8 Million Reasons

Douglas J. Casa, Ph.D., ATC, FNAK, FACSM, FNATA
CEO, Korey Stringer Institute

This issue of Pertinacity is largely dedicated to our Raise Your Rank initiative - the innovative program that aims to assist all 51 states (including D.C.) to implement essential health and safety policies for high school athletes. We have 8 million reasons as to why this program matters so much to the staff at KSI, and that is because we hope to enhance health and safety policies across the country, which could positively impact every one of the 8 million high school athletes in America. We are extremely grateful for the support of donors that have already contributed, but the initial seed funding from the NATA and NFL have allowed this 1-million-dollar fundraising campaign to begin with a resounding success.

Given the governing structures of high school sports in America, the process of change needs to be done on a state-by-state basis. Holding individual state meetings are needed to confront and overcome the many issues and nuances for implementing high school sport policies. Most states have a Sports Medicine Advisory Committee (SMAC) made up of medical doctors with expertise in sports medicine, athletic trainers, and other affiliate health care professionals who are involved with health and safety issues for high school athletes. Each state also has a high school athletic association that governs the high school sports program for their state. In most states, these two entities work together to push forward essential health and safety policies. Additionally, some health and safety policies are funneled through state laws, with the SMAC and state high school athletic association providing the supporting materials to implement the law within the athletic programs.

On August 8, 2017 KSI released the first ever rankings of the 51 states as it relates to health and safety issues that prevent sudden death in high school sport. Our main intention of the rankings was to educate the public on two items: 1) best-practice health and safety policies relating to the prevention of sudden death in high school sport, and 2) how each state performs within each of these metrics. Additionally, through this effort, we provided potential solutions for states considering adoption of a policy by highlighting states that have excelled in that particular policy. Ultimately, it produced vital information to help protect the 8 million high school athletes in the country, and their parents, who are concerned for their safety. Most parents are completely unaware that their child’s school does not have simple policies in place that would protect their child if an emergency occurred or prevention strategies to avoid the onset of the condition in the first place. This initiative brings to light the importance of assessing the current status of health and safety policies nationwide and pushing for proactive change.

The past 12 months have been overwhelmingly positive, certainly the best year of my career, and a very exciting time at KSI. We certainly had a few people upset by the rankings and many of them expressed those emotions to me and my staff. As an example, in this issue of Pertinacity on page 14, you can find the NFHS (the national organization for high school sports) press release that was published concurrently with our press conference on August 8, 2017. While this document shows that both organizations have the same goal, maximizing health and safety of high school athletes, we have very different beliefs in how this is best accomplished. The feel-good part of this journey is that the overwhelming response has been a positive story of a large majority of SMACs and state high school athletic associations willing to work to improve health and safety policies.

Amazingly, at least 21 states made policy changes in the 12 months since the rankings were released. The August 2018 version of the updated rankings can be found on page 17 of this issue. We were very fortunate to have successful in-person state meetings in Florida and New Jersey in 2018, and in both cases, they made incredible progress. Florida jumped from 23rd to 5th, and New Jersey made the impressive leap into the top spot in our rankings. All of this is not rosy though, and much work still needs to be done in these states. Each state SMAC encountered resisted even on their strongest recommendations to their state: New Jersey failed to make WBGT policies for work-to-rest modifications based on the environmental conditions, and Florida failed to implement cold water immersion tub policies for exertional heat stroke care. Florida’s example is amazing when you think that it led the country in exertional heat stroke deaths since 2010 and it is FLORIDA. You would think this policy would be the most obvious, but it has yet to be recognized as essential. For 8 million reasons, we need to press on and have these policies adapted in NJ, Florida and numerous others across the country. Our hope is that in the next few years adoption of essential health and safety policies will continue to climb at a rapid rate, and we are hopeful that we can provide extensive assistance during this process.
National Football League: The National Football League is a founding partner of the Korey Stringer Institute. The NFL supports multiple player safety initiatives for athletes of all levels. For more information on the NFL’s Health and Safety Initiatives, visit NFL Evolution.

Gatorade: Gatorade is a founding partner of the Korey Stringer Institute. Gatorade and the Gatorade Sport Science Institute continue to search for and study new and innovative ways to help athletes improve performance by facilitating proper hydration and nutrition.

National Athletic Trainers’ Association: The National Athletic Trainers’ Association is the professional membership association for certified athletic trainers and others who support the athletic training profession. Its mission is to engage and foster the continued growth and development of the athletic training profession and athletic trainers as unique health care providers.

University of Connecticut: The Korey Stringer Institute is housed at the University of Connecticut. The Department of Kinesiology faculty are renowned for their research and expertise in the areas of heat and hydration, injury prevention, and strength and conditioning.

Camelbak: The mission of Camelbak is to continuously reinvent and forever change the way people hydrate and perform. Visit Hydrated for useful resources on hydration practice.

Kestrel Pocket Weather Meters by Nielsen-Kellerman: Nielsen-Kellerman is committed to ensuring that people know the weather and environmental conditions that impact their health, safety, and bottom line. NK’s Kestrel meters are rugged, accurate, fully calibrated, portable, affordable and easy to use. KSI uses these wet bulb globe temperature thermometers to determine environmental conditions during research studies both inside the heat chamber and in field studies. Visit heatstress.com for resources on physical activity in heat stress.

Mission: Mission has a dual mission. While delivering world-class innovations that meet the unique needs of an athletic lifestyle, Mission also makes an impact off the field of play through the M Foundation, which promotes the health and safety of youth athletes, and simultaneously recognizes and awards high school athletes that give back to their community.

Heartsmart.com: HeartSmart.com is a leading provider of Automated External Defibrillators, also referred to as AEDs. HeartSmart.com offers AED program to support AED owners with essential services, support, product maintenance, and training.

Eagle Pharmaceuticals: Eagle Pharmaceuticals is a specialty pharmaceutical company focused on developing injectable products, primarily in the areas of critical care, orphan diseases, and oncology. Its goal is to provide safer and more convenient solutions for patients and health care professionals with optimized formulations.
"This Death Was Preventable" 
InsideClimateNews Article

NFHS Responds to Korey Stringer Institute 
Ranking of High School Associations 
Regarding Managing Injury Risk

RACE: Exertional Heat Stroke

States Moving to Protect High School Athletes from Heat 
Stroke, Sudden Cardiac Arrest, Other Serious Injuries


Ranking Rubric Elements

KSI Financial History

Raise Your Rank & Upcoming Events

ATLAS Update

KSI Sleep Research

Exertional Heat Stroke Survivor Story

KSI Elite Athlete Testing

Preventing Sudden Death in Strength and Conditioning Sessions

Korey Stringer Institute Intern Experience

KSI at the Falmouth Road Race

Personal Story
I recognized that this passion for research could become a future career while in my junior year of my undergrad at the University of Washington. Thankfully, I had a professor there, Dr. Keith Stamm, who was willing to take me under his wing and help me better understand the research process. His guidance led me to completing an Honor’s Thesis and then pursuing a Master’s degree in Journalism and Communication at The Ohio State University.

Although I had plans to obtain a PhD, there, I found myself struggling with doing all this research and not really knowing how this applied to the real world. However, this concern changed when a good friend of mine became diagnosed with HIV. Worse yet, despite being in a high risk population as a gay man, I knew absolutely nothing about the disease. Suddenly, this desire to learn more about HIV prevention led to taking a job with the Columbus AIDS Task Force after I defended my Master’s Thesis. Working at the Columbus AIDS Task Force was an experience that allowed me to learn more about the intersections of prevention, clinical care, and research. A huge perk of working there was the opportunity they provided to take public health-related coursework at Ohio State. From here, I made a decision to pursue a Master’s in Public Health. While there, I met Dr. Dawn Comstock, who recruited me into the world of injury epidemiology and injury prevention research, where I have been for the past 10 years. I obtained my MPH in 2010, funded by HIV prevention projects yet also learning more about injury prevention research. From there, I headed to the University of North Carolina at Chapel Hill to work with Dr. Stephen Marshall and obtain a PhD in Epidemiology. It was during my doctoral studies that I first met Dr. Doug Casa at KSI who mentored me on research related to exertional heat illness prevention.

After completing my doctoral work in 2014, I worked with Data1ys Center for Sports Injury Research and Prevention, serving as the Director of the National Collegiate Athletic Association Injury Surveillance Program. Working at Data1ys and with the NCAA was a very positive experience. Not only was I able to work with the NCAA injury surveillance data, but I was able to nurture my relationships with individuals such as Drs. Comstock, Marshall, and Casa, while building new ones with researchers from other institutions. It was through these collaborations with numerous injury prevention, athletic training, and sports medicine experts that I have been fortunate to publish a large number of research articles related to injury surveillance and traumatic sport-related injuries such as concussions and exertional heat stroke.

Could you tell us about your first involvement/interaction with KSI? While I was a doctoral student at UNC, I was encouraged by my advisor to consider applying for a SOPHE/CDC Student Fellowship in Unintentional Injury Prevention. Although my interest in sports-related concussions was growing, I wanted to take this opportunity to examine other injuries that were potentially catastrophic if not prevented and managed properly. Dr. Marshall recommended that I speak with Dr. Casa about exertional heat illness, particularly the guidelines on preseason acclimatization in the secondary school setting. I knew Dr. Casa was an expert and emailed him out of the blue, not expecting him to reply. But Dr. Casa replied almost immediately and thus, began a wonderful working relationship. It has been an honor and a pleasure to have continued working together on numerous projects.

