FATAL CATASTROPHIC INJURIES AND ILLNESSES IN NC YOUTH ATHLETES



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SPORT-RELATED CATASTROPHIC INJURY OR ILLNESSES

Sports-related conditions that directly result in either

1. **Fatality**
2. **Permanent disability, such as paraplegia**
3. **Life-threatening, with recovery**

- **Examples of catastrophic sports injuries include spinal cord injury, severe traumatic brain injury, exertional heat stroke, and sudden cardiac arrest**



NC CASE STUDY

- Male 16 year old high school junior basketball player was **practicing with his youth league team when he collapsed.** He was **attended to by first responders who performed CPR. EMS arrived and used AED.** He was transported to the hospital where he underwent surgery. He was diagnosed with an enlarged heart. A full recovery is expected.
- Prevention Opportunities :
  - **Pre-participation medical evaluation to detect medical conditions**
  - **Training in CPR and AED use**
  - **Emergency action plans**
  - **Access to AEDs**
  - **Advanced medical care**



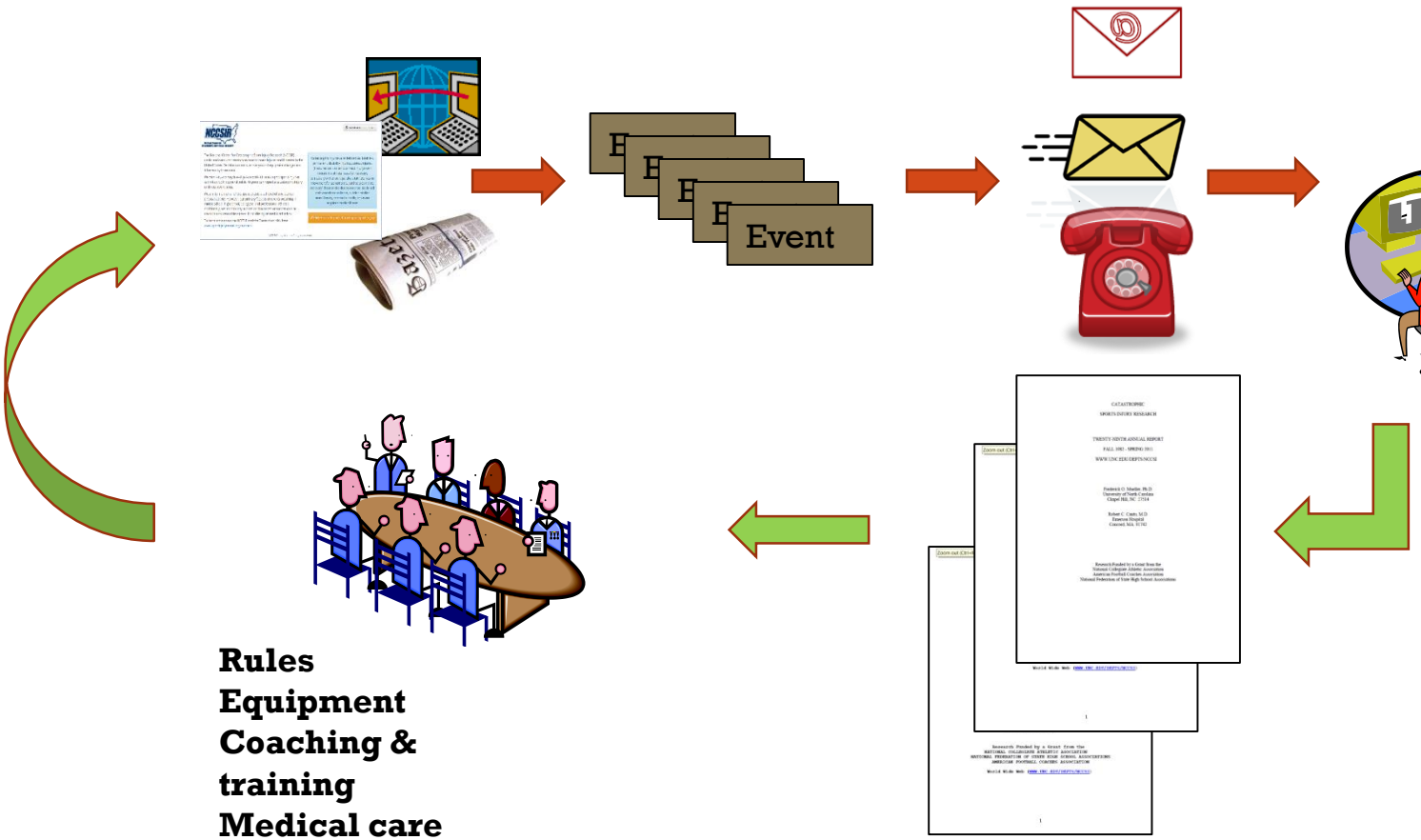
Data from National Center for Catastrophic Sport Injury Research (NCCSIR)

