Missouri State High School Activities Association

2019-2020

Interscholastic Youth Sports Brain Injury Report

2019-2020
Interscholastic Youth Sports Brain Injury Prevention Report

SCS HCS HB 300, 334, and 387 became law in August 2011, and it mandates that an organization with public schools as members must publish and distribute an annual report regarding the impact of student athlete concussions and head injuries which should include efforts that may be made to minimize damages from school sports injuries. The Department of Health and Senior Services, along with a statewide association of school boards [Missouri School Board Association (MSBA)], a statewide activities association that provides oversight for athletic or activity eligibility for students and school districts, [Missouri State High School Activities Association (MSHSAA)], and an organization named by the Department of Health and Senior Services that specializes in support services, education and advocacy of those with brain injuries [Brain Injury Association of Missouri (BIA-MO)] developed guidelines, pertinent information and forms to educate coaches, staff members, athletes and parents or guardians of youth athletes of the nature and risk of concussion and brain injury including continuing to play after a concussion or a brain injury (1).

MSHSAA has distributed and updated head injury materials annually since August of 2009 to its member schools using a variety of sources (2). These materials provide information that will educate parents, coaches, staff members, and athletes on the prevention, management, and dangers of head injuries in interscholastic sports (3). In December of 2011, MSHSAA conducted its first annual survey of member schools and the impact of head injuries. A tenth survey was conducted during the summer of 2020, to collect data from the MSHSAA member schools. Five hundred and ninety schools were contacted to complete the survey. The survey window was from June 2 through July 5, 2020. Working with the Brain Injury Association of Missouri, Department of Health and Senior Services, Missouri Athletic Trainers Association, Missouri School Nurses Association and Missouri School Board Association a pilot program began for the winter and spring of 2014, Sports Concussions: Facts, Fallacies and New Frontiers. The program was conducted in five regional sites presenting a one-day seminar educating staff members, coaches, nurses and athletic trainers on the new research and policies pertaining to head injuries. Because of the great success and attendance of the program, it will once again be conducted in 2021.

Harvey Richards, retired Associate Executive Director formerly in charge of Sports Medicine for MSHSAA, was a part of the state legislative process for the head injury bill (4). Greg Stahl is the current Assistant Executive Director in charge of Sports Medicine for MSHSAA, responsible for the distribution of educational materials to member schools, and conducted the 2019-2020 Head Injury Survey (5).

(1) Timetable of Meetings, Appendix A.
(2) Fall membership-mailing, e-mails, website (mshsaa.org), district in-services.
(3) Educational packet for member schools, Appendix B.
(4) Harvey Richards, Retired Associate Executive Director, 1 N Keene St, Columbia MO 65201; richarvey14@gmail.com
(5) Greg Stahl, Assistant Executive Director, 1 N Keene St., Columbia, MO 65201; greg@mshsaa.org; (573) 875-4880.

2019-2020 Head Injury Survey

School Level	Total Schools			Completed Survey			Did Not Complete the Survey			% of Member Schools that Completed Survey		
	2020	2019	2018	2020	2019	2018	2020	2019	2018	2020	2019	2018
High Schools 9-12 and Combined Schools 7-12	589	592	590	572	498	403	17	94	187	97.1%	84%	68%

Use of Online Video

The National Federation of High School Activities (NFHS) has produced and made available for free, the online course "Concussions in Sports." MSHSAA has approved this course for coaches to take as their educational component of the law. Many school districts continue to view this course as an in-service with the entire coaching staff, while other school districts have coaches complete the course individually to meet the by-law requirement for completing concussion education. For the year July 1, 2018 through June 30, 2019, 4,631 online courses were completed in Missouri.

The next table reflects the number of participants for each sport and/or activity by our member schools. This number will include duplicates for students who are in multiple activities. Music/Band, Sideline Cheerleading (Spirit) and Dance begin in the fall, but some schools will only participate in the winter or spring. The following table reflects the participation rates for both the 2018-19 and 2019-20 school years.

High School Sport/Activity	Participants	
	2019-20	2018-19
Baseball	14,631	14,614
Sideline Cheerleading (Spirit)	9,950	9,755
Field Hockey	1,187	1,138
11-man Football	19,960	19,951
8-man Football	640	512
Dance/Pom Team	2,990	3,036
Water Polo	563	544
Wrestling-Boys	6,748	6,458
Wrestling-Girls	1,600	956
Music-Band	24,921	26,546
Basketball-Boys	13,796	13,750
Cross Country-Boys	5,889	5,863
Cross Country-Girls	4,249	4,221
Soccer-Boys	8,748	8,794
Swimming and Diving-Boys	1,939	1,947
Softball-Girls	9,546	9,660
Tennis-Girls	4,545	4,193
Volleyball-Girls	10,511	10,446
Golf-Boys	3,827	3,982
Tennis-Boys	3,691	3,644
Track and Field-Boys	14,821	15,231
Volleyball-Boys	1,194	1,200
Basketball-Girls	9,528	9,733
Golf-Girls	2,033	1,971
Soccer-Girls	7,650	8,185
Swimming and Diving-Girls	3,342	3,244
Track and Field-Girls	12,025	12,386
Lacrosse-Girls	1,654	1,719
Totals	**202,178**	**203,679**

High School Sport/Activity	Total Participation
Sport	164317
*Taking into Account 20% Duplication of Athletes	32,863
Total Adjustment Participation Sport	131,454
Activity	37,861
*Taking into Account 20% Duplication of Students	7,572
Total Adjustment Participation Activity	30,289
Total Adjustment Participation Sport/Activity	161,743

*20% duplication is only an estimate and not an actual number.

Data Collected

Schools were asked to provide information that related to possible head injuries. If signs or symptoms of a head injury were present, the student was to be withheld from that sport and or activity for a minimum of 24 hours and must have been seen by a medical professional. They must also provide to the school a *Return to Play* form before return to the sport or activity. The information below is a reflection of those students who had to see a medical professional and provide a *Return to Play* form. Not all incidents would have resulted in a concussion.

***Note: Spring Sports noted below were cancelled due to Covid-19 pandemic**

HIGH SCHOOL ACTIVITIES

Level	Activity	Activity Related	Non-Activity Related	Days/ Class Act	Days/ Class Non-Act	Days Missed Activity	Days Missed Non-Act	Diagnosed Activity	Diagnosed Non-Act	Schools Report-ing	Schools Partici-pating
HS	Scholar Bowl	1	1	0	0	0	0	0	0	1	429
HS	Sideline Cheer	410	41	467	175	6257	786	345	36	165	534
HS	Music Activities	24	7	17	33	326	121	19	6	19	527
HS	Dance/Pom	22	13	24	17	246	428	18	11	25	222
HS	Speech/Debate/Theatre	2	0	6	0	141	0	2	0	2	259
HS	Bass Fishing	0	0	0	0	0	0	0	0	0	23
HS	Bowling	0	0	0	0	0	0	0	0	0	10
HS	Chess	0	0	0	0	0	0	0	0	0	27
HS	Target Shooting	0	0	0	0	0	0	0	0	0	33
	TOTAL	**459**	**62**	**514**	**225**	**6,970**	**1,335**	**382**	**53**	**212**	

HIGH SCHOOL SPORTS

Level	Activity	Sport Related	Non-Sport Related	Days/ Class Sport	Days/ Class Non-Sport	Days Missed Sport	Days Missed Non-Sport	Diagnosed Sport	Diagnosed Non-Sport	Schools Report-ing	Schools Partici-pating
HS	Baseball - Spring	11	5	4	8	56	38	7	4	14	513
HS	Basketball - Boys	266	20	274	30	2,295	406	168	17	179	585
HS	Basketball - Girls	348	26	408	58	3,690	509	249	24	214	565
HS	Cross Country - Boys	1	9	0	6	0	109	0	8	10	424
HS	Cross Country - Girls	6	10	1	9	76	109	5	8	14	423
HS	Field Hockey-Girls	42	10	56	7	454	104	35	7	22	32
HS	11-Man Football	1,687	41	1,533	50	17,895	355	1,328	29	277	328
HS	8-Man Football	57	0	78	0	374	0	41	0	22	29
HS	Golf – Boys - Spring	0	2	0	0	0	2	0	2	2	329
HS	Golf - Girls	0	1	0	0	0	13	0	1	1	207
HS	Soccer - Boys	319	22	267	14	2,649	179	218	15	154	248
HS	Soccer – Girls - Spring	35	28	39	48	313	294	31	25	44	241
HS	Softball - Girls Fall	147	15	140	11	1,596	239	117	12	102	353
HS	Swim/Diving - Boys	18	5	12	14	152	69	12	4	19	112
HS	Swim/Diving - Girls	34	10	26	9	623	190	31	8	29	143
HS	Tennis-Boys - Spring	1	0	0	0	6	0	1	0	1	184
HS	Tennis - Girls	12	8	22	3	90	120	10	6	17	188
HS	Track/Field (B) Spring	5	5	1	5	30	41	3	4	9	521
HS	Track/Field (G) Spring	4	2	2	0	15	0	2	1	5	519
HS	Volleyball - Boys	3	2	4	5	19	19	2	1	4	45
HS	Volleyball - Girls	217	25	155	21	2,537	307	166	21	129	457
HS	Water Polo-Boys	4	2	5	0	28	17	3	1	4	21
HS	Wrestling - Boys	327	13	256	9	4,826	140	262	10	142	245
HS	Wresting – Girls	114	6	161	10	1,720	207	87	4	62	199
HS	Baseball - Fall	4	1	6	0	37	2	3	0	4	102
HS	Softball - Girls Spring	2	3	0	7	2	22	0	2	4	146
HS	Lacrosse - Girls	4	7	2	6	19	143	3	7	10	39
	TOTAL	**3,668**	**278**	**3,452**	**330**	**39,502**	**3,634**	**2,784**	**221**	**1,494**	**7,198**

2019-2020 Concussion Survey Results

Sports	# of Sport Related Reports	Number of Days Sport was Missed	Number of Days Class Missed
Male	2,703	28,367	2,440
Female	965	11,135	1,012
Total	**3,668**	**39,502**	**3,452**
Activities	# of Activity Reports	Number of Days Activity was Missed	Number of Days Class Missed
Total	**459**	**6,970**	**514**
GRAND TOTAL	**4,127**	**46,472**	**3,966**

There were a total of 2,703 males and 965 females held out of practices and contests due to a head injury, for a total of 28,367 and 11,135 days respectively. This means that the male athletes were held out an average of 10.49 days per incident, and the female athletes also were held out an average of 11.54 days per incident. This does show a good correlation to the gradual return-to-play guidelines, which indicates at a minimum a five-day to seven-day return rate. The number of days that a student missed class time still remains a low number compared to the total number of days missed in the sport or activity practice/contest.