In what ways has KSI impacted you? KSI has allowed me to continue my goal of meeting other researchers interested in sports injury research and prevention. More importantly, these individuals come from a number of backgrounds, be they physicians, athletic trainers, or public health practitioners. Every person has a unique perspective on research and it has greatly benefited my research by allowing me to think about my methodological approaches, data interpretations, and future research directions a lot more holistically. KSI and their many alum are some of the hardest working individuals I know.

"KSI has allowed me to continue my goal of meeting other researchers interested in sports injury research and prevention. More importantly, these individuals come from a number of backgrounds, be they physicians, athletic trainers, or public health practitioners."
**Could you tell us a little about yourself?**

I'm currently the Director of Product Management for Nielsen-Kellerman (NK), manufacturer and distributor of NK Rowing products and Kestrel Instruments -- including the line of Kestrel Heat Stress Trackers.

A large part of my role at NK is to help to define the right product for the right market at the right price. Since joining NK 20 years ago, I've worked in almost every department, starting as an assembler, then wearing titles of Assistant Production Manager, Sales Manager and Director of Engineering. Working in various departments and serving in different roles has enabled me to gain a more complete understanding of what it takes from start to finish to turn an idea into a useful product that will benefit customers.

A Philadelphia native, I started rowing at La Salle College High School, and continued to row at the University of Miami while earning a degree in Mechanical Engineering. I then took up sculling while pursuing a Master's degree in Naval Architecture/Ocean Engineering at University of California at Berkeley. After graduation, I returned to Philadelphia to continue sculling at Undine Barge Club. As a former college athlete and now recreational rowing enthusiast and coach, I understand the responsibility, passion, and commitment involved when it comes to overseeing student health and safety. The launch of the Kestrel Heat Stress line was born out of this need and desire to help prevent exertional heat stress illness or death.

**Could you tell us about your first involvement/interaction with KSI?**

One of the most memorable events that comes to mind is attending the Falmouth Road Race with KSI. We were able to witness firsthand the knowledge and expertise of the KSI team. It was incredible to watch how many people came through the tent with potential heat-related injuries or illness – and then were examined, treated, and walked away! Everybody that came through the KSI tent that day seeking help walked away safe and alive.

**In what ways has KSI impacted you?**

“Cool first, transport second.” That phrase is something that sticks with me as a message I learned from my interactions with Doug Casa and KSI. It’s an important bit of knowledge that could help save lives in a life or death emergency situation. The impression that KSI has left on me is one of a passion to protect lives and prevent heat-related injury to athletes, soldiers, and workers.

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**Can you tell us a little about yourself?**

I am a junior majoring in Allied health at the University of Connecticut. I am originally from Massachusetts, but I have felt at home here at school. I love to be involved on campus as evidenced by being Treasurer of the club gymnastics team and Vice President of an organization called Changing Health Attitudes and Actions to Recreate Girls (CHAARG). CHAARG is all about health and wellness while empowering women. I am also a Student Health Worker at Student Health Services and have just recently started working as an EMT for a nearby town. This past winter I went beyond campus and traveled to Nicaragua with Global Brigades where I provided underprivileged communities with much needed medical care. My future plans involve traveling abroad and applying to post graduate physician assistant programs.

**Tell about your first involvement/interaction with KSI?**

Having been a gymnast all my life, I have always been interested in sports medicine. I knew that I wanted to partake in research at the University so my advisor, knowing my interest in the field of kinesiology, recommended I reach out to Dr. Casa at KSI. As a second semester sophomore, I attended a new member meeting where all studies being conducted were explained. Ultimately, I was paired with Dr. Scanneo on her ongoing project, State High School Sports Safety Policies, where I helped search for updated safety policies in each state. The main goal of the study is to establish policies and procedures for state high schools to help prevent fatalities. I had a wonderful experience and plan to work for KSI for as long as I can during my time at UConn.

**In what ways has KSI impacted you?**

Working with KSI opened another door for me that I never expected when I started. I have learned about numerous sudden deaths in sports and how policies and their implementation is very important in preventing these fatalities. KSI employed me with a summer job with flexible hours. Through that time, I was able to fully understand the research process and help with some of the lab studies being conducted, such as collecting data for the Falmouth Road Race. All the staff and graduate students at KSI are extremely helpful in sharing their knowledge and mentoring me, inspiring me to come back for more. I can not wait to see what the rest of my time at KSI holds for me and I am eager to see how much of an impact we can make in that time.
'This Was Preventable’: Football Heat Deaths and the Rising

Reprinted with permission from Inside Climate News By: James Bruggers on July 20, 2018

Laurie Giordano had just arrived after her son collapsed on his high school football practice field in Fort Myers, Florida.

It was June 29, 2017, and she remembers it with painful clarity.

The Riverdale High School teammate who knocked on her car window at the end of a sweaty practice, telling her that her son couldn’t get up on his feet. Her son, cradled in a coach’s arms, making a slow, repetitive moaning sound, while players poured water in his mouth. The coach saying the player was just a little overheated.

The ambulance arrived, but 10 days later, Zach Martin-Polsenberg, a 16-year-old lineman, was dead, a victim of heat stroke. In the ambulance, Zach opened his eyes a few times and squeezed his mother’s hands, but that was the last of their communication.

Heat stroke can occur in all states. But researchers studying student athletes, especially football players during summer workouts, see more of it in the East, and particularly the Southeast, where sweltering temperatures, high humidity and intense sunshine make for a trifecta of deadly risk, and where high school football is very popular. These weather conditions are only getting worse as the climate changes, bringing more heat and humidity.

Just as coastal cities brace for rising seas and communities and farms look for ways to manage heavier rain, there’s an increasing awareness that adapting to climate change includes protecting people from heat, including young athletes. Yet a new ranking of states by their heat safety measures for youth sports shows that many states are falling to require simple precautions that could save lives.

"Heat is already a major safety hazard for athletes and the broader public," said Andrew Grundstein, a University of Georgia professor of geography and climate science. "Yet we should still be able to do the activities like sports that we enjoy. Considering that our climate is warming, it is even more important that we have heat safety guidelines and policies. This will help us adapt and be more prepared for the more frequent hot conditions."

Through her grief, a shocked Giordano tried to figure out how this could have happened and concluded Zach’s high school had not taken the potential for heat stroke seriously.

So she spent the last year trying to convince Florida authorities to tighten their heat-safety rules. Giordano shared Zach’s story with the leadership of the Florida High School Athletic Association, but she was only partly successful; the association bucked its own medical advisory committee by voting to "strongly recommend," but not mandate, a first-aid tool experts say could have saved Zach’s life—a cooling tub, water and some ice.

"I felt like I couldn't just sit in my grief and have it happen again," Giordano said. "I don't think I could live with that, knowing that I hadn't done anything to try to make for change."
Summer Days Are Getting Hotter

Since 1995, three football players a year on average have died of heat stroke, most of them high schoolers, according to the National Center for Catastrophic Sport Injury Research, which tracks football injuries and deaths. In the last five years, the average was about two—still too many when these deaths are avoidable.

Max Gilpin, a 15-year-old, was overcome by heat during an August football practice in 2008 at his Louisville, Kentucky, high school. There was no cooling tub there, either, recalled his mother, Michele Crockett.

"This was preventable," said Crockett, who advocates for football safety through the Max Gilpin Beat the Heat Fund.

"What our family went through was horrific," she said. "He struggled for three days in the hospital. We watched all that. We watched as his organs shut down. I never saw him regain consciousness again."

Grundstein has been studying the impact of extreme heat on high school football for several years. He and his fellow researchers have identified the players most at risk of heat stroke—the largest ones—and studied the most dangerous practice weather based on a more sophisticated way of measuring heat.

Developed for the military, certain kinds of heat stress monitors now recommended for high school football practices take into account temperature, humidity, wind speed, sun angle and solar intensity instead of merely temperature. Heat stress monitors also go beyond the commonly used "heat index," which factors in temperature and humidity to provide the "feels like" temperature numbers commonly used by forecasters and weather apps.

Southeastern states, Grundstein said, already experience 40 to 60 days when heat stress factors can become extreme enough for schools to stop outdoor practices—roughly a heat index of 103 degrees. In the next 20 to 50 years, Grundstein expects an additional 30 days of these conditions in the Southeast, with other parts of the country also affected, but to a lesser yet still significant degree.

"Almost the whole country is going to see a lot more of these days in the summer, and they will extend into the spring and fall," Grundstein said. "In the long term, we are going to see more hot, humid days that are going to pose a hazard to athletes."

The Southeast was the slowest region of the country to heat up over the last century, but that's changing, led in large part by warmer nighttime temperatures, said Kenneth Kunkel, a climate scientist and research professor at North Carolina State University and a lead author of the most recent National Climate Assessment.

Since the 1980s, nationally, "it's been steamrolling upward, and the story is not different than that in the Southeast. If you look at the Southeast now, since the 2010s, it's actually the warmest period on record."

As global warming continues, Kunkel said, the Southeast's temperatures will rise.