THE CONSORTIUM FOR CATASTROPHIC INJURY MONITORING IN SPORT

- **NCCSIR has existed since 1982**
- **Expanded in 2013 to develop a stronger national active surveillance program and improve reporting and monitoring of these catastrophic sports injuries.**
- **A national partnership between UNC-CH, U.Washington, U.Conn, Boston U., U. of Maryland, U of Colorado, & the Datalys Center, Inc.**
- **Support from national sport organizations (NCAA, NFHS, AFCA) and medical organizations (NATA, AMSSM) and research grants (NOCSAE)**



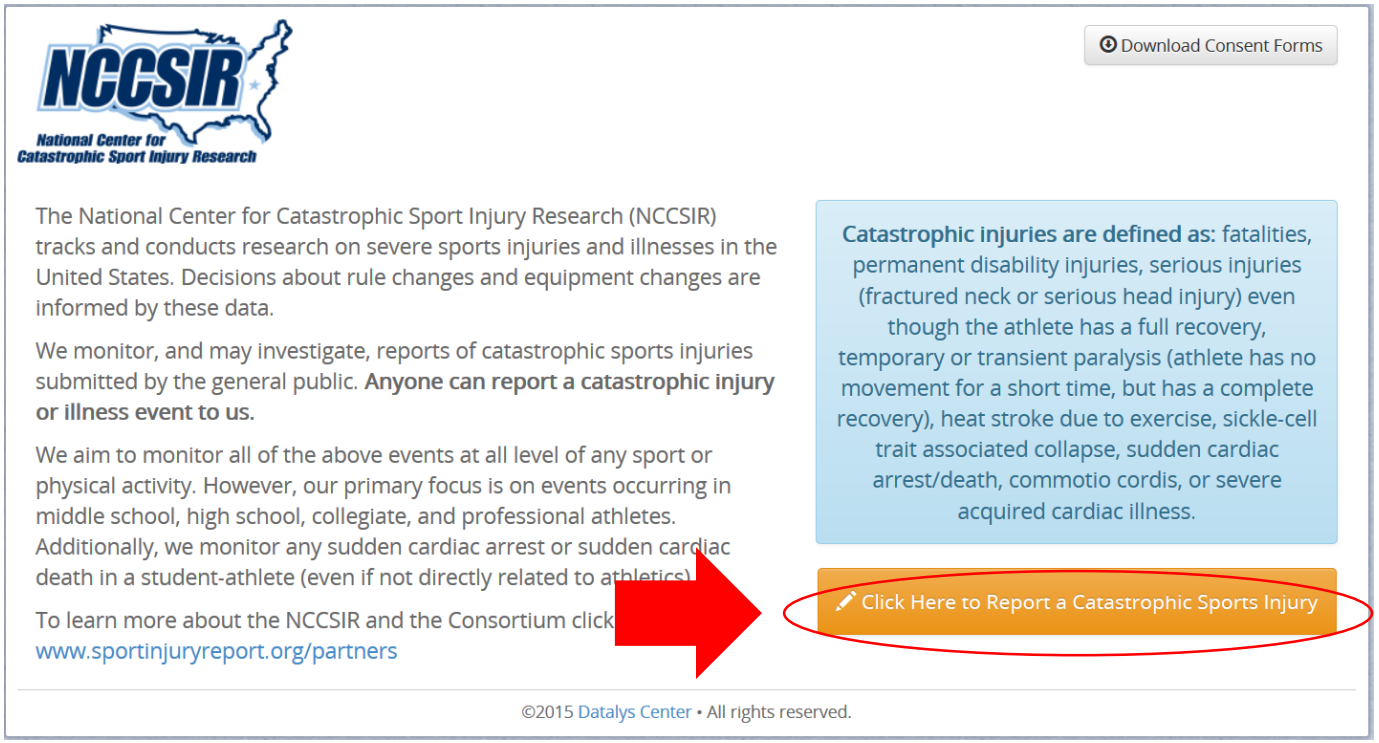
NCCSIR SURVEILLANCE METHODS



Gather info:
Interviews
Medical records
Autopsies

Rules
Equipment
Coaching & training
Medical care

HTTPS://WWW.SPORTINJURYREPORT.ORG



TARGET POPULATIONS

Organized and sponsored sport participants

- **Collegiate & university**
- **High school**
- **Middle school**
- **Youth sport**



