



KSHSAA Concussion Reporting Summary 2019-2020 School Year

Sport related concussions are a traumatic brain injury caused by biomechanical forces. The force can be a direct blow to the head or an indirect blow leading to a sudden acceleration/deceleration of the skull. Concussions are a functional injury to the brain, meaning structural injuries will typically not be present or appear with standard neuroimaging studies (MRI, CT scan). A concussion diagnosis by a physician is based on observed signs and reported symptoms by the student-athlete, and a series of neuro-cognitive tests administered by a health care professional. An athlete does not have to lose consciousness to sustain a concussion. Continuing athletic participation after sustaining a concussion or while a concussion is still resolving can have very serious consequences, including death. Therefore, over the past several years a greater emphasis has been placed on concussion recognition and proper management at all levels of athletics, including the high school/middle school level.

In 2011 the Kansas Legislature enacted the School Sports Head Injury Prevention Act requiring any student-athlete who is suspected of sustaining a concussion be immediately removed from the activity and not permitted to return until they receive written clearance from a physician (MD or DO). For the past several years Kansas coaches and student-athletes have been required to go through annual concussion prevention, recognition and management training. By recommendation of the KSHSAA Sports Medicine Advisory Committee and approval of the KSHSAA Executive Board, the 2018-2019 school year marked the first year KSHSAA member schools (grades 7-12) were required to report concussions to the KSHSAA. Only concussions sustained while participating in a KSHSAA sponsored activity (practice or competition) are to be reported to the Association. School personnel report concussions through a secure online portal, using a two-step process. The first step is to report the concussion injury and answer several questions about the injury as soon as possible after the injury occurs. The second step is to provide the date the student was cleared to resume participation. With this information the KSHSAA is able to determine concussion incidence by activity (and other criteria) as well as calculate the average number of days student-athletes miss due to concussions in each sport.

$$\text{Concussion incidence} = \# \text{ Concussions reported} / \text{Total participants in the activity}$$

The 2019-20 school year was unique in that there were no spring activities due to the coronavirus pandemic, so the data reported on the following pages only reflects the fall and winter seasons. Table 1 summarizes all concussions reported during the 2019-20 school year by activity. A year-to-year comparison by activity is displayed in table 2, which indicates 161 fewer concussions were reported over the 2019-20 fall and winter seasons compared to the same time period the previous year. An overall year-to-year comparison shows a slight decrease in incidence (table 3).



Gender trends nationally indicate females are more likely than males to sustain a concussion when playing a similar sport. Kansas data supports this difference as girls basketball players had a concussion incidence of 2.25% compared to .74% for boys. Boys and girls wrestling and boys and girls soccer (based on 2018-19 data) also support this trend. When looking across all sports, excluding football, a similar difference is noted (table 4).

When looking at concussion incidence based on school size (table 5), there is a noticeable discrepancy between smaller schools and larger schools. Some of this could be due to the fact that while most all schools offer football, many of the smaller schools do not offer some of the other higher concussion incidence activities such as soccer and wrestling. Other reasons could be there are a greater number of competition (competition incidence is higher) exposure opportunities in larger schools who may sponsor more teams within the same activity (Varsity, JV, C-teams, etc.). Larger schools are also more likely to have an athletic trainer onsite more regularly which may account for more accurate reporting. The percentage of concussions taking place in a competition setting versus a practice setting is significantly higher in most activities (table 7). This is expected as most higher contact sports practices are structured to maintain a more controlled practice environment to provide for ample recovery and preserve student-athlete health.

Schools, and particularly coaches, have a great responsibility with concussion safety, recognition and management. There is no “magic number” in the medical community of how many concussions a student could sustain until he/she should no longer participate in high incidence sports. But knowing a student’s concussion history is important. Information on page 8 indicates nearly 18% (312) of reported concussions during the 2019-20 school year were not the first one for that student. Students with a history of multiple concussions need to be identified and monitored closely by schools to ensure they are receiving the medical support necessary to make good decisions about continued participation.

Recognizing concussions can be a challenge, especially if students do not report symptoms right away. Table 8 indicates 38% of students who sustained a concussion were not immediately removed from activity. Participating while symptomatic is potentially dangerous due to the risk of catastrophic second impact syndrome, but also a delay in complete evaluation and diagnosis can result in a delay in appropriate treatment, thus prolonging recovery and/or making recovery more complex. It is imperative that students are educated to report symptoms immediately and coaches are educated to recognize symptomatic students and remove them from participation. Having an athletic trainer or other health care professional onsite to make these decisions should be the goal for every school. Information in table 8 indicates how often an athletic trainer was available to make these decisions and summarizes who the primary decision makers were for all reported concussions.