Hydration is for Survivors

Football's tradition for tough summer workouts despite heat and humidity was described in a 1975 commentary, "Dog Days and Siriasis—How to Kill a Football Player," in the Journal of the American Medical Association, by Dr. James P. Knochel of Dallas. An archaic term for heat stroke—siriasis—came from the expression "the dog days of summer," or the time of the year when the dog star, Sirius, rose in the morning with the sun, Knochel wrote.

It was not uncommon, according to the JAMA commentary, to deny players water or to give overweight lineman diuretic pills to help them lose weight by ridding their bodies of needed water and salt.

Wearing full protective gear and helmets in the heat would also toughen up the players, the coaches' believed.

"People thought hydration was for weaklings," said Michael F. Bergeron, an expert on exercise-heat stress who has advised the International Olympic Committee and the Federation of State High School Associations. He recalled a scene in the 2000 movie "Remember the Titans" in which the coach played by Denzel Washington tells a player that "water is for cowards."

Hydration helps maintain blood flow to muscles, vital organs and the brain, and assists in sweating, which cools the body, Bergeron said. But in hot, humid weather, sweat does not evaporate very well. So people cannot release as much heat through sweating and are at greater risk for dangerously overheating. Well hydrated athletes can still overheat "if the activity is too hard, for too long, especially while wearing too much uniform and protective gear," said Bergeron, the senior vice president of SIVOTEC Analytics, a sports technology and analytics company.

Heat stroke, with a rectal temperature greater than 104 degrees and other symptoms, can cause the brain or other organs to swell, possibly resulting in permanent damage or death, according to the Mayo Clinic.

"Almost the whole country is going to see a lot more of these days in the summer, and they will extend into the spring and fall," Grundstein said.
These High School Policies Can Save Lives

If cooling tubs can now be considered climate adaptation, so can other heat-safety recommendations from the Korey Stringer Institute at the University of Connecticut, named for the Minnesota Vikings football player who died from heat stroke in 2001.

The institute conducts research and education on how to keep athletes, soldiers and laborers safe from sudden death, including heat stroke.

Last year, the institute published its first health and safety state rankings for high school athletes. The institute’s experts believe all high school teams should follow certain policies in categories such as sudden cardiac arrest, brain injury and heat, and its rankings are based on whether those recommendations are followed.

When it comes to heat, the institute wants coaches to ease players into summer workouts, limit the use of full gear and the duration of outdoor practices on hot days, and provide three hours of air conditioned breaks when two practices are held in the same day. It stresses the importance of life-saving cooling tubs by allotting three points out of 20 total possible points for states that mandate their use, and it gives more points for heat stress monitors. Heat stress monitors, which cost around $100 to $200, are “the gold standard” and reflect conditions on the practice field, said Samantha Scarne, vice president of sport safety for the institute. The tubs are the most effective way for teams to bring down body temperature, limit damage and save lives, she added.

“Without a doubt, cold water immersion has a very good cooling rate compared to other previously studied cooling methods, and it is the most feasible,” she said.
The Rankings: States and Heat Safety Measures

Using the institute's latest state-by-state safety data, updated on July 19, InsideClimate News separated out the heat scores and ranked states accordingly.

North Carolina, Hawaii, New Jersey, Utah, Georgia and Kentucky came out on top. Texas, Washington, New Mexico, California, Colorado and New Hampshire were at the bottom.

Thirty-six states received less than half the maximum heat-safety points. Only 12 states require cooling tubs, and only six require heat stress monitors.
Which States Take Heat Risk Seriously for High School Sports?

The Korey Stringer Institute ranks states on high school football safety, including heat risks. The following scores are based on 19 heat safety measures, including requiring cooling tubs, heat stress monitors, air-conditioned practice breaks and policies for easing players into summer workouts and for responding if they show signs of heat stress. No state received the top score of 100 percent.

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<td>North Carolina</td>
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SOURCE: Korey Stringer Institute
PAUL HORN / InsideClimate News
Georgia, a state that had been considered a leader with its response following a series of heat deaths several years ago, made for a perplexing case. Cooling tubs were first required by the Georgia High School Athletic Association in 2012, and a checklist that goes to coaches includes that. But it is unclear if the measure was ever enforced. Steve Figueroa, a spokesman for the association, said the requirement was left out of its main rulebook and only reinstated recently after InsideClimate News raised questions about it.

The rankings rankled some state associations and their National Federation of State High School Associations, which criticized last year’s study as incomplete and flawed by what they saw as a one-size-fits-all approach. "There has never been a time that coaches, athletic directors and school administrators were more focused on risk minimization," the federation said.

Still, the federation acknowledged "room for improvement" and said schools need more funding. States that don’t like the rankings tend to be the ones that haven’t scored as well, said Julian Tackett, commissioner of the Kentucky High School Athletic Association. "Anything that brings awareness is good," he said. Grundstein said heat safety policies are important but should reflect regional differences.

In the Deep South, players get used to really hot conditions, and that can help them during practices, he said. In northern states, student athletes can be less able to tolerate intense heat because they’re not as accustomed to it, he added.

"The rankings rankled some state associations and their National Federation of State High School Associations, which criticized last year’s study as incomplete and flawed by what they saw as a one-size-fits-all approach."
A Dangerous Loophole: Summer Practice

Max's death in Kentucky prompted officials there to make heat awareness training mandatory for all coaches and players—something Florida only required this year after Zach died.

Scarneo, of the Korey Stringer Institute, says Florida has had four high school football deaths from heat since 2010, the most for any state. The Institute wanted the Florida High School Athletic Association to mandate heat stress monitors and cooling tubs, too, she said.

So did the state association's own medical advisory committee.

"We were a little surprised that the board wasn't accepting of our recommendations," said Robert Sefcik, executive director of the Jacksonville Sports Medicine Program, a nonprofit that advocates for youth sports injury prevention, and a member of the advisory committee. That the association "strongly recommended" heat stress monitors and cooling tubs was a step in the right direction, he added.

Kyle Niblett, spokesman for the Florida High School Athletic Association, would not answer questions about why the association's board of directors had rejected its medical advisory committee recommendations.

Sefcik said association officials were worried that they didn't have legal authority to mandate the purchase of cooling tubs or heat stress monitors and had questions about enforcement and liability. Niblett would only say in an email that the association will inform member schools of all heat safety precautions before fall practices are set to begin on July 30.

That date brings up another Florida controversy.

The association leaves heat safety up to county school districts for summer practices, held before July 30. Zach was in a summer practice when he developed heat stroke.

"It's a huge loophole," Sefcik said.

He said surveys suggest more than 95 percent of Florida high schools have cooling tubs already. But that doesn't mean they always use them.

Zach's high school is an example of that, he said. "The school did have an immersion tub, however it was in the locker room and not accessible either because it was out of sight or out of mind," Sefcik said. "Nobody thought to utilize it."

Zach's family has submitted a notice of intent to sue the School District of Lee County. Giordano said the family is weighing legal options.

Because of potential litigation, district spokesman Rob Spiker said he was limited in what he could say. But he said Lee County schools will be using cooling tubs and buying heat stress monitors.

That's a start, Giordano said. She is now working with Florida lawmakers to tighten up statewide heat safety rules that were punted by the association.

"I am frustrated they didn't do more," she said. "Even if Zach had lived, we would still be doing this. There is no way he would have let this go by without saying we need to do something. He was a protector."

"Florida has had four high school football deaths from heat since 2010, the most for any state. The Institute wanted the Florida High School Athletic Association to mandate heat stress monitors and cooling tubs, too, [Scarneo] said."

◆ InsideClimate News is a non-profit, non-partisan news outlet that covers energy, climate and the environment. ◆
National Federation of State High School Associations Responds to Korey Stringer Institute Ranking of High School Associations Regarding Managing Injury Risk

By NFHS on August 08, 2017

In response to the Korey Stringer Institute’s ranking of state high school associations in the area of managing injury risk to high school student-athletes, NFHS Executive Director Bob Gardner has released the following statement and accompanying support information.

NFHS STATEMENT ON MANAGING INJURY RISK IN HIGH SCHOOL SPORTS

In order to provide the safest and most enjoyable experience for the 7.9 million participants in high school sports, it takes a concerted effort on the part of every organization connected to interscholastic athletics.

For a number of years, the NFHS and its member state associations have worked cooperatively with organizations such as the National Athletic Trainers’ Association (NATA) and the Korey Stringer Institute (KSI) to provide as much information as possible for the nation’s 19,000-plus high schools regarding heat illness awareness and prevention, as well as other safety issues related to the heart and head injuries.

Unfortunately, the Korey Stringer Institute has proclaimed itself as judge and jury of heat-illness prevention and other safety issues by ranking the 51 NFHS-member state high school associations—these very associations that have been promoting risk-minimization precautions in their schools’ athletic programs for many more years than the seven-year existence of the KSI. The overall safety of student-athletes competing in high school sports is a key objective of the NFHS and all 51 state associations. Information on precautions related to heat and head issues is regularly shared with schools across the country. While the 19,000 high schools range in size from 50 students to 5,000, there has never been a time that coaches, athletic directors and school administrators were more focused on risk mitigation.

Very simply, a review of state association websites, such as the one employed by KSI, is an incomplete measurement of the efforts employed by states to assist their member schools with heat, heart, and head issues. Providing more research data, as well as funds to enact more prevention programs, would be much more useful than giving grades to these associations.

