

# STATE OF THE GAME

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2021 - 2022 SEASON



An initiative of the  
National Football Foundation

**FUTURE FOR  
FOOTBALL**



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**“The Future for Football is bright. It’s strong at every level. It’s more inclusive, better and provides more opportunities than ever. Football is a constant in American’s lives. We come together on Fridays, Saturdays and Sundays to cheer, cry and commune. The game is vibrant, and the game is growing.”**

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**Steve Hatchell**

President and Chief Executive Officer  
National Football Foundation & College  
Hall of Fame, Inc.



**Football is the most popular sport in the United States.**

**Football provides many benefits to those who play through association with a team or organization and as part of a community.**

**Football provides opportunities for band members, cheerleaders, coaches, the community, managers, media, parents, players, referees, trainers, videographers, and many more.**

**Over the years, many organizations (at all different levels) have worked to make the game better and will continue to do so.**

**Women's involvement in football has increased significantly.**

**Rules changes, guidance issued on coaching techniques, and tech advancements at all levels have helped make the game better.**

**2 million**  
youth players

**1.049+ million**  
HS players

**892** colleges and  
universities at all levels

**68** colleges and  
universities added  
programs since 2010

**93,770+**  
college players

**81%** graduation  
success rate of FBS  
student-athletes  
(68% general student body)



**GOOD OF THE GAME**



# GOOD OF THE GAME

## Insights

### Youth Stats

- More than 1.04 million players (est.) in high school.<sup>1</sup>
- 2 million youth players (est.).<sup>2</sup>

### Collegiate Stats

- 892 colleges and universities playing football at all levels.<sup>3</sup>
  - 767 schools among all NCAA divisions, the NAIA and independents
  - 125 junior college football programs
- 9 collegiate sprint football teams (full-contact sport for players weighing 178 pounds or less that has the same rules as regular college football).<sup>4</sup>
- 68 colleges and universities added programs since 2010.<sup>3</sup>
- 93,770 (+) college football players at all levels.<sup>1</sup>

### Educational Opportunities Provided

- 81% graduation success rate of Football Bowl Subdivision student-athletes.<sup>5</sup>
  - Compared to 68% federal graduation rate of general student body.
- According to the NCAA (not exclusively football)<sup>6</sup>:
  - \$3.5 billion awarded in athletic scholarships every year.
  - More than 90% of student athletes surveyed 10 years after finishing their eligibility reported being satisfied with their overall experience.
- Former student-athletes are significantly more likely to be thriving in four out of five areas of well-being (purpose, social, financial, community and physical).<sup>7</sup>
  - This is important because it demonstrates that college athletics builds the foundation for former student-athletes to excel in multiple areas of well-being.

### Increased Women's Involvement in the Game

The presence of women in football has steadily increased at every level of the game.

### NFL

- In the 2021 season, 12 female coaches were on staff across the League, up from eight in 2020.<sup>8</sup>
- In the 2021 season, women made up 38.8 percent of the NFL league office, 25.3 percent of teams' senior administration, 3.1 percent of team CEOs and presidents, and 1.5 percent of team assistant coaches, according to The Institute for Diversity and Ethics in Sport (TIDES) yearly report card.<sup>9</sup>
  - Five years ago, there were fewer women working at every level of the NFL, with only one full-time female assistant coach and zero female CEOs or presidents, according to the 2016 TIDES report.



- Super Bowl LV had a record-breaking three women on the field with Lori Locust and Maral Javadifar coaching for the Tampa Bay Buccaneers, while Sarah Thomas became the first female to officiate the championship game.<sup>10</sup>

### **Pro Women Leagues**

- The Women's Football Alliance (WFA) has grown from 36 teams<sup>11</sup> in 2009 to 69 teams and more than 2,500 participants in 2022.<sup>12</sup>
- The WFA partnered with the European Women's Football Organization (EWFO) to promote and develop female American Football players in Europe.<sup>13</sup>
- The Women's National Football Conference (WNFC) had their inaugural season in 2019 with 15 teams in 13 states.<sup>14</sup> The 2022 season features 17 teams from 15 states playing in a 10-week season.<sup>15</sup>
- The Extreme Football League (X League), co-owned by Hall of Famer Mike Ditka, will debut the summer of 2022. It features eight teams and is a fast-paced 7-on-7 women's tackle league. The X League plans expansion to all 32 NFL cities by 2028.<sup>16</sup>

### **College**

The participation of women at the college level has been steadily increasing.

- The National Junior College Athletic Association (NJCAA) announced in 2021 that women's flag football would become an emerging sport. The National Association of Intercollegiate Athletics (NAIA) announced the same a month later.<sup>17-18</sup>
- 15 NAIA institutions have added women's flag football as a varsity sport.<sup>3</sup>
- Haley Van Voorhis, 2021 defensive back at Division III Shenandoah University, became the first female to play an NCAA football position other than a kicker or punter.<sup>19</sup>
- Sarah Fuller, Vanderbilt University: first to play in a Power 5 Conference in 2020.<sup>10</sup>
- Toni Harris, Central Methodist University (MO): first to accept a scholarship to a four-year college in 2019.<sup>20</sup>
- Heather Marini: first Division I position coach in 2020.<sup>21</sup>
- Callie Brownson: first full-time Division I coach in 2018.<sup>22</sup>

### **High School/Youth**

- From the 2014-15 to the 2018-19 school years, the overall number of girls participating in "boys" tackle football has grown 53.4% (1,698 to 2,604). The number of NFHS high school programs with at least one girl on its "boys" tackle football team has grown 291.8% (510 to 1,998).<sup>23</sup>
- From the 2014-15 to the 2018-19 school years, the number of girls' flag football programs has grown 36%; overall participation numbers in girls' flag football among NFHS members has grown 23.7%.<sup>23</sup>
- Five states currently sanction girls' high school flag football: Alabama, Alaska, Georgia, Florida and Nevada.<sup>24</sup>



- The NFL has partnered with high schools in home city regions of 12 other states to develop pilot programs for girls' varsity flag football over the past two years<sup>25-36</sup>:
  - Atlanta Falcons (Montana)
  - Baltimore Ravens
  - Chicago Bears
  - Buffalo Bills and New York Giants
  - Carolina Panthers
  - Dallas Cowboys
  - Detroit Lions
  - Los Angeles Chargers and Los Angeles Rams
  - New York Jets (New Jersey)
  - Pittsburgh Steelers
  - Seattle Seahawks
  - Tennessee Titans
- Females are key team contributors achieving high honors, including all-state recognition of kickers in Colorado and Michigan.<sup>37-38</sup>
- The Utah Girls Tackle Football league began in 2015 and is the first of its kind. In 2019, 446 girls played on 24 teams.<sup>39</sup>

