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Implementing Health and Safety Policy Changes at the High School Level from a Leadership Perspective

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Implementing Health and Safety Policies at the High School Level From a Leadership Perspective

Kelly D. Pagnotta, PhD
University of Connecticut, 2014

**Context**: While there are consensus statements and recommendations made by professional organizations aimed at reducing the incidence of injury or sudden death in sport; however nothing is mandated at the high school level. This allows states the freedom to create and implement individual policies. An example of a recommended policy is heat acclimatization. Despite its efficacy in reducing sudden death related to heat stroke very few states follow the recommended guidelines. **Objective**: Retroactively examine why and how 3 states were able to facilitate the successful creation and adoption of heat acclimatization guidelines. **Design**: Case study design utilizing semi-structured phone interviews **Setting**: HSAA in Arkansas, Georgia and New Jersey **Patients or Other Participants**: Eight males, 3 females (n=11) (6 athletic trainers (ATs), 2 members of HSAA, 2 parents, 1 physician) participated. Participant recruitment ceased when data saturation was reached. **Data Collection and Analysis**: All phone interviews were digitally recorded and transcribed verbatim. A grounded theory approach guided analysis, while multiple analysts and peer review were used to establish credibility. **Results**: Each state had a different catalyst to change (student athlete death, empirical data and proactivity). Recommendations from national governing bodies guided the policy creation. Once the decision to implement change was made, the states had two similarities: *shared leadership* and *open communication* between medical professionals,
and members of the high school athletic association helped cover some barriers.

**Conclusions:** While the initiating factor that spurred the change can vary, shared leadership and communication fundamentally allowed for successful adoption of the policy. Our participants were influenced by the recommendations from national governing bodies, which aligns with the institutional change theory. As more states begin to examine and improve their health and safety policies this information could serve as a valuable resource for ATs within other states, and future health and safety initiatives.
Implementing Health and Safety Policies at the High School Level from a Leadership Perspective

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A Dissertation
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Doctor of Philosophy Dissertation

Implementing Health And Safety Policy Changes At The High School Level From A Leadership Perspective

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CHAPTER 1. REVIEW OF THE LITERATURE

Introduction

Every year high school athletes die or are seriously injured while participating in sports.\(^1\)\(^2\) Because of this, many organizations are developing and implementing new policies aimed at keeping athletes safe. In order to effectively develop these policies, one must understand both the sports medicine and organizational change aspect of management theory. This review of the literature will cover sudden death and catastrophic injuries in sport, various policies to prevent these occurrences, organizational change theories, and ways to reduce resistance to change.

Sudden Death And Catastrophic Injuries in Sport

Incidence

The National Center for Catastrophic Sports Injury Research has tracked these incidents since 1982.\(^1\) The center classifies all catastrophic injuries into three different categories, fatalities, non-fatal and serious.\(^1\) Non-fatal injuries are those that are serious and result in a “permanent severe functional disability” while serious injuries are those that are still serious, but result in “no permanent functional disability”.\(^1\) Incidents are also categorized into direct and indirect.\(^1\) Direct incidents are those “which resulted directly from participation in the skills of the sport” while indirect incidents are those that are “caused by systemic failure as a result of exertion while participating in a sport activity or by a complication which was secondary to a non-fatal injury.”\(^1\) Examples of direct causes are traumatic injuries, cervical spine injuries and head injuries. Examples of indirect causes are cardiac incidents, exertional heat stroke, asthma and exertional sickling.
Figure 1 shows total fatal, non-fatal and serious injuries broken down into 5 year blocks from 1986/1987-2010/2011.¹

Fatalities in high school sport are unfortunately not uncommon, as shown in figure ¹.¹ In fact, as reported by the NCCSIR, fatalities are more commonly reported then non-fatal injuries and serious injuries, as shown in Figure 2.¹ This may be a limitation in data collection procedures, as only those injuries reported can be collected. Since there is no national database for all high school injuries to be reported, many of these incidents are only discovered when reported to the media. However, figures 1 and 2 clearly depict that death during high school sports is a concern.¹ Figure 2 shows the death for each year at the high school level allocated into direct and indirect causes from 1982-2011.¹ As shown, there is a fairly consistent trend in the data, which there are periods of time with a limited number of deaths, which can be followed by a year with many deaths.¹ A closer look at just the fatalities in high school sports reveals that indirect fatalities occur more frequently then direct fatalities.¹ This is opposite of non-fatal and serious injuries, which are more likely to be a direct result.¹

Because of the fluctuation in deaths each year, 5 year blocks were created from 1986-2011 to determine if a trend was present. Figure 4 shows the fatalities in high school sports broken down into 5-year blocks.¹ Contrary to advances in medicine and health care, there is not much of a decline in fatalities in high school sport, especially in indirect causes.¹ As a comparison, similar figures were created for collegiate sports. Figure 5 shows the number of fatalities, non-fatal injuries and serious injuries at the collegiate level.¹ Figure 1 illustrates that there are many more fatalities, serious injuries and non-serious injuries at the secondary school level.¹ While the sport is the same at the
collegiate level, competition level, training, number of athletes and medical coverage can be very different then the secondary school level. For this reason, high school athletics will be the primary focus of this literature review.

Causes

As described by Mueller and Casa, in the Preventing Sudden Death in Sport and Physical Activity book\textsuperscript{3}, the top ten causes of death in sport (in alphabetical order, not incident rate) are asthma, cardiac, diabetes, exertional heat stroke, exertional sickling, head injuries, lightning, cervical injuries and trauma.\textsuperscript{1-3} Each year, the top causes of death will vary, however the top 5 causes of death are typically cardiac, head injuries, exertional heat stroke, exertional sickling and cervical spine injuries, in no order.\textsuperscript{1-3} For the purpose of this paper, the top ten causes of death will be addressed with specific focus paid towards the top five.

Cardiac

Cardiac incidence is the leading cause of death for the young physically active population.\textsuperscript{2,3} Maron, et al. investigated the deaths of competitive athletes between 1980 and 2006.\textsuperscript{4} This article found that 1866 athletes died in this 26 year period, with 1049 (56%) being cardiac related. It is important to note, however, that these deaths are not just during activity and also includes suicide and drugs.\textsuperscript{4} The findings reported could be misleading and it is possible to expect that percentage could rise if deaths during, or as a direct result of athletic activity were isolated.\textsuperscript{4} Figure 6, from Maron, et al 2009 shows the break down of deaths.\textsuperscript{4} Also among the leading causes are head injuries, exertional heat stroke, exertional sickling and cervical spine injuries.\textsuperscript{1-4}
Cervical spine injuries

Cervical spine injuries are another cause of death or catastrophic injury in sport.\textsuperscript{1-3} According to the National Spinal Cord Injury Statistical Center, the 4\textsuperscript{th} leading cause of cervical spine injuries is sport, but increases to the second leading cause of cervical spine injuries in those under the age of 30.\textsuperscript{5-7} Axial loading has been identified the most common mechanism for causing an cervical spine injury.\textsuperscript{5,8} Proper recognition and treatment, including immobilization, is the key to reducing further injury or death after an athlete suffers a cervical spine injury.\textsuperscript{5}

Head injuries

Brain injuries are among the leading causes of death in sport.\textsuperscript{2,4,9} While not all brain injuries can be prevented, many can. Research suggests that the proper assessment, treatment and return to play protocols can mitigate further complications of mild traumatic brain injuries, or concussions.\textsuperscript{9-11} With an estimated 1.6 to 3.8 million mild traumatic brain injuries occurring in United States from sports every year, treating mild traumatic brain injuries properly is important.\textsuperscript{9,12} Second impact syndrome is a rapid degeneration of brain function, caused by swelling, thought to occur when the athlete sustains head trauma before the existing mild traumatic brain injury fully heals.\textsuperscript{9} While the exact mechanism and cause has not been pinpointed, withholding an athlete from returning too soon seems to be the key to prevention.\textsuperscript{9}

Exertional sickling

A person must be a carrier of the sickle cell gene, or sickle cell trait positive, in order for exertional sickling to occur.\textsuperscript{2,3,13} Current data suggests that 8\% of African Americans, 0.5\% of Hispanics and 0.2\% of Caucasians are sickle cell trait positive.\textsuperscript{2,3,13,14}
When the red blood cells sickle, it occludes blood flow to the muscles, heart and brain causing an exertional sickling crisis.\textsuperscript{2,3,13} If an exertional sickling episode is recognized and treated, an exertional sickling crisis can be prevented.\textsuperscript{2,3,13} Unfortunately, exertional sickling is the leading cause of death in college football this decade.\textsuperscript{1-3,15} In fact, recent study by Harmon et al. found that NCAA Division 1 football student athletes with sickle cell trait had a 37 time higher risk of death while competing then their counterparts who were not carriers of the sickle cell trait.\textsuperscript{16} Overall, across sports, athletes with sickle cell trait were had a relative risk of death during athletics 15 times higher then their non sickle cell trait counterparts.\textsuperscript{16}

\textit{Heat stroke}

Exertional heat stroke is a life threatening condition characterized by an elevated core body temperature (typically greater than 40°C) and central nervous system dysfunction.\textsuperscript{2,17-19} While there are many predisposing factors that could cause an exertional heat stroke, some include intensity, environmental conditions, equipment or clothing, dehydration, lack of acclimatization, lack of sleep and medications.\textsuperscript{2,17-19} Table A. indicates that the deaths from exertional heat stroke in football appears to be on the rise.\textsuperscript{17}

\textit{Prevention}

Proper prevention, recognition, assessment and return to play policies could decrease the incidence of sudden death in sport.\textsuperscript{2,3,20} Knowing when to seek advanced medical care is imperative.\textsuperscript{2,3} Table 2 describes some basic prevention, recognition/assessment, treatment and return to play guidelines for each of the top 5 conditions.\textsuperscript{2,3} This table is not all encompassing, and for in-depth information regarding
Policies to Prevent Sudden Death and Catastrophic Injuries in Sport

Several recommended policies could be implemented by state high school athletic organizations to reduce the incidence of sudden death in sport, especially at the high school setting. While these policies will not prevent all cases of sudden death, they will certainly reduce the risk associated with sudden death in sport. Several of the policies discussed in this section are condition specific while attention will also be paid towards general emergency procedures and policies that would help address all causes of sudden death in sport. General policies will be presented first, and then condition specific guidelines will follow. It is important to note that some of the policies are specific guidelines established by national organizations, and will be cited as such, while others are the author’s recommendations based on the current literature.

On-Site Medical Care

The National Athletic Trainers’ Association firmly believes that all secondary schools should employ full-time certified athletic trainer.²¹ Less then 50% of high schools have athletic trainers.²² A study by Rav-Acha, et al.²³ indicates that absence of medical triage was present in 100% (n=6) of their cases of fatal exertional heat stroke, while it was only present in 15% (n=18) cases of non-fatal exertional heat stroke.²³ While the sample is small and the cause limited to heat stroke, this could be extrapolated out in regards to other causes of death. In the absence of a certified athletic trainer, coaches would then be the first to administer care. Casa, et al.²⁰ argue that coaches should not be
the one to administer medical care to a sick or injured athlete. The table presented by Casa, et al. highlights the complexity of many conditions and the similar signs and symptoms. Because of the great overlap of signs and symptoms that may be present, it is imperative for a trained medical provider to be the one assessing and treating an athlete. In many cases, a potentially deadly condition, such as exertional heat stroke or exertional sickling, can present with symptoms very similar to a non-fatal condition that is frequently seen in sport, such as heat exhaustion or cramps, respectively. Additionally, as pointed out by Casa et al., the coach may be one who indirectly caused the injury or illness, through their practice regimen, work to rest ratios, hydration breaks or imposed intensity requirements. In many states, coaches aren’t even required to have first aid or CPR training. DeRene et al. found that only about half of the states require first aid and half require CPR. The National Federation of High Schools details that only 14 states require both CPR and First Aid. In those cases where the coach is not certified, parents are leaving their child’s health in the hands of an unqualified coach. It is even more unnerving that a coach would need to be first aid trained, but not CPR and AED because those states are recognizing that the coach may have to give care in the event of an injury, however in the case of an emergency, such as a cardiac incident, the coach has no training, yet would be the one expected to initiate care. Mazerolle et. Al, examined high school football coaches’ understanding of and comfort with the knowledge and skills associated with preventing sudden death in sport. It was found that these coaches felt comfortable treating emergency situations and had confidence in their preparedness. However, even with this high self-confidence, they were not as knowledgeable regarding the signs and symptoms of many conditions. This
inconsistency between confidence and actual knowledge is unnerving, because while they feel empowered through their limited training, including CPR and first aid, they actually are not proficient. This is in some ways consistent with previous literature, which shows that even if a coach is CPR or First Aid certified, in many cases, the coach is still not proficient with the skills or knowledge. However, in those cases, the coach is also uncomfortable with the skills.