2019-2020 Top 7 Head Injury Sports/Activities	
Sport/Activity	Number of Head Injuries
Football	1,744
Sideline Cheerleading	410
Basketball (G)	348
Wrestling (B)	327
Soccer (B)	319
Basketball (B)	266
Volleyball (G)	217

2018-2019 Top 7 Head Injury Sports/Activities	
Sport/Activity	Number of Head Injuries
Football	1,335
Soccer (G)	340
Sideline Cheerleading	300
Wrestling (B)	270
Basketball (G)	252
Soccer (B)	183
Volleyball (G)	154

Note: The 2020 Spring Season was cancelled due to Covid-19; therefore, the top 7 list of sport has been impacted due to the absence of data for a full spring season. Our data is reporting 48.0% of the total number is from the sport of football.

2019-2020 Percentage of Head Injuries per Total Occurrences	
Sport/Activity	% of total reported Head Injuries
Football	48.0%
Sideline Cheerleading	11.3%
Basketball (G)	9.6%
Wrestling (B)	9.0%
Soccer (B)	8.8%
Basketball (G)	7.3%
Volleyball	6.0%

Concussion Rates per 10,000 athletic exposures From High School RIO Surveillance Study	
Sport/Activity	Rate
Football	8.40
Soccer (G)	7.08
Soccer (B)	4.75
Wrestling (B)	4.32
Basketball (G)	4.02
Basketball (B)	2.10

MSHSAA Athletic exposure was calculated from the first day of practice to the end of districts for that sport. This is not a true actual count of participation but very accurate assumption. Example:

Football had on the average 80 days of practice and/or contests.
80 x 20,600 participants = 1,648,000 exposures.
1,744 reported head injuries.

$$\frac{1{,}744}{1{,}648{,}000} = \frac{X}{10{,}000}$$

MSHSAA 2019-2020 – Top 7 Concussion in Sports Concussion Rates per 10,000 Athletic Exposures		
Sport/Activity	*Rate #1	**Rate #2
Football	10.59	8.31
Basketball (G)	4.30	3.07
Wrestling (B)	7.46	5.97
Soccer (B)	5.21	3.56
Basketball (B)	2.27	1.43
Volleyball	3.18	2.43
Softball (G)	3.08	2.45

*Rate #1: Student athletes removed from participation due to suspected concussion.
**Rate #2: Student athletes removed from participation due to diagnosed concussion.

There were several questions asked on this year's survey:

1. Does your school have a written and readily accessible Emergency Action Plan (EAP)?
2. Does your school have a written and readily accessible for EAP for each venue that your school teams use for practice and contests?
3. Who is the individual responsible for the creation, updating and administration of the EAP?
4. How frequently are the EAPs for your school reviewed and updated?
5. Are the EAPs for each venue/athletic facility at your school practiced and reviewed with critical personnel relative to that venue/athletic facility?

6. Which critical personnel are involved with the practice and review of the EAP for each venue/athletic facility?
7. Does your school have access to a licensed or certified Athletic Trainer or other medical care provider?
8. Does your school have any additional school policies or medical group policies above and beyond MSHSAA or NFHS guidelines for dealing with “Lightning/Weather”?
9. Does your school have any school policies or medical group policies above and beyond MSHSAA or NFHS guidelines for dealing with “Dietary or Supplements”?
10. Does your school have any additional school policies or medical group policies above and beyond MSHSAA or MFHS guidelines for dealing with “Performance Enhancing Supplements or Anabolic-adrenergic Steroids”?
11. Have you implemented the MSHSAA guidelines for using Wet Bulb Globe Thermometer for measuring environmental conditions to determine the status of practices/competitions?
12. Does your school offer education for athletes, parents and coaches on heat illness, such as signs and symptoms, hydration recommendations and ways to monitor hydration status?

Below are the results from these questions:

High School Responses		
Question	**Answer**	**Number of Responses**
Does your school have a written and readily accessible Emergency Action Plan (EAP)?	Yes	516
	No	46
Does your school have written and readily accessible EAP for each venue that your school teams use for practice and contests?	Yes	451
	No	111
Who is the individual responsible for the creation, updating and administration of the EAP?	Athletic Trainer	168
	School Administrator	352
	Head Coaches	37
	Team Physician	1
	External Medical Providers	4
How frequently are the EAPs for your school reviewed and updated?	Each Season	47
	Annually	363
	Biannually	26
	Unknown	126
Are the EAPs for each venue/athletic facility at your school practiced and reviewed with critical personnel relative to that venue/athletic facility?	Yes	440
	No	122

Question	Answer	Number of Responses
Which critical personnel are involved with the practice and review of the EAP for each venue/athletic facility?	Athletic Trainers, Coaches, School Administrators, Team Physician, External Medial Providers or EMS	53
	Athletic Trainers, Coaches, School Administrators, Team Physician	44
	Athletic Trainer, Coaches, School Administrator	193
	Coaches, School Administrator	209
	Not Applicable – We do not have an EAP for each venue/athletic facility that our school team uses	63
Does your school have access to a licensed or certified Athletic Trainer or other medical care provider?	Yes, Full Time – All practices and game	181
	Yes, Part Time – Some practices and some games	99
	Yes, Part Time – Games Only	85
	Yes, Part Time – Drop in evaluation of athletes during the school day but not in attendance at practices or games	37
	None – Our school has no Athletic Trainer assistance or other medical care provider, our coaches have to handle all initial injury surveillance.	160
Does your school have any additional school policies or medical group policies above and beyond MSHSAA or NFHS guidelines for dealing with "Lightning/Weather"?	Yes	139
	No	423
Does your school have any school policies or medical group policies above and beyond MSHSAA or NFHS guidelines for dealing with "Dietary or Supplements"?	Yes	54
	No	508
Does your school have any additional school policies or medical group policies above and beyond MSHSAA or MFHS guidelines for dealing with "Performance Enhancing Supplements or Anabolic-adrenergic Steroids"?	Yes	98
	No	464
Have you implemented the MSHSAA guidelines for using Wet Bulb Globe Thermometer for measuring environmental conditions to determine the status of practices/competitions?	Yes	376
	No	186
Does your school offer education for athletes, parents and coaches on heat illness, such as signs and symptoms, hydration recommendations and ways to monitor hydration status?	Yes, education to coaches only	134
	Yes, education to coaches and athletes	153
	Yes, education to coaches, athletes and parents	225
	No, we do not offer educational material regarding heat illness	50

Educational materials were distributed to all member schools and are available for the public to access through our website (www.mshsaa.org). Awareness of this serious issue has come to the forefront. Several schools have requested an in-service to educate their coaching staff, with professionals

conducting the program. Our staff, along with several others, has put programs in place to continue the educational effort and stay abreast of any new research available.

This past year, MSHSAA supported the Brain Injury Association of Missouri in putting together a program at three different locations in the state of Missouri: Sports Concussions: Facts, Fallacies and New Frontiers.

SEMINAR TOPICS included:

- Screening for Concussions
- Identification of Concussions
- Care Management of Concussions
- Prevention of Concussions

MSHSAA will conduct an annual survey during each summer to collect yearlong data. The Sports Medicine Committee will evaluate the questions and the report.

