>
<td>Driver experience/ability</td>
</tr>
<tr>
<td><strong>Event (During the crash)</strong></td>
<td>Spread out energy in time and space with seat belt and/or airbag use</td>
</tr>
<tr>
<td></td>
<td>Child restraint use</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Post-event (After the crash)</strong></td>
<td>Crash victim’s general health status</td>
</tr>
<tr>
<td></td>
<td>Age of victims</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Applying the Haddon Matrix Model

- Identify the problem to be addressed
- Define each row and column
- Generate ideas about interventions
- Select decision-making criteria
  - Effectiveness
  - Cost
  - Feasibility
Challenges in TBI Prevention

- Several external causes
- Injury prevention programs exists in silos
  - Motor-vehicle
  - Falls
  - Violence
- Effect of interventions on TBI difficult to measure
Core Violence and Injury Prevention Program (Core VIPP)
Core VIPP Focus Areas

- Traumatic brain injury
- Sport concussions
- Older adult falls
- Suicide
- Motor vehicle occupant injury
- Domestic/intimate partner violence
- Childhood falls
- Homicide/assault
Future Directions for Primary Prevention

- Core VIPP state review and Special Emphasis Reports
- Focus on TBI leading causes
- Describe impact on TBI incidence
- Best Available Research Evidence (BARE)
  - Information derived from scientific inquiry
  - Assists in determining achievement of intended outcomes
- BARE Strategies
  - Leading causes
  - Specific populations
State X Example

- TBI burden by external cause
  - Suicide 40% deaths
  - Falls 39% hospitalizations
  - Falls 40% ED visits

- Prevention
  - Multimedia campaign to address depression
  - Fall risk assessments
  - Increase balance and gait for older adults
Resources for BARE Strategies

- Preventing Falls: How to Develop Community-based Fall Prevention Programs for Older Adults
- Preventing Suicide: Program Activities Guide
- The Guide to Community Preventive Services
Take Home Message

- Focus on leading causes of TBI
- Bridge gap and reduce silos
- Encourage conversation
- Build capacity for primary prevention
- Explore strategies to measure impact
Thank You

For more information please contact Centers for Disease Control and Prevention

1600 Clifton Road NE, Atlanta, GA  30333
Telephone: 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348
E-mail: cdcinfo@cdc.gov  Web: http://www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.
Taking Charge of Concussion in Youth Sports: What Coaches, Parents, and Players Can Do

Gerard A. Gioia, PhD
Chief, Division of Pediatric Neuropsychology
Children’s National Medical Center
Professor, Depts. of Pediatrics and Psychiatry & Behavioral Sciences
George Washington University School of Medicine
Sports & Kids

- Development Zone: Teaching Life’s Lessons
  - Better Athletes, Better People
- Appreciating “True Competition”
  - Striving for Personal & Team Excellence
- Honoring the Game: Win at all Cost?
- Relationship to Injury Recognition & Response
Youth sports are great place for children to learn important life lessons. Hard not to be worried and to question your child’s involvement in sports. Arm yourself with concussion knowledge skill, feel more in charge of injury, increase your confidence in allowing active sports participation.
Four Corners Approach to Concussion Care

Family

Medical Systems

Athletic/Recreational

School

Child/Teen
(Student, Athlete, Son/Daughter, Friend)
49 States Have Concussion Laws
Know your State Youth Concussion Law

3 Core Principles

1. Concussion Education for Coaches to Recognize & Respond
2. Remove & Protect – When in Doubt, Sit it Out
3. Medical Clearance required for Returning Youth to Play
What is a concussion?

- A bump, blow or jolt to the head or body that causes the brain to move rapidly back & forth
- Causes stretching of brain, causing chemical changes, and cell damage
- Causes change in how brain works (signs & symptoms)
- Once these changes occur, brain is more vulnerable to further injury and sensitive to increased stress
What is a concussion?
Poll #1

What percent of persons with a concusion lose consciousness?

a) 50%

b) 25%

c) 10%

d) 75%
Neurometabolic Cascade Following Traumatic Brain Injury

(Giza & Hovda, 2001)

(Glutamate, Calcium, Glucose, Cerebral Blood Flow)
Recovery from concussion: How long does it take?