The National Athletic Trainers’ Association issued a summary statement on appropriate medical care for the secondary school aged athlete. In this document, it is explained that the medical care of student-athletes should be more comprehensive then just emergency treatment. While the certified athletic trainer is trained and competent to handle the emergencies that arise, it is also important that the student athlete continuously receive the most optimum health care. This encompasses everything from proper pre-participation screenings to injury assessment and treatment, psychological referrals and nutritional guidance. Additionally, in some cases, the return to play decision is just as important as the initial treatment, especially concussion management. A medical professional(s) should be the individual, or team of individuals should be the person evaluating and treating and athlete.

**Continuing Education for Athletic Trainers**

With the emphasis on providing proper medical coverage to student athletes and encouraging schools to hire athletic trainers, we also need to ensure these professionals are practicing at the highest level of care. While athletic trainers must complete a degree from an accredited institution, and in most cases, pass a national certification exam, maintaining knowledge and skills in an ever-changing healthcare
profession is imperative. The Board of Certification requires continuous certification in emergency cardiac care and continuing education; this continuing education is not highly regulated. Mazerolle et al, found that certified athletic trainers were hesitant to use rectal temperature assessment and cold water immersion for the assessment and treatment of a heat stroke patient because they had not learned those skills in school. This supports the thought that clinicians base their treatment options off what they learned in their educational training. With more information and research being conducted on sudden death in sport, especially regarding cardiac condition, exertional sickling and concussions, athletic trainers may not have learned the most up to date information in their undergraduate education. By requiring a minimum level of the continuing education units be completed in topics related to sudden death, or other current trends, athletic trainers can be sure to stay up to date with recent recommendations and policies. This in turn increases the level of care that athletic trainers are able to provide their patients.

Coaching Education and Certification

As explained previously, many states do not require coaches to have first aid or cardiopulmonary resuscitation training. In fact, only about half require first aid and half require cardiopulmonary resuscitation. Currently only 14 states require both cardiopulmonary resuscitation and first aid. In those cases where the coach is not certified, parents are leaving their child’s health in the hands of an unqualified coach. It is even more unnerving that a coach would need to be first aid trained, but not cardiopulmonary resuscitation and automated external defibrillators. Those states are recognizing that the coach may have to give care in the event of an injury. Coaches in
those states would be expected to initiate care in the event of an emergency, such as a cardiac event, yet receive no training. The O’Brien vs. Township High School case highlights the need for this care to be competent. In this legal case regarding medical care and high school athletes, one of the supporting quotes was, “When medical treatment is undertaken by a school or its agent, public policy considerations dictate an obligation to ensure that it is competently rendered. To hold school districts to an ordinary care standard in this area does not appear unduly burdensome.” While this argument could also be made for the hiring of athletic trainers, a coach would also be expected to render medical care for an athlete, even if the role were as a first responder until the athletic trainer or higher medical care arrived. The National Athletic Trainers’ Association Position Statement: Emergency Planning in Athletics also supports this notion by stating that any individual involved in the emergency action plan, including coaches be trained in first aid, CPR and AED usage.

**Emergency Action Plans**

The ability to act immediately and precisely is critical in appropriately managing an emergency situation. An emergency action plan is a written document that outlines the course of action to be taken during an emergency, and is necessary for an optimal outcome when dealing with a condition of sudden death in sport. The National Athletic Trainers’ Association Position Statement: Emergency Planning in Athletics recommends that every organization sponsoring athletics needs to have an emergency action plan and details the important components of this document.

These components include detailing the personnel involved, including their credentialing and role during the emergency, the type and location of emergency
equipment available, the preferred and secondary mode of communication, emergency care facility that the patient would be transported to and the documentation that is completed following an emergency.\textsuperscript{34} The position statement also recommends that the emergency action plan be tailored to the specific venue and reviewed and practiced every year.\textsuperscript{34} Outlining the standard of care and the roles and responsibilities of each responder, as well as reviewing and rehearsing the emergency action plan can help eliminate confusion and conflict during the stressful emergency.

Unfortunately, conflict during the emergency care of an athlete is not uncommon. In fact, 42\% of the athletic trainers surveyed in a study by Decoster et al revealed they have had a conflict or disagreement with emergency personnel while treating a football player.\textsuperscript{35} The position statement also outlines several legal cases, which support the need for emergency action plans.\textsuperscript{34} One case discussed was the Kleinknecht vs. Gettysburg College case.\textsuperscript{34,36} In this case, the athlete suffered a cardiac arrest at lacrosse practice.\textsuperscript{36} The school was found negligent because they had no written emergency action plan, no mode of communication from the practice field, no one on scene that was certified in CPR.\textsuperscript{34,36} This case is one of the first to show that the school owes a duty of care to their student athlete and that the risk of an emergency occurring during athletics is foreseeable and therefore needs to be planned for.\textsuperscript{34,36} In another case, Gathers v. Loyola Marymount College, Hank Gathers a student-basketball player passed away after suffering from a cardiac event during an away game at Loyola Marymount College.\textsuperscript{37} In this case, a student retrieved an AED, but upon use, it was discovered to be the trainer model that does not deliver a shock.\textsuperscript{37} The importance of knowing the location of equipment, and having this specifically outlined in the emergency action plan is highlighted in this case.
Pre-Participation Exams

Pre participation exams are an integral part in athletic health care. These yearly examinations are integral in detecting and documenting any pre-existing conditions. The conditions that can be detected range from cardiac conditions to asthma. Additionally, the documentation of other pre-existing conditions such as sickle cell trait, allergies, diabetes or a history of injury or illnesses is important. Previous history of various conditions including concussions and heat illnesses can predispose athletes to other illnesses.10,19

Cardiac is the leading cause of death in sport and therefore significant attention to preventative measures regarding this cause is important.3,4,38 The American Heart Association has recommendations for screening athletes that should be followed.39 These guidelines include personal history, family history and physical examination.39 The personal history includes questions regarding prodromal symptoms such as syncope or near syncope, dizziness, or unusual/unexplained feelings during exercise including shortness of breath or fatigue.39 Family history includes questions about prior diagnoses of hypertrophic cardiomyopathy, Marfan syndrome or other genetic cardiac conditions and sudden death prior to the age of 50.39 The physical examination should include heart sounds, physical characteristics of Marfan syndrome and blood pressure.35 It is recommended that any athlete who exhibits signs or symptoms of a cardiac condition, through these tests, be further evaluated with the use of other diagnostic tools.39,40

Unfortunately, however, the first indication of an underlying cardiac condition in athletes is sudden death.40
Other causes of sudden death in sport that would be detected or highlighted during this pre participation examination include asthma, anaphylaxis, and diabetes. Through the use of the PPE, athletes with these conditions can be identified and individualized treatment and response plans can be initiated.\textsuperscript{2,41-44} A thorough pre participation examination can help identify an athlete with undiagnosed asthma through self-reported symptoms such as chest tightness, wheezing, coughing and coughing.\textsuperscript{41,43} Athletes with asthma should be identified and an asthma action plan should be created for use in the event of an asthma attack during the pre participation exam.\textsuperscript{41,43} This asthma action plan should identify an individualized treatment plan as well documentation of known triggers, medication, and baseline peak flow meter values.\textsuperscript{37,40} While most athletes with diabetes will be diagnosed prior to their athletic pre participation exam, it is important during this time to clarify and update the athletes diabetic care plan.\textsuperscript{41,43} This diabetic care plan should be developed in conjunction with the athlete’s physician and include preventative measures related to exercise, signs and symptoms of hypoglycemia, and treatment plans.\textsuperscript{42,44} While anaphylaxis is not one of the top ten causes of death in sport,\textsuperscript{2} it is still important to ask about allergies during the pre participation examination.\textsuperscript{44} Having prior knowledge of an athlete’s allergens and the severity of the reaction is important in preventing a case of anaphylaxis. Additionally, ensuring the athlete has his or her own epi-pen for treatment is imperative.\textsuperscript{44}

**Automated External Defibrillators Accessibility**

As stated previously, cardiac conditions are the leading cause of death in athletics.\textsuperscript{3,4,38} Maron, et al.\textsuperscript{4} found that 78\% of the deaths in the young athletic population were of cardiac conditions.\textsuperscript{4} When an emergency arises, especially cardiac related, time is
of the essence. For this reason, we suggest that high schools should have automated
external defibrillators that can be accessed within one minute of any athletic venue. The
American Heart Association has found that for every one minute that defibrillation is
delayed, the chance of survival decreases by 10%.\textsuperscript{45} Ludwig\textsuperscript{46} explains that there are
many confounding variables that prevent a national standard for EMS response time,
however he did note that the standard is that a trained responder, with equipment
including an automated external defibrillator be on scene within four minutes.\textsuperscript{46} One
must remember that the critical survival time starts the moment the athlete collapses. It
takes time for the first responder to realize there is an emergency, assess the scene and
the patient and determine what the cause of the collapse is. Once it has been determined
that the patient is suffering from a cardiac condition and defibrillation is necessary,
cardiopulmonary resuscitation should be started immediately. If defibrillation were able
to occur within one to two minutes of collapse, the chances of an athlete surviving would
be significantly higher than if they had to wait approximately four or more minutes
before advanced care arrived.

\textbf{Concussion Policy}

Recommended policies to prevent catastrophic brain injuries, particularly those
secondary to a concussion, include withholding symptomatic athletes from play, a
thorough evaluation by a medical professional, a gradual return to play protocol, and
withholding youth athletes from play for the entire day if they exhibited symptoms of a
concussion, even if asymptomatic later.\textsuperscript{9-11} Current recommendations also advocate for
the education of athletes, coaches, parents and officials of the signs and symptoms of
concussions. \textsuperscript{9-11} Athletes who are suspected of suffering from a concussion are
recommended to be withheld from competition and be evaluated by a medical professional. Because of the complexity of assessing a concussion and ruling out other, more severe brain injuries, this assessment should be left to a professional. Because of the risk of catastrophic consequences, such as second impact syndrome, any symptomatic athlete should be withheld from play.

Education has also been emphasized in preventing catastrophic brain injuries. This education should include the signs and symptoms of a concussion, as well as the short and long-term consequences of head injuries. In a study by Bramley, soccer players with and without concussion education were compared. Those who had received education were more likely to report their suspected concussion to a coach. One could speculate that this type of education would help reduce the likely hood of athletes hiding their signs and symptoms of concussions and therefore continuing to play. Proper assessment, return to play and education will hopefully reduce the number of athletes dying from traumatic brain injuries.