For the past three years, the state high school associations have attended annual sports medicine meetings with KSI, the American Medical Society for Sports Medicine, and the National Athletic Trainers’ Association. The meetings have been entitled “Collaborative Solutions,” and they have been intended as an opportunity to share ideas about heat illness, cardiac problems and head injuries. The participating organizations have worked together, and the nation’s young athletes have benefited.

Now, KSI has utilized a new approach. By “grading” state high school associations based on a limited number of criteria, KSI has chosen to shine a light on certain areas, but it has left others in the dark. Thus, the information provided today gave an incomplete view. The full picture is much more positive. In fact, the state high school associations, and their respective sports medicine committees, post guidelines, speak at seminars, give warnings and alerts, and otherwise promote the health and well-being of young people. Certainly, there is room for improvement, and the American educational system will continue to be resource-challenged. Schools will need more funding, more defibrillators, more athletic trainers and more constructive legislation. With the assistance of everyone who cares about young athletes, including KSI, we can keep getting better.

The NFHS and its 51 member state associations are disappointed that KSI is, in essence, criticizing many states in this area rather than continuing to work with these groups in a collaborative relationship. Protecting the health and safety of our nation’s high school student-athletes is an ongoing focus of all NFHS state associations.
Exertional Heat Stroke is 100% Survivable if you RACE

**R**ecognition - Collapse, abnormal behavior

**A**ssessment - Rectal temperature

**C**old Water Immersion - Cool first, transport second

**E**mergency Care

For more information

KSI, Associate Director of Research

Graphic by Gabrielle Giersch, MS

FALL 2018 15
States Moving to Protect High School Athletes from Heat Stroke, Sudden Cardiac Arrest, Other Serious Injuries

Twenty-one states have adopted new life safety policies following groundbreaking study/

New Jersey Catapults to the top of the Rankings

STORRS, Conn. (Aug. 20, 2018) --- In the past 12 months twenty-one states have adopted new important life safety policies to protect high school athletes from serious injury. This has occurred in the year since the Korey Stringer Institute (KSI) released a groundbreaking report ranking all 50 states and District of Columbia related to key health and safety policies for high school athletes.

The report, believed to be the first comprehensive state-by-state assessment of high school sports and safety policies, found that many states are not fully implementing important safety guidelines intended to protect student athletes from heat stroke, sudden cardiac arrest, and other potentially life-threatening conditions that may be prevented with proper policies. KSI researchers ranked states according to the extent to which they met a series of evidence-based best practice guidelines.

After the report’s release, safety advocates with the KSI launched a national “Raise Your Rank” campaign. They began working with officials and representatives in individual states to create new policies and practices to protect student athletes.

States that adopted important new life safety policies over the past year include Florida, New Jersey, Kansas, Minnesota, and South Carolina.

“We are very encouraged by the positive changes that have occurred across the nation,” says Professor Douglas Casa, the CEO of KSI, professor of Kinesiology at the University of Connecticut and one of the nation’s foremost authorities on the prevention of exertional heat stroke and other serious injury in sport. “However, we need to continue to be vigilant. We are fully committed to working with individual states on adopting these important guidelines.”

The KSI is a national sports safety research and advocacy organization named after a former Minnesota Vikings offensive lineman who died from exertional heat stroke in 2001. The mission of the KSI is to provide research, education, advocacy and consultation to maximize performance, optimize safety and prevent sudden death for the athlete, warfighter and laborer.

In the 2017 study, North Carolina, Kentucky, and Massachusetts had the best high school sport safety programs in the country.

Today, New Jersey is the new national leader following its recent adoption of the most comprehensive health and safety policies for high school athletes in the country. Representatives from the KSI worked closely with New Jersey officials last spring to help implement change.

“With support and guidance from the experts at the Korey Stringer Institute this past May, the New Jersey State Interscholastic Athletic Association began taking the necessary steps to improve the health and safety of our secondary school athletes,” says David Csillan (Ewing HS Athletic Trainer and NJSIAA Sports Medicine Advisory Committee). “We are in full support of the Raise Your Rank campaign. In May, we were ranked fourth in the nation with regard to athletes' safety and we have since moved into the number one position. However, more work is to be done. Our goal is to be the first state showing 100% compliance with the recommended safety guidelines.”

New Jersey’s new mandates include: cold water immersion tubs at all high school practices and games; a “cool first, transport second” policy for potential heat stroke victims, which research has shown can dramatically improve a person’s chances of survival; and tighter regulation of off-season strength and conditioning sessions. Many heat stroke deaths and heat-related illnesses have been associated with off-season conditioning sessions. New guidelines for when athletes can return to play following a concussion were also adopted.

Other states taking action included:

Florida – New emergency action plans for every school. Mandatory education for coaches on exertional heat illness. Improved heat acclimatization policies. Their ranking went from 23rd to 5th

Kansas- Mandatory emergency action plans and heat acclimatization policies. Their ranking went from 45th to 33rd.

South Carolina – Mandated environmental monitoring. All coaches must receive training in cardiopulmonary resuscitation (CPR) and use of automatic external defibrillators (AED). Their ranking went from 40th to 34th.

Minnesota – All high school athletic trainers must now be licensed. Their ranking went from 47th to 44th.

With more than 7.8 million high school students participating in sanctioned sports each year, the need for comprehensive safety policies and training is critical. Adopting evidence-based safety measures significantly reduces risks. States that adopted mandatory heat acclimatization guidelines, for example, reduced exertional heat illness by 55%, a recent study by Kerr et al. reports.

More information and the full current ranking from the high school sport safety study and details regarding each state’s assessment can be found at https://ksi.uconn.edu/high-school-state-policies-2018/.

More information about the “Raise Your Rank” campaign, including ways to support the $1 million fundraising effort, can be found at https://ksi.uconn.edu/raise-your-rank-campaign/.

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* Scores were determined using a rubric in which each state was analyzed based on five equally weighted sections pertaining to sudden cardiac arrest, traumatic head injuries, exertional heat stroke, appropriate medical coverage, and emergency preparedness. States received points on the rubric if associated policies were required or mandated to be followed by the state high school athletics association member schools in that respective state. States did not receive points on the rubric if policies were only recommended or encouraged. Each state received an aggregate score based on how many safety policies they had in place and how comprehensive they were.

Information obtained from the Korey Stringer Institute; Graphic created by Coach & Athletic Director.
Your Guide to Recognizing Exertional Heat Stroke

A person collapses during or after physical activity in warm weather...

Assess Central Nervous System (CNS) Dysfunction

If central nervous system function is abnormal, continue with assessment.

Assess Rectal Temperature

Core body temperature >105°F

Ranking Rubric Components

The rubric is made up of five sections that are equally weighted (20pts each). The five sections are:

- Exertional Heat Stroke
- Sudden Cardiac Arrest
- Traumatic Head Injuries
- Athletic Training Services
- Emergency Preparedness

The graphics on pages 22-25 provide background information about the top four causes of sport related death.
## Exertional Sickling

**Sickle Cell Trait**

Occurs with too much exertion and blood cells start to sickle, causing a decrease in oxygen to the body.

### Prevention

- Pre-participation physical exam
- Modifications to activity
- Hydration and acclimatization

### Triggers

- Altitude
- Heat
- Novel Exercise

### Recognition

**Signs & Symptoms**

- Lower extremity/back pain
- Cramping
- Fatigue
- Shortness of breath
- Slow collapse, etc.

### Treatment

- Removal from play
- Oxygen
- Rest
- Cooling
- Assess vital signs
Sudden Cardiac Arrest

PRE-PARTICIPATION PHYSICAL EXAM
Health screenings and family history

EQUIPMENT
Proper AED location, maintenance, function, and use

TRAINING
AED/CPR and first aid certification and continued maintenance for coaches

RECOGNITION
Prompt identification of collapse, seizure like activity or agonal respirations

TREATMENT
Immediate EMS activation, begin CPR, access & apply the AED within 3 min. for 90% chance of success
HEAD AND NECK INJURY

HELMETS
They should be maintained, certified and properly fitted by athletic trainers or other professionals

ATHLETIC TRAINERS
Responsible for concussion testing (including SCAT5) and providing education to the community

RECOGNITION
Be on the lookout for altered consciousness, neurological concerns and midline spine pain immediately after a blow to the head or neck

POST INJURY
If symptoms begin to worsen, call 911. Stabilize the patient and begin CPR promptly, if necessary.

RETURN TO PLAY
Patient must have a written release from a healthcare professional with a gradual stepwise return to play protocol.
KSI Financial History
2010-2017

**Services Funding**

KSI has conducted performance and diagnostic testing for warfighters, laborers, former heat stroke victims, and elite athletes.

**Donations**

KSI has corporate partnerships with these nine organizations: NFL, Gatorade, NATA, UCONN, CamelBak, Heartsmart.com, Eagle Pharmaceuticals, Mission, Kestrel by Nielsen-Kellerman.