APPENDIX A

2010-2020 Timetable of Meetings

Place	Date of Meeting
MSHSAA Sports Medicine Advisory Committee Meeting - Columbia, MO	April 28, 2010
NFHS Summer Meeting - Sports Medicine Committee	July 6-9, 2010
Parkway School District - Concussion Presentation	August 12, 2010
MSHSAA Sports Medicine Advisory Committee Meeting - Columbia, MO	January 6, 2011
Capitol, Jefferson City, MO - Concussion Bill	January 11, 2011
Capitol, Jefferson City, MO - Meeting – House Bill 300	February 7, 2011
Phone Conference - House Bill 300	February 25, 2011
St. Louis Children's Hospital - Press Conference House Bill 300	March 4, 2011
MSHSAA Office - Phone Conference - House Bill 300	March 7, 2011
NFHS Summer Meeting - Sports Medicine Committee	June 27 – July 1, 2011
MSHSAA Office - Conference Call - Concussions	August 16, 2011
MSHSAA Office - Concussion Meeting	August 25, 2011
MSHSAA Sports Medicine Advisory Committee Meeting - Columbia, MO	January 5, 2012
Conference Call - Adult Brain Injury (MO Dept. of Health/Sr. Svc.)	January 19, 2012
Conference Call - Adult Brain Injury (MO Dept. of Health/Sr. Svc.)	February 14, 2012
Meeting in St. Louis - St. Louis Brain Association Meeting	March 1, 2012
Mercy Sports Medicine Conference - Exertional Heat Illnesses	March 30-31, 2012
MSHSAA Office - Adult Brain Injury (MO Dept. of Health/Sr. Svc.)	August 30, 2012
University of Missouri Research - Survey of all Injuries	June 1, 2012
Coaches Training Meeting (Chillicothe) - Head/Spinal Injuries (Hedrick Medical Building) - St. Luke's College of Health Sciences	October 12, 2012
MSHSAA Sports Medicine Advisory Committee Meeting - Columbia, MO	December 13, 2012
MSHSAA Office - Meeting with Dr. Hubbard, St. Luke's	April 3, 2013
Conference Call - Brain Injury Association of Missouri	April 16, 2013
University of Missouri Research - Survey of all Injuries	June 2, 2013

NFHS Summer Meeting - Sports Medicine Committee	June 24-28, 2013
Stoney Creek Inn - Brain Injury Association of Missouri - Annual Meeting Planning	September 6, 2013
Coaches Training Meeting - St. Luke's College of Health Sciences	October 2, 2013
Conference Call - St. Luke's College of Health Sciences	October 23, 2013
Conference Call - University of Missouri Journalism - Concussion Interview	November 12, 2013
NFL – Chiefs - Head's Up Mom's Football Safety Clinic	December 3, 2013
MSHSAA Sports Medicine Advisory Committee Meeting - Columbia, MO	December 12, 2013
Sports Concussion: Facts, Fallacies and New Frontiers - Brain Injury Association - Springfield, MO	January 14, 2014
Sports Concussion: Facts, Fallacies and New Frontiers - Brain Injury Association - Kansas City, MO	January 22, 2014
Sports Concussion: Facts, Fallacies and New Frontiers - Brain Injury Association - Columbia, MO	January 27, 2014
Sports Concussion: Facts, Fallacies and New Frontiers - Brain Injury Association - St. Louis, MO	February 4, 2014
NFHS Summer Meeting - Sports Medicine Committee	June 27 – July 2, 2014
Summer's AD Workshop - Emergency Action Planning	July 31, 2014
Stoney Creek Inn - Brain Injury Association of Missouri - Concussion Seminar Planning	October 8, 2014
MSHSAA Sports Medicine Advisory Committee Meeting - Columbia, MO	December 11, 2014
Sports Concussion: Facts, Fallacies and New Frontiers - Brain Injury Association - Springfield, MO	January 16, 2015
NFHS Football Meeting - Indianapolis, IN	January 23-25, 2015
Sports Concussion: Facts, Fallacies and New Frontiers - Brain Injury Association - Columbia, MO	January 27, 2015
Missouri United Schools Insurance Council - Concussion Seminar - Lake of the Ozarks	January 29-30, 2015
Sports Concussion: Facts, Fallacies and New Frontiers - Brain Injury Association - St. Louis, MO	February 5, 2015
Sports Concussion: Facts, Fallacies and New Frontiers - Brain Injury Association - Kansas City, MO	February 12, 2015

MSHSAA Sports Medicine Advisory Committee Meeting - Columbia, MO	February 18, 2015
USA/NFL Football Meeting - Indianapolis, IN	February 22, 2015
Sports Concussion: Facts, Fallacies and New Frontiers - Brain Injury Association - Cape Girardeau, MO	February 26, 2015
USA/NFL Football Meeting - New York, New York	March 26-27, 2015
MIAAA Conference - Concussion Information Booth/Heads Up Football - Lake Ozark, MO	April 10-14, 2015
Sports Medicine Advisory Committee Meeting - Overuse Injuries in Baseball - Indianapolis, IN	June 8-10, 2015
NFHS Summer Meeting - Sports Medicine Committee - New Orleans, LA	June 26 – July 3, 2015
Officiate Missouri Day - St. Louis, MO	July 24-25, 2015
SERC Sports Medicine Symposium - Kansas City, MO	August 1, 2015
Brain Injury Association - Statewide Conference Call	August 18, 2015
KBIA Radio Interview - Athletic Trainers at High School Sporting Events	September 18, 2015
Brain Injury Association Meeting - St. Louis, MO	September 23, 2015
MSHSAA Sports Medicine Advisory Committee Meeting - Columbia, MO	December 10, 2015
Sports Concussion: Facts, Fallacies and New Frontiers - Brain Injury Association - Columbia, MO	February 17, 2016
Sports Concussion: Facts, Fallacies and New Frontiers - Brain Injury Association - Cape Girardeau, MO	February 18, 2016
Sports Concussion: Facts, Fallacies and New Frontiers - Brain Injury Association - St. Louis, MO	February 22, 2016
Sports Concussion: Facts, Fallacies and New Frontiers - Brain Injury Association - Springfield, MO	February 25, 2016
USA/NFL Football Meeting - Indianapolis, IN	March 21-23, 2016
MIAAA Conference - Concussion Information Booth - Lake Ozark, MO	April 8-12, 2016
NFHS Summer Meeting - Sports Medicine Committee - Reno, NV	June 28 – July 3, 2016
MSHSAA Sports Medicine Advisory Committee Meeting - Columbia, MO	December 3, 2016
Sports Concussion: Facts, Fallacies and New Frontiers - Brain Injury Association - St. Louis, MO	January 26, 2017
Sports Concussion: Facts, Fallacies and New Frontiers - Brain Injury Association - Kansas City, MO	February 2, 2017

Sports Concussion: Facts, Fallacies and New Frontiers - Brain Injury Association - Columbia, MO	February 9, 2017
Sports Concussion: Facts, Fallacies and New Frontiers - Brain Injury Association - Springfield, MO	February 23, 2017
Sports Concussion: Facts, Fallacies and New Frontiers - Brain Injury Association - Cape Girardeau, MO	March 2, 2017
Solutions for Safety in Sports Seminar - Kansas City, MO	March 28-29, 2017
MIAAA Conference - Concussion Information Booth – Head Injury Survey Info - Lake Ozark, MO	April 7-11, 2017
NFHS Summer Meeting - Sports Medicine Committee - Providence, RI	June 28 – July 3, 2017
MSHSAA Sports Medicine Advisory Committee Meeting - Columbia, MO	September 5, 2017
Sports Concussion: Facts, Fallacies and New Frontiers - Brain Injury Association - St. Louis, MO	January 29, 2018
Sports Concussion: Facts, Fallacies and New Frontiers - Brain Injury Association - Columbia, MO	February 2, 2018
Sports Concussion: Facts, Fallacies and New Frontiers - Brain Injury Association - Cape Girardeau, MO	February 6, 2018
Sports Concussion: Facts, Fallacies and New Frontiers - Brain Injury Association - Springfield, MO	February 8, 2018
Sports Concussion: Facts, Fallacies and New Frontiers - Brain Injury Association - Kansas City, MO	February 12, 2018
MSHSAA Sports Medicine Advisory Committee Meeting - Columbia, MO	March 1, 2018
MIAAA Conference - Concussion Information Booth – Head Injury Survey Info - Lake Ozark, MO	April 8-10, 2018
NFHS SMAC Summit - Indianapolis, IN	April 21-23, 2018
NFHS Summer Meeting - Sports Medicine Committee - Chicago, IL	June 27-July 3, 2018
MSHSAA Sports Medicine Advisory Committee Meeting - Columbia, MO	September 10, 2018
Sports Concussion: Facts, Fallacies and New Frontiers - Brain Injury Association - St. Louis, MO	February 26, 2019
MSHSAA Sports Medicine Advisory Committee Meeting - Columbia, MO	February 28, 2019
Sports Concussion: Facts, Fallacies and New Frontiers - Brain Injury Association - Kansas City, MO	March 4, 2019

Sports Concussion: Facts, Fallacies and New Frontiers - Brain Injury Association - Columbia, MO	March 11, 2019
MIAAA Conference - Concussion Information Booth – Head Injury Survey Info - Lake Ozark, MO	April 7-9, 2019
NFHS Summer Meeting - Sports Medicine Committee - Indianapolis, IN	June 26-July 2, 2019
MSHSAA Sports Medicine Advisory Committee Meeting - Columbia, MO	September 16, 2019
Sports Concussion: Facts, Fallacies and New Frontiers - Brain Injury Association Columbia, MO	February 7, 2020
MSHSAA Sports Medicine Advisory Committee Meeting Columbia, MO	March 15, 2020
MIAAA Conference - Concussion Information Booth – Head Injury Survey Info Lake Ozark, MO	Postponed – COVID19
NFHS Summer Meeting - Sports Medicine Committee Via ZOOM	June 26 - July 2, 2020

APPENDIX B

REMINDERS FOR ALL ATHLETIC DIRECTORS

PLEASE MAKE SURE THE FOLLOWING REQUIREMENTS ARE IN PLACE

Concussion Information and Materials

- All coaches **must** take a course on the signs, symptoms, and prevention of concussions annually.
  - There is a free-of-charge course that is located on the NFHS Learning Center website (www.nfhslearn.com). Once there, go to the FREE/ELECTIVE COURSES section. Click on the right arrow until you come to the "Concussion in Sports – What You Need To Know" course.
  - There is also a link to this course on our website located at (www.mshsaa.org) located on the Sports Medicine Tab in the CONCUSSION section.
- All **parents and athletes** must receive and sign for the concussion materials as indicated on the MSHSAA Pre-Participation Physical Form.
- The concussion information for parents and athletes can be found in the following three locations:
  - The free NFHS "Concussion in Sports" course described above;
  - The materials that are provided on our website (www.mshsaa.org) by clicking on the Sports Medicine Tab.
  - The Concussion Information PowerPoint located on our website (www.mshsaa.org) by clicking on the Sports Medicine Tab and then on "MSHSAA Concussion Video Introduction."
- **Athletic Directors** must keep accurate records of this information and be able to provide it to MSHSAA if asked to do so.