NC CASE STUDY

- Male 12 year old middle school baseball player was pitching at practice when he **sustained a line drive hit to the head. He had leaned slightly outside the pitching screen when he was hit.** He was transported by EMS to the hospital where he later died. **Cause of death was suspected to be due to a head injury**.
- Missed Prevention Opportunities :
  - **Adequate protection against risk**
  - **Training in CPR and AED use**
  - **Emergency action plans**
  - **Access to AEDs**
  - **Advanced medical care**

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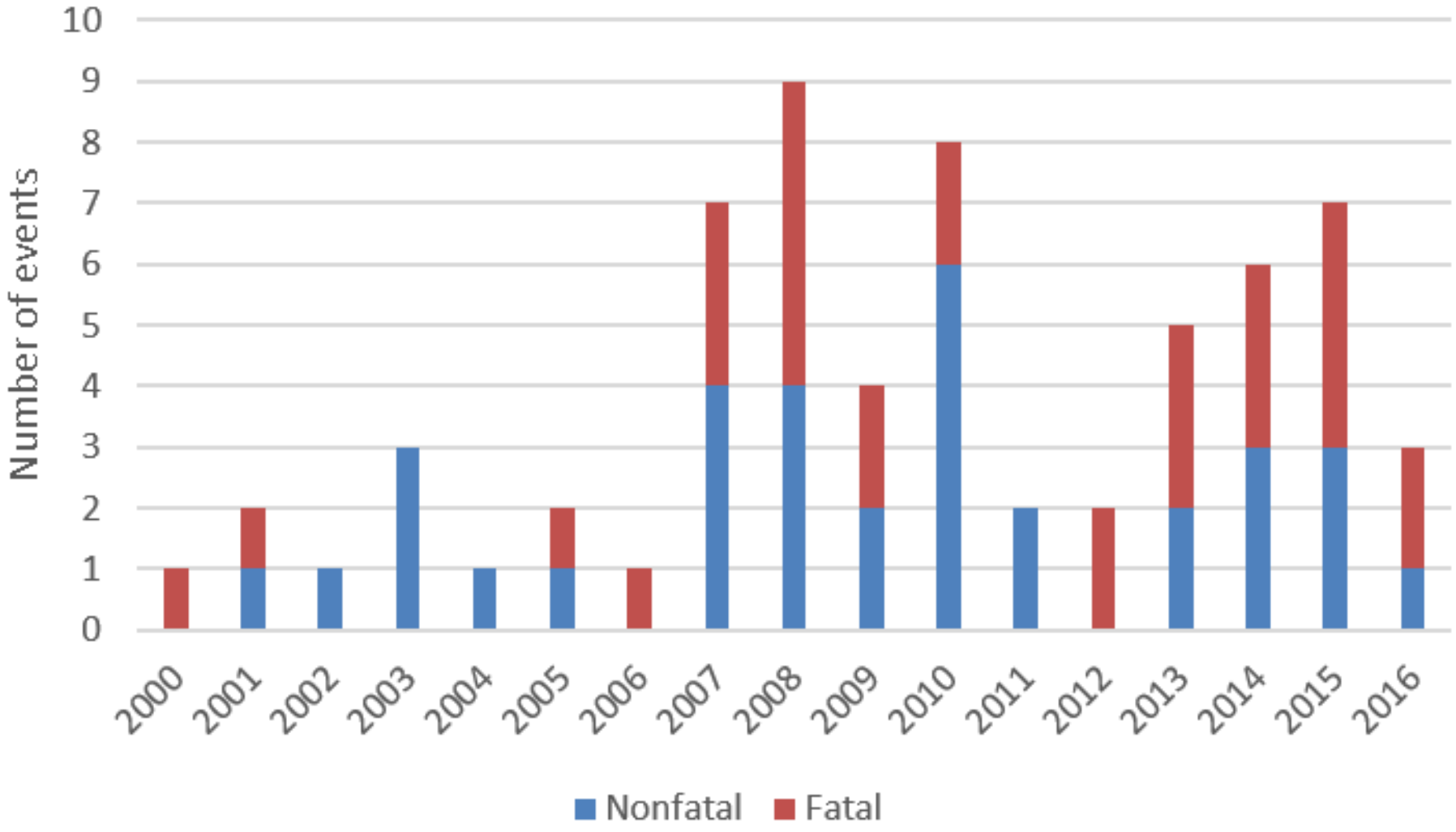
CATASTROPHIC INJURIES AMONG NC SPORT PARTICIPANTS