**Research Funding**

Organizations that KSI has conducted studies for in the past two years include (but are not limited to): US Army, US Air Force, NCAA, Mission, Nix, WHOOP, NATA, NFL, and CamelBak.
Raise Your Rank

The Korey Stringer Institute’s “Raise Your Rank” Campaign is a $1 million fundraising effort to make high school sports safer. KSI maintains an updated ranking of each state’s high school athletics association’s level of implementation of best-practice sports safety guidelines, including the District of Columbia. Currently, no state meets 100% of the minimum best-practice standards. According to Dr. Samantha Scarno, Vice President of Sport Safety for KSI, these best-practice policies aren’t universally implemented throughout the states. Unfortunately, this leaves many of the nation’s high school student-athletes at risk for catastrophic injury during sports participation. Because of this, the goal of KSI’s “Raise Your Rank” Campaign is to raise funds to host meetings in every jurisdiction with the ultimate goal of improving the implementation of best-practice sports safety policies at the state level. “Raise Your Rank” meetings have already occurred in Florida and New Jersey, with future meetings planned for Oklahoma, the District of Columbia, and Georgia over the next few months. For more information on the “Raise Your Rank” Campaign, visit ksi.uconn.edu.

UPCOMING EVENTS

KSI Team Ragnar Relays
October 5th-6th, 2018
Wawayanda, NJ

International Conference on the Physiology and Pharmacology of Temperature Regulation
October 7th-12th, 2018
Split, Croatia

Collaborative Solutions for Safety in Washington, D.C. Sports Meeting
October 24th-25th, 2018
Arlington, VA

Marine Corps Marathon Medical Symposium & Medical Tent
October 27th-28th, 2018
Arlington, VA

New England American College of Sports Medicine Annual Fall Conference
November 8th-9th, 2018
Providence, RI

Professional Baseball Strength & Conditioning Coaches Society Meeting
December 7th, 2018
Las Vegas, NV

Collaborative Solutions for Safety in Oklahoma Sports Meeting
January 9th-10th, 2019
Oklahoma

Eastern Athletic Trainers' Association Annual Convention
January 11th-14th, 2019
Valley Forge, PA

Collaborative Solutions for Safety in Georgia Sports Meeting
January 18th, 2019
Georgia

Pediatric Research in Sports Medicine Society Annual Meeting
January 17th-19th, 2019
Atlanta, GA

Great Lakes Athletic Trainers' Association Annual Meeting
March 14th-17th, 2019
Wheeling, IL

8th Annual Korey Stringer Institute Gala
May 16th, 2019
New York, NY

American College of Sports Medicine 66th Annual Meeting
May 28th-June 1st, 2019
Orlando, FL

National Athletic Trainers' Association Clinical Symposia & AT Expo
June 24th-27th, 2019
Las Vegas, NV
February 21, 2018 was a momentous day for the ATLAS Team, mapping 100% of the 20,272 public, private, magnet, alternative, and special education high schools with athletics programs in the United States (including the District of Columbia) and whether or not the student-athletes have access to an athletic Trainer (AT).

The summer of 2018 also marked a busy time as the ATLAS Team completed the 1st Annual ATLAS Report, outlining the results of the project from its inception in 2010. The report will be available on the KSI website at ksi.uconn.edu/nata-atlas/.
KSI Sleep Research

Ryan Curtis, ATC, MS, CSCS
KSI, Director of Athlete Performance and Safety

Yasuki Sekiguchi, MS, CSCS
KSI, Associate Director of Athlete Performance and Safety

KSI has been studying the relationship between sleep and exercise performance, injury, and recovery in athletes. Sleep quantity and quality are monitored with actigraphy and a wrist-worn multi-sensor sleep device which provide sports scientist, sport medicine staff, and coaches with important information about how to optimize athlete performance and safety. These are a few findings from KSI’s previous studies.

- In soccer, starters experience significant and practically important increase in slow wave sleep (SWS) time % and decrease in rapid eye movement (REM) sleep time % the night of a match indicating match stress is leading to a reallocation of sleep to SWS% with a reduction in REM%.
- In soccer, increased sleep duration positively impacted aspects of sleep quality by decreasing wake time % and increasing REM%, which may allow increases in neuronal and memory formation and decreases in non-functional sleep.
- In endurance athletes, athletes who spent more than 8 hours in bed experienced a higher distribution of SWS and REM sleep and a lower distribution of wake time than athletes who slept less than 6 hours or 6-8 hours.

| Factors That Influence the Quantity and Quality of Sleep of Athletes |
|-----------------------------|-------------------|-------------------|-------------------|-------------------|
| **Nutrition**               | **Morning Practices** | **Travel**        | **Stress**        | **Daytime Napping** | **Screen Time**    |
| Co-ingestion of caffeine and carbohydrates in the evening has a negative impact on sleep quality, sleep onset, and sleep duration. | Early morning practices have been shown to reduce sleep duration and increase pre-training fatigue levels in athletes. | Travel across time zones and high altitude exposure can negatively impact sleep quantity and quality. | Lower perceived sleep quality is associated with higher levels of anxiety. | Napping at 30 minute intervals has been shown to have a beneficial impact on alertness and sprint performance. | Light from electronic screens can delay the onset of sleep. |
| High protein diets may improve sleep quality. | | | | | |
Exertional Heat Stroke Survivor Story
Speech given by Zoe Wallis at the 2018 KSI Gala

Who would have thought that a girl from St. Louis, Missouri would end up here?

In New York City.

Just shy of two days from her college graduation.

I want to tell you all a story.

A story about me.

A story about how this Midwestern girl, full of dreams and aspirations to compete at the collegiate Division 1 level, nearly lost her life while competing as a member of the College of Charleston’s women’s basketball team in Charleston, South Carolina.

Nearly four years ago, I arrived on campus in Charleston, eager to begin my college career as a student and an athlete.

This order is important, so please remember it well, student first, athlete second.

On a typical Charleston August morning, hot and humid, my team and I woke up early to run what my head coach deemed a “mental toughness exercise”.

On one of the first days of practice, we were to run five miles in the heat, over a bridge and back, starting at 6am. Our only rules were that we had to stay together for the first 3.5 miles, we had one hour to complete the run, and that no one was allowed to stop.

Under any circumstances.

Who would have thought that the morning of August 30th, 2014, would change my life forever?

I suffered a major exertional heatstroke, collapsing in front of my entire team, coaches, and athletic training staff.

It was later explained to me by Dr. Casa, that proper treatment for exertional heatstroke is immediate cooling via cold water immersion, and if this is done, the severity of an exertional heatstroke is minimized.

I was taken to the hospital via car, not ambulance, and was admitted with an internal body temperature of ----nearly 105 degrees upon arrival. However, I do not remember any of this at all, as I was completely unconscious.

I was in liver failure, kidney failure, and was unresponsive to painful stimuli. Essentially, I was comatose.

Thankfully, I woke up, however I was in bad shape.

I spent two nights in the hospital, one of which was in the Intensive Care Unit.

It would be 57 days until I stepped foot back onto the basketball court. Unfortunately though, the damage had already been done.

My former university and its athletics department failed me in many ways.

The first is that they failed to properly acclimatize their student-athletes to the unique Charleston heat. If they would have taken the time to do this, the likelihood of my heatstroke would have been highly lessened.

"Who would have thought that the morning of August 30th, 2014, would change my life forever? I suffered a major exertional heat stroke, collapsing in front of my entire team, coaches, and athletic training staff."
The second way they failed me was when the coaching staff did not allow me to stop running when I was exhibiting tell-tale signs of exertional heatstroke.

In fact, as I was begging to stop running, as I was screaming that I felt like I was going to faint, and as I explained over and over that I felt like I needed to close my eyes, one of my assistant coaches put her hands on my lower back and thrust me forward, not allowing me to be in control of my own body and what I could do, or not do, with it.

These details I do remember, these details will forever be ingrained in my mind.

These are the memories of an 18-year-old girl, full of passion, full of life, full of positivity, that she will remember about the beginning of the end of her 15-year career of playing basketball.

I was able to make a recovery enough and continued to be a member of the team through September of 2015, or just shy of the beginning of my sophomore season.

At this point however, the physical and psychological effects of my near-death experience became too overwhelming.

In September of 2015, I was forced to say goodbye to basketball.

In what will be my final example of how my former university failed me, they took away my full-ride athletic scholarship.

Due to this, I was forced to abruptly move back home to St. Louis and attempt to pick up the pieces of my broken life.

The NCAA has a specific by-law that is supposed to protect student-athletes like me.

Student-athletes who suffered an injury or illness while practicing or competing with their athletic team.

The by-law states that if such injury or illness occurs that prevents the student-athlete to compete in their sport, the scholarship will be upheld until the athlete graduates.

This is where I want you to remember what I said at the beginning.

Student first. Athlete second.

At this point, upon communication that I had lost my scholarship, it became abundantly clear, that they did not care about me as a student first.

If I could not produce wins for their athletic department, I was not of value to the program.

However, there is a silver lining through it all.

With some research about exertional heatstroke and its effects on life afterwards, I was introduced to the Korey Stringer Institute at UCONN and its irreplaceable staff.

In February of 2016, I traveled to Storrs, Connecticut and underwent extensive heatstroke testing.

Because of this testing, I was able to be given piece of mind that I was going to be okay. It is an uphill battle, I am strong and I will persevere.

What happened to me, should not happen to anyone else.

I want to use my voice and my story to see this through.

With graduation on the very near horizon, I look towards my bright future.

I will be graduating with a bachelor’s degree in Communication and a minor in Gender Studies from the University of Missouri-St. Louis.