Emergency Action Planning Guide

- On the MSHSAA web site under Sports Medicine is information for your school to set up and implement the "Anyone Can Save a Life" program.
- This program is free of charge.
- If you have any question, please contact MSHSAA.

Online Sports Medicine Information

- Please note that printed copies of the MSHSAA Sports Medicine Manual are no longer being sent in the MSHSAA rules book mailings.
- The Sports Medicine information is located online by going to the MSHSAA website (www.mshsaa.org) and clicking on the Sports Medicine tab.
- **Reminder:** Mandatory Heat/Hydration requirements are to be followed for the start of Fall practice. Please see information on heat/hydration found on the Sports Medicine page of our website.
- **Reminder:** The use of WBGT (Wet Bulb Glob Thermometer) is now the procedure for monitoring environmental conditions to determine when practices/contests may be permitted to occur relative to heat/humidity conditions and the safety of athletes. The WBGT Guidelines along with websites where a WBGT may be purchased are located on the Sports Medicine page of our website.
- **Reminder:** Physical Forms (PPE's) can now be valid for two years from the date the physical is received; however, there are still Pre-Participation Documentation – Annual Requirements that must continue to be collected from your students/parents annually. Go to Sports Medicine tab at www.mshsaa.org, MSHSAA Resources, "New MSHSAA Pre-Participation Documentation – Annual Requirements" link.

MSHSAA INTERSCHOLASTIC BRAIN INJURY SURVEY
2019-2020

HOUSE BILL 300 – Brain Injury Prevention Act

As a reminder to all MSHSAA member schools, House Bill 300 requires the MSHSAA and it's member schools to report and collect information on head injuries each school year. At this time your school needs to start collecting information in order to the complete the MSHSAA Brain Injury Survey for the 2018-2019 school year. The MSHSAA Brain Injury Survey will open on May 1st and will close on June 30th. An email blast will be sent to all Athletic Directors, ATC's and School Nurses notifying you of the survey and containing a direct link to the survey. **In order for your school's Athletic Trainer (ATC) or School Nurse to receive this email blast, please make sure they are added to your school's Administrators page at www.mshsaa.org.**

PLEASE START NOW WITH COLLECTING DATA IN RELATION TO THE FOLLOWING AREAS/TOPICS SO YOUR SCHOOL CAN BE PREPARED FOR COMPLETING THE 2019-2020 MSHSAA INTERSCHOLASTIC BRAIN INURY SURVEY.

**Your school's use of Emergency Action Plans for each sport/activity practices, games/contests, venues.
**Your school's use of an Athletic Trainer(ATC) or other medical providers. At practices? At games/contests? Full time? Part-time?
**Your schools use of EMT services(ambulance) at athletic contests. All contests? Sport specific contests?
**Does your school use the NFHS video "Concussion in Sports – What you need to know", to educate your coaching staffs during the school year?

HEAD INJURIES OCCURING "DURING" SPORT OR ACTIVITY

1. Number of Students removed from sport or activity practices and contests due to signs and symptoms of a concussion and had to obtain a medical Return To Play form.
2. Number of Return To Play forms that indicated a diagnosis of a concussion.
3. Total number of days of practices and contests that were missed by student athletes in each sport/activity due to diagnosis and requirement dictated on through the Return To Play protocol.
4. Total number of days of classroom attendance that students missed due diagnosed concussion.

HEAD INJURIES OCCURING "OUTSIDE" OF A SPORT OR ACTIVITY

1. Number of Students removed from sport or activity due to head injury occurring outside of the sport/activity(car accident, accident at home, etc.) and had to obtain a medical Return To Play form.
2. Number of Return To Play forms that indicated a diagnosis of a concussion.
3. Total number of days that were missed by students in each sport/activity who were required to follow Return To Play protocol.
4. Total number of days of classroom attendance that students missed due diagnosed concussion.

(Additional Information - See Back Page)

CONCUSSION EDUCATION AND MANAGEMENT PROTOCOL

Education

Concussions are common in sports. The Missouri State High School Activities Association (MSHSAA) believes that education of coaches, officials, athletes, and their parents or guardians are key to safely returning a student athlete to play. Appropriate immediate care after a suspected concussion, and follow up incorporating a multi-disciplinary team that includes the coach, parent or guardian, athlete's physician, team physician and athletic trainer (if available), and school representatives, also are important for the proper management of a sport-related concussion.

Each school district will receive educational materials for coaches, athletes, parents, and school officials, required forms for student athlete participation and parent/guardian consent, and recommended medical clearance forms for return to play.

Annually, MSHSAA member school districts will ensure that every coach, student athlete, and parents or guardians of a student athlete completes a concussion and head injury information sheet and returns it to the school district prior to the student athlete's participation in practice or competition. Officials will receive training from their parent organization. Each official's organization will require annual concussion training and maintain a signed head injury information sheet for each official.

Recognition and Evaluation of the Athlete with a Concussion

1. Recognition of the signs and symptoms of a concussion is important. Every member of the team-athlete, teammates, coaches, parents or guardians, officials, athletic trainers, and team physicians have a duty to report a suspected concussion. Not all school districts have medical personnel available to cover every practice and competition; therefore, the coach is the person in the best position to protect the player and must be aware that not all student athletes will be forthcoming about their injury.
2. An official shall not be responsible for making the diagnosis of a concussion. The official can assist coaches and medical staff by recognizing signs and symptoms of a concussion and informing the coach and medical staff of their concerns.
3. The coach, (Athletic Trainer) AT, or physician on site should evaluate the athlete in a systemic fashion:
    a. Assess for airway, breathing, and circulation (basic CPR assessment)
    b. Assess for concussion
        i. Any unconscious athlete should be assumed to have a severe head and/or neck injury and should have their cervical spine immobilized until a determination can be made that the cervical spine has not been injured. If no medical professional can make the assessment, the athlete should be transported to an appropriate emergency care facility.
        ii. A conscious athlete with no neck pain can be further evaluated on the sideline.

4. An athlete experiencing ANY of the signs/symptoms of a concussion should be immediately removed from play. Signs/Symptoms of a concussion include:

PHYSICAL	COGNITIVE	EMOTIONAL
Headache	Feeling mentally "foggy"	Irritability
Nausea/Vomiting	Feeling slowed down	Sadness
Dazed/Stunned	Difficulty concentrating	More emotional
Balance problems	Difficulty remembering	Nervousness

Visual problems	Forgetful of recent information
Fatigue	Confused about recent events
Sensitivity to light	Answers questions slowly
Sensitivity to noise	Repeats questions

5. Evaluation

    a. Following any first aid management, the medical team, or coach in the absence of medical personnel, should assess the athlete to determine the presence or absence of a concussion. The current version of the Sport Concussion Assessment Tool (SCAT) is an assessment tool that is readily available and can assist with the assessment. The athlete should be monitored for worsening or change in signs and symptoms over the next 24 hours. Instructions should be given to the parent or guardian as to signs and symptoms that may require further or more emergent evaluation.

6. Management of a Concussion and Return to Play

    a. An athlete determined to have a concussion or have concussion-like symptoms will be removed from practice or competition and is not allowed to return to practice or competition that same day.
    b. If an athlete displays concussion-like signs or symptoms, the athlete should be assumed to have a concussion until further medical evaluation can occur. “WHEN IN DOUBT, SIT THEM OUT!”
    c. Written clearance from a physician (MD or DO), Advanced Nurse Practitioner in written collaborative practice with a physician, Certified Physician Assistant in written collaborative practice with a physician, Athletic Trainer or Neuropsychologist in written supervision of a physician must be provided prior to return to play.
    d. Following a concussion, current accepted guidelines on physical and cognitive activity should be practiced until symptoms have resolved.
    e. An athlete must be asymptomatic at rest and with exertion prior to return to play
    f. A graduated return to play progression should be followed to guide return to activity following medical clearance as outlined on the MSHSAA Concussion Return to Play form.

National Federation of State High School Associations

Recommendations and Guidelines for Minimizing Head Impact Exposure and Concussion Risk in Football

National Federation of State High School Associations (NFHS)
Report from the July 2014 NFHS Concussion Summit Task Force

The National Federation of State High School Associations (NFHS) and its member associations firmly believe that athletic participation by students promotes health and fitness, academic achievement, healthy lifestyles, and good citizenship. While there will always be a risk of injury, minimizing the risk of head trauma and concussion in all sports is a priority for the NFHS. Over the past several years, the NFHS and the NFHS Sports Medicine Advisory Committee (SMAC) have:

1) Produced a 20-minute online educational course with the Centers for Disease Control (CDC) on "Concussion in Sports."
2) Specifically addressed concussion management in the rules books of all sports, including football.
3) Written several Points of Emphasis in the football rules book focused on limiting helmet-to-helmet contact and blows to the head with the shoulder, forearm, and hand.
4) Disseminated multiple publications regarding concussion management to the member state associations.