- **203,488 NC high school athletes (2016-17 School Year)[1]**
  - **12th highest for U.S. high schools**
  - **Unknown number of middle school and youth sport participants**
- **Among NC sport participants from 2000-2016*:**
  - **30 sport-related deaths**
  - **34 non-fatal catastrophic events**
  - **Past 3 years: 16 events and 9 deaths**
    - **3 in 2014, 4 in 2015 and 2 in 2016**

*Data from National Center for Catastrophic Sport Injury Research (NCCSIR)



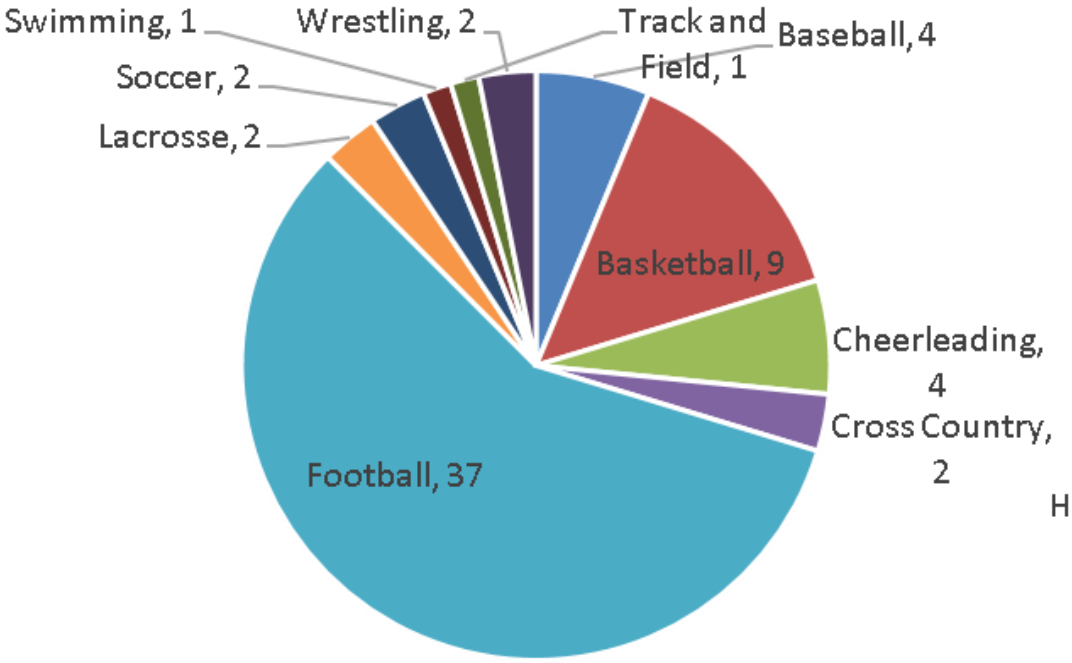
NC CATASTROPHIC EVENTS BY YEAR

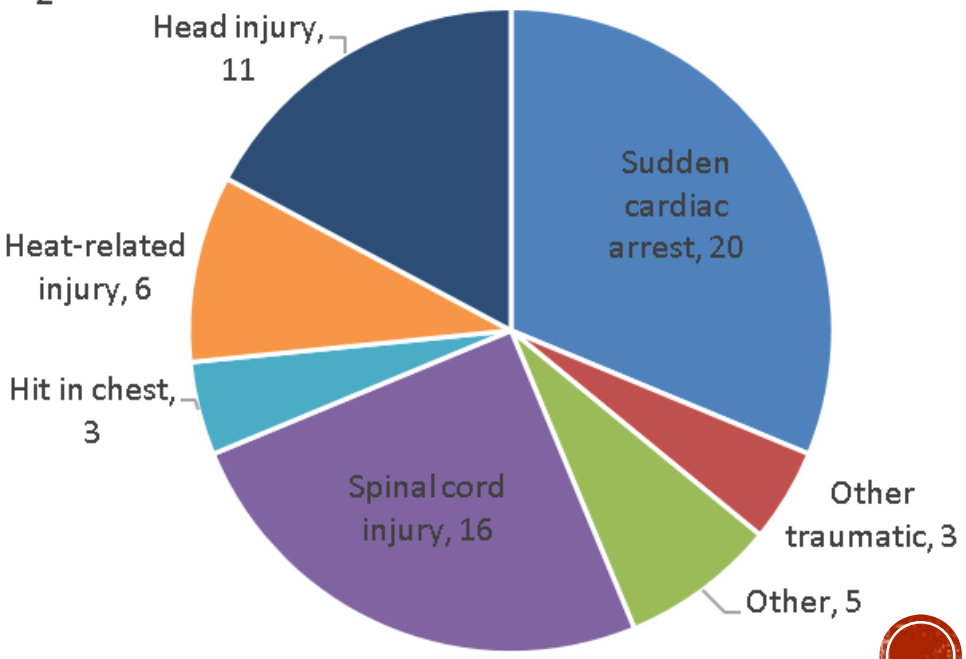


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CATASTROPHIC EVENTS BY SPORT & TYPE





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NC CASE STUDY

- Male 17 year old high school football linebacker **collapsed during a pre-game warmup.** 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.
- Missed Prevention Opportunities :
  - **Recognize concussion, treat, remove from play**
  - **Return concussed athletes to play only when symptom free and fully healed**
  - **Clearance from medical professionals**
  - **Implement emergency action plan**
  - **Access to advanced medical care onsite**



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NC CASE STUDY

- Male 16 year old high school player was injured during the second quarter of the game and died later the same day. **He collapsed on the sideline after being tackled while running the ball. He received a concussion in practice two days before the game and did not have clearance from a physician.** Cause of death was a traumatic brain injury due to second impact syndrome.