WEEK 1
WEEK 2
WEEK 3
WEEK 4
WEEK 5

All Athletes
No Previous Concussions
1 or More Previous Concussions

N=134 High School athletes

Recovery from concussion: How long does it take?
Epidemiology (IOM, 2013)

**TABLE S-1** Reported Concussion Rates by Sport, Sex, and Competition Level (High School and College) (Rates per 10,000 Athletic Exposures)

<table>
<thead>
<tr>
<th>Sport</th>
<th>High School</th>
<th>College</th>
<th>College</th>
</tr>
</thead>
<tbody>
<tr>
<td>Football</td>
<td>6.0</td>
<td>4.7</td>
<td>6.4</td>
</tr>
<tr>
<td>Ice Hockey (W)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ice Hockey (M)</td>
<td>-</td>
<td>-</td>
<td>5.4</td>
</tr>
<tr>
<td>Lacrosse (W)</td>
<td>2.0</td>
<td>-</td>
<td>3.5</td>
</tr>
<tr>
<td>Lacrosse (M)</td>
<td>3.0</td>
<td>-</td>
<td>4.0</td>
</tr>
<tr>
<td>Soccer (W)</td>
<td>3.5</td>
<td>3.6</td>
<td>3.4</td>
</tr>
<tr>
<td>Soccer (M)</td>
<td>1.7</td>
<td>2.2</td>
<td>1.9</td>
</tr>
<tr>
<td>Wrestling</td>
<td>1.7</td>
<td>1.8</td>
<td>2.2</td>
</tr>
<tr>
<td>Field Hockey</td>
<td>1.0</td>
<td>-</td>
<td>2.2</td>
</tr>
<tr>
<td>Basketball (W)</td>
<td>1.6</td>
<td>2.1</td>
<td>2.1</td>
</tr>
<tr>
<td>Basketball (M)</td>
<td>1.0</td>
<td>0.7</td>
<td>1.6</td>
</tr>
<tr>
<td>Softball</td>
<td>1.1</td>
<td>0.7</td>
<td>1.6</td>
</tr>
<tr>
<td>Baseball</td>
<td>0.6</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Volleyball</td>
<td>-</td>
<td>0.5</td>
<td>0.6</td>
</tr>
</tbody>
</table>
6 Action Steps Every Parent & Coach Should Know and Do

1. Learn how to **recognize** a concussion.
2. Learn the 12 Danger Signs → 911
3. Use tools to guide you
   a. CDC Heads Up materials
   b. Concussion Recognition & Response (CRR) app
4. **Remove** child from play if you suspect a concussion, obtain a medical evaluation
5. Monitor & record child’s symptoms at home
6. Support proper treatment: physical, cognitive, emotional support
3 Action Steps for Every Athlete

1. Respect the Game, Yourself, Teammates, and Opponent

2. Take Responsibility for Your Health & Others
   ▫ “Friends don’t let friends play concussed”
   ▫ “No Pain, No Gain… except for the Brain”

3. Learn to Recognize Concussion Signs & Symptoms and Do the Right Thing
What Am I Looking For?
Poll #2

What is the **most** important sign or symptom to look for?

a) vomiting
b) headache
c) dizziness
d) Loss of consciousness
e) All the above
12 Danger Signs ➔ Call 911

- Loses consciousness (even briefly)
- Uneven pupils
- Seizures
- Slurred speech
- Worsening headache
- Is drowsy and cannot be awakened
- Repeated vomiting or nausea

- Unable to recognize people or places
- Weakness, numbness, or decreased coordination
- Becomes increasingly confused, restless, or agitated
- Unusual behavior
- Will not stop crying/cannot be consoled
Signs of a Concussion
(what you observe)

Cognitive
• Appears dazed/stunned
• Confused about events (assignment or position)
• Answers questions more slowly
• Repeats questions/forgets instruction or play
• Can’t recall events prior to or after the hit/fall

Physical
• Vomiting
• Loses consciousness
• Balance problems
• Moves clumsily
• Drowsy

Behavior/Emotion
• Behavior or personality changes
Symptoms of a Concussion
(what they feel and report)

Physical
• Headache
• Fatigue
• Visual problems (blurry/“double”)
• Nausea/vomiting
• Balance problems/ dizziness
• Sensitivity to light/noise
• Numbness/tingling

Cognitive
• Mental fogginess
• Difficulty concentrating
• Difficulty remembering
• Feeling slowed down

Emotional
• More emotional
• Irritable
• Sad
• Nervous

Sleep
• Sleeping more/less
• Trouble falling asleep
• Drowsiness
There’s Increasing Knowledge and Awareness, But…

- Parents and coaches may lack basic skill about **what to do** when concussion is suspected.

  “How will I remember?
  “What do I look for if I suspect a concussion?”
  “What should I do?”
Concussion Recognition

“I SUSPECT!”

1.
Blow / Force to Head / Body

2.
Change in Function / Behavior / Performance

Post-Concussion Signs & Symptoms

<table>
<thead>
<tr>
<th>Physical</th>
<th>Cognitive</th>
<th>Emotional</th>
<th>Sleep</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>Concentrate</td>
<td>Irritability</td>
<td>More</td>
</tr>
<tr>
<td>Fatigue</td>
<td>Memory</td>
<td>Emotional control</td>
<td>Less</td>
</tr>
<tr>
<td>Balance/ Dizziness</td>
<td>Speed of Thinking</td>
<td>Sadness</td>
<td>Cannot</td>
</tr>
</tbody>
</table>
Concussion Response

1 + 2 = “I Suspect”

“When in Doubt, Sit Them Out”

