CATASTROPHIC

SPORTS INJURY RESEARCH

THIRTY-THIRD ANNUAL REPORT

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National Center for Catastrophic Sport Injury Research
At The University of North Carolina at Chapel Hill

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We acknowledge the significant contributions of recently retired Frederick O. Mueller, Ph.D. who directed The National Center for Catastrophic Sport Injury Research (NCCSIR) from 1982 to 2013. Dr. Mueller's work over the past 30 years has improved the safety of football for the participants and these impacts are demonstrated in the pages of this football report.

We also acknowledge NCCSIR staff members Leah Cox Thomas, Catherine Wolff, Rebecca Yau, and Sue Wolf, and members of the Consortium for Catastrophic Sport Injury Monitoring: Drs. Douglas Casa, Jonathan Drezner, Kevin Guskiewicz, Johna Register-Mihalik, Steve Marshall, Dawn Comstock, David Klossner, Tom Dompier, and Zack Kerr.

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INTRODUCTION

In 1931, the American Football Coaches Association (AFCA) initiated the First Annual Survey of Football Fatalities and this research has been conducted at the University of North Carolina at Chapel Hill since 1965. In 1977, the National Collegiate Athletic Association (NCAA) initiated a National Survey of Catastrophic Football Injuries, which is also conducted at the University of North Carolina. As a result of these research projects important contributions to the sport of football have been made. Most notable have been the 1976 rule changes making it illegal to make initial contact with the head and face while blocking and tackling, the National Operating Committee on Standards for Athletic Equipment (NOCSAE) football helmet standard, improved medical care for the participants, and better coaching techniques.

Due to the success of these two football projects the research was expanded to all sports for both men and women, and a National Center for Catastrophic Sports Injury Research (NCCSIR) was established in 1982. The decision to expand this research was based on the following factors:

1. Research based on reliable data is essential if progress is to be made in sports safety.
2. The paucity of information on injuries in all sports.
3. The rapid expansion and lack of injury information in women's sports.

In 1987, a joint endeavor was initiated with the Section on Sports Medicine of the American Association of Neurological Surgeons. The purpose of this collaboration was to enhance the collection of medical data. Dr. Robert C. Cantu, Chairman, Department of Surgery and Chief, Neurosurgery Service, Emerson Hospital, in Concord, MA, is the Medical Director of the NCCSIR and has been responsible for evaluating the medical data. Dr. Cantu is also a Past-President of the American College of Sports Medicine. The NCCSIR has been directed for the past 30 years by Dr. Frederick Mueller. Dr. Mueller retired in the Spring of 2013 and the NCCSIR continues under new direction (Dr. Kucera). The NCCSIR has expanded to become a consortium of universities (University of North Carolina, Boston University, University of Washington, University of Connecticut, University of Colorado) with expertise in head/neck, cardiac, and heat-related sports medicine (these three areas account for the overwhelming majority of catastrophic events).

To learn more about NCCSIR please visit: http://nccsir.unc.edu/about/

To learn more about the Consortium please visit: http://nccsir.unc.edu/consortia-and-partners/

To access online reports please visit: http://nccsir.unc.edu/reports/

METHODS

Outcome Definitions

For the purpose of this research the term catastrophic is defined as any severe injury incurred during participation in a school/college sponsored sport. Catastrophic is divided into the following three definitions:

1. **Fatality**
2. **Non-Fatal** - permanent severe functional disability.
3. **Serious** - no permanent functional disability but severe injury. An example would be fractured cervical vertebra with no paralysis.

Sports injuries are also considered traumatic (or direct) or exertional/systemic (or indirect). The definition for direct and indirect is as follows:

Direct - Those injuries that resulted directly from participation in the skills of the sport.

Indirect - Those injuries that were caused by systemic failure as a result of exertion while participating in a sport activity or by a complication that was secondary to a non-fatal injury.

Note: Beginning in 2014 NCCSIR also collects non sport-related injuries such as sudden cardiac arrest that occurred outside of sport activity (e.g., during sleep). These events were not included in the tables, but are described in the Case Summary sections.

Data Collection

Data were compiled with the assistance of coaches, athletic trainers, athletic directors, executive officers of state and national athletic organizations, online news reports, and professional associates of the researchers. Data collection would not have been possible without

the support of the NCAA, the National Federation of State High School Associations (NFHS), and the AFCA. Upon receiving information concerning a possible catastrophic sports injury, contact by telephone, email or personal letter and questionnaire was initiated with the injured player's athletic trainer, athletic director, or coach. Data collected included background information on the athlete (age, height, weight, experience, previous injury, etc.), accident information, immediate and post-accident medical care, type injury, and equipment involved. Autopsy reports are used when available. In order to improve overall capture of catastrophic sport injury and illness events, NCCSIR and the Consortium for Catastrophic Injury Monitoring in Sport developed an online portal where anyone can report a catastrophic event: **https:\\www.sportinjuryreport.org**. The portal was activated in January 2015.

Participation in Sport

Yearly participation estimates for high school athletes are obtained from NFHS participation reports (available online: http://www.nfhs.org/ParticipationStatics/ParticipationStatics.aspx/). NFHS high school annual athletic participation for 2014/15 included approximately 7,807,047 athletes (4,519,312 males and 3,287,735 females). Yearly participation estimates for collegiate level athletes are obtained from the National Collegiate Athletic Association (NCAA) participation reports (accessed online: http://www.ncaa.org/about/resources/research/sports-sponsorship-and-participation-research). NCAA participation for 2014/15 in championship sports was 482,533 athletes. There were 273,061 males and 209,472 females. There were also 3,538 males in non-championship sports (archery, badminton, bowling, equestrian, rowing, rugby, sailing, and squash) and 3,002 females participating in emerging sports (archery, badminton, equestrian, rugby, sand volleyball, squash, synchronized swimming, and team handball).

During the entire 33 year period from the fall of 1982 through the spring of 2015, there were 205,676,665 high school athletes participating in the sports covered by this report and approximately 11,594,694 college participants (Table 12).

Not all high schools and colleges are members of the NFHS and NCAA. Complete data is not available for the non-member schools. Therefore, these participation numbers underestimate the total number of high school and collegiate participants in the United States.

Analysis

Frequencies and incidence rates of catastrophic injury per 100,000 participants were calculated over the entire 33-year period and stratified by level (high school and college) and sport. Incidence rates were stratified by direct versus indirect and by severity. Precision of incident rate estimates expressed by 95% confidence intervals are included in appendix tables. **Note: if there were no events in the sport for a particular year, the year is excluded from the frequency Table. Rates with number of incidents less than 5 should be interpreted with caution.**

It is important to note that information is continually being updated due to the fact that catastrophic injury information may not always reach the NCCSIR in time to be included in the current final report. The report includes data that is reported to the NCCSIR by the NCAA, the NFHS, online reports, colleagues, coaches, and athletic trainers. There may be additional catastrophic injuries that are not reported to the NCCSIR. The authors acknowledge that not every catastrophic injury is included in this report.

RESULTS

Current AY2014-2015 Summary

From July 1, 2014 to June 30, 2015 there were a total of 92 catastrophic injuries/illnesses captured by NCCSIR among high school and college organized sport participants. Of these, 78 events were due to or occurred during sport-related activities (Table 11). The majority were at the high school level (80%). Member institutions for collegiate cases included NCAA, National Association of Intercollegiate Athletics (NAIA), and National Junior College Athletic Association (NJCAA). Overall 33% of cases were fatal, 14% were nonfatal, and 50% were serious with recovery. Thirty-eight percent (n=30) were due to direct (traumatic injury) causes and almost half occurred in competition (47%) followed by practice (33%). The majority of events occurred to athletes participating in the following sports: football (55%), basketball (18%), soccer (5%), and baseball (5%). Areas of the body most commonly effected were heart (46%), neck/cervical spine (14%), and head/brain (13%). Sudden cardiac arrest (18%) and other cardiac conditions (24%) were the most common types of events followed by fractures (14%), brain trauma (10%), and heat-related illness (6%).

Direct events: 20% of direct events were fatal, 33% non-fatal, and 43% serious with recovery. A greater proportion of direct events occurred in competition versus practice (87% versus 13%). The majority were to the cervical spine (37%) and head/brain (33%). The majority occurred in football (70%).

Indirect events: 42% of indirect events were fatal and 54% were serious with recovery. A greater proportion of indirect events occurred in practice versus competition (46% versus 23%) and 19% occurred during conditioning and weight training sessions. The majority were cardiac-related (69%) and heat/exertional related (10%). Football (46%) and basketball comprised the majority (29%), followed by track and field (6%), soccer (4%), and baseball (4%).

Overall Summary

During this 33-year period, there were 2,372 catastrophic sport-related injuries/illnesses at high school and college levels (Table 1 – excluding cheerleading, drill team, and rodeo there were 2,256). The majority were not fatal (60%) and from traumatic or direct mechanisms (66%), and among high school participants (80%) (Tables 2 and 3). The proportion of fatal (40% versus 38%) and direct (67% versus 62%) were not different by high school compared to college level.

Direct by sport: For high school sports, football had the highest *number* of direct catastrophic events, followed by female cheerleading, baseball, wrestling, and track and field (Table 4a). Accounting for the number of participants in the sport, cheerleading, male gymnastics, football, and ice hockey had the highest rates per 100,000 participants (Figure 2, Table 9a). Similar results were observed when restricted to fatal events (Figure 1).

For college sports, football had the highest *number* of direct catastrophic events, followed by female cheerleading, baseball, and male track and field (Table 5a). Accounting for the number of participants in the sport, male gymnastics, female skiing, football, ice hockey, equestrian and male gymnastics had the highest rates per 100,000 participants (Figure 4, Table 9b). Similar results were observed when restricted to fatal events (Figure 3).

Indirect by sport: For high school sports, football had the highest *number* of indirect catastrophic events, followed by men's basketball, male track and field, wrestling, male soccer, male cross country, and baseball (Table 4b). Accounting for the number of participants in the sport, wrestling, football, male basketball, male lacrosse, male water polo, and female cheer had the highest rates per 100,000 participants (Figure 2, Table 10a). Similar results were observed when restricted to fatal events (Figure 1).

For college sports, football had the highest *number* of indirect catastrophic events, followed by male basketball, female basketball, male soccer, and wrestling (Table 5b). Accounting for the number of participants in the sport, male basketball, male water polo, male wrestling, football, and male rowing had the highest rates per 100,000 participants (Figure 4, Table 10b). Similar results were observed when restricted to fatal events (Figure 3).

DISCUSSION

The following strengths and limitations should be noted:

- Data have been collected by The National Center for Catastrophic Sport Injury Research for all high school and college sports since 1982 using consistent definitions and methodology over a 30+ year period. These data are provided annually to sport organizations (NCAA, NFHS, AFCA), researchers and the public. Sports Medicine Advisory Committees, Sport Rules Committees, and Coaching committees review the reports and have used these data to inform and evaluate safety recommendations, medical care, and rule changes.
- Catastrophic events are primarily captured through publicly available media reports. Therefore, not all catastrophic events are captured. Particularly, for non-fatal catastrophic events which may not be reported in the media as comprehensively as fatalities. Under-reporting may also be due to outcome definitions used (e.g. timing of the event) and event locations (e.g. at home, personal conditioning). **In order to improve overall capture of these events, NCCSIR and the Consortium for Catastrophic Injury Monitoring in Sport have developed an online portal where anyone can report a catastrophic event: https:\\www.sportinjuryreport.org.**

- Details surrounding catastrophic events that are only captured through publicly available media reports may not be completely accurate in the absence of the actual autopsy or medical reports.
- Incidence rates were calculated using participation estimates from NFHS and the NCAA in the rate denominator (Table 12). These participation estimates do not include schools that are not members of these two associations. Participation data was not available for these non-member schools. At present NFHS and NCAA are the only estimates available. Therefore, the participation numbers (rate denominator) in this report are underestimated, which results in an overestimate of the actual incidence rate.
- It is important to note that catastrophic events are rare and statistical power for some strata comparisons are limited. Rates with number of incidents less than 5 should be interpreted with caution.