**Sickle Cell Testing**

In 2010, the NCAA adopted a policy of screening all division 1 athletes. Tarini and colleges performed a policy impact analysis of this program and suggest this testing program, and subsequent interventions could save the life of 7 athletes over about 10 years. The study found that there would be about 2,000 student athletes identified with sickle cell trait. Of these 2,000, not all would have complications, however. Through the use of screening, however, known sickle cell trait carriers would be identified and modifications and precautions could be taken. This problem is not just isolated to the Division I college, however. The Division II just adopted the same screening mandates.
The Division III level of NCAA are not mandated to perform screenings yet, and therefore those athletes are also at risk of complications. It is also becoming an issue in high school athletics, with several athletes passing away from complications in the past year. Because of its quick onset and difficult treatment, preventing this condition from occurring in the first place is imperative. Even if an athlete is found to carry sickle cell trait, this will not preclude them from participating in athletics. Modifications can be made, however to lower the risk associated with exercising with this condition. These modifications include increased rest breaks, self-pacing and education regarding early symptoms. By identifying athletes who may be at risk and modifying some activity, we will hopefully be creating a much safer atmosphere for athletes to participate in.

**Environmental Monitoring**

Because exertional heat stroke is consistently one of the top causes of death in sport, measures should be taken to negate some of the risks associated with exercising in the heat. One way to reduce the risk is modifying or cancelling practices and games when the weather is unsafe. The wet bulb globe temperature (WBGT) is a measure of heat stress that encompasses the ambient temperature, humidity and globe temperature to give an indication of the weather. The American College of Sports Medicine issued recommendations for physical activity based upon the WBGT, stratified by non-acclimatized unfit individuals and acclimatized fit individuals. Modifications should be taken started at a WBGT of 18.4°C. When the WBGT is between 18.4 and 22.2°C, the work to rest ratio should be increased and individuals should be monitored for signs and symptoms of heat illness. When the WBGT is between 22.3°C and 25.6°C,
the risk is at a moderate level and all athletes should be monitored and modifications including shortening the exercise duration and increasing the work to rest ratio should occur. The risk increases to high when the WBGT is between 25.7°C and 27.8 °C. It is during this level that events should be cancelled for high-risk individuals, including those who are un-acclimatized and unfit. Once the WBGT is above 27.8°C it is recommended to cancel events for all athletes. In a study by Grundstein et al., which analyzed heat stroke deaths in American football, 61% of the deaths that had meteorological data (n=33) occurred when the WBGT was in the extreme level of a WBGT of 28°C or higher. The other 39% of these cases occurred when the WBGT was in the high risk category. By taking the precautions outlined by the American College of Sports Medicine and echoed similarly by the National Athletic Trainers’ Association, the risk of athletes suffering from heat illnesses, including exertional heat stroke will hopefully decrease.

**Heat Acclimatization Guidelines**

In addition to modifications based on environmental conditions, another way to decrease this risk of exertional heat stroke is through heat acclimatization. Heat acclimatization is the gradual adaptation that the body achieves by progressively increasing their exposure to exercising in the heat. The heat acclimatization guidelines for secondary school athletics that were set forth by the National Athletic Trainers’ Association in 2009 and very closely mimic those adopted by the NCAA in 2003. These guidelines state help implement a gradual increase in activity and protective equipment worn by secondary school athletes over a period of 14 days. These guidelines recommend single practices on days 1-5, with no practice lasting longer
then 3 hours. Helmets can be worn on days 1 and 2, with the addition of shoulder pads during days 3-5. Day 6 initiates the start of full protective equipment and multiple sessions in 1 day. These sessions must each be no longer then 3 hours, but no more then 5 hours of total practice can occur in one day. There is also a required 3 hour break in between the sessions. Most physiological adaptations occur after 10 days, the last after 14 days of exercising in the heat. For example, heart rate decreases and plateaus after approximately 5-6 days exercising in the heat. A decrease in heart rate, with the same exercise indicates that the relative intensity of the exercise is decreased. Rectal temperature also decreases and plateaus after about 9 days of exercising in the heat. After approximately 14 days of exercising in the heat, sweat rate increases. This increase in sweat rate actually aides in the prevention of heat illnesses by aiding in the evaporative cooling process. Even when euhydrated, Sawka et al. demonstrated that when fully heat acclimatized, core body temperature does not rise as quickly when exercising in the heat. In addition to the acclimatization to exercising in the heat, the guidelines also gradually increase the amount of equipment a player can wear. As demonstrated by Armstrong et al., the amount of stressed placed on the individual differed significantly based upon the amount of equipment they were wearing while completing an exercise protocol in a controlled hot environment (33°C, 48-49% relative humidity). It is because of this amount of protective equipment worn must also be progressively increased. Through this gradual adaptation of exercise and equipment, we hope to mitigate some of the risks associated with exercising in the heat.
State Specific Policies

While current research exists regarding appropriate policies for health and safety in athletics at the secondary school level, there is no one centralized governing body to create and enforce policies at the national level. Unlike the collegiate level, where a national governing body can create and implement rules, at the secondary school level all policies must be created and implemented at the state level. Each state is afforded the freedom to create, implement and adapt policies, as they deem necessary. This means that there is no uniform policy governing any of the state regarding any of the conditions discussed previously. The Korey Stringer Institute, a non-profit organization aimed at preventing sudden death in sport has compiled policy information from all 50 states regarding heat acclimatization, automated external defibrillator availability, concussion policies, emergency action plans, environmental conditions (wet-bulb globe temperature) monitoring, and coaching education.\textsuperscript{56-61} Figures 7-12 demonstrate the variance between states as well as the lack of uniformed adoption of recommended guidelines.

For the purpose of this paper, 3 states were selected due to their current heat acclimatization policies Heat acclimatization guidelines will be the primary focus of the remainder of this paper because exertional heat stroke is among the top causes of death in sport, the incidence of fatal exertional heat strokes appear to be rising, and the established high school guidelines that would cost a school district or state little financially to implement.\textsuperscript{17} Arkansas, Georgia and New Jersey all recently created or updated heat acclimatization guidelines that are in line with the National Athletic Trainers’ Association Consensus Statement.\textsuperscript{52} Table 3 compares each state’s heat acclimatization policies with those of the National Athletic Trainers’ Association. While they do have
similar heat acclimatization standards, they do not have similar policies for all conditions. A brief overview of selected current policies in each state follows.

**Arkansas**

Arkansas recently implemented a new law, Act 1214: An act to promote the health and safety of students in public school athletic activities through the use of athletic trainers and professional development for coaches; and for other purposes. This legislation, which was implemented in August 2011, addresses several causes of sudden death in sport. For example, it is required that schools create and implement emergency action plans for various causes of death in sport including head injuries, exertional sickling, cardiac events, and MRSA. High school athletic coaches must also undergo training for each of these conditions. Also, the bill details a program that will begin to pilot placing certified athletic trainers at every school in Arkansas. In this pilot program, some schools will be assisted with the process of hiring an athletic trainer and data will be collected regarding injuries and effectiveness, prior to mandating this policy throughout the state. While these policies were clouted as being a big step in the right direction, Arkansas was still lacking heat acclimatization policies. In August 2012, these policies, as described previously, were adopted. It is also required that coaches maintain CPR, AED and First Aide certifications.

**Georgia**

Coaches in Georgia, however, are not required to complete CPR/AED certification. They must, however, complete a First Aid course. Georgia also adopted the heat acclimatization guidelines previously discussed. Georgia also implemented a policy mandating that the WBGT be measured at all practices Table 4) following
modifications must be made, depending on the WBGT reading. Georgia’s risk
management policy also includes policies that govern rest breaks, and specify what is
counted as practice and walk-through. Also specified in Georgia’s policy were the
monetary consequences for not adhering to the policy.

New Jersey

New Jersey adopted the recommended guidelines for heat acclimatization in the
secondary school in June of 2010, making it the first state to do so. Coaches must
also have a valid CPR/AED and first aid certification. New Jersey also has a strict
concussion policy requiring that any student athlete who is suspected of sustaining a
concussion be evaluated and cleared by a “physician trained and in the evaluation and
management of concussion”. New Jersey also mandates that the coaches be educated,
and obtain a certificate on concussions as well as heat illnesses.

Policy Development in Sport

What is unclear after highlighting these three particular states is why and how
they were able to implement such changes. Also, after looking at Figures 7-12, it is
unclear why some states have chosen to adopt recommended policies and others have not.
In sports medicine, development or change of a policy appears to be initiated in response
to a death or catastrophic incident. For example, the National Collegiate Athletic
Association mandated sickle cell testing for all Division 1 athletes in response to a
lawsuit following the exertional sickling death of Rice University athlete Dale Lloyd. The same reactive response is also seen at the state high school level. In Washington,
concussion law was implemented and named after Zachary Lystadt, a high school
student-athlete who suffered a catastrophic brain injury after sustaining a concussion and
returning to play the same day. An understanding of organizational change theory and
ways to reduce resistance to change may be the missing information for sports medicine
personnel to proactively initiate policy development.

**Organizational Change**

In order to investigate the idea of organizational change theory as it relates to
athletic health care further, an examination of current literature regarding organizational
change will ensue. This discussion will highlight current literature regarding theoretical
frameworks regarding organizational change and their application to the successful
adoption of health and safety policies at the secondary school level.

**Population Ecology**

The population ecology framework, places less emphasis on why individual
organizations change, but rather why a group of organizations change over time. The
framework explains that before the change process organizations are different to
highlight their uniqueness. During this time, there is a rapid increase in the number of
organizations and great diversity amongst the organizations. Then later, as the
environment influences the success, organizations either change and respond or no longer
exist. It is like the evolutionary view of organizational change- survival of the
fittest. Hannan and Freeman discuss that these pressures from the environment are
varying and dependent on many things, but all have an influence on the type of
organization that will succeed. When organizations change in response to fitting better
within the organization, it results in less variation within the organizations and typically fewer organizations.\textsuperscript{71,72}

While not completely fitting and not typically referenced in the sports management literature, this model may be more applicable to the secondary school setting then the collegiate setting of athletics and is therefore important to understand. In regards to secondary school health and safety policies, one can view the organizations as those that create and enforce the policies. Originally, there were none. As rule changes and awareness of health and safety issues within athletics grew, so did the need for the creation of these policies. In the collegiate setting, the national governing body can create and enforce the rules. However, at the secondary school level, there is no national governing body. These rules must be created and enforced at a lower level. Some policies are created at the state level, some at the conference level, and some at the school district level. All these organizations are operating within the same environment, with the same current events and similar stakeholders. As the environment changes and external and internal pressures mount against the organizations, their strength will be challenged.

An example can be illustrated through CPR and First Aid Certification for coaches. At the secondary school level, some states require all coaches maintain current certification. In the states that do not regulate it, some conferences do, and others are regulated by the school district requirements on their coaches. If, overtime, the environment in a state dictates that all coaches need to maintain current CPR and First Aid certification, there may be a shift in the organizations. This environmental demand does not have to be a mandated rule change, but rather recommendations or stakeholder
influences—such as parent groups. Conferences or districts that already mandate this will not need to change, but those that do not will have to change their policy to conform with the demands of the current environment in order to stay viable.

While this framework can explain why an organization would change, it does not fully apply to health and safety policy organizations, as the consequence for not changing with the environment does not fully apply. This model is most applicable to businesses and other for-profit organizations and rarely seen in a review of sport management literature. The survivability of the organization is dependent on how they compete with other similar organizations. In secondary school athletics, the organizations are not for-profit, and therefore there is not really other rival businesses or organizations to compete with. Student athletes and parents can chose to not allow their child to play, but the choice to go to a better organization isn’t really plausible. For example, one cannot simply chose to attend a school in a different state where there are better policies (unless they move), as they can drive to Wal-Mart over Target because they have better prices.