Removal from sport
Protect from further injury
Notify Parent

Support Recovery
Tools

- CDC “Heads Up” Sideline Materials
  - Clipboard sticker
  - Wallet card
  - Symptom checklist

- Smartphone App
  - Concussion Recognition & Response
Concussion Education Tools

Parents & Coaches & Athletes

Coaches

Schools

Healthcare Providers

Healthcare Providers

www.cdc.gov/concussion
Prevention

- Primary: Prevent concussion
  - NGB’s sports examination of technique, coaching/teaching, officiating, culture
  - USA Football HUT, US Lacrosse girls
- Secondary: early recognition & response (CDC Heads Up program)
  - Preparation/ Education/Training
- Tertiary: Effective medical systems of evaluation & treatment
  - NFL clinics
  - Heads Up: Brain Injury in Your Practice; Tools
Concussion App works!

- This afternoon my 6yr old was trying to keep up with her older sisters, riding her bike down a big hill in our neighborhood and apparently forgot the brakes.
- Without all the gory details - thank God for her helmet - but her cheekbone, chin and chest, knuckles, knees and elbows cushioned her blow. When I arrived (2 minutes later) she was hysterical, vomiting and could not remember what had happened!!!
- Last week would have freaked out but today My first thought was... the APP! As I was consoling - my other daughter was firing off questions from the APP. She emailed the results home; we printed them out and went to the ER as the APP recommended.
Concussion App works!

- At the ER I handed them the printout and they took her in no more than 5 min after we arrived. The ER Dr. was so impressed with the info on the printout and after a quick exam sent her for a CT scan.
- He said that PAR APP print out saved us about 40 min of waiting for a nurse and intake questions.
- Thank God the diagnosis was mild concussion with no additional swelling but the Dr said that coming to the ER was the right thing to do.
- He had never heard of this App but is going to recommend it from now on.

   Kelly
(7/16/2013)
Poll #3

How satisfied are you with your state’s implementation of their youth concussion law?

a) Very satisfied
b) Moderately satisfied
c) Minimally satisfied
d) I don’t know yet
Summary

- Youth sports are rewarding activities for the health & development of kids
- Risks of concussion must be understood and prevented
- All four corners of a child’s life must take responsibility.
- 6 Action Steps for Parents & Coaches, 3 for athletes
- Learn the “1 + 2” rule; When in Doubt, Sit them out
Sports-Related Concussions in Youth: Improving the Science, Changing the Culture

For more information visit
www.iom.edu/concussions

Email: YouthSportsConcussions@nas.edu
• **Recommendation 1 - Surveillance.** The Centers for Disease Control and Prevention should establish and oversee a national surveillance system to accurately determine the incidence of sports-related concussions, including those in youth ages 5 to 21.

• **Recommendation 2 - Diagnosis and Management.** The NIH and DoD should support research to: (1) establish objective, sensitive, and specific metrics and markers of concussion diagnosis, prognosis, and recovery in youth and (2) inform the creation of age-specific, evidence-based guidelines for the management of short- and long-term sequelae of concussion in youth.

• **Recommendation 3 - Short- and Long-term Consequences.** The National Institutes of Health and the Department of Defense should conduct controlled, longitudinal, large-scale studies to assess short- and long-term cognitive, emotional, behavioral, neurobiological, and neuropathological consequences of concussions and repetitive head impacts over the life span.
• **Recommendation 4 - Age-Appropriate Rules and Standards.** The NCAA, National Federation of State High School Associations, national governing bodies for youth sports, and youth sport organizations, should undertake an evaluation of the effectiveness of age-appropriate techniques, rules, and playing and practice standards in reducing sports-related concussions and sequelae. The Department of Defense should conduct equivalent research for sports and physical training, including combatives, at military service academies and for military personnel.

• **Recommendation 5 - Biomechanics, Equipment, and Safety Standards.** The NIH and DoD should fund research on age- and sex-related biomechanical determinants of injury risk for concussion in youth, including how injury thresholds are modified by the number of and time interval between head impacts and concussions.

• **Recommendation 6 - Culture Change.** The NCAA and NFHS, in conjunction with the Centers for Disease Control and Prevention, the HRSA, NATA, and DOE should develop, implement, and evaluate the effectiveness of large-scale efforts to increase knowledge about concussions and change the culture surrounding concussions among elementary school through college-aged youth and their parents, coaches, sports officials, educators, athletic trainers, and health care professionals.
SCORE
Safe Concussion Outcome, Recovery & Education

ggioia@childrensnational.org

PLAY HARD.
PLAY SAFE.
PLAY SMART!
Next Meeting

Challenges in our Work:
Leveraging the Community of Practice for Technical Assistance
Thank you for your participation

Please take a moment to complete our short evaluation

https://www.surveymonkey.com/s/TBI_CoP3_110613

Questions or Comments? Contact:

Rhunt@edc.org

617-618-2178