## Viewership

- Of the top 100 most watched shows of 2021, 75 of those were NFL broadcasts and seven were college football games.<sup>40</sup>
  - Out of the Top 100, beyond the football games, 11 were events from the Tokyo Olympics and two were NCAA basketball games. The NBA, MLB and NHL did not put any games in the Top 100.
  - The only scripted program that made the Top 100 was the episode of *The Equalizer* that CBS aired immediately after the Super Bowl. Only four other non-sports programs made the Top 100: President Biden's inauguration, President Biden's April address to Congress, the Macy's Thanksgiving Day Parade and Oprah Winfrey's interview with Prince Harry and Meghan Markle.
- The 2021 NFL regular season averaged 17.1 million viewers (TV and digital) – the highest regular-season average since 2015 and up more than 10% from 2020.<sup>41</sup>
- ESPN networks were up from both 2019 and 2020, with ABC, ESPN and ESPN2 averaging 1,976,000 viewers, up 19 percent from 2020 and two percent from 2019.<sup>42</sup>
  - ABC registered its most-watched season since 2017, averaging 4,042,000 viewers this season, up 25 percent from 2020 and two percent from 2019.
  - *ABC Saturday Night Football* averaged more than five million viewers in 2021, up 36 percent from 2020 and on par with 2018 and 2019.
  - 3.9 billion minutes of live college football games were streamed across ESPN networks and select MVPD access points, up 37 percent from 2020 and 8 percent from 2019. This was the most-streamed season ever on ESPN platforms.
- Fox's "Big Noon Saturday" package averaged 5.76 million linear TV viewers, which marks a 13% improvement over its inaugural run in 2019 (5.11 million).<sup>43</sup>



- For 80 years, Gallup has polled Americans on their favorite sport to watch. In the most recent poll (2018), football was on top with 37 percent. Football has been on top every time Gallup has conducted that poll for half a century.<sup>44</sup>

#### **Misc.**

- The relaunch of the USFL brought a partnership between NBC and Fox to share broadcast rights and create the first simulcast of a pro football game on two competing networks since the first Super Bowl.<sup>45</sup>
- Since EA Sports stopped making *NCAA Football*, fans have been vocal about the game's return to gaming consoles. In 2023, the game maker will be returning to the space with *EA Sports College Football*.<sup>46</sup>
- The NFL has announced a VR football game set to release each year for Meta Quest and PlayStation VR. The annual franchise is being made in partnership with StatusPRO, a sports technology company whose virtual and augmented reality products are used by actual NFL teams.<sup>47</sup>







# PARTICIPATION

## Insights

Insights in this section reference the following exhibits:

*Exhibit 1: National Federation of High School Associations: Total Participation in High School Football<sup>1</sup>*

	2014-15	2015-16	2016-17	2017-18	2018-19
Boys 6-Man	4,403	4,438	4,546	5,102	5,275
Boys 8-Man	19,423	19,195	19,514	19,554	20,954
Boys 9-Man	5,112	5,310	5,278	4,971	4,992
Boys 11-Man	1,083,617	1,080,693	1,057,382	1,036,842	1,006,013
<b>Boys Tackle Total</b>	<b>1,112,555</b>	<b>1,109,636</b>	<b>1,086,720</b>	<b>1,066,469</b>	<b>1,037,234</b>
Boys Flag	838	1,226	1,210	1,144	945
<b>Boys Total</b>	<b>1,113,393</b>	<b>1,110,862</b>	<b>1,087,930</b>	<b>1,067,613</b>	<b>1,038,179</b>
Girls Tackle	1,698	2,120	2,143	2,401	2,604
Girls Flag	9,059	10,867	11,254	11,007	11,209
<b>Girls Total</b>	<b>10,757</b>	<b>12,987</b>	<b>13,397</b>	<b>13,408</b>	<b>13,813</b>

*Exhibit 2: National Federation of High School Associations: High School Football Programs<sup>1</sup>*

	2014-15	2015-16	2016-17	2017-18	2018-19
Boys 6 Man	247	250	259	317	373
Boys 8 Man	832	834	841	847	946
Boys 9 Man	251	265	258	243	244
Boys 11 Man	14,154	14,047	14,099	14,079	14,247
<b>Boys Tackle Total</b>	<b>15,484</b>	<b>15,396</b>	<b>15,457</b>	<b>15,486</b>	<b>15,810</b>
Boys Flag	32	69	76	56	33
<b>Boys Total</b>	<b>15,516</b>	<b>15,465</b>	<b>15,533</b>	<b>15,542</b>	<b>15,843</b>
Girls Tackle	510	613	706	735	1,998
Girls Flag	278	359	420	350	378
<b>Girls Total</b>	<b>788</b>	<b>972</b>	<b>1,126</b>	<b>1,085</b>	<b>2,376</b>

### Exhibit 3: SFIA Data Trends

All participation figures are in 000s

Team Sports										
	Definition	2016	2017	2018	2019	2020	2021	1-year change	2-year change	5-year AAG
Football (Flag)										
Total participation		6,173	6,551	6,572	6,783	7,001	6,889	-1.6%	1.6%	2.3%
Casual	1-12 times	3,249	3,572	3,573	3,794	4,287	4,137	-3.5%	9.0%	5.1%
CORE	13+ times	2,924	2,979	2,999	2,989	2,714	2,752	1.4%	-7.9%	-1.1%
Core Age 6 to 17		1,401	1,565	1,578	1,590	1,446	1,574	8.8%	-1.1%	2.6%
Football (Tackle)										
Total participation		5,481	5,224	5,157	5,107	5,054	5,228	3.4%	2.4%	-0.9%
Casual	1-25 times	2,242	2,145	2,258	2,413	2,390	2,642	10.6%	9.5%	3.5%
CORE	26+ times	3,240	3,078	2,898	2,694	2,665	2,586	-3.0%	-4.0%	-4.4%
Core Age 6 to 17		2,543	2,427	2,353	2,311	2,226	2,110	-5.2%	-8.7%	-3.7%

*\*SFIA data from the 2022 SFIA Topline Report.<sup>2</sup>*

*All data referenced from Exhibits above and in Exhibit A in Addendum unless otherwise noted.*