Resource Dependence

The resource dependence theory, as the name suggests, explains that organizations must adapt and initiate change in order to maintain their current level of resources.\textsuperscript{72} In order to keep receiving the resources they are accustomed to, they must change to either adapt to changing resources or maintain the current resources.\textsuperscript{72} Organizations change and adapt based on the resources available or unavailable to them.\textsuperscript{72} In many cases, the lack of resources, or removal of resources is the motivation for organizations to change.\textsuperscript{72} This theory is typically seen to explain organizational
change within for-profit businesses and companies, where there is reliance on maintaining and creating resources in order to stay viable.

While many high school and collegiate sport organizations are non-profit, these organizations still rely on resources to keep them up and running. Because they are typically run by state, these state athletic associations need to continue to get financial resources necessary from the state. If these resources are ever threatened the organization must respond. The resources may be threatened if there is not compliance with proposed policies. For example, some health and safety policies are mandated through legislation. If the state athletic association is not in compliance with the legislation, resources could be withdrawn. Also, the new changes, such as certifications or required training, would require a redistribution of the resources already allocated. This would then result in a trickledown effect, unrelated to the actual policies. Therefore, the resource dependence theory could also be useful in not only analyzing why an organization adopted the health and safety policies, but also the resulting changes.

Aside from financial resources, personnel, educational materials, training sessions, guidance and general membership are all resources that state high school athletic organizations need to be mindful of. For example, the National Federation for High Schools, is a national organization for high school sports. This organization creates resources for states to utilize; including online based educational seminars, handbooks, and other educational materials. However, because it is not a governing body, these are simply resources and not mandates and while the organization can provide suggestions, they cannot regulate or enforce anything, as that must come from the state level.
Evolution and revolution

When evaluating the process by which a state will change, it is important to note the type of change that will occur. Evolution and revolution are terms used to describe the change that occurs within an organization. Evolutionary change is a slower, methodical process that occurs with adjustments being made to the current process. This means that the change is less drastic, as the organizational design is typically unchanged. What may be changed is the processes, strategies or policies. Revolutionary change, on the other hand is more of a drastic change that results from an overhaul of the organization. This change process is more swift, and drastic. Typically the organizational design is changed. This typically results from a crisis or other drastic turn of events.

In terms of state athletic associations and implementing health and safety policies, a majority of these initiatives will be an evolutionary change. While the policy advocated may seem drastic to some, in most cases the change will not be a complete overhaul of the organization. This is not always the case, however. For example, an evolutionary approach to change may be warranted in a state with a rash of deaths and negative publicity. This could also simply occur out of fear or emotional reaction to the crisis. It may, however, been out of real assessment that the entire organization or policies overall need to be changed.

Contextualist Theory

In the contextualist theory, it is argued that organizational change cannot be looked at in isolation. It is appropriate to think that, just as the organization does not operate in a vacuum, the change process does not occur in a vacuum either. Pettigrew,
one of the founders of this approach, also advocates that, when analyzing a change process, a longitudinal approach should be taken, as change is not a singular event, but rather a process. When evaluating change using the contextualist theory, one must take a multifaceted look at the organization over time. This framework does not focus only on the reason behind the change, but also incorporates the process and content within the change when describing it. When evaluating the context of the change, this theory explains the need to examine what they call “inner and outer” context. This, similar to the other frameworks described previously, aims to understand the internal and external forces that could be effecting the organization and its decision to change. The inner content is that which is directly connected to the organization, or in control of by the organization or the internal environment. The outer content is more of the external environment- those things that are not directly associated with the organization, but rather those things that are occurring in the outside world that may effect the organization.

Using this framework to fully understand the process by which a state athletic association will change is important. These changes do not occur alone, and therefore one cannot fully understand what is occurring and the process by which the organization is changing without looking at all the elements. For example, if a state chooses to implement these changes (or some of the advocated changes), the context surrounding the decision, as well as the context surrounding the process is important. It is important to not only understand the inner context, such as who the leaders are and their feelings on the issue, as well as what the organizational structure is but also what is occurring in the world surrounding the organization that may influence the change. For example, did an athlete pass away recently? What stakeholder influence is driving the change? What are
other organizations similar to this one doing? Are there national or state initiatives that mimic what is occurring here? What is the financial status of the state or organization and what is the financial impact of this change?

**Full-Integration Theory**

In an article regarding organizational change, Cunningham discussed the full-integration theory as a plausible change process occurring in athletic organizations. Similar to Greiner’s Patterns of Organizational Change, which will be discussed later, the full-integration theory describes the change process in stages. In this article, he discusses the 3 stages of the full-integration theory as they related to a diversity change process that an athletic organization was undertaking. This model, however, is applicable to any change that an athletic organization will undergo.

The first stage, after deciding that a change is necessary is called the issue identification stage. As the name suggests, it is during that this stage the underlying issues are identified. While it is easy to identify the superficial problems, identifying the underlying the issues could be more difficult, as it often challenges the underlying organizational structure, culture and power. Top management initiative, leaders must embrace and show support for the change formally and informally. This means that in addition to supporting formal actions and set initiatives, helping to change the culture and fully immerse the organization in the change is important. For example, a leader within the state high school athletic association cannot support the initiatives for pre-season practice guideline changes and heat acclimatization, but also support the football coaches desires to have autonomy in their decisions for practice scheduling. Changes to the strategy, goals and mission of the athletic organization must occur. In terms of health
and safety initiatives, the health and safety of athletes cannot be segregated to only the sports medicine section or health and safety committee. Rather, it must be integrated into the overall mission of the organization. It is these changes that truly affect the organizational culture.

During the second stage, the implementation stage, the issues identified in the previous stage are addressed and changes throughout the entire organization are made. These could be personnel changes, organizational structure, rules, trainings or policies. In health and safety initiatives, this could be hiring staff with a background in health and safety, implementing the new rules in handbooks and training courses, and developing disciplinary actions for those found not to be following procedures.

During the third stage, maintenance, the change has been implemented and this point focuses on reinforcing the organizational culture change that is like to result. Without this stage, backlash may occur or the organization simply reverts back to the old ways. As Cunningham noticed when studying diversity changes within a collegiate sporting organization, these later two stages are challenging and may take a long time to reach.

Institutional Theory

Another framework that could explain why state associations would choose to adopt the advocated policies is Institutional Theory. Initially, organizations must separate themselves to remain competitive. This is when the field is young and organizations are created to add diversity to the field. Institutional theory explains that there are three reasons why organizations institutionalize, or become more alike: mimetic, normative and coercive. This theory goes on to explain that once the field is
more established, organizations implement change to become more similar to other organizations in the field they compare themselves with.\textsuperscript{72,76} This form of mimetic processes is especially common in times of uncertainty or may simply occur as organizations model their practices after similar groups that they view as successful.\textsuperscript{72,76} As goals become more ambiguous or the uncertainty increases, the more likely an organization is to model itself off an organization it deems to be successful.\textsuperscript{76}

As the change process continues and professionalization occurs within members, normative isomorphism occurs.\textsuperscript{76} In normative isomorphism, the individual members and growth of professions dictate what is considered normal and legitimate for their profession.\textsuperscript{76} When this occurs, members drive changes within organizations based on this professionalization.\textsuperscript{76} This increase in normative isomorphism will occur when there is an increase reliance on education and credentials for leadership, and as the members become more involved in professional organizations.\textsuperscript{76} Coercive isomorphism occurs in response to pressure from professional or governing bodies.\textsuperscript{76} As the reliance on resources from the professional or governing bodies increases, so will the likelihood that the isomorphism will occur.\textsuperscript{76} The rate at which the isomorphism occurs will also increase.\textsuperscript{76}

Institutionalization can be an important reason for understanding why organizations do change; however, it can also explain why organizations may not change as well. Once the processes, policies and organizations are established, many have already become institutionalized to what is deemed acceptable. This institutionalism is not only a driver for organizations to change, but then also for organizations to resist change. This idea of deinstitutionalization will be discussed later.\textsuperscript{71}
Organizations must also change to match what it deemed acceptable in the field at the time.\textsuperscript{72,76} Pressure by governing bodies, professional organizations or other stakeholder organizations can also influence what is considered acceptable, a process that can bring about change called coercive isomorphism.\textsuperscript{72,76} In their article, DiMaggio and Powell discuss how civil service reform was adopted. When the process was required or supported by the state, the change process was much faster, compared to when it was not supported by the state.\textsuperscript{76} In this study, as time went on, and more cities adopted the practices, it became more commonly accepted that was the impetus for change for those organizations and cities who adopted it later.\textsuperscript{76} By institutionalizing, organizations then become legitimate actors in the eyes of their stakeholders.\textsuperscript{72,76} DiMaggio and Powell go on to explain that similar environmental influences can cause organizations to adopt similar policies and converge into similar organizations.\textsuperscript{76}

Often times, there is a void in healthcare literature bridging medicine and the social science theories often seen in other professions. Gómez specifically highlighted the lack of utilization of institutional change theory in the healthcare change literature, but noted it can be used to explain change amongst world health organizations.\textsuperscript{77} Specifically, this study highlights the application of institutional change theory, as it takes into consideration both internal and external pressures that could cause change.\textsuperscript{77} Gómez explains that in healthcare, many internal changes are often caused because of external pressures and influences.\textsuperscript{77}

Because athletic training is a healthcare field centered in sport, the utilization of institutional change theory within sport organizations was also examined. In an article discussing continual change over several years in Canadian national sport organizations,
institutionalism was found to be one of the reasons change occurred. In this case, the national sport organizations were evolving to a more structured and centralized organization. This fell in line with what Sport Canada, the national governing body deemed to be acceptable. Because the governing body deemed this to be acceptable, other organizations had to change and evolve in order to become legitimate, directly aligning with coercive isomorphism. Coercive isomorphism wasn’t the only institutionalism influence on the change however. Mimetic isomorphism was also evident, as all the change and planning process was creating uncertainty within the various organizations. As the uncertainty grew, the organizations began to look at other organizations for ideas and modeled after those, which appeared to be more successful. Normative isomorphism also occurred as those who worked in the sport organizations received their professional education as well as during hiring and promoting of staff members.

In a study of a collegiate athletic department within the United States, institutional theory was also found to explain the driving forces for change. In this study, the competitive pressures to move to a stronger conference were driven by coercive isomorphism. In this study, coercive pressure from alumni, parents and fans pressured the athletic department to change structure, design, and function to conform to the expectations. This added visibility, revenue and resources. The athletic department was also in the process of saving the football program, which was driving by mimetic isomorphism, as there was the perception that having a football program increased legitimacy.
In the case of high school athletics, many of the reasons a state may change their policies fall in line with this theory. For example, state athletic associations may compare themselves to other states’ athletic associations, either neighboring or considered more powerful. These powerful states are often considered powerhouses in certain sports. Additionally, secondary schools consistently compare their governing bodies with higher levels of sport governing bodies, such as the NCAA or professional organizations. Additionally, as expert recommendations become more prominent, individual state policies will be scrutinized against those. In order to associate themselves with this highly respected athletic organization, states may move to adopt similar policies.

Additionally, parents and other advocacy groups may push to get their state to follow these policies. For example, a parent will judge their state’s policies by those enforced at the collegiate level. From a parent’s perspective, secondary school athletes should be protected just as much as collegiate athletes. This is directly aligned with institutional theory, as the high schools will now have to become more like the collegiate model in order to be viewed as legitimate or acceptable. In addition to comparing themselves to the collegiate level, state policies are also compared to other states’ policies and critiqued against national recommendations by governing bodies. As the process of creating and adopting health and safety policies continues, states who have yet to adopt policies will be scrutinized against those states who have. This pressure, both internally and externally can drive the state to adopt policies more in line with those advocated by governing bodies as well as other states and sport governing bodies. Additionally, as this process continues, normative isomorphism will continue. Currently, athletic trainers push
for these policies to occur, a form of normative isomorphism. Coaches, athletic
directors and other professionals will begin to all accept these various policies as the
normative standard and therefore also push for these to occur, adding to the institutional
isomorphic pressures.