On time.

I want to continue to educate future athletes about the potential of heatstroke and how to recognize the signs and hopefully prevent one from happening.

In the future, I would like to work in public relations and social media marketing. I aspire to possibly work in the non-profit sector and help to make positive changes in the community in order to make the world a better place.

What happened to me should not happen to anyone else, and I am thankful to be here to share my story, because I know that not everyone is given a second chance.

Thank you.

"In fact, I was begging to stop running, as I was screaming that I felt like I was going to faint..."
"With some research about exertional heatstroke and its effects on life afterwards, I was introduced to the Korey Stringer Institute at UCONN and its irreplaceable staff."
KSI Elite Athlete Testing

Yasuki Sekiguchi, MS, CSCS
Associate Director of Athlete Performance and Safety

KSI has been working with elite endurance athletes to improve their performance through an electrolyte balance test, a substrate utilization test, a VO2max test, a lactate threshold test, monitoring hydration status, and heat acclimation. Here are a few of the athletes we recently tested.

Matt Hanson-Three time Ironman North American championship winner
Andrew Starykowicz-The owner of the fastest recorded Ironman bike split

"I have spent most of my career experiencing with drink concoctions trying to find the ultimate balance for conquering race day that gets me what I need to get to the finish line but doesn't kill my gut. Testing at KSI in race conditions proved 10+ years of experimenting got me 99% of the way there. The feedback from KSI took me from close to perfection to perfection”.

Sarah Haskins-2018 NYC Triathlon and Ironman Steelhead 70.3 winner

"I feel honored to be working with such a fantastic team and dialing in my nutritional racing performance in the heat! Thanks to everyone of KSI for all the help and hospitality.”
Preventing Sudden Death in Strength and Conditioning Sessions

Summary from NCAA Champion Magazine article, "The Breaking Point-can the strength and conditioning coaching profession find solutions that help remove strategy from training?"

By: Brian Burns, Summer 2018

The NCAA Champion Magazine released a great document entitled, “The Breaking Point-can the strength and conditioning coaching profession find solutions that help remove strategy from training?” in the summer of 2018. According to this document, 85 college athletes died from indirect causes from 2000 to 2016, such as heatstroke and sudden cardiac arrest. Of those 85 deaths, 40% were football players. Most of the deaths occurred after a workout or a conditioning session and when athletes returned to campus from following summer and holiday breaks. Thus, fatalities peak in these February and August transition periods, when athletes need to gradually re-acclimate to their sport’s physical rigors. In addition to this, it was documented that injuries and deaths were not generated simply by errors, but by individuals who see value in punishing athletes beyond the physical demands their sport necessitates.

To prevent sudden death in sports, in 2012, representatives from a dozen prominent sports medicine and sports science organizations put forward a best-practices document for limiting sudden death in conditioning sessions. With Douglas Casa, chief executive officer of the Korey Stringer Institute at the University of Connecticut and Scott Anderson, Oklahoma’s head athletic trainer, as the document’s lead authors, it condemned conditioning as punishment and offered guidance for proper acclimatization, credentialing standards, reporting structure, developing emergency action plans and more. The NCAA, CSCCa and NSCA hope to be on the path to rectifying the current situation by building on this paper with guidelines specific to conditioning sessions. Dr. Casa said that “Even if it is not passed as policy, if the NCAA were to release that as best practices or recommendations, that would put a huge burden on the schools to consider those items”.

In 2015, NCAA Division 1 athletic programs implemented legislation requiring schools to employ strength and conditioning coaches with a “nationally accredited strength and conditioning certification”. However, the strength and conditioning industry has not yet settled on what a nationally accredited strength and conditioning certification means. Thus, the NCAA representatives urged the strength and conditioning coaches to follow the path of comparable health professions, such as athletic trainers, which would require the field to precisely define itself and agree on uniform credentialing requirements. The NSCA has announced that it is working to elevate and advance the strength and conditioning profession by developing a quality assurance process that ensures all future professionals are capable and well-prepared.

Only fewer deaths, fewer injuries, and fewer headlines highlighting ugly exertional rhabdomyolysis incidents will demonstrate whether or not those approaches are enough to mitigate the risks. Conditioning workouts should only help young athletes’ bodies and minds grow stronger, not place their health and safety at risk.

THE BALTIMORE SUN

Dr. Casa was quoted following the exertional heat stroke death of Jordan McNaire

“Douglas Casa, CEO of the University of Connecticut’s Korey Stringer Institute, a nonprofit dedicated to preventing sudden death in sports, outlined a best-practice approach for treating possible heatstroke. The two key diagnostic criteria, he said, are central nervous system dysfunction — signs include confusion, altered consciousness and seizures — and a rectal temperature of at least 105 degrees.

If those symptoms are present, Casa said, cold-water immersion should be used.

“It's the magic elixir,” said Casa, who said he has treated over 285 heatstrokes and studied over 2,000 such cases. In cold-water immersion, he added, body temperature can fall about a degree Fahrenheit every three minutes. “That's the thing that's going to allow the person to survive.”
### Exertional Rhabdomyolysis Cases in Collegiate Sports

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Korey Stringer Institute Intern Experience

Christopher Myers

After finishing college at Washington and Lee University, I decided to take a gap year while I applied to medical school. I graduated with a degree in Neuroscience, but after injuring and rehabilitating my back, I developed a passion for sports medicine. When I returned to my home in Connecticut, I reached out to the Korey Stringer Institute to see how I could get involved in the field. Within a few weeks of working with KSI, it began to feel like home. The staff was incredibly welcoming with their time and included me on any project I wanted to join. We even played soccer on occasion in the summer.

While I heard about KSI because of its proximity to my home in Connecticut, I quickly learned that KSI’s scope is global and far-reaching. Over the course of my gap year, I became deeply involved in many projects, ranging from a study examining effects of prolonged exercise in the heat, to policy work advocating for youth sport safety, to hands-on patient care working in the medical tent of large road races. During my time with KSI, the Mission Heat Lab at UConn’s Korey Stringer Institute opened, allowing us to conduct a large study under extreme environmental conditions. KSI also published the High School Sport Safety Policy Rankings research paper, which I believe will be a strong driving force in creating safer youth sport programs in the immediate and long-term future. I was grateful for the opportunity to participate in this sport safety initiative and help KSI get the “Raise Your Rank” fundraising campaign started.

Starting this Fall, I will be attending Brown University’s Medical School, where I plan to specialize in Orthopedics and Sports Medicine. I believe that KSI has helped me develop the skills to thrive in this field. The Korey Stringer Institute gave me unique opportunities to help victims of exertional heat stroke, study exercise performance in heat, and improve high school sport safety. While this past year was very personally fulfilling, I cannot wait to see the positive changes KSI will make in the coming years.

Louis Kang

My name is Louis Kang, and this past summer I worked as a research assistant on Project Viper at KSI. I am currently a senior at Brown University, majoring in Biology with a focus on Physiology and Biotechnology. Academically, I’ve always had an interest in exercise science, especially as a competitive soccer player, but prior to KSI, I didn’t have any in-depth education or experience about preventing sudden death in sport or exercise physiology.

Working mainly in the heat lab on VIPER with Luke Belval, my time at KSI this summer has been incredibly beneficial for me. I learned a tremendous amount about clinical research involving exercise in the heat, what kind of instruments are used, the different tests that are being utilized, and the purpose of these tests to evaluate different aspects of human performance (both physical and mental.)

Apart from my involvement in research, I enjoyed being able to attend some of the summer classes taught by KSI staff on exertional heat stroke, exertional sickling, cardiac arrest, EAP’s, and policy at the high school level. Additionally, experiencing the day-to-day workplace environment at KSI has really given me a sense of not only how large-scale research is conducted and managed, but also the range of projects that are going on at KSI.

"With aspirations to enter a profession in health care and medicine, my time at KSI was invaluable and I am truly grateful to Dr. Casa for providing me with the opportunity to work in his lab with passionate staff, who all serve as role models for me. I now have a much more informed perspective on the necessary precautions and steps to protect athletes at all levels of sports, which will undoubtedly influence my own behaviors and those of everyone I interact with, as both an athlete and future healthcare professional."

With aspirations to enter a profession in health care and medicine, my time at KSI was invaluable and I am truly grateful to Dr. Casa for providing me with the opportunity to work in his lab with passionate staff, who all serve as role models for me.
KSI at the Falmouth Road Race

Rachel Katch, MS, LAT, ATC
Associate Director of Military and Occupational Safety

Starting in 1994, Dr. Douglas Casa from the University of Connecticut has helped provide medical care at the Falmouth Road Race. These beginnings have led to a unique relationship that keeps the Falmouth Road Race at the forefront of medical research. After NFL player, Korey Stringer, passed in 2001 from an exertional heat stroke (EHS), his widow, Kelci Stringer, joined forces with Dr. Casa to create the Korey Stringer Institute (KSI) in 2010 to honor her husband’s legacy. The mission of the KSI is to provide research, education, advocacy, and consultation to maximize performance, optimize safety, and prevent sudden death for the athlete, warfighter, and laborer, with goals to serve the needs of active individuals and athletes at all levels; including those participating in summer road races. To further this mission, KSI partnered with the race in 2013 to start conducting research in the hopes of preventing exertional heat related illness from occurring. The Falmouth Road Race is an ideal place to research heat related illnesses, as it has a high rate of EHS, with an incidence of 1-2 EHS cases for every 1,000 entrants.[1,2]

Thankfully, due to exceptional medical care and preparedness, no deaths have ever been reported from EHS for runners who have been treated by the medical team.