### Growth Areas

- While NFHS did not release participation data for 2019-20 season, the optimism surrounding a positive trend in football participation came to fruition. After annual declines of 23,311, 20,540 and 30,829 the past three years, boys' participation in high school 11-player football in 2019 dropped by only 2,489 – from 1,006,013 to 1,003,524. Last year's decline is the smallest in 10 years.<sup>3</sup>
- SFIA data regarding flag and tackle combined among core participants ages 6-17 indicates that there has been a slight increase in participation for the first-time year-over-year since 2016-2017. And total participation for flag football among core participants ages 6-17 is up 8.8% year-over-year and 2.6% over the last five years.<sup>2</sup>

### Net Numbers Fall

- From the 2014-15 school year to 2018-19, there has been an overall 6.75% decline in participation in all forms of boys' football among NFHS-member schools. (Boys' tackle is down 6.77%.)
- By net numbers, the decline of 75,321 tackle football participants overall is comprised of: 77,604 net losses in 11-man players, 120 net losses in 9-man players, 1,531 net gains in 8-man players, and 872 net gains in 6-man players.

### From the 2014-15 to the 2018-19 school years:

- There are 1,103 more schools participating in boys' football and 1,954 more schools participating in girls' football.
- 93 net 11-man tackle programs, 114 net 8-man tackle programs and 126 net 6-man football were gained, while seven programs in 9-man football were lost. (Net +326 programs.)
- Boys' flag football saw a 12.8% jump in participation over the same time frame, from 838 to 945 participants.
- Boys' 6-Man football has grown every season, in programs and total participation.
- Also, over the past five seasons, boys' 8-Man football has seen growth in programs and participation.



- Together, 6-Man and 8-Man football has seen a net growth of 240 programs and 2,403 participants from 2014-15 to 2018-19.
- The overall number of girls participating in “boys” tackle football has grown 53.4% (1,698 to 2,604).
- The number of NFHS high school programs with at least one girl on its “boys” tackle football team has grown 291.8% (510 to 1,998).
- The number of girls’ flag football programs has grown 36%; overall participation numbers in girls’ flag football among NFHS members has grown 23.7%.

### Related to Other Sports

- According to NFHS data for the 2008-2009 – 2018–2019-time frame, baseball participation is up 2.02% basketball is down .803%, golf is down 8.8% and soccer is up 19.6%.<sup>A</sup>
- When reviewing the data as a percentage of all sports played, at its peak in 2008-2009 (in terms of raw participation numbers), football made up 25.8% of the total participation in all sports. Last year (2018-2019), it made up 22.9%. During that same timeframe:<sup>A</sup>
  - Basketball: 12.3% to 11.9%
  - Track & Field (outdoor): 12.6% to 13.4%
  - Baseball: 10.7% to 10.6%
  - Cross Country: 5.2% to 5.9%
  - Golf: 3.6% to 3.16%
  - Tennis: 3.6% to 3.5%
  - Wrestling: 6.0% to 5.5%
  - Soccer: 8.7% to 10.1%
  - Swim & Dive: 2.9% to 3%
  - Others: 8.6% to 10%
- When looking at weighted percentages, Soccer and Others are the only sports that had more than a 1% increase of total participation from the 2008-2009 school year. Basketball, baseball, golf, tennis and wrestling all went down (from a weighted percentage standpoint).

Historic summary breakdown by sports since 1977-1978 (full list found in Addendum Exhibit A).

	Football	Basket	T&F	BB	XC	Golf	Tennis	Wrest	Soccer	S&D	OTHER
1977-78	25.9	17.5	16.2	9.9	4.7	3.1	3.9	7.7	3.2	2.4	5.3
1987-88	27.7	15.3	13.1	12.1	4.5	3.4	3.9	7.5	6.1	2.5	4.0
1997-98	26.5	14.5	12.5	12.0	4.7	4.2	3.7	6.1	8.2	2.3	5.4
2008-09	25.8	12.3	12.6	10.7	5.2	3.6	3.6	6.0	8.7	2.9	8.6
2018-19	22.9	11.9	13.3	10.6	5.9	3.2	3.5	5.5	10.1	3.0	10.0

*Percentage of participation by sports pulled from National Federation of High School Associations.<sup>1</sup>*

# INJURIES



# INJURIES

## Insights

### Not the Most Dangerous Sport

#### Football Deaths

- Deaths from directly or indirectly from participation in the game of football are down.<sup>1</sup>
- Deaths in all levels of football by decades:<sup>1</sup>
  - 1931-1965: 914
  - 1966-1969: 146
  - 1970s: 633
  - 1980s: 144
  - 1990s: 124
  - 2000s: 170
  - 2010s: 153
  - 2020: 6
- Deaths steadily decreased in the 1980s and 1990s before increasing in the 2000s. That trend was reversed in the 2010s.

#### Injuries from Other Sports

- At the collegiate level, there are more catastrophic direct injuries in men's gymnastics (15.82 per 100,000 competitors) and women's skiing (10.96) than football (9.87).<sup>2</sup>
- As it relates to catastrophic indirect injuries in college, men's basketball (9.9 per 100,000), men's water polo (5.46), and men's skiing (4.53) all rank above football (3.95).<sup>2</sup>
- At the high school level there are more catastrophic direct injuries in men's gymnastics (3.32 per 100,000), men's cheerleading (3.2), and women's cheerleading (2.64). All rank above football (2.62).
- As it relates to catastrophic indirect injuries in high school, men's rowing (1.71 per 100,00) and men's basketball (.86) both rank above football (.80).<sup>2</sup>

*All above referenced data is from the National Center for Catastrophic Sport Injury Research Annual Survey of Football Injury Research<sup>1</sup> and Catastrophic Sports Injury Research<sup>2</sup>.*

- Injury risk associated with high school football is at its lowest in history.<sup>3</sup>
- According to a Tweet from the NCAA Research account, 42% of NCAA men experienced a major sports-related injury before entering college. Highest by sport: Ice Hockey (56%), Soccer (50%) and Wrestling (47%). Ranked next: Baseball, Football and Lacrosse – all at 44%.<sup>4</sup>
- Concussion rates are higher in girls' soccer than boys' football in high school. During the years after TBI law enactment (2010 to 2015), the concussion rate was higher in girls' soccer than boys' football. During the 2014-2015 school year, concussions were more common in girls' soccer than any other sport.<sup>5</sup>
- A study from the University of Colorado Boulder found no link between youth contact sports and future brain and mental health problems.<sup>6</sup>

- In preseason and regular-season NFL practices and games in each year from 2015 to 2019, players had, in order, 275, 243, 281, 214 and 224 concussions; in 2021, the number was reduced to 187. (The number was lower in 2020 but there were no preseason games played.)<sup>7</sup>
- A study of children's (age 5 to 14) sports and recreation by the Stanford Children's Orthopedic and Sports Medicine Center, which includes football, concluded that almost 50% of head injuries sustained in sports and recreation activities occur during bicycling, skateboarding or skating incidents.<sup>8</sup>



# **RULE CHANGES, GUIDANCE & COACHING ADVANCEMENTS**

Over the years, rules changes have been implemented to make the game better.