RECOMMENDATIONS

1. Each athlete should have a complete physical examination with a medical history and an annual health history update.
2. All personnel involved with training athletes should emphasize proper, gradual, and sport-specific physical conditioning.
3. Every school should strive to have a certified athletic trainer.
4. Each school should have a written emergency action plan (EAP) in place, all personnel should have copies, and procedures should be reviewed and practiced annually.
    - The CDC has guidelines and templates for these plans (http://www.cdc.gov/niosh/docs/2004-101/emrgact/emrgact1.html).
    - NCAA and the NFHS have guidelines for these plans at the following websites: www.nfhs.org and www.ncaa.org.
    - **An automatic electronic defibrillator (AED) should be available onsite and staff should be trained in the use.**
5. There should be an emphasis on employing well trained athletic personnel, providing excellent facilities, and securing the safest and best equipment available.

6. There should be strict enforcement of game rules and administrative regulations to protect the health of the athlete and reduce the risk of catastrophic injury. Coaches and school officials must support the game officials in their rulings during the sporting event.
7. Coaches should be educated on and have the ability to teach the proper fundamental skills of the specific sport. Specific to football, the proper fundamentals of blocking and tackling should be emphasized to help reduce head and neck injuries, especially with keeping the head out of blocking and tackling.
8. Weight loss in wrestling to make weight for a match can be dangerous and cause serious injury or death. Coaches should be aware of safety precautions and rules associated with this practice.
9. There should be continued surveillance and safety research in athletics (rules, facilities, equipment, medical care and procedures).
10. **Sudden cardiac arrest**: The number of indirect cardiac related events has increased over the years and it is recommended that schools have and emergency action plan and automated external defibrillators (AED) available on-site for emergency situations. Early detection and defibrillation is critical for survival (3-5 minutes recommended). (Casa et al. 2012)
    - See also Drezner et al. 2007 for additional information about sudden cardiac arrest preparedness and management: http://www.nata.org/sites/default/files/sudden-cardiac-arrest-consensus-statement.pdf
11. **Heat-illness:** All personnel associated with sport participation should be cognizant of the safety measures related to physical activity in hot weather. Heat stroke and heat exhaustion are prevented by careful control of various factors in the conditioning program of the athlete. The NATA has a heat illness position statement on their web site with recommendations for prevention (http://www.nata.org/sites/default/files/attr-44-03-332.pdf). (Casa & Cisllan, 2009)
    - Coaches, athletic trainers, and players should refer to the multiple published best practices by the NATA, American College of Sports Medicine (ACSM), NFHS, and NCAA on preventing and managing heat illness. Emergency action plans should be activated.

- Link to the NFHS Sport Medicine Advisory Committee Position Statements: http://www.nfhs.org/sports-resource-content/smac-position-statements-and-guidelines/
- Link to handout from the NATA on Heat Illness: http://www.nfhs.org/media/1015650/2015-nata-heat-illness-handout.pdf
- Link to handout from the Kory Stringer Institute on heat illness: http://ksi.uconn.edu/wp-content/uploads/sites/1222/2015/03/Preventing-Surviving-EHS.pdf

12. **Head Trauma:** When a player has shown signs or symptoms of head trauma (such as a change in the athlete's behavior, thinking, or physical functioning), the player should receive immediate medical attention from an appropriate medical provider and should not be allowed to return to practice or game that day. The athlete should not be allowed to return to practice or game without an evaluation by an appropriate medical provider.
    - All athletes and athletic personnel should follow the state, NFHS, and NCAA policies related to concussion and return to play. See the following CDC resource for a list of states with concussion policies: http://www.cdc.gov/concussion/policies.html.
    - For the most up to date information on concussion management please see the updated Consensus Statement on Concussion in Sport: The 4th International Conference on Concussion in Sport held in Zurich, November 2012 (McCrory et al. 2013).
    - Some cases associated with brain trauma reported that players complained of symptoms or had a previous concussion prior to their deaths. The team physician, athletic trainer, or coach should ensure players understand signs and symptoms of concussion and brain trauma. Players should also be encouraged to inform the team physician, athletic trainer, or coach if they are experiencing any of the signs or symptoms of brain trauma outlined by the CDC.
    - HEADS UP ON CONCUSSION IN SPORTS:
      Information for Parents, Coaches, and School & Sports Professionals. Available at: http://www.cdc.gov/headsup/highschoolsports/index.html

The NFHS Sport Medicine Advisory Committee has developed guidelines for concussion management in sports: http://www.nfhs.org/media/1014737/suggested-guidelines-for-management-of-a-concussion-in-sports-october-2013-2.pdf

The NCAA has created several rules to help manage concussion injuries. The NCAA has created a set of best practices that are available in the Sports Medicine Handbook. A free download for 2013-2014 may be found at: http://www.ncaapublications.com/p-4328-2013-14-ncaa-sports-medicine-handbook.aspx

Every NCAA member school is required to have a concussion-management plan that:

- Requires student-athletes to receive information about the signs and symptoms of concussions. They also are required to sign a waiver that says they are responsible for reporting injuries to the medical staff.
- Mandates that institutions provide a process for removing a student-athlete from play/participation if they exhibit signs of a concussion. Student-athletes exhibiting signs of a concussions must be evaluated by a medical staff member with experience in the evaluation and management of concussions before they return to play.
- Prohibits a student-athlete with concussion symptoms from returning to play on the same day of the activity.
- Requires student-athletes diagnosed with a concussion be cleared by a physician before they are permitted to return.

13. **Spinal injuries**: Updated guidelines for the care of the spinal cord injured athlete can be found at the NATA's website: http://www.nata.org/sites/default/files/Executive-Summary-Spine-Injury-updated.pdf. The final guidelines "Appropriate Prehospital Management of the Spine-Injured Athlete" will be published in the Journal of Athletic Training when completed.
    - See also Swartz et al. 2009 for information about cervical spinal injury management and prevention: http://www.nata.org/sites/default/files/AcuteMgmtOfCervicalSpineInjuredAthlete.pdf

CASE SUMMARIES AY2014/15

Compiled from available media reports (n=81 of 92 events captured by NCCSIR).

HIGH SCHOOL

High school Sport=Baseball Direct

A male 14 year old high school freshman junior varsity baseball player was struck in the head while in the dugout from an errant throw. The opposing teams' athletic trainer and EMS immediately responded. He was airlifted to the hospital where he later died. Cause of death was due to blunt force head trauma.

High school Sport=Baseball Indirect

A male 14 year old high school freshman baseball player was playing in a game when he collapsed. The athletic trainer began CPR while a coach called 911. An AED was available and one shock was administered. He was transported to the hospital where a congenital heart defect was found. He underwent open heart surgery and was released from the hospital a few days later. A full recovery is expected.

A male 18 year old high school senior baseball player was in the second game of a double header when he collapsed. Athlete was being attended to by the athletic trainer for another injury when he lost consciousness. He was immediately attended to by athletic trainer and bystander, who began CPR while another coach retrieved the defibrillator. He was shocked twice before being transported to the hospital by EMS. He underwent surgery to have a defibrillator implanted. A full recovery is expected.

High school Sport=Baseball Not sport-related

A male 15 year old high school baseball pitcher experienced sudden cardiac arrest during class. Bystanders administered CPR until EMS arrived with an AED. Shocks were administered before he was transported to the hospital. He was diagnosed with Wolf Parkinson White Syndrome, which was exacerbated by running in practice the previous day. He underwent surgery and a full recovery is expected.

High school Sport=Basketball Indirect

A male 15 year old high school sophomore basketball player collapsed during practice. Coaches administered CPR and he was revived by an AED. Reports indicate that asthma may have triggered sudden cardiac arrest. A full recovery is expected.

A male 16 year old high school basketball player was running drills and sprints during practice when he collapsed. He was immediately attended to by coaches who began CPR. AED was retrieved and 911 was called. One shock was advised before EMS arrived. He was transported to the hospital where he was diagnosed with a congenital heart defect. He is expected to have surgery to have defibrillator implanted. A full recovery is expected.

A male 15 year old high school sophomore basketball player collapsed during practice. Coaches performed CPR until EMS arrived. He was transported to the hospital but later died. Cause of death was due to fatal cardiac arrhythmia caused by congenital heart defect.

A male 16 year old high school basketball player was taking foul shots when he collapsed during a game. He was attended to by an athletic trainer and bystander police officer. CPR was administered and an AED was used to revive him. He was transported to the hospital where a defibrillator was implanted. A full recovery is expected although he is restricted in playing competitive sports.

A male high school freshman basketball player collapsed on the bench during the 1st quarter of a game. He was immediately attended to by athletic trainers and coaches, who used an AED to revive him. He was conscious when EMS arrived to transport him to the hospital. A full recovery is expected.

A male 15 year old high school sophomore basketball player was participating in an open gym session with his team when he collapsed. CPR was administered until EMS arrived. He was pronounced dead shortly after. Cause of death is due to cardiomyopathy.

A male 16 year old high school junior power forward junior varsity basketball player collapsed after a run with teammates during gym class. CPR was administered and AED advised no shock. He was transported to the hospital and died shortly after. Cause of death is due to cardiomyopathy.

A female 17 year old high school senior basketball player appeared to suffer a heart attack while swimming with friends. She later died. Cause of death was due to lymphocytic myocarditis.

A male high school junior basketball player collapsed during a scrimmage game at a team camp. An athletic trainer for the facility began CPR and an AED was used to revive the athlete. EMS transported him to the hospital where he was in stable condition. He had surgery to have a defibrillator implanted. Cause of collapse is thought to be from sudden cardiac arrest. A full recovery is expected.

High school Sport=Cheerleading Indirect

A female 16 year old high school junior cheerleader collapsed during a boys' basketball game. She was attended to by first responders before being transported to the hospital. She underwent surgery to have defibrillator implanted. A full recovery is expected.

High school Sport=Field Hockey Not sport-related

A female 17 year old high school junior field hockey player collapsed at home. She was taken to the hospital the next day where she underwent surgery to remove clots from her lungs. She died shortly after. Cause of death was due to a massive pulmonary embolism.

High school Sport=Football Direct

A male high school freshman football running back and defensive lineman told his coach his arm felt "tingly" after a routine play during practice. He was taken to the emergency room where initial CT scans were inconclusive--he was taken to a larger hospital. He was diagnosed with a fractured cervical vertebrae, which cause his to have a stroke. Long-term prognosis is unknown at this time.

A male 18 year old high school senior football player sustained a hit during a game and collapsed shortly after. Athlete was unconscious but did not lose vital signs. EMS were present but attending to another injured player. He was transported to the hospital where a CAT scan

revealed brain bleeding. He underwent surgery to relieve pressure and is in critical condition. Long-term outcome is unknown at this time.

A male 16 year old high school junior football player collapsed on the sideline during a game from a severe head injury. He was transported by ambulance to the hospital. As a result of his injury, he is quadriplegic and is unable to speak or care for himself. Reports indicate that he had sustained a concussion the week before he collapsed.

A male high school senior football player was jumping to block a punt during a game when he landed on his head. He fractured his C6 vertebrae. He was immediately attended to by EMS and transported to the hospital. No surgery is required. A full recovery is expected.

A male 17 year old high school senior football player collapsed during the 2nd quarter of a game after making a tackle. He died at the hospital two days later. Cause of death was due to brain hemorrhage.

A male 17 year old high school junior football linebacker collapsed during a pre-game warm-up. He was transported to the hospital and died three days later. He had complained of headaches and sustained a hit to the back of his head during practice two days prior. Cause of death is due to vertebral artery dissection from blunt force trauma to the head and neck.

A male 16 year old high school junior football offensive guard and linebacker suffered a head injury during the 3rd quarter of a varsity game after tackling an opponent. EMS was called and athlete was transported to the hospital where he underwent surgery. He died the same day. Cause of death was due to blunt force trauma to the head.