But, KSI is passionate about preventing EHS from occurring in the first place, which is one of the focal points of their research at the Falmouth Road Race. In 2014 and 2015, KSI’s research focused on trying to develop a Heat Stress Score that would determine the level of heat exposure and exercise intensity of an individuals’ training prior to race day. Additionally, participants in the study would travel to the University of Connecticut’s Human Performance Lab to go through testing to determine their fitness levels. With this information, a calculation was performed to assess the athletes’ preparedness to run the Falmouth Road Race. Then on race day, the participants’ calculated preparedness was compared to actual performance to see if similarities existed. Although no significant correlations were found, the research did not stop there. In 2016, a pre-race educational video on heat safety and hydration and its effectiveness in minimizing exertional heat illness risk among runners was studied.[3] KSI found that more than a quarter of participants demonstrated a lack of knowledge in: (1) the amount of fluid they should consume to stay hydrated, (2) methods to detect dehydration, (3) risk factors and recognition of heat illnesses, and (4) characteristics of heat acclimatization.[3] From these findings more research was warranted to improve safety. From 2017-2019, the pre-race educational video is continuing to be analyzed, along with studying the exercise heat tolerance among the runners at Falmouth to optimize their training and performance in the heat. And our research will surely not stop there, with many field studies planned for the future. All runners registered for the Falmouth Road Race are invited to participate in our studies, and we welcome individuals from the elite to the weekend warrior. Preventing sudden death while maximizing performance in sport is our main goal, and we will continually strive to make sports participation safer for everyone.

REFERENCES


Personal Story

#08: ROBERT SEFCIK, LAT, ATC
Executive Director of the Jacksonville Sports Medicine Program

The Jacksonville Sports Medicine Program (JSMP) is a volunteer-based, non-profit organization dedicated to youth sports injury awareness, advocacy and prevention in the Northeast Florida region. The program was incorporated in 1984 and has been benefiting youth athletes in the Jacksonville, FL region ever since. In 2006, I was recruited from Ohio to lead the mission of the program that had, in some regard, slowed. By late 2006, the program had a fresh new focus, one that would serve as the primary sports injury advocacy program in northeast Florida and one that would be a backbone of support for the sports medicine professionals who practice within this diverse region of the state.

Immediately the program began to offer continuing educational opportunities for certified athletic trainers and team physicians that would highlight best practices in sports medicine. These opportunities were offered on a monthly basis and created opportunities for local experts to present relevant material to other community based providers. In 2011, the JSMP offered its first annual symposium for clinical professionals. The 2011 program focused specifically on sports related concussion and current best practices for our medical teams who were working with the high school-aged athlete and included a nationally-ranked faculty including Kevin Guskiewicz, Ph.D., ATC and Robert Cantu, MD. This annual program brings in more than 100 attendees of diverse sports medicine backgrounds who work with school-aged athletes to promote the latest strategies in sports safety. In 2015, the JSMP partnered with Dr. Douglas Casa and KSI to offer a major portion of the annual event to heat stroke prevention and care.

As our educational efforts progressed, it became evident there was a shortage of certified athletic trainers representing our local public high schools. Attention was quickly drawn to how to increase the level of safety within our school athletic programs both by educating the stakeholders on not only the best practices for sport safety, but also on the need to have the right professionals in place to implement these standards. Then in late 2015, the JSMP partnered with the NFL, the Jacksonville Jaguars and leading businesses in Jacksonville to initiate a collaborative effort for placing certified athletic trainers in all 17 public high schools in Duval County, FL. I credit the association and friendship of Dr. Casa and the Korey Stringer Institute in raising the awareness for this program to launch in 5 schools its first year. Project 17, as it is referred to, will end up creating more than 17 full time jobs for certified athletic trainers in the school district by the year 2020. Currently, 15 schools are benefiting from this level of care and implementing best practices for sports injury safety along with their volunteer team physicians.

Through the success of the local programs in Jacksonville, the JSMP achieved state-wide recognition as a leader in sports injury safety. While energizing the successful efforts in Jacksonville, in 2014 I was named as the administrator for the Florida Alliance for Sports Medicine (FASMed). This state-wide organization was created through the support of State Senator, William Montford, and the interest of more than 15 leading orthopedic surgery practices throughout the state. Structured as a legislative advisory council, this group has quickly earned significant respect as a state-wide advocacy program for the promotion of best practices in sports medicine. As the head administrator to FASMed and a member of the FHSAA sports medicine advisory team, I, along with FASMed Board President Kevin Farmer, MD attended the Collaborative Solutions for Sports Safety Meeting hosted in Indianapolis back in 2016. During the meeting, we approached Dr. Casa in the hopes of together promoting a state effort of Collaborative Solutions. The first Florida meeting was hosted at the University of Florida in 2017 and a
subsequent meeting in 2018 at the FHSAA headquarters in Gainesville. More than 150 state-wide representatives attended these meetings to learn more about sports safety and implement new policies to protect student athletes. These representatives included sideline team physicians, certified athletic trainers, school administrators, media, parents and FHSAA Board members.

Florida is making some significant strides in sports safety and the process has been encouraged through the dedication and support of many committed coaches throughout the state. The process has also had some challenges along the way and most recently was met with some resistance to mandatory cold water immersion tubs and wet-bulb globe thermometers. We do foresee the eventual passage of these items; however, more education is needed. Our challenges are not unique to Florida, as implementing new policy does not always occur rapidly. It is important we provide the education needed for the FHSAA Board, school Superintendents and coaches for complete understanding and support of these initiatives. Our efforts are most successful when they are recognized as non-threatening to any one particular sport and are perceived as preserving the integrity of the sport versus changing the game.

We will be continuing our efforts on heat safety and also be introducing standardized lightning safety protocols and policy in our next advisory meetings here in Florida. Our committee resumes regular meetings in August.

I look forward to the continued leadership of KSI on sports safety matters and our partnership in sports safety here in Jacksonville and across the entire state of Florida.

"Our challenges are not unique to Florida, as implementing new policy does not always occur rapidly. It is important we provide the education needed for the FHSAA Board, school Superintendents and coaches for complete understanding and support of these initiatives."
Could you tell us about yourself? I was born and raised in Wallingford, CT. After spending 18 years of my life there, I pursued a Bachelor’s degree in athletic training at High Point University in North Carolina. After obtaining my degree, I traveled back up north to the University of Connecticut, where I received my master’s degree in exercise science and was offered to continue my education here for my doctoral degree. During my master’s degree, I worked as an athletic trainer at RHAM High School in Hebron, and transitioned to UConn Club Sports for the first two years of my doctoral program. My role now is more focused on research and teaching. I currently serve as the Director of Education for KSI, where I have been leading a study on various stakeholders’ perceptions of the athletic training profession, and will be teaching Health & Medicine for the senior athletic training students this semester (Fall 2018). I hope to use the skills I have obtained in my educational career to work as a faculty member in a Professional Master’s Athletic Training Program, where I will continue my career goals related to advocacy and advancement of the profession.

Could you tell us about your first involvement/interaction with the Korey Stringer Institute? There was the time I first met Dr. Casa, and the time I had my first interaction with KSI two different, yet equally important stories. One brought me to UConn, while the other served as validation for choosing a master’s at UConn as the next step on my educational journey. If I remember correctly, it was the Fall semester of my senior year at High Point, just when I was beginning to get anxious about future plans. Dr. Casa made the trip to campus to give a presentation to the athletic training students on exertional heat stroke treatment and preventing sudden death in sport. I vaguely remember this quirky, passionate guy spiking my interests and opening a door for possibility that I didn’t know existed until that day. He told my Program Director to let him know if any of the students were interested in getting their Master’s degree and studying under him at UConn. I remember the light bulb going off, and jumping at the opportunity to learn more about the program. The rest was history.

My first interaction with KSI as an organization was during the summer of 2013, just before I started my master’s degree. Dr. Casa extended an invitation to me to travel with the staff to the Lake Placid Ironman Triathlon, where they were conducting a research study. They welcomed me with open arms, and got me involved immediately by tasking me with analyzing a whole lot of pre- and post-race urine samples. It was definitely an unforgettable, immersive experience, and one that made me realize I was right where I needed to be.

In what ways has KSI impacted you? In what ways hasn’t it? I think that’s the more telling question, because I wouldn’t be able to answer it. From the Fall of 2013 to now, the opportunities, experiences, and skills I have gained are immeasurable. Honestly, when I think of KSI, the two words that come to mind are passion and opportunity. I have never worked alongside a more passionate, driven, and goal-oriented group of people. They make me want to be a better version of myself, and continue to grow as a teacher, researcher, and advocate for the athletic training profession. From assisting with research studies, to being the lead of one, to giving talks and presentations at regional and national conferences, and saving lives at the Falmouth Road Race, Marine Corps Marathon, and more, the opportunities have been endless. The learning hasn’t stopped, and the passion continues to grow. I know KSI has impacted me in other ways, but those are the most memorable ones. I have grown personally and professionally, because I’ve had the opportunity to work here. That is something I will always be grateful for.

