INTRODUCTION

This Recommendations Paper was written by the Colorado Youth Sports Concussion Special Interest Group Subcommittee (APPENDIX A). The Special Interest Group (SIG) is a volunteer group of physicians, psychologists, certified athletic trainers, nurses, educators, Colorado High School Activities Association representatives, coaches, attorneys, parents, advocacy groups and others concerned about enhancing safety in youth sports in Colorado. The SIG was created in November 2009 by interested professionals and was organized under the umbrella of the Brain Injury Association of Colorado (BIAC). The purpose of the SIG is to study the issue of concussion in youth sports in Colorado, to raise awareness, develop a network of concussion experts, provide resources, and to make recommendations to BIAC and other interested groups. The SIG meets regularly, attendance at the meetings is open to the public, and there is no cost to participate.

METHODOLOGY

The methodology in the writing of these Recommendations included a review of the scientific literature and published guidelines on sports concussions, a review of legislative statutes from other states, and by a consensus of opinion from participating expert practitioners in Colorado. The SIG participants reached a consensus on these Recommendations and no Minority Opinion report was necessary.

OVERVIEW OF THE PROBLEM

Incidence: The exact number of youth sports concussion annually in Colorado is unknown, so incidence is based on extrapolation from national data. The Center for Disease Control and Prevention (CDC) reports an annual incidence of 134,959 youth sport concussions resulting in emergency department visits in the US.¹ (the CDC defines “youth” as less than 18 years of age.) According to a recent study in *Pediatrics* there were 251,000 sports-related concussions among 8-19 year olds seen in emergency departments between 2001 and 2005. That study reported that
emergency department visits for concussions in organized team sports (OTS) increased 100% among 8-13 year olds and 200% among 14-19 year olds between 1997 and 2007. Based on an extrapolation of these two national studies to Colorado’s population, the annual incidence of youth sports concussion in Colorado resulting in emergency department visits is estimated to be between 1,349 and 2,510. This number significantly underestimates the total incidence of youth sports concussions because it does not include youth athletes evaluated in non-emergency department settings, or concussions that were not reported.

Definition, Signs, and Symptoms: Concussion is an injury to the brain caused either by a direct blow to the head, face and/or neck, or a blow elsewhere in the body, whereby an “impulsive” force is transmitted to the head. The injury produces a complex pathophysiological process affecting the brain with associated signs and symptoms. Widely accepted definitions of concussion recognize that concussions may occur with or without the loss of consciousness. Most concussions do not involve loss of consciousness, but result in a graded constellation of clinical signs and symptoms. The immediate clinical signs of concussion may include one or more of the following: confusion, disorientation, nausea, vomiting, vacant stare, slowed responses, amnesia, emotional lability, disequilibrium or incoordination, slurred or incoherent speech, or loss of consciousness. Post-concussion symptoms experienced by the athlete may occur immediately after injury or develop over time. Symptoms may include one or more of the following: headache, dizziness, nausea, visual disturbance, feeling like in a fog, fatigability, drowsiness, sleep disturbance, light or noise hypersensitivity, emotional reactivity such as anxiety, depressed mood, nervousness, or cognitive impairment.

Recovery and Outcomes: The current scientific literature suggests that when properly managed, most persons with a single sports-related concussion recover without long term consequences. While the majority of post-concussion symptoms usually resolve in seven to ten days, children and adolescents may recover slower than adults. A concussive injury increases the probability of sustaining additional concussions, with potential cumulative effects resulting in prolonged or incomplete recovery. It is important that individuals not sustain a second concussion prior to the resolution of symptoms from the previous concussion. In extremely rare cases, concussion may result in catastrophic injury or even death.

General Management Considerations: Concussion management is an emerging and complex field, with evolving guidelines that are beyond the scope of this document that are published elsewhere. Common to all guidelines is the basic principle that the athlete should fully recover prior to returning to athletic participation. In addition to the implications of concussion for return to athletic participation, concussions also have implications for the youth’s academic, extracurricular, and family functioning. Rest, followed by a step-wise return to cognitive, physical, and social activity is the primary management strategy. This graduated progression is typically managed by health care providers, school personnel and family. Schools and sports organizations are developing concussion awareness programs and management teams. Teams include, but are not limited to, the student, parents, coaches, teachers, guidance counselors, nurses, certified athletic trainers, psychologists, and other health care professionals, where available. The purpose of concussion teams is to work with youth athletes to match the graduated pace of the youth’s recovery to environmental demands.
Despite growing public attention to the issue of concussion and the emergence of some innovative programs, there remains a general lack of public awareness about concussion. This document presents three core youth sports safety recommendations that have been consistently recognized in the sports concussion literature and legislation in other states: 1) education and training  2) removal from play and  3) return to athletic participation.

CORE RECOMMENDATIONS

It is recommended that all organized youth sports entities have concussion management policies and procedures in place that address education, removal from play, and return to athletic participation. Organizations may elect to adopt policies and procedures that are stricter than the core recommendations contained in this document.