In July of 2014, at the request of the NFHS Board of Directors, a task force of medical and scientific experts, high school football coaches, state association personnel, and representatives of several stakeholder organizations met to discuss strategies to reduce head impacts and minimize concussion risk in high school football players during contests and practices, as well as during activities conducted outside of the traditional fall football season (spring and summer practices). The Fundamentals outlined below represent the task force's recommendations and guidelines developed following two days of presentations and discussion of the relevant medical literature and current expert opinion.

The members of the task force fully acknowledge the present limited – though evolving – scientific evidence available to support the Fundamentals outlined below with absolute certainty and explicit detail. Accordingly, the outcomes and clinical relevance of an increasing number of research studies may eventually alter these recommendations and guidelines. Ideally, this emerging data will clarify the potential for long-term adverse cognitive, emotional, and/or neurologic effects from concussions and repetitive blows to the head that may not result in the clinical symptoms of concussion. Based on what is currently known, the guiding principles in developing this report for young athletes and those who oversee, support and administer high school football programs were to reasonably limit overall

exposure to multiple blows to the head and body (*head impact exposure*) and minimize concussion risk, while maintaining the integrity of the game and attempting to avoid unintended consequences.

The Fundamentals below are designed to allow flexibility for the state associations that collectively oversee the more than 15,000 high schools playing football across the country. The teams fielded by these schools may vary tremendously in the number of available players. Team size dictates numerous variables that may affect an athlete's potential head impact exposure. Those variables cannot be easily accounted for by stringent guidelines. For example:

- An athlete playing on offense, defense and special teams will have greater cumulative head impact exposure and will be at higher risk for injury than an athlete playing a single position.
- The fewer the number of players on a team, the greater the chance some players will need to participate in repeated drills, raising head impact exposure and potential injury risk.

As additional evidence emerges, these Fundamentals will evolve and may become more or less restrictive. While the current level of knowledge keeps this task force from making proposals that are specific and rigid, there is consensus that lessening the frequency of contact (and thus head impact exposure) is likely beneficial to overall brain health. The task force also recognizes multiple contributing factors that affect head impact exposure and the parallel effects on an individual football player's brain. For example:

- Position played (linemen receive more total blows than other positions)
- Two-way players versus those who only play offense or defense
- Tackling and blocking techniques
- Practice frequency and duration
- Players that practice and/or compete on multiple levels (such as varsity and sub-varsity)*
- Concussion history
- Genetic predisposition to concussion

***Note:** *This contributing factor was added to the document by the NFHS SMAC.*

It is very likely that each athlete has a unique level of resilience or susceptibility to concussion and further brain injury. While there is currently no definitive way to measure or quantify this resilience or susceptibility, the task force recommends reasonably limiting head impact exposure through the Fundamentals presented below. Individual risk factors that are modifiable, such as position played, total time spent on field, and sport technique, must be also considered when implementing contact limitations.

Fundamentals for Minimizing Head Impact Exposure and Concussion Risk in Football

1. Full-contact should be limited during the regular season, as well as during activity outside of the traditional fall football season. For purposes of these recommendations and guidelines, full-contact consists of both "Thud" and "Live Action" using the USA Football definitions of *Levels of Contact*.

> ***Rationale:*** By definition, "Thud" involves initiation of contact at, or up to, full speed with no pre-determined winner and no take-down to the ground. Accordingly, the task force supports that initial contact, particularly with linemen, is just as violent with "Thud" as with "Live Action." However, the task force also recognizes that "Live Action" likely carries a higher risk for other

injuries to the body than does “Thud.” The USA Football *Levels of Contact* “Air,” “Bags,” and “Control” are considered no- or light-contact, and thus no limitations are placed on their use.

2. Member state associations should consider a variety of options for limiting contact in practices. The task force strongly recommends full-contact be allowed in no more than 2-3 practices per week. Consideration should also be given to limiting full-contact on consecutive days and limiting full-contact time to no more than 30 minutes per day and no more than 60-90 minutes per week.

Rationale: The task force acknowledges that there are insufficient data to specify with certainty a research-validated “best practices” standard for contact limitations. Several states (Alabama, Arizona, Maryland, and Texas) adopted varying limitations on contact prior to the 2013 football season. Preliminary *High School RIO* injury surveillance data suggest these states have seen a statistically significant decrease in concussion rates during practices, with no increase in concussion or other injuries during games.

3. Pre-season practices may require more full-contact time than practices occurring later in the regular season, to allow for teaching fundamentals with sufficient repetition.

A. Pre-season acclimatization protocols and regulations regarding heat and hydration take precedent and should always be followed.
B. While total full-contact practice days and time limitations may be increased during the pre-season, the emphasis should focus on the proper principles of tackling and blocking during the first several practices, before progressing to “Thud” and “Live Contact.”

Rationale: The task force acknowledges regular season practice limitations may need to be revised during the pre-season. This should be done in a specific and systematic manner to allow coaches to spend sufficient time teaching proper tackling and blocking techniques. Emphasis should be placed upon inexperienced players, as they slowly work through tackling and blocking progressions with “Air,” “Bags,” and “Control” using the USA Football definitions of “*Levels of Contact.*”

4. During pre-season twice-daily practices, only one session per day should include full contact.

Rationale: The adolescent brain needs sufficient recovery time following full-contact practices. In addition, concussion signs and/or symptoms may not develop for several hours after the initial injury.

5. Each member state association should review its current policies regarding total quarters or games played during a one-week time frame.

***Rationale*:** *High School RIO* injury surveillance data consistently show that competition presents the highest risk for concussion. The task force is concerned that participation in games at multiple levels of competition during a single week increases risk for head injury and unnecessarily increases head impact exposure. In addition, games played on consecutive days or those scheduled on the same day (Freshman and Junior Varsity games or Junior Varsity and Varsity games) may not allow the brain an opportunity to adequately recover. Consideration should be given to moderating these situations as much as possible.

6. Consistent with efforts to minimize total exposure to full-contact, head impact exposure, and concussion risk, member state associations with jurisdiction over football outside of the traditional fall football season should review their current policies to assess if those policies stand in alignment with the Fundamentals discussed within this report and, if needed, modify the policies accordingly.

> ***Rationale:*** Football played outside of the traditional fall football season presents an opportunity for learning, physical activity, and skill development. However, athletes are at further risk for head impact exposure and concussion during any full-contact activity. Consideration should be given to significantly limiting the total time of full contact. Other factors to consider include time elapsed since the previous football season and whether individual athletes have recently been, or are currently, participating in other contact/collision sports (e.g., Ice Hockey, Lacrosse, Soccer and Wrestling).

7. Each member state association should reach out to its respective state coaches' association on designing and implementing a coach education program that appropriately integrates youth, middle school, and high school football programs in every community. USA Football and the NFHS Fundamentals of Coaching courses should be the primary education resources for all coaches. Education for coaches should also include the proper fitting and care of helmets.

> ***Rationale:*** The game of football continues to evolve and proper coaching technique at each level is fundamental to keeping the game safe and enjoyable. A proper fitting helmet may help decrease, but not eliminate concussion risk.

8. Each member state association should regularly educate its schools on current state concussion law and policies and encourage schools to have a written Concussion Management Protocol. Schools should also be encouraged to share this information with coaches, parents, and students annually.

> ***Rationale:*** Many schools experience frequent turnover of Athletic Directors and coaches. Frequent "refreshers" on state concussion laws and policies as well as sample concussion management protocols should be made available to ensure all schools are current on, and prepared for, safe and effective concussion management.

9. An Emergency Action Plan (EAP) with clearly defined written and practiced protocols should be developed and in place at every high school. When possible, an athletic trainer should be present at all practices and games.

> ***Rationale:*** An effective EAP should be in place, as a prompt and appropriate response to any emergency situation can save a life. The EAP should be designed and practiced to address all teams (Freshman, Junior Varsity, and Varsity) and all practice and game sites. An athletic trainer is a key component in any strategy to minimize injury risk and optimize safety for all participants.

Resources:

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Approved by the NFHS Concussion Summit Task Force in August 2014; Approved by the NFHS SMAC in October 2014; and Approved by the NFHS Board of Directors in October 2014.

National Federation of State
High School Associations

A PARENT'S / GUARDIAN'S GUIDE TO CONCUSSION

National Federation of State High School Associations (NFHS)
Sports Medicine Advisory Committee (SMAC)

What is a concussion?

- A concussion is a traumatic brain injury that interferes with the normal function of the brain. Concussions were previously referred to as a "ding" or a "bell-ringer" but this undermines the seriousness of problem. Any suspected concussion must be taken very seriously. An athlete does not need to lose consciousness (be "knocked-out") to suffer a concussion. In fact, less than 5% of concussed athletes suffer a loss of consciousness.