**Deinstitutionalization**

While in institutionalization organizations change in order to become more
similar, deinstitutionalization is another process organizations can undertake during a
change. Cunningham suggests that organizations who have a tradition of doing things
the same way, such as athletic organizations, are candidates for this process. These
organizations that have formed and institutionalized become accustomed to doing things
the same way, or the way things have always been done. However, various pressures
can make members of the organization question or rethink the habits or tradition that
guide the organization. Because of this, the current way of doing things no longer
becomes acceptable and a change is needed. These pressures can be political, resources,
financial or social.

This idea of deinstitutionalization was specifically highlighted in a study by
Kikulis, which examined Canadian sport organizations. In this study, Kikulis looked at
change in Canada’s national sport organizations. While aspects of the organization
underwent institutionalization, as they integrated a more professional and businesslike
model of the volunteer aspect of the organization, deinstitutionalization also occurred.
This process of deinstitutionalization was deemed necessary when the current practices
were outdated.
Athletic organizations are typically institutionalized, as the culture in athletics is one built off history and tradition. Also, because these organizations are not new, they typically have a standard of how things have been done. For example, coaches may run practices they way they have always run practices or the way things were run when they were athletes. However, for reasons that were described previously, the traditional way of doing things may not always be regarded as acceptable anymore. Sport organizations must then deinstitutionalize and change the current way of doing things. This process is particularly applicable to organizations that make this change first or early on.

While it is important to understand why a state athletic association chose to adopt certain health and safety policies, it is just as important to understand the process that occurs as these policies are being set in place. An organization such as the Korey Stringer Institute, or others pushing to help states adopt policy changes cannot help facilitate this process without fully understanding the process that states will incur.

*Greiner’s Patterns of Organizational Change*

Understanding the individualized process each state may take is important. This can be attained using the contextualized approach. However, it is also important to have some generalizations regarding the entire process, so that resources, support and guidance can be given to the states, which plan to understand this endeavor. While each organization and change process may be different, understanding the steps that a typical change process undertakes is important. The Greiner’s Patterns of Organizational Change does this.75

In this model, there are 6 stages that the organization travels through during the change process, each with an input and reaction to that input.72,75 **Pressure and**
arousal”, the first stage, is the reason for the change. It is during this step that the reasons and frameworks why an organization may change come into play. Here, environmental pressures, stakeholder influence and the need for resources can all play into the pressure to change. This pressure has to elicit a change in the leadership. In a sport organization this pressure could be a rash in recent deaths or close calls at local schools, increased research and media attention on certain topics such as concussions or athletic training groups constant advocacy. Whatever the input, it has to be enough to spur a reaction from the leadership. Greiner also states that typically there has to be a change in power, as often times- without this the pressure goes ignored by those currently in power.

After this redistribution of power, Greiner explains that change is still not guaranteed. Typically, an outside perspective needs to be brought in with this change of power to truly ensure change will occur. This outsider has to be high enough in the organization to be able to make decisions, but because they are an outsider, they have a fresh and unbiased perspective of the organization and what the flaws are. In the case of athletics, someone who has been involved with the state association for an extended period of time is less likely to notice deficiencies then someone who is removed. This suggests that perhaps people get complacent in the status quo and cannot see that things are not as good as perceived. An outsider will be more likely to notice this and help initiate change. The organization must be then reorganized so that this person is able to make decisions and address the issues.

In the third stage, the organization is critiqued and the true root of the issue is uncovered. This stage is often difficult, Greiner explains, as oftentimes the information is
uncomfortable or unwelcomed. The issue with this step is the real issue needs to be
diagnosed or the change process will not be as effective. Greiner explained that in
unsuccessful change, this was often ignored. This is very important for state athletic
associations to realize, as it is often easier to give a quick assessment and change a policy
to appease the masses but unless the root of the problem is fixed, the organization is still
at risk and deficient. An example of this can be seen in Kentucky when the state athletic
association created a policy in response to the death of a student athlete and subsequent
criminal charges against the coach. This policy simply required that coaches undergo
more advanced training in heat illness and other sport related injuries. While this seems
like a good solution, the root of the problem was not addressed. One of these issues is the
lack of appropriate medical coverage- this policy simply covered that up. Another issue
was the lack of heat acclimatization and unmodified practice in hot and humid conditions.
These were also not addressed.

Once the root of the issue is uncovered, the appropriate solution must be
developed. Greiner explained the need to have unique and new solutions to these
problems, rather then reverting back to old ways. As explained previously, if the old
ways include coaches education, creating additional coaching education may not be an
adequate solution to the problem. Rather, something different and new is needed to
actually create a change. This decision needs to be made and agreed upon by all
involved.

In step 5, these solutions are tested and the results are analyzed. This can
occur on a smaller scale before implementing the change widespread or occur through
smaller changes throughout the organization before major changes occur. An example of
this is Arkansas’ bill that requires a testing period before hiring athletic trainers at local high schools. They started an experimental trial period before they could mandate that all schools needed to employ a certified athletic trainer. After all the data is analyzed, and the policy is implemented widespread, the change needs to be reinforced. With the positive reinforcement, less resistance will occur, therefore it is more likely to be accepted by all the stakeholders.\textsuperscript{75}

**Overcoming Resistance to Change**

There are many sources of resistance that high school athletic associations will face, but there are also ways to mitigate these sources of resistance, if done properly. Change is uncomfortable for most. This resistance can come from many places, including the state’s athletic association itself or other stakeholders like coaches, physicians, parents and the athletes. Anticipating these sources of resistance and creating formal and informal ways to mitigate the stress of change ahead of time is key to a successful change process. Effective leadership throughout the entire leadership process is key.

One source of resistance can be self-interest. For example, coaches may not want to be mandated to have increased training, as they fear it could increase their liability. If they receive no training, and are not obligated to care, their perceived risk is less then if they receive more training and therefore must care for an athlete. Athletic trainers may oppose certain policies out of self-interest. For example, if a policy says that all athletes with suspected concussions must be evaluated by a physician and cannot return to play until cleared by that physician, many athletic trainers may feel professionally threatened.
By taking away duties and skills typically associated with their profession, they may resist endorsing or supporting the new policy.

Another main reason for people to resist change is because they simply do not understand what is occurring. Any change can elicit stress amongst though it is effecting, especially if there is ambiguity regarding the actual policy or misunderstanding about it. For example, some may resist the advocated heat acclimatization standards because they do not understand them or hear rumors about them. Coaches may fear that they will not be able to have any double sessions, that they cannot have preseason or that their players will not be ready for the season. Implementing guidelines for modifying practice based upon environmental conditions is also resisted because of many misunderstandings. For example, those in southern states simply believe these guidelines will tell them that they cannot practice outside for a majority of the year, as their average temperature and humidity is consistently high.

Another reason state athletic associations resist change is the cost. This cost is not just financial in nature, but also the effort, time and resources that would be put into implementing and enforcing the change. One financial concern is any cost associated with new trainings and certifications, printing and distributing new information and any supplies that schools would incur for being in compliance with these policies. For example, the American Red Cross charges $19 a card for each CPR and First Aid certification, per participant. The cost to running a new certification course is even more expensive. In order for a school district to get all of their coaches certified, it would cost quite a bit of money. Additionally, in order to put together educational materials for
other initiatives such as concussion awareness, money, time, effort and manpower would be necessary.

*Transformational Leadership*

There are many ways to minimize the resistance to change. While the optimal tactics to reduce resistance depends on the reason for resistance, effective leadership is an overwhelming theme. The specific type of leadership that is necessary to reduce the resistance and facilitate effective change varies based on the task at hand and the reason for resistance. In a study by Herold *et. Al*\(^{83}\), transformational leadership was found to be most effective in increasing commitment to an organizational change. Transformational leadership is characterized as “appealing to the ideals and values of subordinates.”\(^{72}\) This is effective in the changes process, especially regarding health and safety of athletes, because everyone involved has the same common goal of safe athletic participation. By using these common goals and values, the leaders are able to facilitate the change.\(^{72}\) Transformational leaders tend to also pay great attention to the needs, feelings and emotions of those affected by the change.\(^{72}\) By doing so, the resistance can be decreased. Aarons and Somerfield examined leadership during the implementation of evidence-based practices within a nursing community.\(^{84}\) Transformational leadership styles were more evident in those groups implementing the evidence-based practice initiative.\(^{84}\) This created more innovation and more positive feelings towards the practices.\(^{84}\) This echoed the suggestions by Luzinski, who also recommended utilizing transformational leadership when navigating change in the nursing field.\(^{85}\) Fortunately Laurent has shown that transformational leadership was a prominent style used by head athletic trainers and other leaders in the athletic training profession.\(^{86}\)
Once the leader understands the needs and feelings of those affected, they can take the appropriate measures to address some concerns. Regardless of the concerns, appropriate communication and education on the change, the process and the effects is necessary. Effective leadership is often associated with open, clear communication. de Vries found that effective, specific, open communication was the biggest factor in the leaders’ perceived performance and satisfaction. Neufeld also found that transformational leadership and open communication increased confidence in the leader, as well as increased the leader’s perceived performance. As described earlier, many times, the resistance occurs because of misunderstanding or inadequate information regarding the process and new policies. By creating a common vision and capitalizing on shared values, the transformational leader can help offset some of the concern about the cost of the change process. Also, being involved and actively participating in the change process is also a way to reduce resistance. Additionally, by involving those stakeholder groups who may have concerns—such as coaches and athletic trainers as discussed previously, there will be a reduced amount of resistance because they will also be involved throughout the process.

Within sport management, Soucie summarized many leadership styles and skills that could be used to manage change. In addition to simply reviewing transformational leadership, he provided practical skills, or prescriptions, that could be learned from the various literature on organizational change and leadership. These recommendation include: “Be persistent and consistent in the pursuit of a vision for your sport organization.” “Be congruent, live up to the values you hold, and manage by example.” And finally, “believe in people, delegate, and be prepared to share power.”
These traits are shown in the successful leadership style of Cal Berkley’s Rugby coach Cal Clark. Even during times of change and uncertainty, Coach Clark was able to successfully manage his organization through the process.

Weese studied transformational leadership, organizational culture and organizational effectiveness within collegiate athletic organizations. While there was no significant relationship found between the level of transformational leadership and organizational culture, the authors surmise that this may be an effect of the organization size and direct or indirect influence the leaders had. What was discovered, however, was that organizational culture was significantly related to organizational effectiveness. This was not specifically studied during a time of change, however.

Conversely, when Aarons and Somerfield examined leadership during the implementation of evidence-based practices within a nursing community; transformational leadership styles were more evident in those groups implementing the evidence-based practice initiative. This created more innovation and more positive feelings towards the practices. This echoed the suggestions by Luzinski, who recommended utilizing transformational leadership when navigating change in the nursing field. This is important to note because the health and safety policies that are being advocated for the secondary school are a direct implementation of evidence-based practice, only within the athletic training and sports medicine community. It is then comforting to know that leaders within the athletic training profession have been shown to be transformational leaders.

*Shared Leadership*
While the idea of a predominant style amongst leaders is prevalent in the literature, another method to reduce resistance is the idea of shared leadership has also emerged. The idea of shared leadership has also referred to as distributed leadership, collective leadership, horizontal leadership, and team leadership. Fundamentally, the terms are all describing the same concept, whereby multiple leaders emerge within a work setting or organization. Shared leadership diverges from the traditional perspective of a single leader who leads a group of individuals towards a common goal or vision, but rather is a seen as a collective effort, whereby leadership resides with a group of individuals. The importance of a cohesive workplace environment has become increasingly important in many organizations, and likely the reason for the emergence of a shared effort in leadership. Also, multiple team leaders can benefit the workplace by facilitating the accomplishment of the goals and objectives set forth within in the mission by capitalizing on the skills, knowledge, and expertise each leader possesses. Research on the topic is growing, but has been limited to the healthcare sector (ie-nursing) and education.