A male high school sophomore football cornerback took a forearm to the chin, causing his head and neck to whip back during a game. He left the field on a stretcher. He suffered 6-7 broken bones in his neck and a slipped disc that required surgery. Long term prognosis is unknown at this time.

A male 17 year old high school junior football defensive back sustained a neck fracture after making a tackle during a game. He underwent two surgical procedures. Long-term prognosis is unknown at this time.

A male 17 year old high school junior varsity football player sustained head-to-head contact with another player. He began vomiting on the sidelines but re-entered the game. He was eventually seen by the athletic trainer who told the athlete's father to take him to the hospital. Long term symptoms include constant fogginess, photosensitivity, headaches when reading, and inability to be left alone.

A male high school junior football lineman sustained an injury during the kickoff return. He was able to walk off the field and collapsed on the sideline. CPR was administered while EMS and med-flight helicopter were called for. He was transported to the hospital but died shortly after. Cause of death was from blunt force trauma to the head.

A male 18 year old high school senior football running back and linebacker collapsed during the 3rd quarter of a game due to a traumatic brain injury. He was treated by the athletic trainer before being transported by EMS to the hospital. He underwent surgery for a subdural hematoma and was placed in a medically induced coma. He died six days later. Official cause of death is pending autopsy.

A male high school senior football quarterback was blindsided during a game. He was slammed on his head while opponents tackled him. He was immediately evaluated by an athletic trainer and had to be resuscitated by EMS on the way to the hospital. No surgery was required as the brain hemorrhage stopped on its own. Athlete has long lasting symptoms due to the injury.

High school Sport=Football Indirect

A male 15 year old high school sophomore football player collapsed during practice. The athletic trainer began CPR while coaches called 911. EMS transported him to the hospital where he underwent surgery. Cause of collapsed was due to a congenital heart defect. A full recovery was expected.

A male 15 year old high school sophomore football defensive lineman collapsed near the end of a morning practice. Coaches and the athletic trainer used an AED to stabilize him until EMS arrived. He was transported to the hospital where he had a defibrillator implanted. A full recovery is expected.

A male 17 year old high school senior football offensive lineman collapsed hours after football practice. He had struggled with dehydration and cramping. After practice, he consumed four gallons of water and Gatorade. He was transported to the hospital and died six days later. Cause of death was due to brain swelling from over hydration (water intoxication).

A male 16 year old high school sophomore football player collapsed at the beginning of football practice. He was attended to by on-site EMS before being transported to the hospital where he later died. Cause of death was due to atrial myxomna, a non-cancerous tumor. Doctors believe the tumor broke off and blocked blood flow to his heart.

A male high school junior football player was found collapsed on the bathroom floor by the coach. The athletic trainer began CPR. He was transported to the hospital and a full recovery is expected.

A male 17 year old high school junior football defensive tackle was acting strangely during a game. His parents took him to the hospital where he began vomiting and having a seizure. He was hospitalized for brain swelling and was in critical condition. He died three days later from cerebral edema secondary to exercise-associated hyponatremia.

A male 16 year old high school junior football defensive tackle collapsed during practice after running sprints because he was late. Cause of death was ruled as hypertrophic cardiomyopathy (HCM) with obesity as a contributing factor.

A male 15 year old high school freshman football player was forced to practice for two hours with no water. He was diagnosed with heat stroke. Long term symptoms include severe headaches and missing an entire year of school.

A male 14 year old high school freshman junior varsity football player collapsed while playing soccer with his friends. His friends called 911 and CPR was performed by first responders until EMS arrived. He was taken to the hospital but died shortly after. Official cause of death is unknown but is suspected to be cardiac related.

A male 16 year old high school sophomore football player collapsed during team conditioning. He was immediately attended to by the athletic trainer who administered CPR and used the AED while EMS were called. He was transported to the hospital were initial tests were inconclusive. A full recovery is expected.

A male 16 year old high school sophomore football left tackle was lifting weights with his football team when he collapsed on the training room floor. He was attended to by the athletic trainer. He was transported to the hospital and was complaining of a headache. Tests/scans determined he was having a stroke. A full recovery is expected with slight problems with speech, grip, walking, and running.

A male 15 year old high school freshman football player was jumping rope during the conditioning session of a spring practice when he collapsed. EMS administered CPR before being transported to the hospital where he later died. Cause of death is suspected to be due to sudden cardiac arrest.

A male 16 year old high school junior football player collapsed during a morning conditioning session. Coaches and bystanders administered CPR until EMS arrived. He was transported to the hospital and placed in a medically induced coma. Cause of collapsed was due to sudden cardiac arrest. Long term prognosis is unknown at this time.

A male 13 year old high school freshman football player was stretching prior to a weight training session when he collapsed. He was attended to by coaches until EMS arrived. Cause of death is due to an enlarged heart.

A male 16 year old high school junior football defensive end felt ill during a strength and conditioning workout. EMS were called, but nothing was found wrong. He later fell ill again at home and was taken to the hospital, where he was found to be extremely dehydrated. His condition deteriorated rapidly and he died later. Cause of death was due to exertional sickling due to prolonged physical activity complicating sickle cell trait.

High school Sport=Football Not sport-related

A male 16 year old high school football player died at his home. Cause of death is pending autopsy.

A male 16 year old high school junior football wide receiver and defensive back was found dead at his home. Cause of death was due to acute cardiac dysrhythmia.

A male 17 year old high school senior football player died in his sleep. Cause of death was due to cardiac arrhythmia.

A male 15 year old high school freshman football player died at home. He had been previously diagnosed with a congenital heart disorder and had surgery to correct the defect almost a week prior.

A male high school senior football player died at his home from cardiac arrhythmia.

A male 18 year old high school senior football player was found unresponsive at home. His brother began CPR while EMS were called. He was transported to the hospital and diagnosed with Wolff-Parkinson-White Syndrome. He is currently in an intensive care facility due to the sudden cardiac arrest causing a brain injury. Long term prognosis is unknown.

High school Sport=Gymnastics Direct

A female 15 year old high school freshman gymnast was practicing an uneven bars routine when she fell and landed on her head. The athlete lost consciousness, and complained of neck pain and forehead tingling. Her mother was called and upon arrival EMS were called. She was transported

to the hospital and diagnosed with a cervical spine fracture. She underwent surgery. A full recovery is expected.

High school Sport=Ice Hockey Direct

A male 15 year old high school ice hockey defenseman was defending the puck during practice when he bounced off a teammate and hit the boards. He was unable to get up and experience tingling in his extremities. An off duty fireman witnessed the event, halted practice, and stabilized his neck while EMS were called. He was transported to the hospital where he was found to have a fractured C4 vertebrae. He underwent surgery and had rods placed to stabilize. He was released from the hospital shortly after. A full recovery is expected.

High school Sport=Lacrosse Direct

A female 14 year old high school lacrosse player was going for a ball when she was hit on the head by an opponent's stick. She continued playing the remainder of the game. She evaluated after the game by the athletic trainer and coaches after collapsing and throwing up. Reports indicate that she suffered a traumatic brain injury. Case is in litigation.

A male high school junior lacrosse player sustained a hit to the neck with the lacrosse ball. He was transported to the hospital by EMS. He underwent surgery to repair his fractured C6 vertebrae. He is paralyzed from the waist down.

High school Sport=Rowing Indirect

A male 17 year old high school varsity crew athlete was practicing with the high school sponsored club rowing league when he collapsed. CPR was started immediately and 911 called. EMS arrived and 3 shocks were administered with the AED. He was airlifted to the hospital where he was diagnosed with long QT syndrome. He had a defibrillator implanted and a full recovery is expected.

High school Sport=Soccer Direct

A female high school sophomore soccer player was battling for a ball when she fell and landed on her head during a game. She was transported to the hospital by EMS. She had lost feeling below her belly button and was diagnosed with a concussion and a spinal contusion. She was eventually sent home once she gained feeling back. A full recovery is expected.

High school Sport=Soccer Not sport-related

A male 16 year old high school junior soccer player collapsed at home shortly after soccer practice. He was diagnosed with Long QT Syndrome and a defibrillator was implanted. A full recovery is expected.

High school Sport=Track and Field Indirect

A male 17 year old high school senior track distance runner had difficulty breathing after running and collapsed in the locker room. Coaches performed CPR and EMS transported him to the hospital where he later died. Cause of death was due to sudden cardiac arrest. He had been to the doctor the day before for heart-related issues.

A male 16 year old high school sophomore track and field athlete collapsed during a workout. Coaches and students responded immediately by calling 911, administering CPR, and using the AED until EMS arrived. He was transported to the hospital where he was diagnosed with a heart

attack. He was recovering when he had a second heart attack two days later and died. Official cause of death is suspected to be due to a congenital heart defect.

A male 16 year old high school junior track and field discus thrower was running laps during warm up for practice when he collapsed. An assistant coach immediately called 911 and began CPR. He was transported by EMS to the hospital where he later died. Cause of death is due to ischemic heart disease.

High school Sport=Volleyball Not sport-related

A male 16 year old sophomore volleyball middle blocker was not feeling well while at home. His mother took him to the hospital but he was released later that day. He collapsed that evening and died. Cause of death was due to a congenital heart defect diagnosed when he was in 6th grade.

High school Sport=Wrestling Indirect

A male 18 year old high school wrestler collapsed, experienced a seizure, and went into cardiac arrest at the state wrestling championships. Paramedics, trainers, and physicians immediately begin CPR. He was revived with an AED. He was taken to the hospital where he was diagnosed with Wolf-Parkinson-White Syndrome. He underwent surgery and is expected to have a full recovery.

COLLEGIATE

College Sport=Baseball Direct

A male college junior baseball player was struck by a foul ball in the head during a game while in the dugout. He was immediately taken to the locker room and examined by the athletic trainer and coach. He was taken to the hospital and was unable to play for the remainder of the season. A full recovery is expected.

College Sport=Basketball Indirect

A female college basketball center was participating in a five mile conditioning bridge run when she complained of not feeling well. She collapsed and received no medical assistance. She was eventually driven to the hospital by car. She was admitted to the hospital with a body temperature of 104.6 degrees and was found to be suffering metabolic acidosis, acute renal failure, and electrolyte abnormalities. She spend two days in the hospital. A full recovery is expected.

A male 19 year old college freshman basketball player collapsed during a team workout. Coaches called 911 and the athletic trainer began CPR and administered the AED. He was transported to the hospital where he underwent surgery to have an ICD implanted. He was diagnosed with hypertrophic cardiomyopathy. A full recovery is expected but he has not been cleared to play contact sports.

A male 22 year old college basketball player was running sprints during practice when he collapsed. The athletic trainer began CPR and an AED was available. He was revived before being transported to the hospital. He was diagnosed with a congenital heart defect and underwent surgery to have a defibrillator implanted. A full recovery is expected, but he was advised to stop playing contact sports.

A male 19 year old college freshman basketball forward collapsed near the end of a practice. He was immediately attended to by the athletic trainer. CPR was administered and an AED was used to revive him. He was transported to the hospital. Cause of collapse is suspected to be cardiac, but a full recovery is expected.

A male college senior basketball player collapsed on the court after missing a layup. He was immediately attended by coaches, staff and EMS. He was hooked up to an EKG machine while regaining consciousness. No resuscitation or oxygen was required. He is undergoing testing but reports indicate a similar cardiac event occurred the previous year. Long term prognosis is unknown.

College Sport=Football Direct

A male college senior football safety fractured a rib during practice that eventually led to a bowel injury. He underwent treatment at the hospital. A full recovery is expected.

A male college junior football defensive lineman sustained a cervical spine injury during the 4th quarter of a game. He was not moving when he was transported off the field. He was transported to the hospital and underwent surgery. Athlete spent two months in the hospital before being released with outpatient therapy. A full recovery is expected.

A male college sophomore football quarterback sustained an injury during a play in which he was hit on both sides by two different players. He was diagnosed with transient quadriplegia. His symptoms subsided and he was able to walk out of the stadium that evening on his own. A full recovery is expected.