- Missed Prevention Opportunities :
  - **Recognize concussion, treat, remove from play**
  - **Return concussed athletes to play only when symptom free and fully healed**
  - **Clearance from medical professionals**
  - **Implement emergency action plan**
  - **Access to advanced medical care onsite**



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U.S. HIGH SCHOOL STATE-LEVEL POLICY ASSESSMENT

- **Korey Stringer Institute 2017 study assessed if state meets best practice guidelines addressing the four major causes of sudden death for that age group**
  - **Cardiac arrest, traumatic head injuries, exertional heat stroke, and exertional sickling occurring in athletes with sickle cell trait [2]**
- **North Carolina led the nation in having the most comprehensive health and safety school policies**
  - **79% compliant with ideal being 100% [3]**
  - **Followed by Kentucky at 71%, at the bottom were Colorado (23%) and California (26%)[3]**
  - **http://ksi.uconn.edu/high-school-state-policies/**



CURRENT NC LEGISLATION: GFELLER-WALLER LAW

- **Evidence-based[1]**
- **For sport and activity, one of the most comprehensive of the laws in US**
  - **Requires student be removed from competition following concussion**
  - **Cannot be returned to competition until cleared by medical professional**
  - **Requires parent and athletes education on concussion**
  - **Only applies to public high schools**

[1]Casa DJ, Almquist J, Anderson SA, et al. The Inter-Association Task Force for Preventing Sudden Death in Secondary School Athletics Programs: Best-practices recommendations. J Athl Train 2013;48:546-53.