- In 2019, Pop Warner became the first national football program at any level to eliminate the three-point stance in further efforts to make the sport safer for young players (for its three youngest divisions). Additionally, Pop Warner's 2016 rule banning kickoffs in its three youngest age groups was introduced at its Pee Wee division in the 2019 season. Instead of kicking the ball off following a score or to start a half, it will be placed at the 35-yard line.<sup>1</sup>
- Since 2015, NFHS has recommended an estimated 27 rules changes, or new rules, regarding players' health and safety.<sup>2-9</sup> Member associations of the NFHS independently make decisions regarding compliance with or modification of these playing rules for the student-athletes in their respective states.
- Since 1985, the NFL has changed or implemented more than 76 rules pertaining player health and safety.<sup>10-11</sup>
- In college football since 2008, an estimated 34 rules changes, or new rules, have been implemented regarding players' health and safety.<sup>12-24</sup>

Almost every state high school athletics association has proactively, or by state legislated law, put limits on full contact during football practices and limited exposure to heat exertion. Studies done since these limits have been put in place (or just before) show a reduced number of injuries, concussions and heat-related illnesses.

- All 50 states and the District of Columbia passed legislation between 2009 - 2015 targeting brain injuries and concussions in youth sports.<sup>25</sup>
- High school athletics associations in 46 of 50 states began the 2016 football season with limits on full contact practices in high school football. Examples:
  - California-2014: passed a law limiting middle and high school to two full contact practices per week, each no more than 90 minutes long during the 30-day period before and during the regular season. It also banned all off-season practice contact entirely.<sup>26</sup>
  - Wisconsin and Michigan-2014: prohibited contact, at some level, during football's preseason and regular season.<sup>27-28</sup>
  - Florida-2016: limits contact during regular and postseasons to no more than three days per week, 30 minutes per day and 80 minutes per week. Also bans contact on more than two consecutive days.<sup>29</sup>
  - Pennsylvania-2016: limits contact in practice to 60 minutes per week.<sup>30</sup>
  - New Jersey-2019: limits full contact drills in practice to 15 minutes per week, down from 90.<sup>31</sup>
  - Michigan-2019: no more than six hours of full-pads collision contact per week during the preseason, no more than 30 minutes of collision contact during the regular season.<sup>32</sup>
  - Florida-2019: an independent foundation is educating athletes, trainers and coaches on how to protect from abdominal injuries.<sup>33</sup>
- The NFL has asked teams to stop the Oklahoma drill, pitting blocker vs. defender in a battle-type atmosphere surrounded by teammates.<sup>34</sup>
- The NCAA Division I Council made changes to football preseason practice to protect the health and safety of student-athletes while providing the opportunity to prepare them for the football season.<sup>35</sup> The changes include:



- Prohibiting athletic activities, such as drills that encourage or create straight-line contact, as specified in policies and procedures established and maintained by the Division I Football Oversight Committee and the NCAA Committee on Competitive Safeguards and Medical Aspects of Sports. This prohibition applies year-round, not just during the preseason.
- Reducing the maximum number of contact practices from 21 to 18 and restricting full-pads days to nine (9).
- Increasing the acclimatization period from five (5) to seven (7) days.
- Additional limits on full-contact practices, including no more than two consecutive days of full-contact practices, a total of no more than 75 minutes of full contact within any practice session and no more than two scrimmages in the preseason.
- Maryland passed the Jordan McNair Safe and Fair Play Act, which gives student-athletes certain health-related protections, including the right to speak up for themselves when they are exhausted or overheated and remove themselves from competition until they are ready to return.<sup>36</sup>
- Studies show positive signs:
  - Published results from the University of Wisconsin-Madison in 2015 reported that concussion rates during the 2014 high school football season decreased concussions by 57% (compared to previous two seasons) after practice contact limits were put in place by the state association.<sup>37</sup>
  - A 2016 study showed that a 2014 rule change in Michigan limiting full-contact high school football practices to no more than two days per week reduced head-impact exposure for all players by an average of 42%, with the largest reduction occurring among linemen.<sup>38</sup>
  - 2019: University of North Carolina-Chapel Hill research showed “strong evidence” that rates of heat-related illnesses such as heat strokes were cut in half in states that mandated guidelines to reduce exertion-related heat illnesses.<sup>39</sup>
  - The NCAA-U.S. Department of Defense Concussion Assessment, Research and Education Consortium is the largest concussion and repetitive head impact study in history. The project, funded by the NCAA and DOD, launched in 2014 and now includes participants on 30 campuses across the country.<sup>40</sup>
    - The initial phase of the study focused on the acute effects of concussion by evaluating concussed study participants with a sequence of tests in the immediate hours, days and weeks after the injury, and comparing the results with baseline tests administered at the start of the study.
    - The second phase of the study, initiated in the winter of 2018, includes comprehensive testing of the participants when they leave college and up to four years after their collegiate sports or service academy career has ended. This new phase will enable researchers to study the intermediate and cumulative effects of concussion and repetitive head impact exposure. Importantly, researchers hope — for the first time — to differentiate between the effects of concussion and repetitive head impact from sports participation with no history of either concussion or repetitive head impact exposure.
    - While numerous studies have come out regarding the research over the last few years, some key findings include:
      - Concussions in collegiate football are managed more conservatively than 15 years ago.<sup>41</sup>
      - The average time between injury and return to play in the original NCAA Concussion Study was 6.7 days (1999-2001). In the CARE study, that figure increased to 16.1 days (2014-2017).<sup>41</sup>

- The rate of same season repeat concussion in the CARE study was 41% lower than in the earlier NCAA Concussion Study. Further, among those who suffered a repeat concussion, the average interval between injuries in CARE was 50.8 days longer.<sup>42</sup>
- Preliminary evidence suggests that age of first exposure to contact sports is not associated with neurocognitive impairment in college athletes.<sup>43</sup>
- Female and male collegiate athletes take approximately the same amount of time to recover from a concussion, with subtle differences in recovery time depending on the type of sports being played and the division level.<sup>43</sup> The findings suggest that equity in access to sports medical care among college athletes may contribute to these similar outcomes.
- College athletic training staff are starting to report to medical staff instead of athletic staff and coaches, as the NCAA has recommended as a best practice.<sup>44</sup>
- At the collegiate level, all training and conditioning sessions should be administered by personnel with demonstrated competency in the safe and effective development and implementation of training and conditioning activities, and with the necessary training to respond to emergency situations arising from those activities.<sup>45</sup>

Numerous entities have issued guidance and guidelines.