College Sport=Football Indirect

A male 22 year old college football offensive lineman collapsed during the beginning of a voluntary conditioning session. No coaches were present besides the strength and conditioning coaches, who administered CPR until EMS arrived. He died shortly after. Reports indicate he died from cardiac arrest due to an enlarged heart.

A male 18 year old college freshman football defensive lineman became disoriented during practice and was taken to the hospital. He was hospitalized for two weeks before he died. Cause of death was heat stroke with complications from enlarged heart and rhabdomyolysis.

A male 25 year old collegiate football offensive lineman collapsed during training after complaining of shortness of breath and chest pain. He had complained of chest pains the previous day but preliminary assessment by training staff did not find anything abnormal. EMS arrived and CPR was started before he was transported to the hospital where he died shortly after. Cause of death was due to an enlarged heart.

College Sport=Football Not sport-related

A male 21 year old college senior football center lineman failed to show up for morning practice. He was found unresponsive at his home and was unable to be revived. Cause of death was due to an enlarged heart.

A male 21 year old college football player was found unresponsive in his dorm room. CPR was administered until EMS arrived. He was taken to the hospital where he died shortly after. Cause of death was due to an enlarged heart.

College Sport=Soccer Direct

A male 20 year old college junior soccer player was hit in the head by an opponent. He sustained a fractured temporal bone and ruptured two ear canals. He has fully recovered but has hearing loss in his left ear.

College Sport=Soccer Indirect

A male 18 year old college freshman soccer player collapsed during practice. Reports indicate that an athletic trainer was present at the practice. His current cause of death is unknown but is suspected to be cardiac related.

College Sport=Softball Direct

A female 19 year old college sophomore softball player was stealing second base when she slid into the knee of the shortstop and was knocked out cold. She was able to stand up but felt a shooting pain in her neck and the right side of her body felt numb and heavy. She was driven to the hospital by another athlete's parent. She had fractured her C5 vertebra and it was a millimeter from severing her spinal cord. She underwent surgery and had to relearn how to do most everything. Doctors say she is expected to walk again but was recommended not to play softball.

College Sport=Track and Field Not sport-related

A female 21 year old college senior track and field sprinter was found dead in a hotel room by friends. No foul play is suspected. Cause of death was due to cardiac arrhythmia.

A male 22 year old college senior football player became ill while studying with friends at the student center. He went to the restroom and his friends later found him collapsed. Cause of death was due to heart-related natural causes.

College Sport=Volleyball Indirect

A female college volleyball player was attending a sponsored team building activity when she collapsed due to sudden cardiac arrest. First responders administered CPR until EMS arrived. She was revived with an AED. She was induced into a hypothermic coma for 48 hours and had a defibrillator and pacemaker implanted. An unknown pre-existing heart condition (long QT syndrome) is a contributing factor. A full recovery is expected.

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Table 1: Number of All catastrophic injuries/illnesses by year: All sports combined, all levels (high school and college)

	College		High school		All	
	N	**%**	**N**	**%**	**N**	**%**
1982-1983	10	16.70%	50	83.30%	60	100.00%
1983-1984	13	21.00%	49	79.00%	62	100.00%
1984-1985	9	17.60%	42	82.40%	51	100.00%
1985-1986	16	28.10%	41	71.90%	57	100.00%
1986-1987	18	25.70%	52	74.30%	70	100.00%
1987-1988	15	17.90%	69	82.10%	84	100.00%
1988-1989	17	23.00%	57	77.00%	74	100.00%
1989-1990	10	13.30%	65	86.70%	75	100.00%
1990-1991	14	23.00%	47	77.00%	61	100.00%
1991-1992	11	23.40%	36	76.60%	47	100.00%
1992-1993	10	16.40%	51	83.60%	61	100.00%
1993-1994	11	17.50%	52	82.50%	63	100.00%
1994-1995	12	24.50%	37	75.50%	49	100.00%
1995-1996	8	15.70%	43	84.30%	51	100.00%
1996-1997	9	13.60%	57	86.40%	66	100.00%
1997-1998	15	20.00%	60	80.00%	75	100.00%
1998-1999	10	12.80%	68	87.20%	78	100.00%
1999-2000	9	12.90%	61	87.10%	70	100.00%
2000-2001	17	24.60%	52	75.40%	69	100.00%
2001-2002	14	17.30%	67	82.70%	81	100.00%
2002-2003	16	25.80%	46	74.20%	62	100.00%
2003-2004	18	24.30%	56	75.70%	74	100.00%
2004-2005	9	13.80%	56	86.20%	65	100.00%
2005-2006	12	21.80%	43	78.20%	55	100.00%
2006-2007	13	17.60%	61	82.40%	74	100.00%
2007-2008	15	18.50%	66	81.50%	81	100.00%
2008-2009	17	15.70%	91	84.30%	108	100.00%
2009-2010	27	28.10%	69	71.90%	96	100.00%
2010-2011	15	20.50%	58	79.50%	73	100.00%
2011-2012	15	19.50%	62	80.50%	77	100.00%
2012-2013	12	30.80%	27	69.20%	39	100.00%
2013-2014	16	22.50%	55	77.50%	71	100.00%
2014-2015	16	20.80%	61	79.20%	77	100.00%
Total	449	19.90%	1807	80.10%	2256	100.00%
Total*	*483*	*20.00%*	*1889*	*80.00%*	*2372*	*100.00%*

*Includes Cheerleading, Drill Team, Rodeo

Table 2: Number of Direct catastrophic injuries/illnesses by year: All sports combined, all levels (high school and college)

	College		High school		All	
	N	**%**	**N**	**%**	**N**	**%**
1982-1983	4	10.30%	35	89.70%	39	100.00%
1983-1984	8	19.00%	34	81.00%	42	100.00%
1984-1985	9	22.50%	31	77.50%	40	100.00%
1985-1986	15	30.60%	34	69.40%	49	100.00%
1986-1987	14	26.90%	38	73.10%	52	100.00%
1987-1988	8	12.30%	57	87.70%	65	100.00%
1988-1989	13	22.80%	44	77.20%	57	100.00%
1989-1990	8	14.80%	46	85.20%	54	100.00%
1990-1991	10	26.30%	28	73.70%	38	100.00%
1991-1992	6	17.60%	28	82.40%	34	100.00%
1992-1993	8	20.00%	32	80.00%	40	100.00%
1993-1994	6	14.30%	36	85.70%	42	100.00%
1994-1995	9	25.00%	27	75.00%	36	100.00%
1995-1996	6	18.80%	26	81.30%	32	100.00%
1996-1997	7	14.00%	43	86.00%	50	100.00%
1997-1998	6	12.00%	44	88.00%	50	100.00%
1998-1999	10	18.20%	45	81.80%	55	100.00%
1999-2000	9	20.50%	35	79.50%	44	100.00%
2000-2001	12	28.60%	30	71.40%	42	100.00%
2001-2002	5	9.60%	47	90.40%	52	100.00%
2002-2003	10	26.30%	28	73.70%	38	100.00%
2003-2004	12	22.20%	42	77.80%	54	100.00%
2004-2005	5	15.60%	27	84.40%	32	100.00%
2005-2006	7	21.90%	25	78.10%	32	100.00%
2006-2007	7	14.60%	41	85.40%	48	100.00%
2007-2008	9	17.00%	44	83.00%	53	100.00%
2008-2009	10	12.20%	72	87.80%	82	100.00%
2009-2010	16	27.60%	42	72.40%	58	100.00%
2010-2011	9	19.10%	38	80.90%	47	100.00%
2011-2012	8	15.40%	44	84.60%	52	100.00%
2012-2013	5	29.40%	12	70.60%	17	100.00%
2013-2014	2	6.50%	29	93.50%	31	100.00%
2014-2015	6	20.00%	24	80.00%	30	100.00%
Total	279	18.76%	1208	81.24%	1487	100.00%
Total*	*313*	*19.66%*	*1279*	*80.34%*	*1592*	*100.00%*

*Includes Cheerleading, Drill Team, Rodeo

Table 3: Number of Indirect catastrophic injuries/illnesses by year: All sports combined, all levels (high school and college)

	College		High school		All	
	N	%	N	%	N	%
1982-1983	6	28.60%	15	71.40%	21	100.00%
1983-1984	5	25.00%	15	75.00%	20	100.00%
1984-1985	0	0	11	100.00%	11	100.00%
1985-1986	1	12.50%	7	87.50%	8	100.00%
1986-1987	4	22.20%	14	77.80%	18	100.00%
1987-1988	7	36.80%	12	63.20%	19	100.00%
1988-1989	4	23.50%	13	76.50%	17	100.00%
1989-1990	2	9.50%	19	90.50%	21	100.00%
1990-1991	4	17.40%	19	82.60%	23	100.00%
1991-1992	5	38.50%	8	61.50%	13	100.00%
1992-1993	2	9.50%	19	90.50%	21	100.00%
1993-1994	5	23.80%	16	76.20%	21	100.00%
1994-1995	3	23.10%	10	76.90%	13	100.00%
1995-1996	2	10.50%	17	89.50%	19	100.00%
1996-1997	2	12.50%	14	87.50%	16	100.00%
1997-1998	9	36.00%	16	64.00%	25	100.00%
1998-1999	0	0	23	100.00%	23	100.00%
1999-2000	0	0	26	100.00%	26	100.00%
2000-2001	5	18.50%	22	81.50%	27	100.00%
2001-2002	9	31.00%	20	69.00%	29	100.00%
2002-2003	6	25.00%	18	75.00%	24	100.00%
2003-2004	6	30.00%	14	70.00%	20	100.00%
2004-2005	4	12.10%	29	87.90%	33	100.00%
2005-2006	5	21.70%	18	78.30%	23	100.00%
2006-2007	6	23.10%	20	76.90%	26	100.00%
2007-2008	6	21.40%	22	78.60%	28	100.00%
2008-2009	7	26.90%	19	73.10%	26	100.00%
2009-2010	11	28.90%	27	71.10%	38	100.00%
2010-2011	6	23.10%	20	76.90%	26	100.00%
2011-2012	7	28.00%	18	72.00%	25	100.00%
2012-2013	7	31.80%	15	68.20%	22	100.00%
2013-2014	14	35.00%	26	65.00%	40	100.00%
2014-2015	10	21.30%	37	78.70%	47	100.00%
Total	170	22.11%	599	77.89%	769	100.00%
Total*	*170*	*21.79%*	*610*	*78.21%*	*780*	*100.00%*

*Includes Cheerleading, Drill Team, Rodeo

Table 4a: Number of Direct catastrophic injuries/illnesses by severity by sport: High school all years combined

		Serious		Non-fatal		Fatal		All	
		N	%	N	%	N	%	N	%
Baseball	**Male**	22	34.90%	26	41.30%	15	23.80%	63	100.00%
Basketball	**Female**	3	50.00%	3	50.00%	0	0	6	100.00%
	Male	8	53.30%	6	40.00%	1	6.70%	15	100.00%
Cheerleading	**Female**	41	59.40%	27	39.10%	1	1.40%	69	100.00%
	Male	1	50.00%	1	50.00%	0	0	2	100.00%
Cross Country	**Male**	0	0	1	50.00%	1	50.00%	2	100.00%
Field Hockey	**Female**	0	0	3	100.00%	0	0	3	100.00%
Football	**Male**	362	40.90%	398	44.90%	126	14.20%	886	100.00%
Golf	**Male**	0	0	1	100.00%	0	0	1	100.00%
Gymnastics	**Female**	3	33.30%	6	66.70%	0	0	9	100.00%
	Male	1	25.00%	2	50.00%	1	25.00%	4	100.00%
Ice Hockey	**Female**	2	66.70%	1	33.30%	0	0	3	100.00%
	Male	7	26.90%	15	57.70%	4	15.40%	26	100.00%
Lacrosse	**Female**	2	66.70%	1	33.30%	0	0	3	100.00%
	Male	5	31.30%	9	56.30%	2	12.50%	16	100.00%
Skiing	**Female**	0	0	0	0	1	100.00%	1	100.00%
Soccer	**Female**	5	71.40%	1	14.30%	1	14.30%	7	100.00%
	Male	6	37.50%	3	18.80%	7	43.80%	16	100.00%
Softball	**Female**	6	85.70%	1	14.30%	0	0	7	100.00%
Swimming	**Female**	1	16.70%	5	83.30%	0	0	6	100.00%
	Male	3	33.30%	5	55.60%	1	11.10%	9	100.00%
Track and Field	**Female**	6	66.70%	2	22.20%	1	11.10%	9	100.00%
	Male	11	21.20%	20	38.50%	21	40.40%	52	100.00%
Wrestling	**Male**	21	33.30%	40	63.50%	2	3.20%	63	100.00%