Some students struggle with concentration, memory and organization early on after sustaining a concussion. These students may need their academic workload modified or even be completely removed from the classroom setting while they are in their early stages of recovery. Trying to meet academic requirements too early after sustaining a concussion can exacerbate symptoms and could potentially delay recovery. Based on 2019-20 concussion data collection, 39% of the concussions that occurred while participating in KSHSAA sponsored activities resulted in the student receiving some type of academic modification for a period of time (table 8). Any academic modifications should be coordinated jointly between the student's medical providers and school personnel. No consideration should be given to returning to full sport activity until the student is fully integrated back into the classroom setting and is symptom free. Occasionally, a student will be diagnosed with post-concussive syndrome and have symptoms that last weeks to months. In these cases, a student may be recommended to start a non-contact physical activity regimen, but this will only be done under the direct supervision of a health care provider.

The KSHSAA and the KSHSAA Sports Medicine Advisory Committee are extremely grateful for the efforts of all member schools in reporting concussion data. Having quality Kansas data to evaluate is invaluable in helping make well informed policy decisions and maintain the healthiest possible participation environment for Kansas students.



Table 1

2019-20 KSHSAA FALL DATA				
ACTIVITY	REPORTED CONC.	TOTAL PART.	INCIDENCE	AVG. DAYS
Football (Overall)	797	14,754	5.40%	18.00
Football (11-Player)	711	12,663	5.61%	18.00
Football (8-Player)	73	1,913	3.82%	17.00
Football (6-Player)	13	178	7.30%	14.00
Volleyball	97	8,520	1.14%	18.00
Boys Soccer	87	4,253	2.05%	12.17
Cross Country (G)	4	2,787	0.14%	19.50
Band	3	16,550	0.02%	10.67
Girls Golf	1	1,251	0.08%	12.00
Girls Tennis	1	3,030	0.03%	7.00
Gymnastics	0	124	0.00%	0.00
Cross Country (B)	0	3,820	0.00%	0.00
	990			
MIDDLE SCHOOLS				
Football	191	9,712	1.97%	19.00
Volleyball	33	8,972	0.37%	13.00
Cross Country (G)	0	2,134	0.00%	0.00
Cross Country (B)	1	2,922	0.03%	12.00
Boys Soccer	1	693	0.14%	17.00
	226			
Fall Total:	1216			
2019-20 KSHSAA WINTER DATA				
ACTIVITY	REPORTED CONC.	TOTAL PART.	INCIDENCE	AVG. DAYS
Basketball (G)	145	6,449	2.25%	18.00
Basketball (B)	64	8,625	0.74%	16.00
Cheer	88	4,910	1.79%	22.00
Dance	9	2,289	0.39%	24.00
Swim/Dive (Boys)	3	1,714	0.18%	12.00
Wrestling	131	5,847	2.24%	20.00
Wrestling (B)	96	4,921	1.95%	19.00
Wrestling (G)	35	926	3.78%	24.00
	440			
MIDDLE SCHOOLS				
Basketball (G)	44	7,814	0.56%	13.00
Basketball (B)	27	8,992	0.30%	14.00
Cheer	14	3,332	0.42%	15.00
Wrestling	22	3,765	0.58%	13.00
	107			
Winter Total:	547			



Table 2

HIGH SCHOOLS						
	2019-20			2018-19		
ACTIVITY	# CONC	TOTAL PART.	INCIDENCE	# CONC.	TOTAL PART.	INCIDENCE
Cross Country (G)	4	2,787	0.14%	0	2,816	0.00%
Cross Country (B)	0	3,820	0.00%	1	3,857	0.03%
Football (Overall)	797	14,754	5.40%	903	14,661	6.16%
Football (11-Player)	711	12,663	5.61%	806	12,605	6.39%
Football (8-Player)	73	1,913	3.82%	93	1,921	4.84%
Football (6-Player)	13	178	7.30%	4	135	2.96%
Golf (G)	1	1,251	0.08%	4	1,171	0.34%
Gymnastics	0	124	0.00%	3	153	1.96%
Soccer (B)	87	4,253	2.05%	89	4,342	2.05%
Tennis (G)	1	3,030	0.03%	0	2,795	0.00%
Volleyball	97	8,520	1.14%	115	8,278	1.39%
Band	3	16,550	0.02%	4	17,417	0.02%
Basketball (G)	145	6,449	2.25%	137	6,530	2.10%
Basketball (B)	64	8,625	0.74%	66	8,788	0.75%
Cheer	88	4,910	1.79%	105	4,807	2.18%
Dance	9	2,289	0.39%	12	2,192	0.55%
Swim/Dive (Boys)	3	1,714	0.18%	3	1,695	0.18%
Wrestling	131	5,847	2.24%	149	5,000	2.98%
Wrestling (B)	96	4,921	1.95%	139	4,724	2.94%
Wrestling (G)	35	926	3.78%	10	276	3.62%
Baseball	0			27	6,502	0.42%
Golf (B)	0			2	2,633	0.08%
Soccer (G)	3			128	3,524	3.63%
Softball	2			49	5,160	0.95%
Swimming & Diving (G)	1			10	2,178	0.46%
Track & Field (B)	0			5	10,048	0.05%
Track & Field (G)	0			6	7,304	0.08%
	1436			1818		