Education and Training

The SIG recommends that youth sports athletic directors, coaches, officials, school health personnel, parents and athletes receive annual concussion education and training. Educational training courses are becoming widely available. (See APPENDIX B).

Removal From Play

Youth athletes who demonstrate signs, symptoms, and/or behaviors consistent with suspected concussion should be immediately removed from play and not allowed to return that day. Coaches, certified athletic trainers, or licensed health care providers may remove an athlete from play. Youth athletes should be encouraged to notify responsible adults if they believe that they or one of their teammates have sustained a concussion.

Athletes removed from play should be appropriately monitored, and the parents/guardians should be contacted about the injury as soon as possible. Parents should then contact a licensed health care provider for consultation/evaluation.

Return to Athletic Participation

If an athlete has been removed from play with a suspected concussion, written clearance by a licensed health care provider with current training in the evaluation and management of concussion should be required before an athlete can begin return to participation. A graduated return to full participation in athletic activities, with ongoing evaluation and management is recommended. The SIG does not recommend a standard length of time away from resumption of participation.
References


   www.pediatrics.org


12. Ibid.


28. Ibid.
References continued


31  Ibid.
APPENDIX A

SIG Recommendations Subcommittee Participants

**Advanced Orthopedics and Sports Medicine Specialists, P.C.,** Andy Motz, MD  
**Brain Injury Association of Colorado,** Gavin Attwood, Executive Director  
**Children’s Hospital, Concussion Program**  
Gerald Clayton, Ph.D., Director, Translational Medicine  
Rachel Coel, M.D., Ph.D., Co-Director, Sports Medicine  
Michael Kirkwood, Ph.D., Clinical Neuropsychologist  
Aaron Provance, M.D., Co-Director, Sports Medicine  
Pamela Wilson, M.D., Rehabilitation Physician  
**Colorado Athletic Trainers’ Association (CATA)**  
**Colorado TBI Trust Fund Board Members:** Kim Gorgens, Ph.D. Chair  
Debbie Boyle-Grimwood, Bob Gant, Ph.D. Board Member  
**Cherokee Trail High School,** Tod McKercher, Head Certified Athletic Trainer  
**Craig Hospital,** Alan H. Weintrub, M.D., Medical Director Brain Injury Program  
Don Gerber, Psy.D., Clinical Neuropsychologist  
Kenneth R. Hosack, M.A. Director of Provider Relations  
**Denver Public School District,** Darryl Miller, ATC, District Athletic Trainer  
**Douglas County School District,** Paulette Joswick, RN, Health Services Supervisor  
Peter Thompson, Ph.D. School Psychologist  
Linda Lyons, M.A.-CCC/SP S/L Pathologist  
**Jefferson County School District,** Catherine West, ATC, District Athletic Trainer  
**Memorial Health System,** Mike Nunley, Ph.D. Clinical Neuropsychologist  
**Regis University,** Jose Lafosse, Ph.D., Clinical Neuropsychologist, Department of Psychology and Neuroscience  
**Rocky Mountain Hospital for Children- Center for Concussion**  
Suzanne Rosenberg, M.D., Pediatric Physical Medicine and Rehabilitation  
Karen McAvoy, Psy.D. Director, Center for Concussion  
Sue Kirelik, M.D., Pediatric Emergency Medicine  
Brooke Pengel, M.D., Medical Director, Youth Sports Medicine Institute  
**Smoky Hill High School,** Elsie Humes B.S.N., N.P., School Nurse  
**Swedish Medical Center,** Cheryl Melick, MD. Emergency Medicine  
**University of Colorado,** Sourav K. Poddar, MD; Associate Professor and Director of Primary Care Sports Medicine, Team Physician CU Buffaloes  
**University of Denver,** Girish Paranjape, DO, Medical Advisor/Head Team Physician  
Julie Campbell, M.Ed., ATC Director of Sports Medicine  
Kim Gorgens, Ph.D. Clinical Assistant Professor, Graduate School of Professional Psychology  
David G. Mirich, Ph.D., Psychologist, Wheat Ridge  
Adam O’Neil, University of Denver, Graduate Student  
Jennifer Mello, JM, Brandeberry-McKenna, Colorado Traumatic Brain Injury Collaborative
Valerie Stone, Ph.D., Director of Continuing Education, Answers about Brain Injury, Golden, CO.
APPENDIX B

Concussion Resources

The Brain Injury Association of Colorado, www.biacolorado.org

Center of Disease Control, http://www.cdc.gov/concussion/HeadsUp/youth.html

National Federation of State High School Associations (NHFS)
Guidelines for Management of Concussion and Free Training Course www.nfhs.org

Epidemiology of Postconcussion Syndrome in Pediatric Mild Traumatic Brain
www.biacolorado.org/files/Barlow_Post_Concussive_Syndrome_Peds.pdf

Zurich Consensus Statement on Concussion in Sport


Athletic Concussion Training for Coaches Active http://us1.campaign-archive.com/?u=122170920a09d85cb56dc6f9c&id=ea39ceba29&e=1d0a11164c

REAP- Reduce, Educate, Accommodate, Pace. The Benefits of Good Concussion Management.