Concussion Facts

- Structural injuries, like torn ligaments and broken bones, can be seen on an x-ray or on scans like an MRI. On the other hand, a concussion is a disruption of how the brain works, or its function, and not in its structure. That is why CAT scans and MRIs are typically normal. The injury affects the way the brain works, not how it looks.
- It is estimated that over 300,000 high school athletes across the United States suffer a concussion each year. (Data from the NFHS Injury Surveillance System, "High School RIO™")
- Concussions can happen in any sport. While they are more common in sports that involve collisions, athletes in all sports are at risk for a concussion. When researchers looked at 14 different high school sports, they found that over two-thirds of concussions result from contact with another athlete and the second leading cause of concussion, is player-to-surface contact. This includes falling and hitting the ground.
- An athlete may report many physical, behavioral, and cognitive symptoms. Physical symptoms include headaches, nausea, vomiting, dizziness, and sleep changes. Some behavioral changes include irritability, anxiety, and depression. Cognitive symptoms are changes in the way we think and include feeling sluggish, hazy, or foggy, difficulty concentrating or memory problems, and confusion.
- Many symptoms appear immediately after the injury, while others may develop over the next several days. The symptoms can interfere with normal daily life in addition to difficulty with school, work, and social life.
- Concussion symptoms may last from a few days to several months. It is important to remember that each student athlete responds and recovers differently.
- Athletes should not return to sports or activities that will put them at risk for another head injury until the concussion has completely resolved. To do so puts them at risk for worsening and prolonged symptoms and a more severe injury. While rare, a repeat concussion can also result in severe swelling and bleeding in the brain. This condition can lead to death or permanent disability.

What should I do if I think my child has had a concussion?
If your child sustains a head injury, it is good to be aware of the signs and symptoms of a concussion. If you suspect an athlete has a concussion, the athlete must be immediately removed from activity. Continuing to participate in a contact or collision sport while experiencing concussion symptoms can lead to worsening of symptoms, increased risk for further injury and sometimes death.

Parents and coaches should not make the diagnosis of a concussion. Any athlete suspected of having a concussion should be evaluated by a medical professional trained in the diagnosis and management of concussions.

When in doubt, sit them out!

All athletes who sustain a concussion need to be evaluated by an appropriate health-care professional who is experienced in concussion management. If your child's school has an athletic trainer (AT), please inform the AT of your concerns. You should also call your child's primary care provider and explain what has happened and follow the instructions you are given. Sometimes, an injury is more severe than it appears. If your child has persistent vomiting, a worsening headache, a seizure, or is acting differently, you should take your child to an emergency department for immediate attention.

What are the signs and symptoms of a concussion?

SIGNS OBSERVED BY PARENTS, ATHLETIC TRAINERS, FRIENDS, TEACHERS OR COACHES	SYMPTOMS REPORTED BY ATHLETE
• Dazed or stunned appearance. • Confusion about assignment or position. • Forgetfulness. • Uncertainty of game, score, or opponent. • Clumsy movements. • Slow response to questions. • Mood, behavior or personality changes. • Can't recall events prior to or after hit or fall.	• Headache or "pressure" in head. • Nausea • Balance problems or dizziness • Double or blurry vision • Sensitivity to light or noise • Feeling sluggish, hazy, foggy or groggy • Concentration or memory problems • Confusion • "Not feeling right" or "feeling down"

How can a concussion affect schoolwork?
Following a concussion, many students have difficulty in school due to difficulties with short-term memory, concentration, and organization.

In many cases after the injury, it is best to decrease the athlete's class load early in the recovery phase. This may include staying home from school for no more than 1 or 2 days, followed by academic adjustments (such as a reduced class schedule), until the athlete has fully recovered. Decreasing the stress on the brain and not allowing the athlete to push through symptoms will shorten the recovery time and ensure total resolution of symptoms. The academic adjustments are best managed by a school concussion team. Speak with the school guidance counselor, school nurse, or athletic trainer to help with this process.

When can an athlete return to play following a concussion?
After suffering a concussion, or if you suspect an athlete has a concussion, **no athlete should EVER return to play or practice on that same day**.

Concerns over athletes returning to play too quickly led lawmakers in all 50 states and the District of Columbia to pass laws stating that **no player shall return to play the day of a concussion, and the athlete must be cleared by an appropriate health-care professional before being allowed to return to play in either games or practices.** Many of these laws require players, parents and coaches to receive education on the dangers of concussion in addition to recognizing the signs and symptoms of concussion. **Click here to see what your state law requires:**
http://www.ucdenver.edu/academics/colleges/medicalschool/departments/pmr/documents/concussion_toolkit/laws/state.htm

Once an athlete no longer has symptoms of a concussion AND is cleared by an appropriate health-care professional to begin a return to play progression, the athlete must proceed with activity in a step-wise fashion in a carefully controlled and monitored environment to allow the brain and body to re-adjust to exertion. On average, the athlete will complete a new step every 24-48 hours. An example of a typical return-to-play schedule is shown below:

Return to Play Progression:

Step 1: Back to Regular Activities
To enter into the return to play protocol the athlete should first be back to regular activities (such as school) and has the cleared by their health-care professional to begin the return to play process. In most all cases, the athlete should have all concussion-related academic adjustments removed prior to beginning the Return to Play Program.

Step 2: Light Aerobic Activity
Begin with light aerobic exercise only to increase heart rate. This means about 5 to 10 minutes on an exercise bike, brisk walking, or light jogging. No anaerobic activity such as weight lifting should be done at this stage.

Step 3: Moderate Activity
Continue with activities that increase an athlete's heart rate while adding movement. This includes running and skating drills.

Step 4: Non-Contact Training Activity
Add sports specific, more intense, non-contact physical activity, such as such as passing in hockey, dribbling in basketball or soccer, high-intensity stationary biking, regular weightlifting routine.

Step 5: Practice and Full Contact
The athlete may return to practice and full contact (if appropriate for the sport) in a controlled practice setting where the skills can be assessed by the coaches.

Step 6: Competition
The athlete may return to competition.

If symptoms occur at any step, the athlete should immediately stop activity and consult with a qualified appropriate health-care professional before moving on to the next step.

What can I do?

- Both you and your child should learn to recognize the "Signs and Symptoms" of concussion as listed above.
- Encourage your child to tell the medical and/or coaching staff if any of these signs and symptoms appear after a blow to the head or body.
- Emphasize to administrators, coaches, physicians, athletic trainers, teachers and other parents your concerns and expectations about concussion and safe play.
- Encourage your child to tell the medical and coaching staff if there is suspicion that a teammate has suffered a concussion.
- Ask teachers to monitor any decrease in grades or changes in behavior in students that could indicate a concussion.
- Report concussions that occurred during the school year to appropriate school staff. This will help in monitoring injured athletes as they move to the next season's sports.

Click here for more information about returning to school after a concussion:
http://www.cdc.gov/headsup/basics/return_to_school.html

Other Frequently Asked Questions:

Why is it so important that athletes not return to play until they have completely recovered from a concussion?
Students that return to play too soon may worsen concussion symptoms, prolong the recovery time, and they also risk catastrophic consequences if they suffer another head injury. These consequences are preventable if each athlete is allowed time to recover from their concussion including completing the stepwise return-to-play protocol. No athlete should return to sport or other at-risk activity when signs or symptoms of concussion are present and recovery is ongoing.

Is a "CAT scan" or MRI needed to diagnose a concussion?
No! The diagnosis of a concussion is based upon the athlete's history of the injury and an appropriate health-care professional's physical examination and testing. CT and MRI scans are rarely needed following a

concussion since this is a functional injury and not a structural one. However, they are helpful in identifying life-threatening head and brain injuries such as skull fractures, bleeding or swelling.

What is the best treatment to help my child recover quickly from a concussion?
Treatment for concussion varies from one person to the next. Immediately after a concussion, the best treatment is physical and cognitive rest. Exposure to loud noises, bright lights, computers, tablets, video games, television and smart phones may worsen the symptoms of a concussion. You should allow your child to rest in the days following a concussion. As the symptoms lessen, an appropriate health-care professional may allow increased physical and cognitive activity, but this has to be monitored closely for a recurrence of symptoms.

There are no medications to treat concussions, but an appropriate health-care professional may prescribe medications and therapies to treat symptoms of a concussion, such as headache, dizziness, sleep changes, etc. Some athletes may require rehabilitative therapies, such as physical, occupational, vestibular, ocular or speech/cognitive. Others may require treatment for mood and behavior changes. All of these interventions are done on a personalized basis.

How long do the symptoms of a concussion usually last?
For most concussions, symptoms will usually go away within 2–3 weeks after the initial injury. You should anticipate that your child will not fully participate in sports for several weeks following a concussion. In some cases, symptoms may last longer, sometimes several months. Since recovery differs from person to person, all concussions should be carefully managed.

How many concussions can an athlete have before we should consider retiring from playing sports?
There is no "magic number" of concussions that determine when an athlete should give up playing sports that put one at high risk for a concussion. The circumstances that surround each individual injury, such as how the injury occurred as well as the number and duration of symptoms following the concussion, are very important. These circumstances must be individually considered when assessing an athlete's risk for potential long-term consequences and potentially more serious brain injuries. The decision to "retire" from sports is a decision best reached after a complete evaluation by your child's primary care provider and consultation with an appropriate health-care professional who specializes in treating concussions.

I've read recently that concussions may cause long-term brain damage in athletes, especially professional football players. Is this a risk for high school athletes who have had a concussion?
Recently, increasing attention has been directed at CTE or Chronic Traumatic Encephalopathy. CTE is a *brain disease* that results from changes in the brain. These changes can affect how a person thinks, feels, acts, and moves. The cause of CTE has not been definitively established. Traumatic brain injuries, including concussions, and repeated hits to the head, called sub-concussive head impacts, may contribute to CTE.

Sub-concussive head impacts are impacts to the head that do not cause a concussion. Unlike concussions, which cause symptoms, sub-concussive head impacts do not cause symptoms. A collision while playing sports is one way a person can get a sub-concussive head impact.