Shared leadership commonly occurs in situations when there is no set or assigned leader, as defined by titles or roles, but may also occur naturally based on the setting. In shared leadership at least two individuals work together to help move the organization towards a common goal. Based on the task at hand, leaders emerge from the organization’s membership as determined by their expertise, knowledge and previous experiences. Inglis noted that the professionalization of the organization increased when board members were chosen for an area of expertise, rather then simply the availability and interest in serving. Additionally, this form of leadership was been
shown to be useful when many different groups or organizations come together to work towards a common cause. This is particularly important in creating health and safety changes in high school athletics, as multiple professions including school administration, coaching, athletic training and physicians must work together to create practical, yet medically sound policies. This supports the notion that shared leadership occurs most when members of an organization are needed based on their knowledge, previous experiences or skills.

While never previously studied in this context, this type of leadership style can be particularly effective in the sports medicine context because of the dynamic and complex nature of the field. Athletic training must work with a variety of professionals and other constituents due to the nature of providing comprehensive medical care to the healthy, physically active population. This is particularly true in the high school setting. Heidorn and Hall examined the shared leadership model in the context of an overall school wellness policy, primarily targeting youth obesity. Many of the overarching themes including empowering and utilizing the right professionals including administrators and teachers, while still ensuring everyone plays a role is particularly fitting within athletic training and creation and adoption of heat acclimatization guidelines. Within an athletics model, the utilization and effectiveness of shared leadership has been shown within amateur sports through the empowerment of board members and committees. Inglis also noted the importance of volunteers (i.e. those not in formal leadership roles) during times of change.

Shared leadership affords more flexibility by being multidirectional (coming from across various levels within an organization) rather than vertical (coming from the top
down [particularly someone in an assigned leadership role]) and is more dynamic due to the interactions needed between the leaders themselves.\textsuperscript{92} Additionally, shared leadership has been shown to be more effective in facilitating trust and team cohesiveness\textsuperscript{92}, likely because member feel as though their voice is heard. Additionally, shared leadership has been shown to increase problem solving, satisfaction with the outcome, perceived self and team effectiveness and team performance.\textsuperscript{92} An organization’s ability to problem solve and work towards everyone’s satisfaction with the new policy is crucial when examining the ability for a state to implement new heat acclimatization guidelines at the high school level.

**Conclusion**

As shown previously, there is still much work to be done regarding health and safety policies for athletics at the high school level. Additionally, a significant gap in the literature exists regarding organizational change theory and leadership’s impact on health and safety policy development. Sports medicine is lacking a significant social science theoretical base and therefore much of the information presented was spliced from various fields including sports management, business and nursing. As more states strive to implement new health and safety policies for high school athletics, more information is needed regarding the change process.
References


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86. Laurent TG, Bradney DA. Leadership behaviors of athletic training leaders compared with leaders in other fields. *JAT*. 2007;42(1):120–125.


Figure 1. Total catastrophic injuries at the high school and collegiate setting.

Adapted from National Center for Catastrophic Sports Injury Research.¹
Figure 2. Total Catastrophic Injuries in High School Sports.

Adapted from National Center for Catastrophic Sports Injury Research.¹
Figure 3. Fatalities in high school athletics from 1982-2011.

Adapted from National Center for Catastrophic Sports Injury Research.¹
Figure 4. Fatalities in high school athletics from 1982-2011 broken into 5 year blocks.

Adapted from National Center for Catastrophic Sports Injury Research.
Figure 5. Total catastrophic injuries in collegiate sports.

Adapted from National Center for Catastrophic Sports Injury Research.¹
Figure 6. Flow diagram summarizing causes of death in 1866 young competitive athletes.

*Suicide (n=22); lightning (n=12); drowning (n=10 and 3 during the swimming segment of triathlon events); cerebral aneurysm (n=9); rhabdomyolysis (n=8); epilepsy (n=2); and miscellaneous (n=4). †Congenital heart disease (n=8); myocardial infarction (n=6); Kawasaki disease or related conditions (n=5); sickle cell trait (n=5); sarcoidosis (n=4); stroke (n=3); cardiac tumor (n=1); conduction system disease (n=2); and miscellaneous (n=2). ‡Regarded as possible (not definitive) evidence for hypertrophic cardiomyopathy at autopsy with mildly increased left ventricular wall thickness (18±4 mm) and heart weight (447±76 g). **Of wrong sinus origin coursing between aorta and pulmonary trunk; most commonly, anomalous left main coronary artery from right (anterior) sinus of Valsalva (n=65) and anomalous right coronary artery from the left sinus (n=16). ARVC indicates arrhythmogenic right ventricular cardiomyopathy; AS, aortic stenosis; CA, coronary artery; CAD, coronary artery disease; CM, cardiomyopathy; CV, cardiovascular; HCM, hypertrophic cardiomyopathy; LAD, left anterior descending coronary artery; MVP, mitral valve prolapse; and WPW, Wolff-Parkinson-White. Cited from Maron et al. 2009.
Figure 7. Heat acclimatization policies by state.

Cited from the Korey Stringer Institute.\textsuperscript{56}
Figure 8. Automated external defibrillator availability policies by state.

Cited from the Korey Stringer Institute.¹⁷
Figure 9. Concussion policies by state.

Cited from the Korey Stringer Institute.$^{58}$
Figure 10. Emergency action plan policies by state.

Cited from the Korey Stringer Institute.⁵⁹
Figure 11. Wet-bulb globe temperature monitoring policies by state.

Cited from the Korey Stringer Institute.⁶⁰
Figure 12. Coaching education policies by state.

Cited from the Korey Stringer Institute.⁶¹
<table>
<thead>
<tr>
<th>Years</th>
<th>Number of Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975-1979</td>
<td>8</td>
</tr>
<tr>
<td>1980-1984</td>
<td>9</td>
</tr>
<tr>
<td>1985-1989</td>
<td>5</td>
</tr>
<tr>
<td>1990-1994</td>
<td>2</td>
</tr>
<tr>
<td>1995-1999</td>
<td>13</td>
</tr>
<tr>
<td>2000-2004</td>
<td>11</td>
</tr>
<tr>
<td>2005-2009</td>
<td>18</td>
</tr>
<tr>
<td>5-year average</td>
<td>9</td>
</tr>
</tbody>
</table>

Table 1. Number of football deaths from exertional heat stroke in the last thirty-five years.

Cited from Stearns RL, O’Connor RG, Casa DJ, Kenny GP. Exertional Heat Illnesses; Casa DJ. Preventing Sudden Death in Sport and Physical Activity. Sadbury, MA: Jones, Bartlett Learning, LLC; 2012.1,17
<table>
<thead>
<tr>
<th>Condition</th>
<th>Prevention</th>
<th>Recognition/Assessment</th>
<th>Treatment</th>
<th>Return to Play</th>
</tr>
</thead>
</table>
| **Cardiac**        | • Appropriate Pre-participation Examinations  
• Family History  
• Questionnaires  
• Physical Examination | • No pulse  
• No breath  
• Sudden collapse  
• Shortness of breath  
• Syncope  
• Near syncope | • CPR  
• AED use within 3 minutes of collapse  
• Immediate referral | • Dependent upon condition based on Bethesda guidelines  
• Clearance from physician |
| **Head Injuries**  | • Proper technique/ sport mechanics  
• Proper return to play protocol from previous injury (Table 1. In Zurich Statement)  
• Education on recognition and reporting of symptoms | • Cognitive deficits  
• Balance deficits  
• Objective symptoms measurement (such as graded symptom checklist)  
• See SCAT2 (in Casa book) | • Immediate referral if symptoms worsen or persist  
• Withhold from competition while symptomatic | • Symptom free  
• Balance returns to baseline level  
• Cognitive assessment returns to baseline level  
• Gradual return to play protocol. (Table 1. In Zurich Statement) |
| **Spinal Cord Injuries** | • Proper technique/ sport mechanics  
• Equipment maintenance  
• Proper removal of equipment | • Loss of or altered consciousness  
• Pain in the cervical spine  
• Bilateral neurological defects  
• Obvious deformity over the spine | • Assess and maintain airway, breathing circulation  
• Immediate immobilization and transportation to the local hospital | • Dependent upon injury  
• No neurological deficits  
• Full tissue healing  
• Clearance from physician |
| **Exertional Sickling** | • Sickle cell trait (SCT) screening and education  
• Increased rest breaks for SCT athletes  
• No timed | • Muscle cramping, but the cramp is not visible or palpable  
• Fatigue  
• Inability to catch breath | • Cessation of activity  
• Immediate referral  
• Supplemental oxygen | • No residual symptoms  
• Clearance from physician  
• Full recovery from possible rhabdomyolysis if a severe case |
| activities for SCT athletes | • Slumping to the ground  
• Typically occurs within the first half hour of intense activity |
|-------------------------------|-----------------------------------------------------------------|
| **Heat Stroke**               | • Heat acclimatization  
• Proper hydration  
• Appropriate work to rest ratio  
• Appropriate intensity  
| **Elevated core body temperature** | • Cold water immersion or whole body ice water dousing within ten minutes of collapse |
| **Central nervous system dysfunction** | • No residual sequelae  
• Pass a gradual return to physical activity protocol with a gradual increase of activity, intensity and ambient temperature when possible  
• Clearance from physician |

**Table 2.** Specific prevention, assessment, treatment and return to play guidelines for the top 5 causes of sudden death in sport.²,³
<table>
<thead>
<tr>
<th>Policy Type</th>
<th>National Athletic Trainer’s Association</th>
<th>New Jersey State Interscholastic Athletic Association</th>
<th>Georgia High School Association</th>
<th>Arkansas Activities Association</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>June 2009</td>
<td>May 2011</td>
<td>March 2012</td>
<td>June 2012</td>
</tr>
</tbody>
</table>
| Requirements | “1. Days 1 through 5 of the heat-acclimatization period consist of the first 5 days of formal practice. During this time, athletes may not participate in more than 1 practice per day.  
2. If a practice is interrupted by inclement weather or heat restrictions, the practice should recommence once conditions are deemed safe. Total practice time should not exceed 3 hours in any 1 day.  
3. A 1-hour maximum walk-through is permitted during days 1–5 of the heat-acclimatization period. However, a 3- | “1. Days 1 through 5 of the heat-acclimatization period consist of the first 5 days of formal practice. During this time, athletes may not participate in more than 1 practice per day.  
2. If a practice is interrupted by inclement weather or heat restrictions, the practice should recommence once conditions are deemed safe. Total practice time should not exceed 3 hours in any 1 day.  
3. A 1-hour maximum walk-through is permitted during days 1–5 of the heat-acclimatization period. However, a 3- | “1. In the first five days of practice for any student, the practice may not last longer than two (2) hours, and the student may wear no other protective football equipment except helmet and mouthpieces. NOTE:  
a. The time for a session shall be measured from the time the players report to the practice or workout area until they leave that area.  
b. During acclimatization practices, teams may hold a walk-through as long as there is at least a two-hour break between the two activities.  
2. Beginning | “1. Football practice may begin on Monday of week #5.  
2. Practice on days 1 and 2 of week #5;  
a. Shall be conducted without any contact equipment except helmets,  
b. 1 practice with a maximum of 3 hours in length,  
c. no contact,  
d. 1 hour walk through is permitted following practice but must be separated by a 1 hour rest and recovery period.  
3. Practice on days 3-5 of week #5;  
a. Shall be conducted with helmets and shoulder pads as the only |
hour recovery period should be inserted between the practice and walk-through (or vice versa).

4. During days 1–2 of the heat-acclimatization period, in sports requiring helmets or shoulder pads, a helmet should be the only protective equipment permitted (goalies, as in the case of field hockey and related sports, should not wear full protective gear or perform activities that would require protective equipment). During days 3–5, only helmets and shoulder pads should be worn. Beginning on day 6, all protective equipment may be worn and full contact may begin.