Table 4b: Number of Indirect catastrophic injuries/illnesses by severity by sport: High school all years combined

		Serious		Non-fatal		Fatal		All	
		N	%	N	%	N	%	N	%
Baseball	**Male**	3	14.30%	0	0	18	85.70%	21	100.00%
Basketball	**Female**	1	5.90%	0	0	16	94.10%	17	100.00%
	Male	13	9.90%	1	0.80%	117	89.30%	131	100.00%
Cheerleading	**Female**	1	10.00%	1	10.00%	8	80.00%	10	100.00%
Cross Country	**Female**	3	23.10%	1	7.70%	9	69.20%	13	100.00%
	Male	1	4.50%	1	4.50%	20	90.90%	22	100.00%
	Unknown	1	100.00%	0	0	0	0	1	100.00%
Drill Team	**Female**	0	0	0	0	1	100.00%	1	100.00%
Field Hockey	**Female**	0	0	0	0	1	100.00%	1	100.00%
Football	**Male**	14	5.70%	2	0.80%	228	93.40%	244	100.00%
Ice Hockey	**Male**	1	20.00%	0	0	4	80.00%	5	100.00%
Lacrosse	**Male**	0	0	0	0	8	100.00%	8	100.00%
Rowing	**Male**	1	100.00%	0	0	0	0	1	100.00%
Soccer	**Female**	1	11.10%	1	11.10%	7	77.80%	9	100.00%
	Male	1	3.40%	2	6.90%	26	89.70%	29	100.00%
Softball	**Female**	0	0	0	0	1	100.00%	1	100.00%
Swimming	**Female**	0	0	1	12.50%	7	87.50%	8	100.00%
	Male	0	0	0	0	3	100.00%	3	100.00%
Tennis	**Male**	0	0	0	0	4	100.00%	4	100.00%
Track and Field	**Female**	0	0	1	14.30%	6	85.70%	7	100.00%
	Male	0	0	0	0	35	100.00%	35	100.00%
Volleyball	**Female**	0	0	1	50.00%	1	50.00%	2	100.00%
Water Polo	**Female**	0	0	0	0	1	100.00%	1	100.00%
	Male	0	0	0	0	3	100.00%	3	100.00%
Wrestling	**Male**	4	12.50%	1	3.10%	27	84.40%	32	100.00%

Table 5a: Number of Direct catastrophic injuries/illnesses by severity by sport: College all years combined

		Serious		Non-fatal		Fatal		All	
		N	%	N	%	N	%	N	%
Baseball	**Male**	7	36.80%	9	47.40%	3	15.80%	19	100.00%
Basketball	**Male**	8	80.00%	1	10.00%	1	10.00%	10	100.00%
Cheerleading	**Female**	13	46.40%	14	50.00%	1	3.60%	28	100.00%
	Male	3	60.00%	2	40.00%	0	0	5	100.00%
Equestrian	**Female**	0	0	0	0	1	100.00%	1	100.00%
Field Hockey	**Female**	2	66.70%	1	33.30%	0	0	3	100.00%
Football	**Male**	132	69.80%	44	23.30%	13	6.90%	189	100.00%
Gymnastics	**Female**	0	0	2	100.00%	0	0	2	100.00%
	Male	2	66.70%	1	33.30%	0	0	3	100.00%
	Unknown	0	0	1	100.00%	0	0	1	100.00%
Ice Hockey	**Female**	1	100.00%	0	0	0	0	1	100.00%
	Male	7	58.30%	5	41.70%	0	0	12	100.00%
Lacrosse	**Female**	0	0	2	100.00%	0	0	2	100.00%
	Male	1	16.70%	1	16.70%	4	66.70%	6	100.00%
Rodeo	**Male**	0	0	0	0	1	100.00%	1	100.00%
Rowing	**Male**	0	0	0	0	1	100.00%	1	100.00%
Rugby	**Male**	1	50.00%	1	50.00%	0	0	2	100.00%
Skiing	**Female**	0	0	1	50.00%	1	50.00%	2	100.00%
	Male	0	0	0	0	1	100.00%	1	100.00%
Soccer	**Female**	0	0	2	100.00%	0	0	2	100.00%
	Male	2	66.70%	1	33.30%	0	0	3	100.00%
Softball	**Female**	2	100.00%	0	0	0	0	2	100.00%
Swimming	**Male**	0	0	1	100.00%	0	0	1	100.00%
Track and Field	**Female**	0	0	1	100.00%	0	0	1	100.00%
	Male	1	7.70%	6	46.20%	6	46.20%	13	100.00%
Wrestling	**Male**	0	0	2	100.00%	0	0	2	100.00%

Table 5b: Number of Indirect catastrophic injuries/illnesses by severity by sport: College all years combined

		Serious		Non-fatal		Fatal		All	
		N	%	N	%	N	%	N	%
Baseball	**Male**	0	0	1	20.00%	4	80.00%	5	100.00%
Basketball	**Female**	3	37.50%	0	0	5	62.50%	8	100.00%
	Male	9	19.10%	3	6.40%	35	74.50%	47	100.00%
Cross Country	**Female**	0	0	0	0	1	100.00%	1	100.00%
	Male	0	0	0	0	2	100.00%	2	100.00%
Football	**Male**	3	5.00%	0	0	57	95.00%	60	100.00%
Gymnastics	**Female**	0	0	0	0	1	100.00%	1	100.00%
Ice Hockey	**Male**	1	33.30%	1	33.30%	1	33.30%	3	100.00%
Lacrosse	**Male**	0	0	0	0	2	100.00%	2	100.00%
Rowing	**Male**	0	0	0	0	2	100.00%	2	100.00%
Skiing	**Male**	0	0	0	0	1	100.00%	1	100.00%
Soccer	**Female**	0	0	0	0	3	100.00%	3	100.00%
	Male	0	0	2	25.00%	6	75.00%	8	100.00%
Swimming	**Female**	1	33.30%	0	0	2	66.70%	3	100.00%
	Male	0	0	0	0	7	100.00%	7	100.00%
Tennis	**Female**	0	0	0	0	1	100.00%	1	100.00%
	Male	0	0	0	0	1	100.00%	1	100.00%
Track and Field	**Male**	0	0	0	0	2	100.00%	2	100.00%
Volleyball	**Female**	2	50.00%	0	0	2	50.00%	4	100.00%
Water Polo	**Male**	0	0	0	0	2	100.00%	2	100.00%
Wrestling	**Male**	2	28.60%	0	0	5	71.40%	7	100.00%

Table 6a: Number of Catastrophic injuries/illnesses by Severity by year: High school

	Fatal		Non-fatal		Serious	
	N	Rate per 100,000	N	Rate per 100,000	N	Rate per 100,000
1982-1983	25	0.49	10	0.20	15	0.30
1983-1984	23	0.46	15	0.30	11	0.22
1984-1985	17	0.34	13	0.26	12	0.24
1985-1986	10	0.20	15	0.29	16	0.31
1986-1987	26	0.51	14	0.27	12	0.23
1987-1988	17	0.33	25	0.48	27	0.52
1988-1989	21	0.40	19	0.37	17	0.33
1989-1990	24	0.46	26	0.50	15	0.29
1990-1991	23	0.44	15	0.29	9	0.17
1991-1992	12	0.23	9	0.17	15	0.28
1992-1993	23	0.43	14	0.26	14	0.26
1993-1994	21	0.38	16	0.29	15	0.27
1994-1995	12	0.21	13	0.23	12	0.21
1995-1996	19	0.32	16	0.27	8	0.13
1996-1997	24	0.40	20	0.33	13	0.21
1997-1998	24	0.38	24	0.38	12	0.19
1998-1999	31	0.48	14	0.22	23	0.36
1999-2000	33	0.51	17	0.26	11	0.17
2000-2001	26	0.39	16	0.24	10	0.15
2001-2002	28	0.43	22	0.34	17	0.26
2002-2003	21	0.31	13	0.19	12	0.18
2003-2004	17	0.25	24	0.36	15	0.22
2004-2005	33	0.48	17	0.25	6	0.09
2005-2006	20	0.29	15	0.21	8	0.11
2006-2007	21	0.29	24	0.34	16	0.22
2007-2008	23	0.32	16	0.22	27	0.37
2008-2009	28	0.38	32	0.44	31	0.42
2009-2010	24	0.32	19	0.26	26	0.35
2010-2011	22	0.30	18	0.24	18	0.24
2011-2012	22	0.30	23	0.31	17	0.23
2012-2013	15	0.20	7	0.09	5	0.07
2013-2014	19	0.26	10	0.14	26	0.36
2014-2015	22	0.29	10	0.13	27	0.36

Note: Rates with number of incidents less than 5 should be interpreted with caution.

Table 6b: Number of Catastrophic injuries/illnesses by Severity by year: College

	Fatal		Non-fatal		Serious	
	N	**Rate per 100,000**	**N**	**Rate per 100,000**	**N**	**Rate per 100,000**
1982-1983	6	2.34	3	1.17	1	0.39
1983-1984	5	1.85	2	0.74	6	2.22
1984-1985	1	0.35	3	1.04	5	1.73
1985-1986	4	1.38	4	1.38	8	2.75
1986-1987	5	1.80	2	0.72	11	3.96
1987-1988	7	2.64	1	0.38	7	2.64
1988-1989	4	1.49	4	1.49	9	3.34
1989-1990	3	1.14	2	0.76	5	1.89
1990-1991	5	1.82	6	2.18	3	1.09
1991-1992	5	1.78	2	0.71	4	1.43
1992-1993	3	1.05	0	0	7	2.46
1993-1994	7	2.39	0	0	4	1.37
1994-1995	3	1.01	3	1.01	6	2.02
1995-1996	2	0.60	4	1.19	2	0.60
1996-1997	3	0.91	5	1.51	1	0.30
1997-1998	9	2.68	2	0.59	4	1.19
1998-1999	2	0.56	3	0.84	5	1.40
1999-2000	2	0.56	2	0.56	5	1.40
2000-2001	7	1.89	5	1.35	5	1.35
2001-2002	10	2.74	1	0.27	3	0.82
2002-2003	6	1.60	4	1.07	6	1.60
2003-2004	9	2.39	4	1.06	5	1.33
2004-2005	4	1.04	3	0.78	2	0.52
2005-2006	5	1.27	5	1.27	2	0.51
2006-2007	6	1.48	1	0.25	6	1.48
2007-2008	5	1.21	2	0.48	8	1.93
2008-2009	5	1.18	2	0.47	10	2.37
2009-2010	13	3.01	2	0.46	12	2.78
2010-2011	4	0.90	8	1.80	3	0.67
2011-2012	7	1.54	0	0	8	1.76
2012-2013	6	1.29	3	0.65	3	0.65
2013-2014	6	1.26	0	0	10	2.11
2014-2015	4	0.83	1	0.21	11	2.27

Note: Rates with number of incidents less than 5 should be interpreted with caution.