Early evidence suggested that the more years a person has repeated sub-concussive head impacts or other brain injuries, the higher the chance they have of getting CTE. However, we have now learned that CTE does

not just occur in athletes. And, most people with head impacts or brain injuries will not get CTE. Furthermore, CTE has been diagnosed in people who have never had any history of brain trauma.

In light of the suggestion of a correlation between head impacts and CTE, the NFHS SMAC recommends limiting full contact during practice sessions and limiting the total number of quarters or periods played per week in sports at high risk for head impacts, such as football and ice hockey. These recommendations and guidelines were defined in the report from the July 2014 NFHS Concussion Summit Task Force. The guiding principles used to develop this report were to reasonably limit the opportunity for multiple hits to the head and to minimize concussion risk. The goal is also to maintain the integrity of the games and avoid unintended consequences. The report can be read in its entirety in the Resources section on the Sports Medicine page of the NFHS Website.

We cannot eliminate all of the risk of concussion from sports. However, we can take what we learn from science to reduce the chance for injury and set policy to ensure that students with a concussion get the care they need.

Everyone involved in high school sports plays an active role in educating others about concussion and other serious brain injuries. Please check out the Resource section on the Sports Medicine page of the NFHS Website for more information on how you can take an active role and get involved in keeping students safe, healthy and active.

Some of this information has been adapted from the CDC's "Heads Up: Concussion in High School Sports" materials by the NFHS's Sports Medicine Advisory Committee. Please go to **www.cdc.gov/ncipc/tbi/Coaches_Tool_Kit.htm** for more information.

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National Federation of State
High School Associations

SUGGESTED GUIDELINES FOR MANAGEMENT OF CONCUSSION IN SPORTS

National Federation of State High School Associations (NFHS)
Sports Medicine Advisory Committee (SMAC)

Introduction

A concussion is a type of traumatic brain injury that impairs the function of the brain. It occurs when the brain moves within the skull as a result of a blow to the head or body. What may appear to be only a mild jolt or blow to the head or body can result in a concussion or other serious brain injury.

The understanding of sports-related concussion continues to evolve. We now know that young athletes are particularly vulnerable to the effects of a concussion. Once considered a "ding" to the head, it is now understood that a concussion has the potential to result in a variety of short- or long-term changes in brain function and, rarely, death.

What is a concussion?

A concussion is a traumatic brain injury that interferes with the normal function of the brain. Simply stated – a concussion results from an injury to the brain, and there is no such thing as a minor brain injury! Concussions should never be referred to as a "ding" or a "bell-ringer." Any suspected concussion must be taken very seriously.

An athlete does not need to lose consciousness (be "knocked-out") to suffer a concussion. In fact, less than 5% of concussed athletes suffer a loss of consciousness.

What happens to the brain during a concussion is not completely understood. It is a complex process, primarily affecting the function of the brain. The sudden movement of the brain causes stretching and tearing of brain cells, damaging the cells and creating chemical changes in the brain. Once this injury occurs, the brain is vulnerable to further injury and very sensitive to any increase in stress, such as another head injury, until it fully recovers.

Common sports injuries such as torn ligaments and broken bones are structural injuries that can be seen on x-rays or MRI. A concussion, however, is an injury that interferes with how the brain works and cannot be seen on MRI or CT scans. Therefore, even though the brain is injured, the brain looks normal on these tests.

Recognition and Management

If an athlete exhibits any signs, symptoms, or behaviors that make you suspicious of a concussion, the athlete **must** be removed from play and not be allowed to return to play until they are evaluated and cleared by a health-care professional. Failure to remove the athlete from activity puts them at risk for sustaining another

head injury while concussed, which can lead to worsening concussion symptoms, increased risk for further injury, and, sometimes even death.

Parents/guardians and coaches are not expected to "diagnose" a concussion. However, everyone involved in athletics must be aware of the signs, symptoms and behaviors associated with a concussion. If you suspect that an athlete may have a concussion, then the athlete must be **immediately removed** from all physical activity.

Signs Observed by Coaching Staff

- **Dazed or stunned appearance.**
- **Confusion about assignment or position.**
- **Forgetfulness.**
- **Uncertainty of game, score, or opponent.**
- **Clumsy movements.**
- **Slow response to questions.**
- **Mood, behavior or personality changes.**
- **Can't recall events prior to or after hit or fall.**

Symptoms Reported by Athlete

- **Headache or "pressure" in head.**
- **Nausea.**
- **Balance problems or dizziness.**
- **Double or blurry vision.**
- **Sensitivity to light or noise.**
- **Feeling sluggish, hazy, foggy or groggy.**
- **Concentration or memory problems.**
- **Confusion.**
- **Emotions of "not feeling right" or "feeling down".**

When in doubt, sit them out!

If you suspect that a player has a concussion, follow the "Heads Up" 4-step Action Plan.

1. Remove the athlete from play.
2. Ensure the athlete is evaluated by an appropriate health-care professional.
3. Inform the athlete's parents/guardians about the possible concussion and give them information on concussion.
4. Keep the athlete out of play the day of the injury, and until an appropriate health-care professional **has given written clearance** that the athlete is symptom-free and may return to activity.

The signs and symptoms associated with a concussion are not always apparent immediately after a bump, blow, or jolt to the head or body and may develop over a few hours or longer. However, until an athlete is evaluated by an appropriate health-care professional, they should be closely watched following a suspected concussion and should not be left alone.

Athletes should never try to "tough out" a concussion. Teammates, parents/guardians, and coaches should never encourage an athlete to "play through" the symptoms of a concussion. In addition, there should never be an attribution of bravery or courage to athletes who play despite having concussion signs and/or symptoms. The risks of such behavior must be emphasized to all members of the team, as well as coaches and parents.

If an athlete returns to activity before being fully healed from an initial concussion, their reaction time and reflexes may be compromised, placing the athlete at greater risk for sustaining another head injury. A second injury that occurs before the brain has a chance to recover from the initial concussion will delay recovery and increase the chance for long-term problems. In rare cases, a repeat head injury can result in severe swelling and bleeding in the brain that can be fatal.

What Are Some Danger Signs to Look Out For?

In rare cases, a dangerous collection of blood (hematoma) may form between the brain and skull after a bump, blow, or jolt to the head or body. The pressure from this blood can squeeze the brain within the skull. Call 9-1-1 for any athlete that demonstrates any of the following signs or symptoms after a bump, blow, or jolt to the head or body for transport to the emergency department:

- One pupil larger than the other.
- Drowsiness or inability to wake up.
- A headache that gets worse and does not go away.
- Slurred speech, weakness, numbness, or decreased coordination.
- Repeated vomiting or nausea
- Convulsions or seizures (shaking or twitching).
- Unusual behavior, increased confusion, restlessness, or agitation.
- Loss of consciousness (passed out/knocked out). Even a brief loss of consciousness should be taken seriously.

Management Until Recovery

Rest

The first step in recovering from a concussion is rest. Rest is essential to help the brain heal. Athletes with a concussion need rest from physical and mental activities that require concentration and attention as these activities may worsen symptoms and delay recovery. Exposure to loud noises, bright lights, computers, video games, television and phones (including texting) all may worsen the symptoms of concussion. Athletes typically require 24-48 hours of rest, though some may require a longer period of time.

Return to Learn

Following a concussion, many athletes will have difficulty in school. These problems may last from days to weeks and often involve difficulties with short- and long-term memory, concentration, and organization. In many cases, it is best to lessen the student's class load early on after the injury. This may include staying home from school during the short period of rest (typically no more than 1-2 days) followed by a lighter school schedule for a few days, or longer, if necessary. Decreasing the stress to the brain in the early phase after a concussion may lessen symptoms and shorten the recovery time. Additional academic adjustments may include decreasing homework, allowing extra time for assignments/tests, and taking breaks during class. Such academic adjustments are best made using a team approach collaborating with teachers, counselors, and school nurses.

Return to Play
After suffering a concussion, **no athlete should return to play or practice on that same day**.

An athlete should *never* be allowed to resume play following a concussion until symptom free and given the approval to resume physical activity by an appropriate health-care professional.

Once an athlete no longer has signs or symptoms of a concussion **and is cleared to return to activity by an appropriate health-care professional**, they should proceed in a step-wise fashion to allow the brain to re-adjust to exercise. In most cases, the athlete should progress no more than one step each day, and at times each step may take more than one day. **Below is an example of a return to physical activity program**:

Progressive Return to Play Protocol
Step 1: Back to Regular Activities (such as school)
To enter into the stepwise return to play protocol the athlete should first be back to regular activities (such as school) and has been cleared by their appropriate health-care professional to begin the return to play process. In most all cases, the athlete should have all concussion-related academic adjustments removed prior to beginning the Return to Sports Activity Program

Step 2: Light Aerobic Activity
Begin with light aerobic exercise only to increase heart rate. This means about 5 to 10 minutes on an exercise bike, brisk walking, or light jogging. No anaerobic activity such as weight lifting should be done at this stage.

Step 3: Moderate Activity
Continue with activities that increase an athlete's heart rate while adding movement. This includes running and skating drills.

Step 4: Non-Contact Training Activity
Add sports specific, more intense, non-contact physical activity, such as such as passing in hockey, dribbling in basketball or soccer, high-intensity stationary biking, regular weightlifting routine.

Step 5: Practice and Full Contact
The athlete may return to practice and full contact (if appropriate for the sport) in a controlled practice setting where the skills can be assessed by the coaches.

Step 6: Competition
The athlete may return to competition.