- National Football Foundation Issues Coach Guidelines.<sup>46</sup>
  - In August of 2016, the National Football Foundation distributed a set of guidelines, created with feedback from the Texas High School Coaches Association (THSCA) and the American Football Coaches Association (AFCA), to help more than 150,000 high school coaches inform parents about efforts to make their programs safer.
  - The guidelines were sent to and utilized by state high school athletic associations, the AFCA membership base of 11,000, the NFF's 120 nationwide chapters and high school coaches across the country.
- 28 states require coaches to be trained in youth sports concussion recognition and awareness.<sup>47</sup>
  - Hawaii, Oregon, California, Montana, North Dakota, South Dakota, Minnesota, Wyoming, Colorado, New Mexico, Texas, Louisiana, Arkansas, Alabama, Tennessee, Kentucky, West Virginia, Ohio, Michigan, Pennsylvania, New York, New Jersey, Delaware, Connecticut, Rhode Island, Massachusetts, Vermont, Maine.
    - The state of Ohio requires training of coaches and referees.
- Data from the NCAA-DOD CARE Consortium is used to shape rules changes designed to facilitate ongoing objectives in college sports.<sup>48</sup>
- The NCAA Sport Science Institute and leading scientific and sports medicine organizations have developed recommendations for athletics departments and coaches to use as they plan their year-round football practice sessions.<sup>49</sup>
  - The 2017 recommendations serve as an update from 2014 guidance and include additional recommendations for preseason, in-season, postseason and spring practice.
- In 2014, NFHS issued recommendations and guidelines for minimizing head impact exposure and concussion risk in football.<sup>50</sup>
  - Full contact should be limited during the regular season, as well as during activity outside of the traditional fall football season.



- Member state associations should consider a variety of options for limiting contact in practices. The task force strongly recommended full contact be limited to no more than 2-3 practices per week.
- Preseason practices may require more full contact time than practices occurring later in the regular season to allow for teaching fundamentals with sufficient repetition.
- During preseason twice-daily practices, only one session per day should include full contact.
- Each member state association should review its current policies regarding total quarters or games played during a one-week time frame.
- 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 the report and, if needed, modify the policies accordingly.
- 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.
- An Emergency Action Plan (EAP) with clearly defined written and practiced protocols should be developed and in place at every high school.
- In 2018, the NFL launched "Way to Play," an initiative committed to promoting proper playing technique across all levels of football.<sup>51</sup>
  - Current players and NFL Legends from key positions demonstrate proper technique.
  - NFL coaches explain fundamental concepts, share best practices and advice on how to coach each position on the field.
  - The Playbook, created with the Legends Youth Advisory Committee, is a tool for youth coaches that outlines the curriculum, language to use and fundamentals of the game.
  - In 2022, NFL and NFHS launch FREE online course to help teach proper tackling techniques.<sup>52</sup> And American Youth Football, Inc. (AYF), a national youth partner of the NFL, will require all coaches on its regional/national track (more than 50,000) to take the new course introduced on the NFHS Learning Center.<sup>53</sup>
- In February 2020, the Center for Disease Control (CDC) revised its HEADS UP to Youth Sports to improve the culture of concussion by taking a free online training and using what is learned to inform how coaches and parents talk about, prevent and respond to concussions. The HEADS UP to Youth Sports: Online Training is available to coaches, parents, sports officials, athletic trainers and other individuals interested in learning about concussion safety.<sup>54</sup>
- Pop Warner Rules and Heads-Up Football Training has resulted in an injury rate that has 87% fewer injuries compared to non-Heads-Up and non-Pop Warner programs, according to Datalys Institute's research data.<sup>55-56</sup>
- From 2010-2019, Pop Warner instituted other major safety-focused changes.<sup>57</sup>
  - Teach kids how to better recognize if they or a teammate have suffered a concussion. Pop Warner provides access to CrashCourse, an interactive concussion education program developed by TeachAids, a nonprofit education initiative, and researchers at Stanford University.
  - Offers Rookie Tackle, a program to help kids transition from Flag Football to 11-player tackle. It is played on a smaller field with fewer players and meant to introduce the sport.
  - In 2016, Pop Warner announced contact is restricted to 25 percent of practice time.

- In 2012, Pop Warner banned full speed head-on, blocking or tackling drills where players lined up more than 3 yards apart.
- In 2010, Pop Warner implemented the first youth sports concussion policy. Under the policy, any participant removed from play due to a head injury may not return to Pop Warner activities until he or she is evaluated – and receives written clearance – by a licensed medical professional trained in the evaluation and management of concussions.
- To ensure that Pop Warner stays on the forefront of health and safety issues and any medical developments that may affect our young athletes, Pop Warner formed an independent Medical Advisory Committee in 2010. Led by neurosurgeons, researchers, pediatricians and sports medicine professionals, the committee is focused on the prevention, proper identification and treatment of concussions; hydration awareness and proper nutrition guidelines; and general health and safety issues.
- The University Interscholastic League (UIL) and the Texas High School Coaches Association (THSCA) worked collaboratively to take the unprecedented step forward to make football a safer sport. In October 2017, the UIL Legislative Council passed a rule requiring every Texas high school and junior high school football coach to become certified in teaching tackling as a part of the official UIL Coaches Certification Program that began in the 2018-19 school year.<sup>58</sup>



# TECHNOLOGY ADVANCEMENTS

# TECHNOLOGY ADVANCEMENTS

## Insights

Technology advancements through the years are making the game better.

The reliability and performance of helmets is an area of increasing study, and various tech businesses are creating new helmets to improve game safety.