This Expert Consensus Statement Summarizes the Evidence Base for NC's Current Gfeller-Waller Law

Journal of Athletic Training 2013;48(4):546–553
doi: 10.4085/1062-6050-48.4.12
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consensus statement

The Inter-Association Task Force for Preventing Sudden Death in Secondary School Athletics Programs: Best-Practices Recommendations

Douglas J. Casa, PhD, ATC, FNATA, FACSM (Chair)*†; Jon Almquist, VATL, ATC*; Scott A. Anderson, ATC*; Lindsay Baker, PhD‡; Michael F. Bergeron, PhD, FACSM§; Brian Biagioli, EdD‖; Barry Boden, MD¶; Joel S. Brenner, MD, MPH, FAAP#; Michael Carroll, MEd, LAT, ATC*; Bob Colgate; Larry Cooper, MS, LAT, ATC*; Ron Courson, PT, ATC, NREMT-I, CSCS*; David Csillan, MS, LAT, ATC*; Julie K. DeMartini, MA, ATC†; Jonathan A. Drezner, MD††; Tim Erickson, CAA‡‡; Michael S. Ferrara, PhD, ATC, FNATA*; Steven J. Fleck, PhD, CSCS, FNSCA, FACSM§§; Rob Franks, DO, FAOASM‖‖; Kevin M. Guskiewicz, PhD, ATC, FNATA, FACSM*; William R. Holcomb, PhD, LAT, ATC, CSCS*D, FNATA, FNSCA§§; Robert A. Huggins, MEd, ATC†; Rebecca M. Lopez, PhD, ATC, CSCS†; Thom Mayer, MD, FACEP¶¶; Patrick McHenry, MA, CSCS*D, RSCC§§; Jason P. Mihalik, PhD, CAT(C), ATC##; Francis G. O'Connor, MD, MPH, FACSM††; Kelly D. Pagnotta, MA, ATC, PES†; Riana R. Pryor, MS, ATC†; John Reynolds, MS, VATL, ATC*; Rebecca L. Stearns, PhD, ATC†; Verle Valentine, MD††**

*National Athletic Trainers' Association; †Korey Stringer Institute; ‡Gatorade Sports Science Institute; §American College of Sports Medicine; ‖National Council on Strength and Fitness; ¶American Orthopaedic Society for Sports Medicine; #American Academy of Pediatrics; **National Federation of State High School Associations; ††American Medical Society for Sports Medicine; ‡‡National Interscholastic Athletic Administrators Association; §§National Strength and Conditioning Association; ‖‖American Osteopathic Academy of Sports Medicine; ¶¶American College of

NCCSI

CFTF ISSUE APPLICATION OBJECTIVE

- **Increased awareness, coordination, and collaboration between agencies and organizations at the state level has considerable potential to assist and inform surveillance and prevention efforts.**



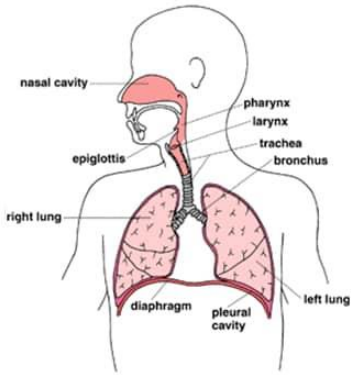
ACHIEVING OUR GOALS

- **An appropriate coalition of state agencies, including the Division of Public Health, Department of Public Instruction, and NCHSAA, could conduct many of the above-listed activities without additional state funding, if there was a collaborative coordinating structure in place.**
- **The agencies/organizations already exist and are engaged, but NC lacks a formalized and solidified infrastructure in place for them to collaborate towards these goals.**



NC CASE STUDY

- Male 13 year old middle school 8th **grader collapsed during football practice due to an asthma attack.** He **was transported to the hospital where he died a few days later**. Cause of death is pending autopsy.
- Missed Prevention Opportunities :
  - **Pre-participation medical evaluation to detect medical conditions**
  - **Training in CPR and AED use**
  - **Emergency action plans**
  - **Access to AEDs**
  - **Advanced medical care**



Data from National Center for Catastrophic Sport Injury Research (NCCSIR)

THANK YOU

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REFERENCES

- [1]2016-17 High School Athletics Participation Survey. The National Federation Of State High School Associations; http://www.nfhs.org/ParticipationStatistics/PDF/2016-17_Participation_Survey_Results.pdf
- [2]Casa DJ, Almquist J, Anderson SA, et al. The Inter-Association Task Force for Preventing Sudden Death in Secondary School Athletics Programs: Best-practices recommendations. J Athl Train 2013;48:546-53.
- [3]US News and World Report. Sports Study: High School Athletes Not Being Fully Protected: Many states are not fully implementing key safety guidelines for high school athletes. Aug. 8, 2017; https://www.usnews.com/news/news/articles/2017-08-08/sports-study-high-school-athletes-not-being-fully-protected.