Table 7a: Rate of direct catastrophic injuries/illnesses by severity by year: High school

	Fatal		Non-fatal		Serious	
	N	Rate per 100,000	N	Rate per 100,000	N	Rate per 100,000
1982-1983	10	0.20	10	0.20	15	0.30
1983-1984	8	0.16	15	0.30	11	0.22
1984-1985	6	0.12	13	0.26	12	0.24
1985-1986	3	0.06	15	0.29	16	0.31
1986-1987	13	0.25	14	0.27	11	0.21
1987-1988	5	0.10	25	0.48	27	0.52
1988-1989	8	0.15	19	0.37	17	0.33
1989-1990	5	0.10	26	0.50	15	0.29
1990-1991	4	0.08	15	0.29	9	0.17
1991-1992	4	0.08	9	0.17	15	0.28
1992-1993	4	0.08	14	0.26	14	0.26
1993-1994	5	0.09	16	0.29	15	0.27
1994-1995	2	0.04	13	0.23	12	0.21
1995-1996	4	0.07	15	0.25	7	0.12
1996-1997	10	0.16	20	0.33	13	0.21
1997-1998	8	0.13	24	0.38	12	0.19
1998-1999	8	0.13	14	0.22	23	0.36
1999-2000	7	0.11	17	0.26	11	0.17
2000-2001	4	0.06	16	0.24	10	0.15
2001-2002	9	0.14	21	0.32	17	0.26
2002-2003	3	0.04	13	0.19	12	0.18
2003-2004	3	0.04	24	0.36	15	0.22
2004-2005	5	0.07	16	0.23	6	0.09
2005-2006	4	0.06	14	0.20	7	0.10
2006-2007	2	0.03	23	0.32	16	0.22
2007-2008	2	0.03	16	0.22	26	0.36
2008-2009	10	0.14	31	0.42	31	0.42
2009-2010	2	0.03	18	0.24	22	0.30
2010-2011	5	0.07	17	0.23	16	0.22
2011-2012	4	0.05	23	0.31	17	0.23
2012-2013	3	0.04	5	0.07	4	0.05
2013-2014	8	0.11	9	0.12	12	0.16
2014-2015	6	0.08	9	0.12	8	0.11

Note: Rates with number of incidents less than 5 should be interpreted with caution.

Table 7b: Rate of direct catastrophic injuries/illnesses by severity by year: College

	Fatal		Non-fatal		Serious	
	N	Rate per 100,000	N	Rate per 100,000	N	Rate per 100,000
1982-1983	0	0	3	1.17	1	0.39
1983-1984	0	0	2	0.74	6	2.22
1984-1985	1	0.35	3	1.04	5	1.73
1985-1986	3	1.03	4	1.38	8	2.75
1986-1987	1	0.36	2	0.72	11	3.96
1987-1988	0	0	1	0.38	7	2.64
1988-1989	0	0	4	1.49	9	3.34
1989-1990	1	0.38	2	0.76	5	1.89
1990-1991	1	0.36	6	2.18	3	1.09
1991-1992	1	0.36	1	0.36	4	1.43
1992-1993	1	0.35	0	0	7	2.46
1993-1994	2	0.68	0	0	4	1.37
1994-1995	0	0	3	1.01	6	2.02
1995-1996	0	0	4	1.19	2	0.60
1996-1997	1	0.30	5	1.51	1	0.30
1997-1998	1	0.30	1	0.30	4	1.19
1998-1999	2	0.56	3	0.84	5	1.40
1999-2000	2	0.56	2	0.56	5	1.40
2000-2001	2	0.54	5	1.35	5	1.35
2001-2002	1	0.27	1	0.27	3	0.82
2002-2003	1	0.27	3	0.80	6	1.60
2003-2004	3	0.80	4	1.06	5	1.33
2004-2005	1	0.26	2	0.52	2	0.52
2005-2006	0	0	5	1.27	2	0.51
2006-2007	0	0	1	0.25	6	1.48
2007-2008	0	0	1	0.24	8	1.93
2008-2009	0	0	1	0.24	9	2.13
2009-2010	4	0.93	2	0.46	10	2.32
2010-2011	0	0	7	1.57	2	0.45
2011-2012	1	0.22	0	0	7	1.54
2012-2013	0	0	3	0.65	2	0.43
2013-2014	1	0.21	0	0	1	0.21
2014-2015	0	0	1	0.21	5	1.03

Note: Rates with number of incidents less than 5 should be interpreted with caution.

Table 8a: Rate of indirect catastrophic injuries/illnesses by severity by year: High School

	Fatal		Non-fatal		Serious	
	N	Rate per 100,000	N	Rate per 100,000	N	Rate per 100,000
1982-1983	15	0.30	0	0	0	0
1983-1984	15	0.30	0	0	0	0
1984-1985	11	0.22	0	0	0	0
1985-1986	7	0.14	0	0	0	0
1986-1987	13	0.25	0	0	1	0.02
1987-1988	12	0.23	0	0	0	0
1988-1989	13	0.25	0	0	0	0
1989-1990	19	0.37	0	0	0	0
1990-1991	19	0.36	0	0	0	0
1991-1992	8	0.15	0	0	0	0
1992-1993	19	0.36	0	0	0	0
1993-1994	16	0.29	0	0	0	0
1994-1995	10	0.18	0	0	0	0
1995-1996	15	0.25	1	0.02	1	0.02
1996-1997	14	0.23	0	0	0	0
1997-1998	16	0.26	0	0	0	0
1998-1999	23	0.36	0	0	0	0
1999-2000	26	0.40	0	0	0	0
2000-2001	22	0.33	0	0	0	0
2001-2002	19	0.29	1	0.02	0	0
2002-2003	18	0.27	0	0	0	0
2003-2004	14	0.21	0	0	0	0
2004-2005	28	0.41	1	0.01	0	0
2005-2006	16	0.23	1	0.01	1	0.01
2006-2007	19	0.27	1	0.01	0	0
2007-2008	21	0.29	0	0	1	0.01
2008-2009	18	0.25	1	0.01	0	0
2009-2010	22	0.30	1	0.01	4	0.05
2010-2011	17	0.23	1	0.01	2	0.03
2011-2012	18	0.24	0	0	0	0
2012-2013	12	0.16	2	0.03	1	0.01
2013-2014	11	0.15	1	0.01	14	0.19
2014-2015	16	0.21	1	0.01	19	0.25

Note: Rates with number of incidents less than 5 should be interpreted with caution.

Table 8b: Rate of indirect catastrophic injuries/illnesses by severity by year: College

	Fatal		Non-fatal		Serious	
	N	Rate per 100,000	N	Rate per 100,000	N	Rate per 100,000
1982-1983	6	2.34	0	0	0	0
1983-1984	5	1.85	0	0	0	0
1985-1986	1	0.34	0	0	0	0
1986-1987	4	1.44	0	0	0	0
1987-1988	7	2.64	0	0	0	0
1988-1989	4	1.49	0	0	0	0
1989-1990	2	0.76	0	0	0	0
1990-1991	4	1.45	0	0	0	0
1991-1992	4	1.43	1	0.36	0	0
1992-1993	2	0.70	0	0	0	0
1993-1994	5	1.71	0	0	0	0
1994-1995	3	1.01	0	0	0	0
1995-1996	2	0.60	0	0	0	0
1996-1997	2	0.60	0	0	0	0
1997-1998	8	2.38	1	0.30	0	0
2000-2001	5	1.35	0	0	0	0
2001-2002	9	2.47	0	0	0	0
2002-2003	5	1.34	1	0.27	0	0
2003-2004	6	1.59	0	0	0	0
2004-2005	3	0.78	1	0.26	0	0
2005-2006	5	1.27	0	0	0	0
2006-2007	6	1.48	0	0	0	0
2007-2008	5	1.21	1	0.24	0	0
2008-2009	5	1.18	1	0.24	1	0.24
2009-2010	9	2.08	0	0	2	0.46
2010-2011	4	0.90	1	0.22	1	0.22
2011-2012	6	1.32	0	0	1	0.22
2012-2013	6	1.29	0	0	1	0.22
2013-2014	5	1.05	0	0	9	1.90
2014-2015	4	0.83	0	0	6	1.24

Note: Rates with number of incidents less than 5 should be interpreted with caution.

Table 9a: Rate of Direct catastrophic injuries/illnesses by level and severity by sport: High school

		Fatal		Non-fatal		Serious	
		N	Rate per 100,000	N	Rate per 100,000	N	Rate per 100,000
Baseball	**Male**	15	0.10	26	0.18	22	0.15
Basketball	**Female**	0	0	3	0.02	3	0.02
	Male	1	0.01	6	0.03	8	0.05
Cheerleading	**Female**	1	0.05	27	1.42	41	2.15
	Male	0	0	1	2.05	1	2.05
Cross Country	**Male**	1	0.02	1	0.02	0	0
Field Hockey	**Female**	0	0	3	0.16	0	0
Football	**Male**	126	0.38	398	1.21	362	1.10
Golf	**Male**	0	0	1	0.02	0	0
Gymnastics	**Female**	0	0	6	0.78	3	0.39
	Male	1	0.88	2	1.76	1	0.88
Ice Hockey	**Female**	0	0	1	0.74	2	1.48
	Male	4	0.41	15	1.54	7	0.72
Lacrosse	**Female**	0	0	1	0.09	2	0.18
	Male	2	0.13	9	0.58	5	0.32
Skiing	**Female**	1	0.37	0	0	0	0
Soccer	**Female**	1	0.01	1	0.01	5	0.06
	Male	7	0.07	3	0.03	6	0.06
Softball	**Female**	0	0	1	0.01	6	0.06
Swimming	**Female**	0	0	5	0.12	1	0.02
	Male	1	0.03	5	0.15	3	0.09
Track and Field	**Female**	1	0.01	2	0.01	6	0.04
	Male	21	0.12	20	0.11	11	0.06
Wrestling	**Male**	2	0.02	40	0.49	21	0.26

Note: Rates with number of incidents less than 5 should be interpreted with caution.

Table 9b: Rate of Direct catastrophic injuries/illnesses by level and severity by sport: College

		Fatal		Non-fatal		Serious	
		N	Rate per 100,000	N	Rate per 100,000	N	Rate per 100,000
Baseball	**Male**	3	0.35	9	1.06	7	0.83
Basketball	**Male**	1	0.20	1	0.20	8	1.60
Equestrian	**Female**	1	4.60	0	0	0	0
Field Hockey	**Female**	0	0	1	0.57	2	1.13
Football	**Male**	13	0.69	44	2.34	132	7.01
Gymnastics	**Female**	0	0	2	4.06	0	0
	Male	0	0	1	5.67	2	11.34
Ice Hockey	**Female**	0	0	0	0	1	3.09
	Male	0	0	5	3.90	7	5.46
Lacrosse	**Female**	0	0	2	1.18	0	0
	Male	4	1.72	1	0.43	1	0.43
Rowing	**Male**	1	1.41	0	0	0	0
Skiing	**Female**	1	6.01	1	6.01	0	0
	Male	1	4.91	0	0	0	0
Soccer	**Female**	0	0	2	0.40	0	0
	Male	0	0	1	0.17	2	0.34
Softball	**Female**	0	0	0	0	2	0.44
Swimming	**Male**	0	0	1	0.37	0	0
Track and Field	**Female**	0	0	1	0.09	0	0
	Male	6	0.47	6	0.47	1	0.08
Wrestling	**Male**	0	0	2	0.89	0	0

Note: Rates with number of incidents less than 5 should be interpreted with caution.

Table 10a: Indirect catastrophic events by level and severity: High school

		Fatal		Non-fatal		Serious	
		N	Rate per 100,000	N	Rate per 100,000	N	Rate per 100,000
Baseball	**Male**	18	0.12	0	0	3	0.02
Basketball	**Female**	16	0.11	0	0	1	0.01
	Male	117	0.67	1	0.01	13	0.07
Cheerleading	**Female**	8	0.42	1	0.05	1	0.05
Cross Country	**Female**	9	0.18	1	0.02	3	0.06
	Male	20	0.34	1	0.02	1	0.02
Field Hockey	**Female**	1	0.05	0	0	0	0
Football	**Male**	228	0.69	2	0.01	14	0.04
Ice Hockey	**Male**	4	0.41	0	0	1	0.10
Lacrosse	**Male**	8	0.52	0	0	0	0
Rowing	**Male**	0	0	0	0	1	2.08
Soccer	**Female**	7	0.09	1	0.01	1	0.01
	Male	26	0.26	2	0.02	1	0.01
Softball	**Female**	1	0.01	0	0	0	0
Swimming	**Female**	7	0.17	1	0.02	0	0
	Male	3	0.09	0	0	0	0
Tennis	**Male**	4	0.08	0	0	0	0
Track and Field	**Female**	6	0.04	1	0.01	0	0
	Male	35	0.20	0	0	0	0
Volleyball	**Female**	1	0.01	1	0.01	0	0
Water Polo	**Female**	1	0.31	0	0	0	0
	Male	3	0.65	0	0	0	0
Wrestling	**Male**	27	0.33	1	0.01	4	0.05

Note: Rates with number of incidents less than 5 should be interpreted with caution.