"I have never worked alongside a more passionate, driven, and goal-oriented group of people."
Could you tell us about yourself?

I am currently a faculty member in the Department of Educational Leadership at the University of Connecticut holding the title of Raymond Neag Endowed Professor of Educational Leadership. From 1997 to 2012 and 2016-2018 I had the honor of serving as Dean of the Neag School of Education. I am proud to be a double alumn of UConn with both my master's and Ph.D. coming from the Neag School of Education. Prior to returning to UConn in 1997, I was an Associate Professor at the University of New Hampshire and Dean at Drake University in Iowa. My research interests are in educational reform and occupational stress and health.

Could you tell us about your first involvement/interaction with the Korey Stringer Institute?

When I began my first term as Dean of the School of Education in 1997 we set the goal of becoming one of the top 20 schools of education in the nation. One of the major things we did to achieve this was to reinvent the Department of Sports, Leisure and Exercise Sciences as the Kinesiology Department. As part of this process we closed programs and identified selected areas where we would build a national reputation. In 1999 our dreams were rewarded by a generous philanthropist named Raymond Neag who gave us a 21-million-dollar gift to fund an endowment. With the restructuring, strategic investment of funds and hiring of new faculty members, the Department of Kinesiology became the number 1 ranked doctoral program in the country within five years. One of the areas we identified as a primary focus was Athletic Training and within that program we built an internationally recognized research focus in hydration and heat stroke prevention. A major emphasis of all Neag School research programs at that time was to bring research to practice and improve the education, health, and well-being of our nation.

Under the leadership of Dr. Doug Casa and Department Head Dr. Carl Maresh, we collaborated with researchers, practitioners and philanthropists to establish the Korey Stringer Institute with the express goals of saving lives and preventing the debilitating effects of heat illness. After I returned to the faculty, the Kinesiology Department decided to move to the College of Agriculture, Health and Natural Resources to expand collaborative efforts with health-related programs within that college. This move has allowed KSI to move to an even greater influence. While we miss the dynamic research, advocacy and outreach of the Institute, I am proud that the institute has become one of UConn's truly interdisciplinary centers of excellence.

In what ways has KSI impacted you?

I am very proud that I played a small part in helping to get the Korey Stringer Institute off the ground. When one reflects upon a career you often think "did I help make the world a better place in some small way?" In this case, I know that supporting this effort and hiring visionary leaders like Doug Casa has done that. On a regular basis I see KSI quoted in important news stories and see representatives on various media platforms arguing for safe practices. Today coaches worldwide have a new awareness of their responsibility in preventing sudden deaths in their athletes. Labors working in extreme conditions and our nation’s fighting men and women are now a bit safer because of KSI work. While I am no longer directly involved with KSI, I will always be one of its biggest cheerleaders.

"I'm very proud that I played a small part in helping get the Korey Stringer Institute off the ground. When on reflects upon a career you often think, "did I help make the world a better place in some small way?" In this case, I know that supporting this effort and hiring visionary leaders like Doug Casa has done that."
SUMMER CONFERENCES
Kelsi Stringer  Founder and Spokesperson of KSI.
James Gould  Chairman, KSI. Chairman, Management One. Korey's NFL Agent.
Chad Lawrence  Chief Technology Officer, Mission. KSI Corporate Sponsor Representative.
Heberto Calves  Chief Marketing Officer, SVP of Marketing, Link AKC.
George Chiampas, DO  Assistant Professor in Emergency Medicine and Orthopedic Surgery.
Feinberg School of Medicine, Northwestern University.
Cathy Experti  Publisher, Jones and Bartlett Learning. KSI Educational Partner Representative.
Mike Naughten  Senior Global Account Executive, Nielsen-Kellerman. KSI Corporate Sponsor Representative.
Jeff Kearney  Senior Director of Sports Marketing, Gatorade. KSI Corporate Sponsor Representative.
Sherry Korczynski  Senior Vice President, Eagle Pharmaceuticals. KSI Corporate Sponsor Representative.
Amanda & Brian Marshall  CEOs, Heartsmart.com. KSI Corporate Sponsor Representative.
Jeff Miller  Senior Vice President for Health and Safety Policy, National Football League.
Rachael Oats  Associate Executive Director, National Athletic Trainers' Association.
KSI Corporate Sponsor Representative.
Tory Lindley  President, National Athletic Trainers’ Association Representative. KSI Corporate Sponsor Representative.
Derek Campbell  Public Relations and Events Manager, CamelBak Products LLC.
KSI Corporate Sponsor Representative.
Robert Reed  Founder, Transition-Integrated-Resources.
KSI Corporate Sponsor Representative.
Angela Ruggiero  Co-Founder, Sports Innovation Lab.
KSI Corporate Sponsor Representative.

John Jardine, MD  Chairman, Chief Medical Advisor, Korey Stringer Institute.
Our Lady of Fatima Hospital, North Providence, RI. Medical Director, Falmouth Road Race.
William Adams, PhD, ATC  Assistant Professor, Department of Kinesiology, Director, Athletic Training Program,
University of North Carolina Greensboro.
Lawrence Armstrong, PhD  Professor, Department of Kinesiology, University of Connecticut.
Lindsay Baker, PhD  R&D Principal Scientist, Gatorade Sports Science Institute.
Mike Carroll, Med, ATC  Head Athletic Trainer and Assistant Athletic Director for Graham High School, Graham, TX.
Jason Cates, ATC  Head Athletic Trainer, Cabot Public Schools, Cabot, AR.
Cindy Chang, MD  Clinical Professor, Primary Care Sports Medicine.
Department of Orthopedics and Family & Community Medicine, University of California, San Francisco.
Larry Cooper, MS, ATC  Athletic Trainer, Penn Trafford High School.
Ronald Courson, PT, ATC, EMT  Director of Sports Medicine, University of Georgia Athletic Association.
David Coillan, MS, ATC  Athletic Trainer, Ewing High School, Ewing Township, NJ.
Robert Davis, MD  Diplomat, American Board of Emergency Medicine, Medical Director,
Emergency Department at Falmouth Hospital, Medical Director, Falmouth Road Race.
Julie Nolan, PhD, ATC  Assistant Professor, Athletic Training Education Program, Sacred Heart University.
Lindsay DiStefano, PhD, ATC  Program Director, Athletic Training Program, Associate Professor, University of Connecticut.
Jonathan Drezner, MD  Associate Professor, Department of Family Medicine, University of Washington.
Associate Director, Sports Medicine Fellowship, University of Washington.
Team Physician, Seattle Seahawks & UW Huskies, University of Washington.
Christianne Eason, PhD, ATC  Assistant Professor of Athletic Training, Lasell College.
Michael Ferrara, PhD, ATC  Dean, College of Health and Human Services, University of New Hampshire.
Matthew Ganio, PhD, FACSM  Chief Statistical Advisor, Korey Stringer Institute.
Associate Professor and Director, Human Performance Laboratory, University of Arkansas.
Andrew Grundstein, PhD  Professor, University of Georgia.
<table>
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<tr>
<td>Kevin Guskiecz, PhD, ATC</td>
<td>Distinguished Professor, University of North Carolina</td>
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<tr>
<td></td>
<td>Co-Director, Matthew Gfeller Sport Related TBI Research Center</td>
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<td></td>
<td>Director, Center for the Study of Retired Athletes</td>
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<tr>
<td>Jay Hoffman, Ph.D., CSCS, FNSCA, FACSM</td>
<td>Department Chair, Education and Health Sciences</td>
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<td></td>
<td>Professor, Dual Appointment in Sport and Exercise Science and Burnett School of</td>
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<tr>
<td></td>
<td>Biomedical Science, Director, Institute of Exercise Physiology and Wellness, University of Central Florida</td>
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<tr>
<td>John Jefferies, MD</td>
<td>Director of Cardiomyopathy and Advanced Heart Failure, The Heart Institute, Cincinnati Children’s Hospital Medical Center</td>
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<td>Stavros Kavouras, PhD, FACSM, FECS</td>
<td>Associate Professor, University of Arkansas</td>
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<tr>
<td>Glen Kenny, PhD</td>
<td>Full Professor and University Research Chair, Human and Environmental Physiology Research Unit University of Ottawa</td>
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<tr>
<td>Zachary Kerr, PhD, MPH</td>
<td>Assistant Professor, University of North Carolina</td>
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<tr>
<td>Lisa Larkin, MD, NCMP, FACP</td>
<td>Associate Professor of Obstetrics and Gynecology</td>
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<td>University of Cincinnati College of Medicine, Director of Division Midlife Women’s Health and Primary Care, Director of UC Health Women’s Center</td>
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<td>Elaine Lee, PhD</td>
<td>Assistant Professor, University of Connecticut</td>
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<td>Rebecca Lopez, PhD, ATC, CSCS</td>
<td>Associate Professor, University of South Florida</td>
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<td>Thom Mayer, MD, FACEP, FAAP</td>
<td>Medical Director, NFL Players Association</td>
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<tr>
<td>Stephanie Mazero, PhD, ATC, FNATA</td>
<td>Associate Professor, Department of Kinesiology, University of Connecticut</td>
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<tr>
<td>Brendon McDermott, PhD, ATC</td>
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