- During the 2019 and 2020 seasons, 99 percent of NFL players wore high-performing helmets.<sup>1</sup> This is a jump from 41% in 2017.<sup>2</sup>
- The NFL helmet safety rankings ranked the VICIS ZERO2-R Matrix ID Trench the number one performing helmet, followed by the VICIS ZERO2-R Trench and VICIS ZERO2-R. The rankings are based on the ability of the helmet to reduce head impact severity measures in lab testing.<sup>3</sup>
- The VICIS ZERO1 (number eight) is utilized by more than 1,200 high school programs and 150 professional and college teams.<sup>4</sup>
- Virginia Tech Helmet Ratings<sup>5</sup>
  - A total of 26 varsity football helmets have been rated using the STAR evaluation system. The impact tests evaluate a helmet's ability to reduce linear and rotational acceleration of the head resulting from a range of head impacts a football player might see on the field. Helmets with more stars provide a reduction in concussion risk for these impacts compared to helmets with less stars.<sup>6</sup>
  - A total of 29 youth football helmets have been rated using the STAR evaluation system. The impact tests evaluate a helmet's ability to reduce linear and rotational acceleration of the head resulting from a range of head impacts that youth football players might see on the field. The lab tests are based on data collected directly from 10- to 14-year-old youth football players that wore helmets equipped with sensors.<sup>7</sup>
  - A total of 22 flag football headgear have been evaluated using the STAR evaluation system. The impact tests evaluate a headgear's ability to reduce linear and rotational acceleration of the head resulting from impacts a flag football player might see on the field. Headgear with more stars provide a reduction in concussion risk compared to headgear with less stars.<sup>8</sup> Group ratings are differentiated by pre-determined thresholds.
- One neurologist believes a new helmet concept will save high school football.<sup>9</sup>
  - Modified testing showed the BrainGuard helmet reduced rotational force by 25-50% compared to the top helmets on the market.
- Scientists and the U.S. Army Research Laboratory have developed elastic microlattice pads that can withstand both single hits and a series of impacts better than existing state-of-the-art foams used in football helmets. Their research suggests that the material may pave the way for helmets that better protect football players and other athletes from brain injuries caused by repeated head hits.<sup>10</sup>
- The National Operating Committee on Standards for Athletic Equipment (NOCSAE), an independent and nonprofit standards development body, works to enhance athletic safety through scientific research and the creation of performance standards for athletic equipment, including football helmets and face guards. NOCSAE standards are constantly being updated to reflect the latest science, technology and medicine.<sup>11</sup> A list of NOCSAE certified equipment is available online.



- New tracking technology has improved the benefits of “smart” mouthguards.<sup>12,13,14</sup>
  - Data from mouthguards can track the force of impact on a player and assist in evaluating the risk of a concussion after a hit.
  - Force Impact Technologies (FITGuard), Akervall Technologies (SISU Sense) and Catapult are three companies that have created mouthguards that use sensors placed in a mouthguard to measure accurate acceleration readings upon impact.
- Organizations are testing and/or being rewarded for advancing the game through technology.
  - The NFL awarded over \$1.3 million in HeadHealthTECH Challenge grant funding in June 2020 to support teams of innovators in the creation of their helmet prototypes.<sup>15</sup>
  - In July 2021, all helmet prototypes were officially submitted in the NFL Helmet Challenge, the multi-year innovation challenge aimed at stimulating the development of a new helmet that outperforms any model currently available to NFL players. An expert panel of judges has been assembled and is ready to award the \$1 million prize.<sup>16</sup>
  - The Pac-12 Grant Program offers research funding to support the advancement of Pac-12 student-athlete health and well-being and has made it a priority to research and develop best practices for general improvements in these areas. The Conference has committed approximately \$3,500,000 per year in research grants for projects at Pac-12 institutions designed to improve the health, general well-being and safety of student-athletes at all Conference member universities.<sup>17</sup> Specific topics of interest to Pac-12 member institutions include:
    - Head Trauma
    - Prevention of Sudden Death (Cardia, Temperature Matters, Hydration)
    - Overuse Injuries / Injury Prevention
    - Emergency Care - Planning / Prevention of Emergent Medical Events
    - Student-Athlete Well Being (Sleep, Nutrition, Mental Health)
    - Data Driven Decisions (Use of Pac-12 Health Analytics Program - HAP) such as expansion of Presagia platform (e.g., software development) or sports injury epidemiology
- The NFL and Amazon Web Services (AWS) partnered to transform player health and safety using cloud computing, machine learning and artificial intelligence (AI). The partnership combines the NFL’s extensive set of game data with AWS technologies to provide a deeper understanding of the game than ever before. The NFL and AWS will work to develop new tools and generate deeper and better-informed insights into injuries, specifically the impact of a variety of factors such as game rules, equipment, and rehabilitation and recovery strategies.<sup>18</sup>



# ABOUT THE NATIONAL FOOTBALL FOUNDATION

The National Football Foundation was founded in 1947 with leadership from Colonel Earl “Red” Blaik, General Douglas MacArthur, and Grantland Rice with a mission to mobilize the constructive forces of amateur football to strengthen America’s young people. All felt strongly that the sport built leaders like no other activity. The hallmarks taught through the game, courage, dedication, discipline, teamwork and tenacity, uniquely positioned football’s impact on the country.

The National Football Foundation is a multifaceted, 501(c)(3) nonprofit organization dedicated to promoting and representing everything right with the sport. Through the NFF’s programs and initiatives that encompass a broad spectrum of amateur football, the organization preserves the past, promotes the present, prepares for the future and protects the game and the opportunities it provides. These national programs and initiatives include, but are not limited to: Annual Awards Dinner, College Football Hall of Fame, Future For Football campaign, National Scholar-Athlete awards (including the William V. Campbell Trophy presented to college football’s top scholar-athlete), nationwide Chapter System, and research.