A. Football only: On days 3–5, contact with blocking equipment, 

b. 1 practice with a maximum of 3 hours in length, 
c. contact can be with blocking sleds/dummies only, 
d. 1 hour walk through is permitted following practice but must be separated by a 1 hour rest and recovery period.

4. Practice after day 5; 

a. Schools can practice with full equipment. 

b. Schools cannot have consecutive days of “two-a-day” practices. 
c. Student athletes shall not engage in more than three hours of practice activities on those days during which one practice is conducted. 
d. Student athletes shall not engage in more than five
sleds and tackling dummies may be initiated. 

B. Full-contact sports: 100% live contact drills should begin no earlier than day 6.

5. Beginning no earlier than day 6 and continuing through day 14, double-practice days must be followed by a single-practice day. On single-practice days, 1 walk-through is permitted, separated from the practice by at least 3 hours of continuous rest. When a double-practice day is followed by a rest day, another double-practice day is permitted after the rest day.

6. On a double-practice day, neither practice should exceed 3 hours in duration, and student-athletes should not participate in more than 5 total hours of sessions.

iv. There may not be consecutive days of two-a-day practice sessions. All double-session days must be followed by a single-session day or a day off.

v. A walk-through may not be held on days when two practices are conducted.

c. These procedures are derived from recommendations created by the Inter-Association Task Force for Preseason Secondary School Athletics Participants in the paper "Preseason Heat-Acclimatization Guidelines for Secondary School Athletes."

3. From the end of school in the spring until the first day of preseason practice, hours of practice activities on those days when more than one practice is conducted.

e. The maximum length of any single practice session is three hours.

f. On days when more than one practice is conducted, there shall be, at a minimum, one hour of rest/recovery period between the end of one practice and the beginning of the next practice.
Warm-up, stretching, cool-down, walk-through, conditioning, and weight-room activities are included as part of the practice time. The 2 practices should be separated by at least 3 continuous hours in a cool environment.

7. Because the risk of exertional heat illnesses during the preseason heat-acclimatization period is high, we strongly recommend that an athletic trainer be on site before, during, and after all practices.”

<table>
<thead>
<tr>
<th>Other</th>
<th>Policy also mandates</th>
<th>Also implemented a</th>
</tr>
</thead>
</table>

Players may wear no other protective football equipment except helmets and mouthpieces for all voluntary workouts and passing league games. Institutional heat policies are also in effect for voluntary workouts supervised by school personnel.

4. Team camps that have been approved in writing by the Executive Director may allow participants to wear shoulder pads for blocking drills. Coaches for these players must verify that the participants have had acclimatization practices for five weekdays immediately preceding the camp.”
modifications based on the WBGT readings at the specific practice site for law that mandates emergency action plans and coaching education. Other medical providers, including emergency medical services companies and hospitals also implemented state-wide exertional heat illness policy changes.


Table 3. Overview of each state’s policy, as compared to the National Athletic Trainers’ Association Consensus Statement on Pre-season heat acclimatization for the secondary school athlete.52,62-64
<table>
<thead>
<tr>
<th>WBGT READING</th>
<th>ACTIVITY GUIDELINES &amp; REST BREAK GUIDELINES</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNDER 82.0</td>
<td>Normal activities -- Provide at least three separate rest breaks each hour of minimum duration of 3 minutes each during workout</td>
</tr>
<tr>
<td>82.0 - 86.9</td>
<td>Use discretion for intense or prolonged exercise; watch at-risk players carefully; Provide at least three separate rest breaks each hour of a minimum of four minutes duration each.</td>
</tr>
<tr>
<td>87.0 – 89.9</td>
<td>Maximum practice time is two hours. For Football: players restricted to helmet, shoulder pads, and shorts during practice. All protective equipment must be removed for conditioning activities. For all sports: Provide at least four separate rest breaks each hour of a minimum of four minutes each</td>
</tr>
<tr>
<td>90.0–92.0</td>
<td>Maximum length of practice is one hour, no protective equipment may be worn during practice and there may be no conditioning activities. There must be 20 minutes of rest breaks provided during the hour of practice.</td>
</tr>
<tr>
<td>OVER 92</td>
<td>No outdoor workouts; Cancel exercise; delay practices until a cooler WBGT reading occurs</td>
</tr>
</tbody>
</table>

Table 4: Practice modification policy based on WBGT readings for the state of Georgia.

Cited from the Georgia High School Association.\textsuperscript{63}
CHAPTER 2. STATEMENT OF PROBLEM

Sudden in sport is a major concern for student-athletes, particularly those participating in youth and collegiate sports. Exertional heat stroke (EHS) is one condition ranked among the top 3 causes of sudden death in sport each year; primarily due to a combination of factors including inappropriate medical coverage, misdiagnosis, and a failure to cool immediately upon diagnosis. In the collegiate setting, the NCAA is able to govern practices that help prevent EHS from occurring, however in the secondary school setting there is no national governance creating rule policies. Several policies are recommended including employing a certified athletic trainer, heat acclimatization, adequate water breaks, and cool first transport second. According to the Korey Stringer Institute 3 states have no policies regarding the health and safety of the high school aged athlete, more than half are deficient in implementing appropriate guidelines, and only 7 states have adequate or recommended health and safety policies. It is critical that other states follow the lead of those 7 states and move towards implementing the recommended health and safety policies for the prevention of sudden death in sport, including but not limited to EHS.

Purpose of the Study

The purpose of this study is to retroactively examine why and how 3 states were able to facilitate the successful creation and adoption of high school sports safety policies.

Research Questions

1) What contributed to the decision to implement health and safety policies regarding student-athletes at the high school level?
2) How did the states of Georgia, New Jersey and Arkansas successfully implement their health and safety policies?

3) How did they overcome any barriers to this implementation?

4) What resources were needed to create and implement the health and safety policies at the high school level?
CHAPTER 3: IMPLEMENTING HEALTH AND SAFETY POLICY CHANGES AT THE HIGH SCHOOL LEVEL FROM A LEADERSHIP PERSPECTIVE

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IMPLEMENTING HEALTH AND SAFETY POLICY CHANGES AT THE HIGH SCHOOL LEVEL FROM A LEADERSHIP PERSPECTIVE

ABSTRACT

Context: While there are consensus statements and recommendations made by professional organizations aimed at reducing the incidence of injury or sudden death in sport; however nothing is mandated at the high school level. This allows states the freedom to create and implement individual policies. An example of a recommended policy is heat acclimatization. Despite its efficacy in reducing sudden death related to heat stroke very few states follow the recommended guidelines. Objective: Retroactively examine why and how 3 states were able to facilitate the successful creation and adoption of heat acclimatization guidelines. Design: Case study design utilizing semi-structured phone interviews Setting: HSAA in Arkansas, Georgia and New Jersey Patients or Other Participants: Eight males, 3 females (n=11) (6 athletic trainers (ATs), 2 members of HSAA, 2 parents, 1 physician) participated. Participant recruitment ceased when data saturation was reached. Data Collection and Analysis: All phone interviews were digitally recorded and transcribed verbatim. A grounded theory approach guided analysis, while multiple analysts and peer review were used to establish credibility. Results: Each state had a different catalyst to change (student athlete death, empirical data and proactivity). Recommendations from national governing bodies guided the policy creation. Once the decision to implement change was made, the states had two similarities: shared leadership and open communication between medical professionals, and members of the high school athletic association helped cover come barriers. Conclusions: While the initiating factor that spurred the change can vary, shared
leadership and communication fundamentally allowed for successful adoption of the policy. Our participants were influenced by the recommendations from national governing bodies, which aligns with the institutional change theory. As more states begin to examine and improve their health and safety policies this information could serve as a valuable resource for ATs within other states, and future health and safety initiatives.
INTRODUCTION

Every year high school athletes die or are seriously injured while participating in sports. The National Center for Catastrophic Sports Injury Research has tracked these incidents since 1982. The center classifies all catastrophic injuries into three different categories, fatalities, non-fatal and serious. Non-fatal injuries are those that are serious and result in a “permanent severe functional disability” while serious injuries are those that are still serious, but result in “no permanent functional disability”. There is a fairly consistent trend in the data, which there are periods of time with a limited number of fatalities, non-fatal and serious injuries, which can be followed by a year with many fatalities, non-fatal and serious injuries. The National Center for Catastrophic Sports Injury Research also collects information on cause of death and as presented by Mueller and Casa, the top ten causes of death in sport (in alphabetical order, not incident rate) are asthma, cardiac, diabetes, exertional heat stroke, exertional sickling, head injuries, lightning, cervical injuries and trauma. The most common causes of death may be interchangeable depending on the year, however the top 5 usually include cardiac, head injuries, exertional heat stroke, exertional sickling and cervical spine injuries. Several recommended policies could be implemented by to reduce the incidence of sudden death in sport, especially at the high school setting. While these policies will not prevent all cases of sudden death, they will certainly reduce the risk associated with sudden death in sport.

Appropriate medical coverage, emergency action plans, AED availability, heat acclimatization, and appropriate concussion evaluation and return to play guidelines are all policies to reduce the risk of sudden death in sport for high school athletes. The data
from the National Center for Catastrophic Sports Injury Research suggests there are many more fatalities, serious injuries and non-serious injuries at the secondary school level when compared to the collegiate level, as shown in figure 1.\textsuperscript{1} While the actual sport (i.e., football, basketball, etc.) is the same at the collegiate level, competition level, training, number of athletes and medical coverage can be very different than the secondary school level. Additionally, unlike the collegiate level, where a national governing body can create and implement rules, at the high school level all policies must be created and implemented at the state level. While there are consensus statements and recommendations made by professional organizations, each state is afforded the freedom to create, implement and adapt policies, as they deem necessary. This means that there is no uniform policy governing any of the state regarding any of the conditions discussed previously.

Many policies require funding, such as appropriate medical coverage, which could be cited as a barrier for implementation. However, heat acclimatization for the prevention of exertional heat stroke can be implemented with little to no additional cost to the school districts. As stated previously, exertional heat stroke is consistently among the top causes of death in sport.\textsuperscript{2,3} In fact, current data suggest that cases of exertional heat stroke are increasing.\textsuperscript{3} In 2009, the National Athletic Trainers’ Association issued a consensus statement, Preseason Heat-Acclimatization for Secondary School Athletes, which outline recommended guidelines for proper heat acclimatization for secondary school athletes in order to help reduce the occurrence.\textsuperscript{4} Since the publication of these recommended guidelines, only twelve states have policies that adhere to these guidelines.\textsuperscript{5} In addition to these twelve states, fourteen more are currently working to
improve their current policies, however 22 states have guidelines that do not adhere to the national recommendation and 2 states have no guidelines at all. Anecdotal evidence suggests that many health and safety policies in sport are developed in response to death or catastrophic injury. For example, the National Collegiate Athletic Association requires sickle cell trait testing after the death of a collegiate athlete and Washington created concussion legislation in response to a high school student athlete’s catastrophic injury; however little to no empirical research exists regarding why some states have chosen to adopt the recommended heat acclimatization policies while other states have not yet done so. For the purpose of this study, three states were selected due to their current heat acclimatization policies. Arkansas, Georgia and New Jersey all recently created or updated guidelines regarding exertional heat stroke. Arkansas passed legislation as well as policies in the Arkansas Activity Association in June 2012. Georgia also passed policies in the state athletic association in March 2012. New Jersey was the first state in the nation to adopt the policies in the high school athletic association in May 2011. The individual experiences of each state’s change process, as well as success and failures cannot be looked at in isolation however, as the context of other things occurring in the state and professional interactions also could play a role in the change process. Additionally, existing theories regarding organizational change and leadership may provide further insight into these phenomena.