If symptoms of a concussion recur, or if concussion signs and/or behaviors are observed at any time during the return-to-play program, the athlete must discontinue all activity immediately. The athlete may need to be re-evaluated by the appropriate health-care professional or may have to return to the previous step of the return-to-activity program, as pre-determined by the appropriate health-care professional.
Summary of Suggested Concussion Management

1. **No athlete should return to play (RTP) or practice on the same day of a concussion.**
2. **Any athlete suspected of having a concussion should be evaluated by an appropriate health-care professional.**

3. **Any athlete diagnosed with a concussion should have written clearance from an appropriate health-care professional prior to resuming participation in any practice or competition.**
4. **After medical clearance, RTP should follow a step-wise protocol as outlined above with provisions for delayed RTP based upon return of any signs or symptoms.**

References:

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Additional Resources:

Brain 101 – The Concussion Playbook.

Concussion in Sports- What you need to know.
https://nfhslearn.com/courses/61151/concussion-in-sports

Heads Up: Concussion in High School Sports
http://www.cdc.gov/concussion/headsup/high_school.html

REAP Concussion Management Program.
http://www.rockymountainhospitalforchildren.com/sports-medicine/concussion-management/reap-guidelines.htm

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MSHSAA Concussion Return to Play Form

If diagnosed with a concussion, an athlete must be cleared for progression to activity by an approved healthcare provider, MD/DO/PAC/LAT/ARNP/Neuropsychologist (**Emergency Room physician cannot clear for progression**).

Athlete's Name: _____ DOB: _____ Date of Injury: _____

THIS RETURN TO PLAY IS BASED ON TODAY'S EVALUATION

Date of Evaluation: _____ Return to School On (Date): _____

The following are the return to physical activities recommendations at the present time:

- □ Diagnosed with a concussion: Cannot return to physical activity, sport or competition (must be re-evaluated).
- □ Diagnosed with a concussion: May return to sports participation under the supervision of your school's administration after completing the return to play protocol (see below).
- □ Not diagnosed with a concussion. Patient has diagnosis of _____ and MAY/MAY NOT return to play at this time.

Medical Office Information (Please Print/Stamp):

Evaluator's Name: _____ Office Phone: _____

Evaluator's Specialty: _____

Evaluator's Signature: _____

Evaluator's Address: _____

Return to Play (RTP) Procedures After a Concussion

Return to activity and play is a medical decision. Progression is individualized, must be closely supervised according to the school's policies and procedures, and will be determined on a case-by-case basis. Factors that may affect the rate of progression include: previous history of concussion, duration and type of symptoms, age of the athlete, and sport/activity in which the athlete participates. An athlete with a prior history of concussion, one who has had an extended duration of symptoms, or one who is participating in a collision or contact sport may be progressed more slowly as determined by the healthcare provider who has evaluated the athlete. After the student has not experienced symptoms attributable to the concussion for a **minimum of 24 hours** and has returned to school on a full-time basis (if school is in session), the stepwise progression below shall be followed:

Step 1: Light cardiovascular exercise.
Step 2: Running in the gym or on the field. No helmet or other equipment.
Step 3: Non-contact training drills in full equipment. Weight-training can begin.
Step 4: Full, normal practice or training (a walk-through practice does not count as a full, normal practice).
Step 5: **Full participation.** Must be cleared by MD/DO/PAC/LAT/ARNP/Neuropsychologist before returning to play.

The athlete should spend a minimum of one day at each step before advancing to the next. If concussion symptoms return with any step, the athlete must stop the activity and the treating healthcare provider must be contacted. Depending upon the specific type and severity of the symptoms, the athlete may be told to rest for 24 hours and then resume activity at a level one step below where he or she was at when the symptoms returned.

Return to Play Protocol (Steps 1-4) Completed (Date/Signature): _____

Cleared for Return to Play (Step 5) by: _____ **Date:** _____

I accept responsibility for reporting all injuries and illnesses to my school and medical staff (athletic trainer/team physician) including any signs and symptoms of a CONCUSSION.

Signature of Student Athlete: _____ **Date:** _____

May be advanced back to competition after phone conversation with the healthcare professional that evaluated the athlete (MD/DO/PAC/LAT/ARNP/Neuropsychologist) and documented above.

This form is adapted from the Acute Concussion Evaluation (ACE) care plan on the CDC website (www.cdc.gov/injury). All medical providers are encouraged to review this site if they have questions regarding the latest information on the evaluation and care of the scholastic athlete following a concussion injury.

MSHSAA RETURN TO LEARN – BACKGROUND AND SUGGESTIONS

What is Returning to Learn After a Concussion?

A concussion is an injury to the brain that affects how the brain can function. Commonly, a person with a concussion can experience headaches, dizziness, troubles with loud noises or bright lights, difficulty focusing and difficulty concentrating. Some students may have only a few symptoms and others may have many symptoms. These symptoms may affect a student's ability to perform at their normal ability in school.

Once diagnosed with a concussion (which may happen through the athletic trainer or another healthcare professional), it is important for the appropriate individuals at the school to be notified of the injury. That may be a school nurse, counselor, athletic trainer, specific teacher or other individual designated by the school as the point person for getting the information to all the student's teachers about the concussion diagnosis.

Following the diagnosis, the school can then make adjustments to the student's environment (as examples: changing seating, reducing brightness on computer monitors, allowing a student to be in a quieter area of the class, allowing breaks in the nurse's office if symptoms increase) and to the students workload (as examples: giving extra time for assignments or testing, reducing overall workload and homework, providing the student assistance in concepts that may be causing struggles).

A school is able to make adjustments without a note from a healthcare professional. These can be temporary adjustments until the student is able to have a formal evaluation from a healthcare professional. It would benefit the student for these adjustments to be applied as soon as possible and not delayed based on the provision of a healthcare provider's note.

Since most concussion in young athletes resolve within 3-4 weeks, it is not expected that adjustments are necessary for prolonged periods of times, but a small percentage of students may have difficulties that linger. In prolonged cases of concussion, schools may need to consider implementing a 504 plan to formalize the adjustments for the student.

Ideally, students with concussions should be encouraged to communicate with their individual teachers about their specific symptoms as they may change from class to class or from day to day. Since many of the symptoms of concussion are not outwardly visible to others, the communication is critical to keep everyone 'in the loop' about what the student is struggling with so the teachers and school has the most accurate information to help assist the student through whatever means they feel would be best.

Several research studies have demonstrated that prolonged periods of time out of school do not help a student's recovery and may actual lead to increased symptoms and a longer recovery. Prolonged absences also can lead to additional stress the student may experience, including the stress of getting behind on homework and missing out on key concepts to help with their learning.

Even though a student may experience worsening of symptoms during the school day, no research has demonstrated that the act of doing school work is harmful to recovery. It is important for the student, however, to make adjustments to minimize significant periods of worsening symptoms.

Sample school note a healthcare professional can utilize to document recommendations for the student as well as current reported symptoms.

SCHOOL RECOMMENDATIONS FOLLOWING CONCUSSION

Patient Name: _____ Date of Birth: _____
Date of Evaluation : _____ Referred by: _____
Duration of Recommendations : 1 week 2 weeks 4 weeks Until further notice

The patient will be reassessed for revision of these recommendations in _____ weeks.

This patient has been diagnosed with a concussion (a brain injury) and is currently under our care. Please excuse the patient from school today due to the medical appointment. Flexibility and additional supports are needed during recovery. The following are suggestions for academic adjustments to be individualized for the student as deemed appropriate in the school setting. Feel free to apply/remove adjustments as needed as the student's symptoms improve/worsen.

Attendance
_____ No school for _____ school day(s)
_____ Attendance at school _____ days per week
_____ Full school days as tolerated by the student
_____ Partial days as tolerated by the student

Breaks
_____ Allow the student to go to the nurse's office if symptoms increase
_____ Allow other breaks during the school day as deemed necessary and appropriate by school personnel

Visual Stimulus
_____ Change classroom seating as necessary
_____ Pre-printed notes for class material or note taker
_____ Avoid extremes of light/dark in classrooms
_____ Reduce brightness on monitors/screens

Audible Stimulus
_____ Lunch in a quiet place with a friend
_____ Avoid music or shop classes
_____ Allow to wear earplugs as needed

Workload/Multi-Tasking
_____ Reduce overall amount of make-up work, class work and homework
_____ Prorate workload when possible
_____ Reduce amount of homework given each night
_____ Excuse from makeup work if possible

Testing
_____ Additional time to complete tests
_____ No more than one test a day
_____ No standardized testing until _____
_____ Allow for scribe, oral response, and oral delivery of questions, if available

Physical Exertion
_____ No physical exertion/athletics/gym/recess
_____ Walking in gym class only
_____ Begin return to play protocol as outlined by return to activity form

Additional Recommendations
_____
_____
_____
_____

Current Symptoms List (the student is noting these today)

_____	Headache	_____	Visual problems	_____	Sensitivity to noise	_____	Memory issues
_____	Nausea	_____	Balance problems	_____	Feeling foggy	_____	Fatigue
_____	Dizziness	_____	Sensitivity to light	_____	Difficulty concentrating	_____	Irritability

Student is reporting most difficulty with/in

_____	All subjects	_____	Reading/Language arts	_____	Foreign Language	_____	Math
_____	Science	_____	Music	_____	History	_____	Using Computers
_____	Focusing	_____	Listening	Other: _____			

WWW.MSHSAA.ORG • 573.875.4880
Missouri State High School Activities Association
1 North Keene St. • Columbia, MO 65201
@MSHSAAorg