Table 10b: Indirect catastrophic events by level and severity: College

		Fatal		Non-fatal		Serious	
		N	Rate per 100,000	N	Rate per 100,000	N	Rate per 100,000
Baseball	**Male**	4	0.47	1	0.12	0	0
Basketball	**Female**	5	1.13	0	0	3	0.68
	Male	35	6.99	3	0.60	9	1.80
Cross Country	**Female**	1	0.28	0	0	0	0
	Male	2	0.54	0	0	0	0
Football	**Male**	57	3.03	0	0	3	0.16
Gymnastics	**Female**	1	2.03	0	0	0	0
Ice Hockey	**Male**	1	0.78	1	0.78	1	0.78
Lacrosse	**Male**	2	0.86	0	0	0	0
Rowing	**Male**	2	2.82	0	0	0	0
Skiing	**Male**	1	4.91	0	0	0	0
Soccer	**Female**	3	0.60	0	0	0	0
	Male	6	1.01	2	0.34	0	0
Swimming	**Female**	2	0.63	0	0	1	0.31
	Male	7	2.62	0	0	0	0
Tennis	**Female**	1	0.37	0	0	0	0
	Male	1	0.39	0	0	0	0
Track and Field	**Male**	2	0.16	0	0	0	0
Volleyball	**Female**	2	0.49	0	0	2	0.49
Water Polo	**Male**	2	6.16	0	0	0	0
Wrestling	**Male**	5	2.23	0	0	2	0.89

Note: Rates with number of incidents less than 5 should be interpreted with caution.

Table 11: Characteristics of all catastrophic events during AY 2014-2015

	Direct		Indirect		All	
	N	%	N	%	N	%
Total	30	100.00%	48	100.00%	78	100.00%
Level						
College	6	20.00%	10	20.80%	16	20.50%
High school	24	80.00%	38	79.20%	62	79.50%
Severity						
Serious	13	43.30%	26	54.20%	39	50.00%
Non-fatal	10	33.30%	1	2.10%	11	14.10%
Fatal	6	20.00%	20	41.70%	26	33.30%
Unknown	1	3.30%	1	2.10%	2	2.60%
Sex						
Female	4	13.30%	5	10.40%	9	11.50%
Male	26	86.70%	43	89.60%	69	88.50%
Month						
Jul-Aug	0	0	13	27.10%	13	16.70%
Sep-Oct	19	63.30%	6	12.50%	25	32.10%
Nov-Dec	3	10.00%	8	16.70%	11	14.10%
Jan-Feb	3	10.00%	7	14.60%	10	12.80%
Mar-Apr	5	16.70%	6	12.50%	11	14.10%
May-Jun	0	0	8	16.70%	8	10.30%
Type of Activity						
Competition/Game	26	86.70%	11	22.90%	37	47.40%
Practice	4	13.30%	22	45.80%	26	33.30%
Scrimmage	0	0	1	2.10%	1	1.30%
Strength/Weight Session	0	0	1	2.10%	1	1.30%
Conditioning Session	0	0	8	16.70%	8	10.30%
Other Team activity	0	0	1	2.10%	1	1.30%
Other	0	0	4	8.30%	4	5.10%
Sport						
Baseball	2	6.70%	2	4.20%	4	5.10%
Basketball	0	0	14	29.20%	14	17.90%
Cheerleading	0	0	1	2.10%	1	1.30%
Football	21	70.00%	22	45.80%	43	55.10%
Gymnastics	1	3.30%	0	0	1	1.30%
Ice Hockey	1	3.30%	1	2.10%	2	2.60%
Lacrosse	2	6.70%	0	0	2	2.60%
Rowing	0	0	1	2.10%	1	1.30%
Soccer	2	6.70%	2	4.20%	4	5.10%
Softball	1	3.30%	0	0	1	1.30%
Track and Field	0	0	3	6.30%	3	3.80%
Volleyball	0	0	1	2.10%	1	1.30%
Wrestling	0	0	1	2.10%	1	1.30%

	Direct		Indirect		All	
	N	%	N	%	N	%
Type of injury						
Bleed	1	3.30%	0	0	1	1.30%
Cardiac arrest	0	0	14	29.20%	14	17.90%
Cardiac arrhythmia	0	0	4	8.30%	4	5.10%
Cardiomyopathy	0	0	8	16.70%	8	10.30%
Congenital heart	0	0	7	14.60%	7	9.00%
Contusion	1	3.30%	0	0	1	1.30%
Fracture	11	36.70%	0	0	11	14.10%
Heat stroke	0	0	5	10.40%	5	6.40%
Missing	5	16.70%	4	8.30%	9	11.50%
Sickle cell	0	0	1	2.10%	1	1.30%
Stroke	0	0	1	2.10%	1	1.30%
Subdural hematoma	1	3.30%	0	0	1	1.30%
Trauma	3	10.00%	0	0	3	3.80%
Traumatic brain injury	7	23.30%	0	0	7	9.00%
Unknown	1	3.30%	4	8.30%	5	6.40%
Body part						
Head/brain	10	33.30%	0	0	10	12.80%
Neck	11	36.70%	0	0	11	14.10%
Heart	0	0	36	75.00%	36	46.20%
Total body	0	0	7	14.60%	7	9.00%
Other	2	6.70%	0	0	2	2.60%
Unknown	0	0	3	6.30%	3	3.80%
Missing	7	23.30%	2	4.20%	9	11.50%

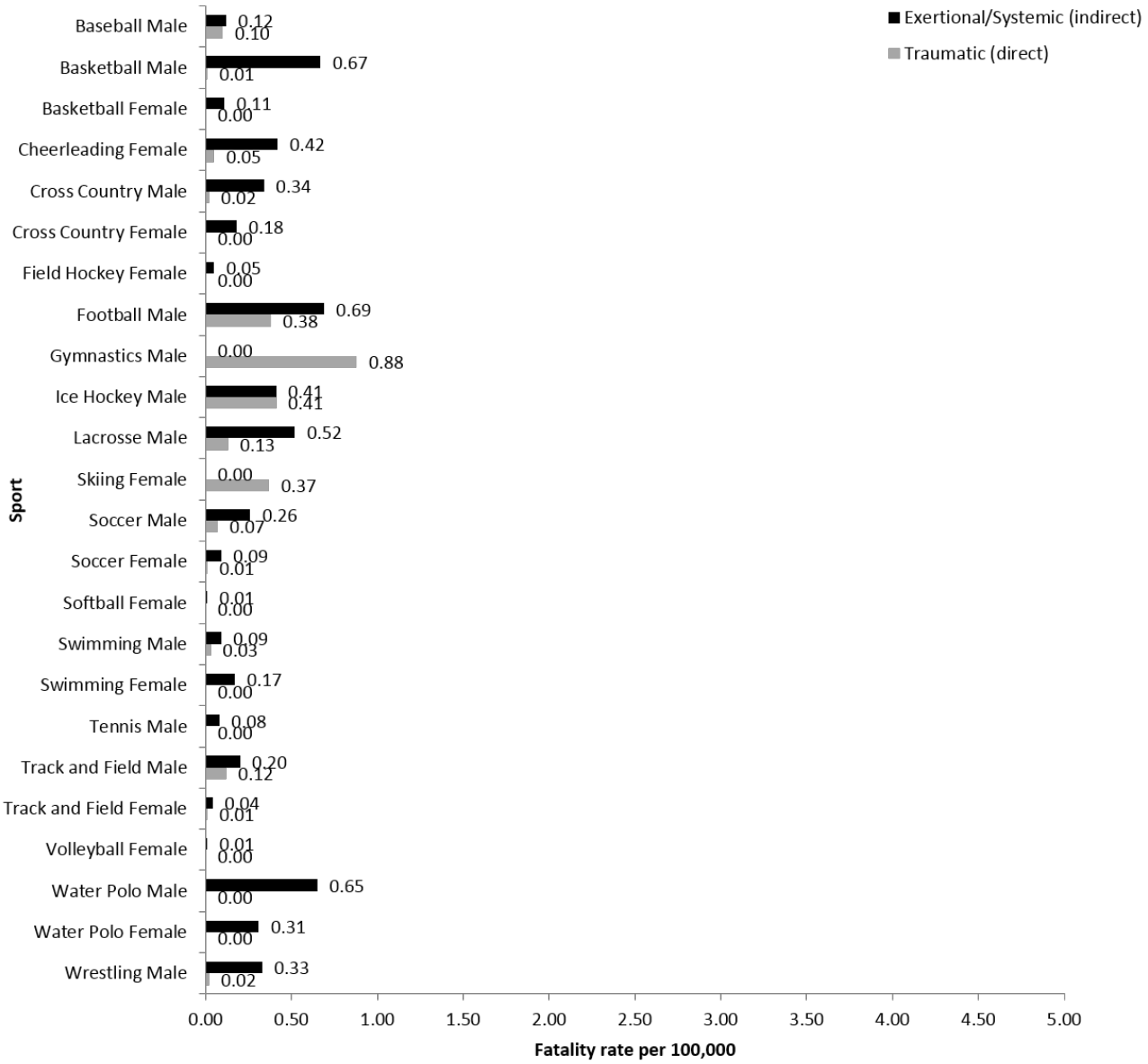
Table 12. Participation numbers, 1982-1983 to 2014-2015

	High School[1]		College[2]	
	Female	Male	Female	Male
Baseball	30,576	14,676,482	-	845,076
Basketball	14,099,994	17,587,150	442,142	500,681
Cheerleading	1,906,200	48,745	-	-
Cross Country	4,961,360	5,865,002	359,221	368,880
Equestrian	19,116	3,357	21,719	1,023
Field Hockey	1,866,623	4,487	176,734	-
Football	27,815	32,949,535	-	1,884,123
Golf	1,682,995	4,732,141	94,049	250,984
Gymnastics	770,508	113,728	49,261	17,644
Ice Hockey	134,970	975,538	32,395	128,090
Lacrosse	1,115,187	1,551,520	169,490	232,447
Rowing	56,604	47,965	150,697	70,906
Skiing	273,581	331,414	16,633	20,385
Soccer	7,753,413	10,029,784	503,507	592,398
Softball	10,803,113	50,316	454,906	-
Swimming	4,059,376	3,242,805	319,714	267,387
Tennis	5,047,532	4,736,647	266,821	256,032
Track and Field	14,491,567	17,803,850	1,088,206	1,288,854
Volleyball	11,764,440	1,068,675	411,007	36,451
Water Polo	320,529	459,420	20,281	32,461
Wrestling	104,320	8,108,285	-	224,089

[1]NFHS available online: http://www.nfhs.org/ParticipationStatics/ParticipationStatics.aspx
[2]NCAA accessed online: http://www.ncaa.org/about/resources/research/sports-sponsorship-and-participation-research