MIDDLE SCHOOLS						
	2019-20			2018-19		
ACTIVITY	# CONC	TOTAL PART.	INCIDENCE	# CONC.	TOTAL PART.	INCIDENCE
Cross Country (B)	1	2,922	0.03%	1	2,832	0.04%
Cross Country (G)	0	2,134	0.00%	0	2,048	0.00%
Football	191	9,712	1.97%	155	9,508	1.63%
Soccer (B)	1	693	0.14%	2	559	0.36%
Volleyball	33	8,972	0.37%	27	8,726	0.31%
Basketball (B)	27	8,992	0.30%	21	8,681	0.24%
Basketball (G)	44	7,814	0.56%	52	7,532	0.69%
Cheer	14	3,332	0.42%	12	3,269	0.37%
Wrestling	22	3,765	0.58%	22	3,668	0.60%
Soccer (G)		574	0.00%	5	448	1.12%
Track & Field (B)				7	10,232	0.07%
Track & Field (G)				5	10,208	0.05%
	333			309		



Table 3

Year	Reported Concussions	Total Participants	Incidence
2018-19	2127	112,116	1.90%
2019-20	1769	108,490	1.63%

Total participants = total number of students submitted through the KSHSAA online eligibility portal. All athletes and spirit participants are to be reported. Students are reported one time, no matter how many sports they participate in.

Table 4 (fall and winter sport comparison)

		2019-2020			2018-2019		
		Reported Concussions	Total Participants	Incidence	Reported Concussions	Total Participants	Incidence
Boys		1048	39241	2.67%	1235	60775	2.03%
Girls		385	31053	1.24%	579	48092	1.20%
		All sports/spirit (HS only)					

		Reported Concussions	Total Participants	Incidence	Reported Concussions	Total Participants	Incidence
Boys		253	24523	1.03%	332	46114	0.72%
Girls		383	31017	1.23%	579	48092	1.20%
		All sports/spirit except football					

Table 5

Class	Reported Concussions	Total Participants	Incidence
1A	126	8,676	1.45%
2A	127	7,784	1.63%
3A	174	11,385	1.53%
4A	215	9,717	2.21%
5A	359	13,986	2.57%
6A	432	18,724	2.31%

Table 6

Grade	Reported Concussions	Total Participants	Incidence
Freshman	434	21,350	2.03%
Sophomore	425	18,586	2.29%
Junior	313	16,341	1.92%
Senior	250	14,046	1.78%

11 concussions did not have a grade reported



Table 7

HIGH SCHOOLS				
	Competition		Practice	
Basketball	156	74.64%	53	25.36%
Cheer	19	21.59%	69	78.41%
Cross Country	1	25.00%	3	75.00%
Dance/Drill Team	2	22.22%	7	77.78%
Football	587	73.65%	210	26.35%
Golf	0	0.00%	1	100.00%
Soccer	78	86.67%	12	13.33%
Softball	0	0.00%	2	100.00%
Swimming	0	0.00%	4	100.00%
Tennis	0	0.00%	1	100.00%
Volleyball	62	63.92%	35	36.08%
Wrestling	67	51.15%	64	48.85%

MIDDLE SCHOOLS				
	Competition		Practice	
Basketball	56	78.87%	15	21.13%
Cheer	0	0.00%	14	100.00%
Cross Country	0	0.00%	1	100.00%
Football	138	72.25%	53	27.75%
Soccer	0	0.00%	1	100.00%
Volleyball	18	52.94%	16	47.06%
Wrestling	11	50.00%	11	50.00%



Table 8

Was the student immediately removed from participation at the time of injury?

Yes	1095	61.86%
No	675	38.14%

Was an athletic trainer onsite at the time of injury?

Yes	1012	57.18%
No	639	36.10%
Don't know	119	6.72%

Who made the decision to remove the student from participation?

Athletic Trainer	796	44.97%
Coach	597	33.73%
Physician	129	7.29%
Other/No answer	100	5.65%
Student Participant	84	4.75%
Parent	34	1.92%
Other Health Care Provider	30	1.69%

Were academic modifications necessary for this student due to the concussion?

Yes	685	38.70%
No	1040	58.76%
No answer	45	2.54%

Has this student sustained any other concussions that you are aware of?

Yes	312	17.63%
No	1031	58.25%
Don't know	427	24.12%