NATIONAL FOOTBALL  
FOUNDATION



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# Exhibit A: Percentage Share of Total HS Sports Played

BOYS	All Football	Basketball	Track & Field (out)	Baseball	Cross Country	Golf	Tennis	Wrestling	Soccer	Swim & Dive	OTHERS
1969-70	900480.00 25.09%	678559.00 19.62%	625139.00 18.02%	360157.00 10.41%	144488.00 4.18%	93841.00 2.71%	83717.00 2.42%	23681.00 0.68%	49693.00 1.43%	83289.00 2.41%	212459.00 6.14%
1970-71	932861.00 25.44%	646670.00 17.61%	642639.00 17.53%	409068.00 10.93%	166261.00 4.53%	120078.00 3.27%	91279.00 2.49%	265089.00 7.23%	785100.00 2.14%	91939.00 2.49%	232515.00 6.34%
1971-72											3668917.00
1972-73											377052.00
1973-74	1076904.00 28.46%	686690.00 16.92%	667974.00 16.41%	408510.00 10.09%	214840.00 5.28%	135813.00 3.34%	124208.00 3.05%	319048.00 7.84%	98482.00 2.42%	114645.00 2.82%	225011.00 5.53%
1974-75											
1975-76	1132172.00 27.55%	722895.00 17.59%	664413.00 16.17%	425386.00 10.35%	250289.00 5.23%	189176.00 4.60%	150401.00 3.66%	355160.00 8.64%	115811.00 2.82%	128942.00 3.14%	241080.00 5.87%
1976-77											
1977-78	1133350.00 25.95%	764702.00 17.51%	706892.00 16.19%	432853.00 9.91%	238587.00 4.73%	135844.00 3.11%	170553.00 3.91%	338328.00 7.75%	141070.00 3.29%	106468.00 2.44%	230665.00 5.28%
1978-79	1008729.00 27.05%	618901.00 16.70%	562867.00 15.17%	415681.00 11.21%	170126.00 4.59%	117688.00 3.17%	158376.00 4.22%	281704.00 7.59%	132073.00 3.59%	95718.00 2.58%	154289.00 4.16%
1979-80	957759.00 26.42%	589228.00 16.89%	524890.00 15.57%	415880.00 12.34%	169094.00 4.84%	117273.00 3.48%	131290.00 3.90%	273326.00 8.11%	133648.00 3.97%	84204.00 2.50%	3370573.00
1980-81	958425.00 27.36%	553702.00 15.81%	507791.00 14.50%	423910.00 12.09%	172270.00 4.92%	118890.00 3.38%	130046.00 3.71%	245029.00 6.96%	148376.00 4.29%	90841.00 2.60%	154846.00 4.42%
1981-82	927666.00 27.21%	538670.00 15.80%	477650.00 14.01%	415353.00 12.18%	166891.00 4.68%	110431.00 3.24%	124478.00 3.80%	256107.00 7.51%	161167.00 4.73%	79615.00 2.34%	143033.00 4.24%
1982-83	925780.00 27.53%	514791.00 15.34%	475228.00 14.16%	406970.00 12.22%	165114.00 4.92%	115187.00 3.43%	124458.00 3.77%	254581.00 7.59%	162504.00 4.84%	76657.00 2.81%	131267.00 3.91%
1983-84	944473.00 26.59%	487277.00 15.09%	464856.00 14.07%	398608.00 12.07%	152521.00 4.62%	103196.00 3.12%	118538.00 3.59%	248300.00 7.52%	173425.00 5.29%	82702.00 2.50%	119904.00 3.62%
1984-85	1006675.00 30.01%	488806.00 14.72%	452277.00 13.57%	391810.00 11.68%	155550.00 4.64%	107155.00 3.19%	124467.00 3.71%	244598.00 7.29%	180281.00 5.37%	78256.00 2.33%	116409.00 3.47%
1985-86	955516.00 28.51%	505130.00 15.10%	446286.00 13.34%	368908.00 11.78%	154890.00 4.62%	112602.00 3.37%	128820.00 3.85%	247653.00 7.41%	194028.00 5.69%	8316.00 2.44%	124229.00 3.71%
1986-87	931176.00 27.68%	518589.00 15.34%	489441.00 13.09%	408046.00 12.07%	152418.00 4.53%	113660.00 3.38%	130057.00 3.89%	251281.00 7.47%	138864.00 4.09%	85371.00 2.54%	133889.00 3.98%
1987-88	948299.00 27.71%	528006.00 15.31%	481009.00 12.58%	408630.00 11.90%	157306.00 4.59%	124488.00 3.63%	136083.00 3.97%	246771.00 7.20%	136835.00 4.10%	94199.00 2.75%	116473.00 4.25%
1988-89	951669.00 27.85%	513575.00 15.03%	422251.00 12.36%	412625.00 12.03%	155192.00 4.54%	124598.00 3.65%	136158.00 3.98%	242054.00 7.03%	218973.00 6.41%	84966.00 2.47%	155012.00 4.54%
1989-90	947757.00 27.89%	517271.00 15.22%	406684.00 11.94%	413581.00 12.17%	155806.00 4.58%	122948.00 3.62%	136939.00 4.03%	233856.00 6.88%	220777.00 6.50%	85112.00 2.50%	158411.00 4.66%
1990-91	941425.00 27.64%	518644.00 15.14%	401350.00 11.78%	419015.00 12.30%	155375.00 4.59%	129605.00 3.70%	141250.00 4.15%	230673.00 6.77%	228380.00 6.70%	8225.00 2.43%	164417.00 4.83%
1991-92	912845.00 26.61%	518127.00 15.11%	417451.00 12.17%	433684.00 12.64%	154119.00 4.49%	132487.00 3.87%	145374.00 4.28%	234908.00 6.70%	256382.00 7.39%	79648.00 2.33%	169418.00 4.94%
1992-93	910407.00 26.65%	520023.00 15.29%	412638.00 12.03%	430401.00 12.60%	159536.00 4.67%	129129.00 3.78%	138177.00 4.04%	222025.00 6.50%	242095.00 7.09%	78474.00 2.30%	172484.00 5.03%
1993-94	928134.00 27.24%	530088.00 15.29%	419758.00 12.09%	438846.00 12.64%	162188.00 4.67%	131207.00 3.78%	135702.00 3.91%	224833.00 6.49%	255338.00 7.39%	81328.00 2.34%	166765.00 4.80%
1994-95	955247.00 27.01%	540289.00 15.28%	480807.00 12.88%	440508.00 12.46%	165828.00 4.63%	133705.00 3.78%	132735.00 3.75%	216435.00 6.12%	272610.00 7.71%	80089.00 2.24%	169912.00 4.80%