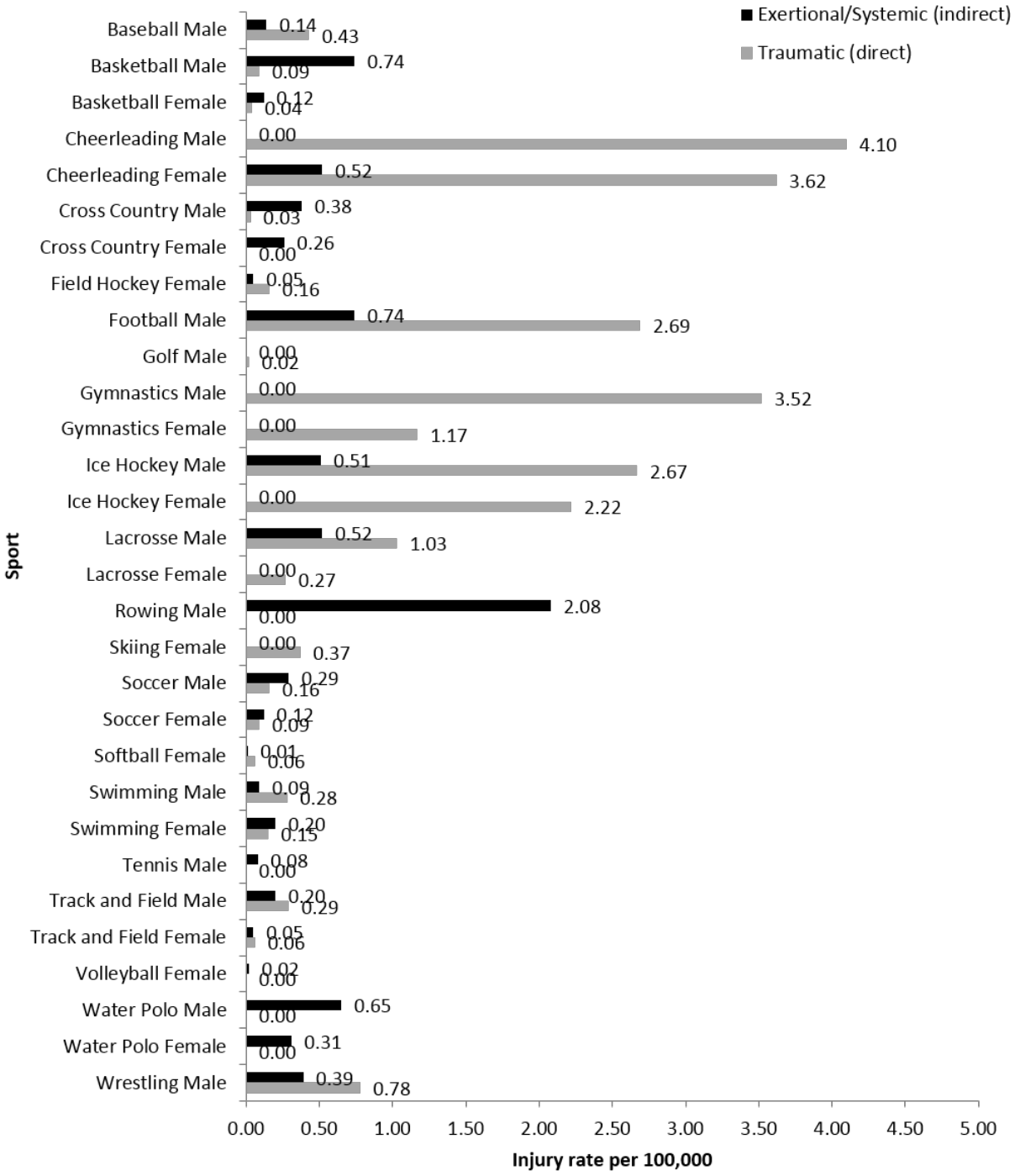
Note: Not all high schools and colleges are members of the NFHS and NCAA. Complete data is not available for the non-member schools. Therefore, these participation numbers underestimate the total number of high school and collegiate participants in the United States.

Figure 1: Rates of <u>fatal</u> catastrophic direct and indirect injuries/illnesses by sport-gender among high school participants, 1982/83-2013/14



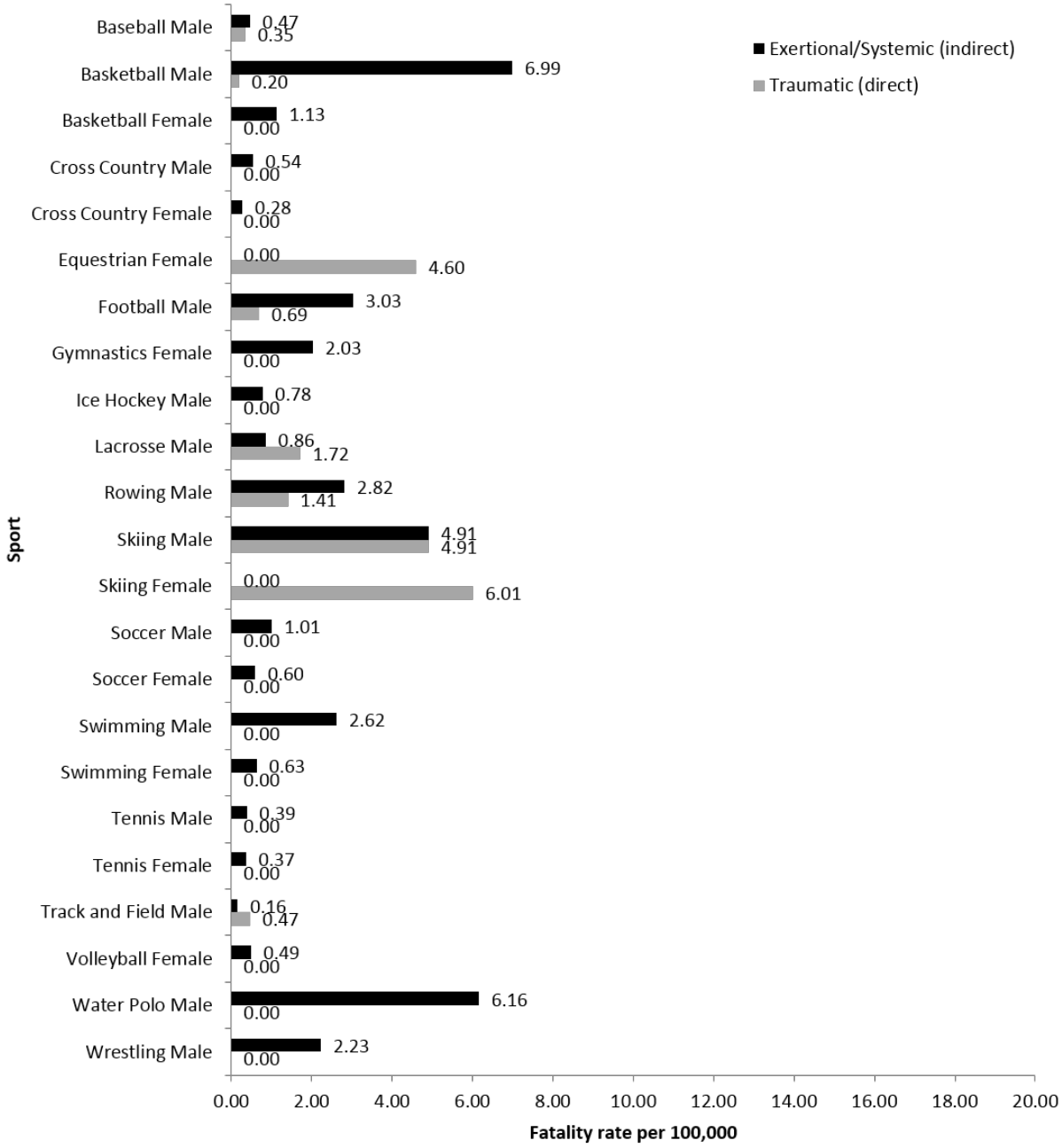
Note: Rates with number of incidents less than 5 should be interpreted with caution.

Figure 2: Rates of <u>all</u> catastrophic direct and indirect injuries/illnesses by sport-gender among high school participants, 1982/83-2013/14



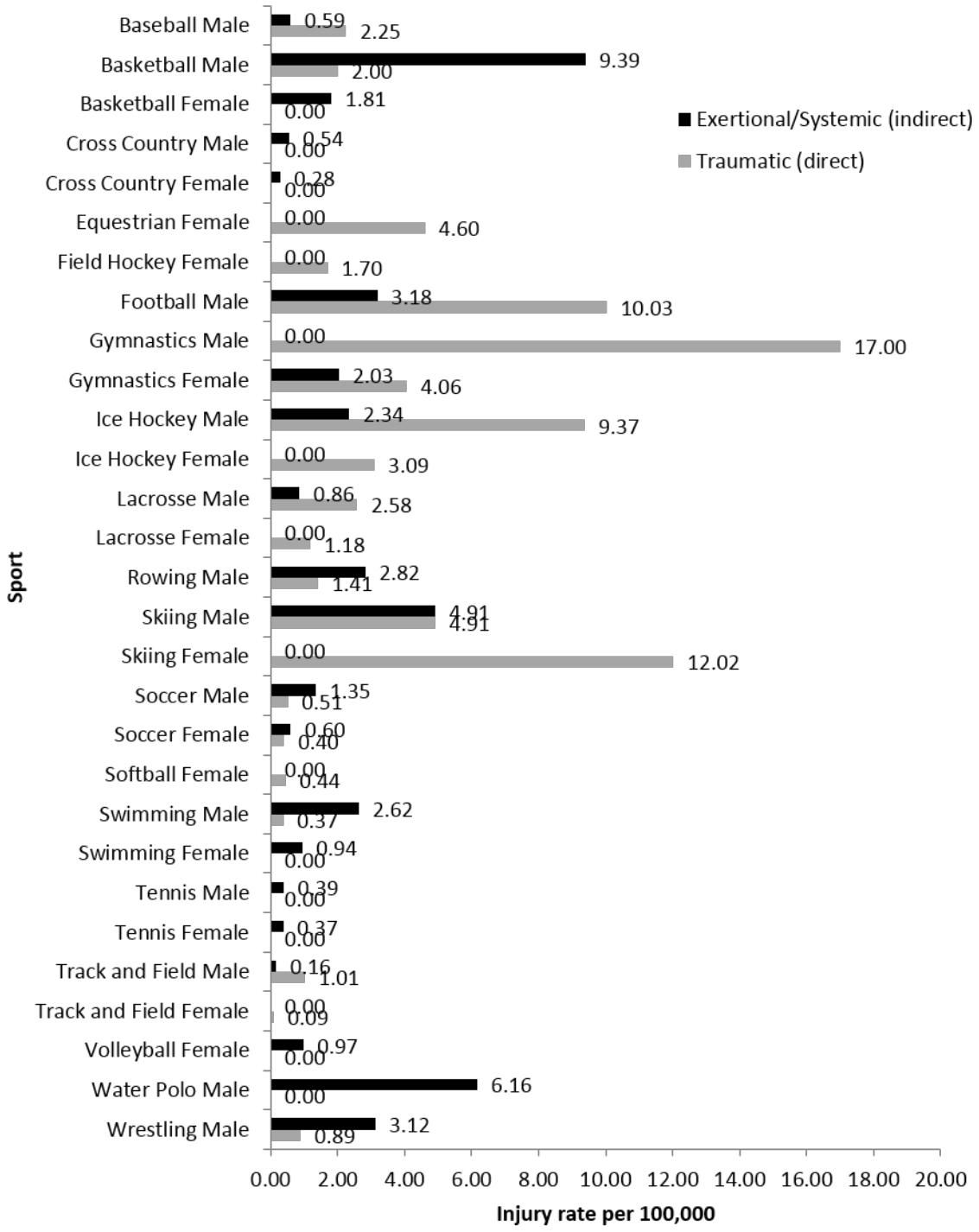
Note: Rates with number of incidents less than 5 should be interpreted with caution.

Figure 3: Rates of fatal catastrophic direct and indirect injuries/illnesses by sport-gender among Collegiate participants, 1982/83-2013/14



Note: Rates with number of incidents less than 5 should be interpreted with caution.

Figure 4: Rates of <u>all</u> catastrophic direct and indirect injuries/illnesses by sport-gender among Collegiate participants, 1982/83-2013/14



Note: Rates with number of incidents less than 5 should be interpreted with caution.