1995-96	981480.00 27.01%	545596.00 15.01%	464645.00 12.51%	444476.00 12.28%	168238.00 4.63%	140011.00 3.85%	136534.00 3.76%	221162.00 6.09%	23728.00 0.64%	81000.00 2.24%	17727.00 0.48%
1996-97	981790.00 26.46%	544025.00 14.89%	463061.00 12.63%	444246.00 11.99%	174989.00 4.71%	150576.00 4.09%	136451.00 3.68%	227596.00 6.14%	246587.00 6.80%	93525.00 2.52%	188767.00 5.09%
1997-98	996797.00 26.46%	548463.00 14.74%	471175.00 12.52%	446897.00 11.96%	176672.00 4.75%	156601.00 4.24%	137827.00 3.66%	234176.00 6.09%	309484.00 8.22%	83781.00 2.29%	202347.00 5.38%
1998-99	1007670.00 26.29%	549464.00 14.34%	477960.00 12.47%	455305.00 11.85%	181915.00 4.75%	167781.00 4.53%	142953.00 3.73%	236373.00 6.16%	321416.00 8.39%	83411.00 2.18%	208499.00 5.44%
1999-2000	1025762.00 26.56%	541130.00 14.01%	480791.00 12.49%	451701.00 11.70%	182139.00 4.74%	165557.00 4.29%	136807.00 3.61%	239105.00 6.19%	330044.00 8.55%	86640.00 2.34%	218073.00 5.85%
2000-01	1036141.00 26.42%	539849.00 13.77%	481822.00 12.54%	450513.00 11.46%	188420.00 4.81%	161757.00 4.13%	152731.00 3.90%	244864.00 6.25%	333109.00 8.50%	88811.00 2.34%	252667.00 5.94%
2001-02	1046476.00 26.50%	540697.00 13.65%	484022.00 12.47%	451674.00 11.40%	190993.00 4.82%	163296.00 4.12%	151999.00 3.84%	244637.00 6.18%	339481.00 8.57%	90968.00 2.34%	244490.00 6.17%
2002-03	1040885.00 26.27%	540674.00 13.59%	488027.00 12.40%	453792.00 11.38%	191833.00 4.81%	162606.00 4.08%	156831.00 3.85%	239485.00 6.01%	345156.00 8.89%	94612.00 2.37%	256758.00 6.44%
2003-04	1056760.00 26.28%	548811.00 13.54%	504801.00 12.54%	457146.00 11.36%	196428.00 4.88%	163341.00 4.09%	152938.00 3.80%	238700.00 5.89%	346785.00 8.69%	96650.00 2.40%	262577.00 6.52%
2004-05	1071183.00 26.09%	545497.00 13.27%	516708.00 12.57%	459717.00 11.18%	201719.00 4.91%	161025.00 3.92%	148530.00 3.61%	243009.00 5.91%	354837.00 8.63%	103754.00 2.52%	304615.00 7.41%
2005-06	1067584.00 26.09%	546335.00 12.99%	533985.00 12.89%	470571.00 11.19%	203303.00 4.95%	161284.00 3.83%	153005.00 3.64%	251534.00 5.98%	358835.00 8.53%	107468.00 2.55%	317444.00 7.55%
2006-07	1130480.00 26.16%	556289.00 12.87%	544180.00 12.59%	477430.00 11.05%	206035.00 5.00%	159747.00 3.70%	159944.00 3.63%	257246.00 5.95%	377999.00 8.79%	106738.00 2.47%	337985.00 7.82%
2007-08	1135612.00 26.14%	552935.00 12.73%	548821.00 12.63%	478029.00 11.00%	221109.00 5.09%	159953.00 3.68%	156285.00 3.60%	259688.00 5.98%	383561.00 8.83%	111896.00 2.58%	336302.00 7.74%
2008-09	1139446.00 26.76%	546145.00 12.33%	558007.00 12.62%	473184.00 10.70%	231452.00 5.29%	157062.00 3.55%	157165.00 3.55%	267378.00 6.05%	383824.00 8.68%	130182.00 2.94%	379817.00 8.59%
2009-10	1135388.00 25.46%	540207.00 12.12%	572128.00 12.84%	472644.00 10.61%	239608.00 5.38%	157795.00 3.84%	162755.00 3.85%	272890.00 6.12%	391839.00 8.79%	131376.00 2.96%	379140.00 8.51%
2010-11	1134712.00 25.25%	548444.00 12.14%	574902.00 12.89%	471025.00 10.48%	246948.00 5.48%	158665.00 3.49%	161667.00 3.59%	273732.00 6.09%	398351.00 8.89%	133900.00 2.98%	392299.00 8.73%
2011-12	112966.00 25.02%	535289.00 11.94%	575638.00 12.83%	474219.00 10.57%	248444.00 5.44%	152725.00 3.41%	158800.00 3.56%	272149.00 6.07%	41157.00 0.18%	133825.00 2.98%	399108.00 8.90%
2012-13	1157035.00 26.84%	538676.00 11.99%	580672.00 12.69%	474791.00 10.57%	248200.00 5.59%	152844.00 3.40%	157247.00 3.50%	270163.00 6.02%	410862.00 9.19%	138177.00 3.08%	400867.00 8.97%
2013-14	112284.00 26.46%	541054.00 12.09%	580821.00 12.82%	482629.00 10.66%	252547.00 5.58%	152647.00 3.37%	160545.00 3.55%	269514.00 5.96%	417419.00 9.22%	138373.00 3.08%	410681.00 9.22%
2014-15	1113388.00 26.64%	541479.00 11.98%	578632.00 12.90%	486567.00 10.77%	250681.00 5.59%	148825.00 3.29%	157240.00 3.48%	258208.00 5.71%	432598.00 9.57%	137067.00 3.08%	414333.00 9.17%
2015-16	1110852.00 26.46%	546428.00 12.09%	591133.00 13.04%	488815.00 10.76%	257911.00 5.67%	146677.00 3.22%	157201.00 3.46%	250653.00 5.86%	440322.00 9.22%	133470.00 2.94%	418707.00 9.22%
2016-17	1087930.00 25.84%	550305.00 12.09%	600136.00 13.19%	491790.00 10.78%	266211.00 5.84%	141466.00 3.10%	158171.00 3.47%	244804.00 5.36%	450284.00 9.87%	138364.00 3.08%	433767.00 9.51%
2017-18	1067613.00 25.38%	551373.00 12.08%	600087.00 13.14%	487067.00 10.67%	270095.00 5.92%	144024.00 3.19%	158151.00 3.46%	245594.00 5.38%	456862.00 10.00%	138935.00 3.04%	446289.00 9.77%
2018-19	1038179.00 22.89%	540769.00 11.92%	605354.00 13.33%	482740.00 10.65%	269295.00 5.94%	143200.00 3.16%	158514.00 3.51%	247441.00 5.48%	459077.00 10.12%	138688.00 3.01%	452751.00 9.98%

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