Institutional theory explains that organizations change and become more similar for three reasons: mimetic, normative and coercive isomorphism. Initially, organizations must separate themselves to remain competitive. This is when the field is young and organizations are created to add diversity to the field. This theory goes on to
explain that once the field is more established, organizations implement change to
become more similar to other organizations in the field they compare themselves with.\textsuperscript{9,10} This form of mimetic processes is especially common in times of uncertainty or may simply occur as organizations model their practices after similar groups that they view as successful.\textsuperscript{9,10} As the change process continues and professionalization occurs within members, normative isomorphism occurs.\textsuperscript{10} In normative isomorphism, the individual members and growth of professions dictate what is considered normal and legitimate for their profession.\textsuperscript{10} When this occurs, members drive changes within organizations based on this professionalization.\textsuperscript{10} While an important reason in understanding why organizations do change, it can also be linked in understanding of why organizations may not change as well. Once the processes, policies and organizations are established, many have already become institutionalized to what is deemed acceptable. This institutionalism is not only a driver for organizations to change, but then also for organizations to resist change. Organizations must also change to match what it deemed acceptable in the field at the time.\textsuperscript{9,10} Pressure by governing bodies, professional organizations or other stakeholder organizations can also influence what is considered acceptable, a process that can bring about change called coercive isomorphism.\textsuperscript{9,10}

There are many sources of resistance that high school athletic associations will face, but there are also ways to mitigate these sources of resistance, if done properly. Change is uncomfortable for most. This resistance can come from many places including the state’s athletic association itself or other stakeholders like coaches, physicians, parents and the athletes. Anticipating these sources of resistance and creating formal and informal ways to mitigate the stress of change ahead of time is key to a successful change
process. Effective leadership throughout the entire leadership process is key. There are many ways to minimize the resistance to change. While the optimal tactics to reduce resistance depends on the reason for resistance, effective leadership can be a primary facilitator to change. The specific type of leadership that is necessary to reduce the resistance and facilitate effective change varies based on the task at hand and the reason for resistance. In a study by Herold et. Al\textsuperscript{11}, transformational leadership was found to be most effective in increasing commitment to organizational change. Transformational leadership is characterized as “appealing to the ideals and values of subordinates.”\textsuperscript{9} This is effective in the changes process, especially regarding health and safety of athletes, because everyone involved has the same common goal of safe athletic participation. By using these common goals and values, the leaders are able to facilitate the change.\textsuperscript{9} Transformational leaders tend to also pay great attention to the needs, feelings and emotions of those affected by the change.\textsuperscript{9} By doing so, the resistance can be decreased, and therefore success with implementation and compliance is more likely.

While it is important to understand the reasoning behind policy development and catalyst for change, as well as tactics to reduce change, it is also important to note that additional theories exist to explain the process organizations go through for change to occur. One of those theories is Griener’s Patterns of Organizational Change.\textsuperscript{9,12} This 6-step explanation explains the change process through action and the result of that action.\textsuperscript{9,12} This theory can help explain the process that organizations go through while developing and implementing organizational change.

As more states begin to examine and improve their current health and safety policies, more data is needed regarding successful changes. This information could serve
as a valuable resource for other states, and future health and safety initiatives. The purpose of this study is to retroactively examine why and how 3 states were able to facilitate the successful creation and adoption of high school sports safety policies. Specifically, the following research questions will guide the data collection and analysis:

1) What contributed to the decision to implement health and safety policies regarding student-athletes at the high school level?

2) How did the states of Georgia, New Jersey and Arkansas successfully implement their health and safety policies?

3) How did they overcome any barriers to this implementation?

4) What resources were needed to create and implement the health and safety policies at the high school level?

METHOD

Design

The study employed a retrospective case study design\textsuperscript{13} utilizing semi-structured phone interviews with follow-up questioning. The semi-structured nature of the phone interview allowed for follow-up and discourse during each interview but provided consistency across participants. It was our intended goal to holistically examine how states were able to successfully implement health and safety policy change. Case studies are utilized to gain a holistic and in-depth perspective of a specific, bounded experience, especially when little is known regarding the topic.\textsuperscript{13} Additionally, it allowed the entire experience to be analyzed without losing context or removing from the environment in which it occurred.\textsuperscript{14,15}
A retrospective analysis ensured that the states utilized had already successfully implemented the changes. Additionally, it allowed the participants time to reflect on the experience. In this case, each state’s process of creating and implementing the health and safety policy changes, specifically heat acclimatization for high school sports, served as a common experience shared amongst participants. These individual experiences could not be looked at in isolation however, as the context of other things occurring in the state and professional interactions also could have played a role in the change process. As more states begin to examine and improve their current health and safety policies, more data is needed regarding successful changes. This information could serve as a valuable resource for other states, and future health and safety initiatives.

**Participant Sampling**

Three states were chosen for this case study based on their recent successful implementation of similar health and safety policies, varying geographical location, and previous contacts in the states- as a form of convenience sampling.\textsuperscript{13,16} For the purpose of this study, successful implementation was operationally defined being passed by the high school athletic association, implemented statewide, and adherence to the recommended heat acclimatization guidelines. The National Athletic Trainers’ Association established these guidelines, which were published in the consensus statement on secondary school heat acclimatization.\textsuperscript{4} Specifically, Arkansas was chosen due to professional contacts and geographical location in the south mid-west region. Georgia was also chosen due to the southeast geographical location and professional contacts. New Jersey was chosen because it was the first state to adopt guidelines that mirrored those established by the National Athletic Trainers’ Association\textsuperscript{5} and is in the northeast.
Participant sampling began with a professional contact with knowledge of the changes in all three states. The main gatekeeper had personal, professional relationships with key members in each state, which was important for us to gain access to the participants and their willingness to be involved. This participant led us to a gatekeeper in each specific state. These gatekeepers helped facilitate initial contacts with key constituents in the state’s high school athletic association as well as the medical and science advisory board. This criterion was purposeful as these individuals have in depth working knowledge of the process that occurred and were key influencers in the process. Snowball sampling ensued, as through the conversations, we then recruited other constituents who were identified by the current participants as being important stakeholders or influencers. The use of multiple recruitment strategies, including criterion, convenience, gatekeeper and snowball sampling allowed us to gain the perspective of many of the key influencers of the change process- therefore gaining a holistic perspective. Data saturation also occurred with our initial sample of participants, and guided participant recruitment.

Participants

Eight males, 3 females (n=11) (6 athletic trainers (ATs), 2 members of high school athletic associations, 2 parents, 1 physician) participated. The states of Georgia and New Jersey were each represented by 3 of our participants, 4 participants were from Arkansas and our final participant was the initial gatekeeper. Table 1 gives an overview of the participants and their pseudonyms.

Our initial gatekeeper, Bill, is an athletic trainer with expertise in exertional heat stroke. He has worked with states and organizations, which were attempting to adopt heat
acclimatization guidelines, and had knowledge of the change process in all 3 states. The 4 participants from Arkansas were Dan, Sue, Sally and Lenny. Dan, our gatekeeper for the state of Arkansas, is high school athletic trainer who was highly involved in the state’s Sports Medicine Advisory Committee during the time of the heat acclimatization guidelines creation and adoption. Sue is parent from the state of Arkansas whose son died of exertional heat stroke in 1995. Since then, she has created several educational resources to prevent exertional heat stroke from occurring to other student-athletes. She served as a resource as well as an advocate as she has been advocating for the guidelines for years. Sally’s son also suffered an exertional heat stroke in the summer of 2010, only he survived. Their story was used to help promote the need for the guidelines. Lenny had a leadership role within the Arkansas Activities Association, as they created and implemented these guidelines.

The three participants from Georgia were John, Jack and Ed. John, our gatekeeper, is an athletic trainer and researcher who implemented the study examining the heat related illnesses in the state of Georgia, and also helped draft and present the proposed heat acclimatization guidelines. Jack had a leadership role within the Georgia High School Association during the time in which they created and implemented the heat acclimatization guidelines. Ed was a graduate student athletic trainer at the University of Georgia who helped collect and present the data to the coaches.

The 3 participants from the state of New Jersey are Andrew, Ken, and Lauren. All 3 served on the state’s Sports Medicine Advisory Committee at the time of the creation and adoption of the policies. Andrew, our gatekeeper, is a high school athletic trainer who helped develop the National Athletic Trainers’ Association Consensus Statement on
Heat Acclimatization in the Secondary School. Ken is a physician who serves as a team physician for several high schools within the state. Lauren is a high school athletic trainer who was serving on the Sports Medicine Advisory Committee.

**Data Collection Procedures**

Initial recruitment occurred online, via email contacts and began once IRB approval was gained from the host institution. Once the participant consented, by returning the consent form directly back to the researchers a phone interview was scheduled at the convenience at the participant. Phone interviews followed a semi-structured format (Table 2), drawing from current literature regarding organizational change\(^{9-11}\), as well as athletic training research regarding sudden death in sport and emergency procedures\(^{3,4,5}\). Three content area experts in qualitative methodology, organizational change and culture and sudden death in sport reviewed both interview guides (Table 2) for clarity and accuracy. Only minor changes for flow and verbiage occurred. The primary researcher conducted all interviews for consistency. Each phone interview lasted approximately 45 minutes to 1 hour and were digitally recorded and transcribed verbatim by an outside company. The primary researcher then reviewed these transcripts for accuracy.

We conducted follow-up questioning with our participants after initial analysis was completed. This allowed us to verify our findings as well as expand upon themes that emerged, including the emergence of shared leadership. In addition to the phone interviews, data were collected through analysis of documents, websites, handbooks and other materials. The primary researcher conducted all searches prior to initial interviews to help guide conversations. This process also continued throughout data collection based on participant recommendations. Materials were selected after a search
of media and news reports as well as recommendations of documents from the participants. These materials gave another perspective of the process of change through their documentation of the change process and the resulting policy.

**Data Analysis**

All phone interview transcripts and documents were analyzing following open coding techniques borrowing from the grounded theory method.\textsuperscript{13,17} Initial steps included reviewing the data for understanding. The preliminary review of the transcripts was to provide context and understanding of the data gained during the interview sessions. A fundamental component of the open coding procedures as described by Glasser\textsuperscript{16} is memoing, in which field notes were written to help code and categorize the developing themes. We used this technique to help guide data analysis and ensure the dominant themes are determined. Initial coding occurred both during the interviews as well as during the initial phase of analysis, after all interviews were completed. After initial coding was completed, codes were assigned to the data. These codes were combined into categories (selective coding) and later to themes (axial coding) based off the research questions stated above. Table 3 provides a description of the data analysis process and coding.

**Trustworthiness and credibility**

Data trustworthiness and credibility was ensured in several ways. The first method was multiple data source triangulation.\textsuperscript{13,16} The use of multiple states, phone interviews, follow up questioning, as well as document analysis added credibility to the data. By interviewing members of the high school athletic association and the medical and science advisory boards, we hoped to obtain multiple perspectives of the process.
Participant verification was utilized by conducting follow up questioning of participants, after the data was analyzed, verifying the themes that emerged. Additionally, multiple researchers analyzed the data. Each researcher independently analyzed the data as described above and then met to discuss the findings and came to an agreement regarding the final themes. Finally, a peer reviewer appraised the data and results. The peer reviewer is same qualitative researcher as described previously, who was otherwise uninvolved with data collection, and was used to ensure accuracy, credibility and trustworthiness with the data.\textsuperscript{14,16}

RESULTS

Results will be presented in 3 stages that help answer the 4 research questions previously mentioned, catalyst to change, policy decision and the change process, as shown in Figure 2.

Catalyst to change

Analysis of the data reveals that the catalyst to implementing the policy was different for each state (\textit{death, research, and forethought}). In the state of Arkansas, the process for change was stimulated by the death of a high school aged athlete from an exertional heat stroke in 2011. Dan, an athletic trainer in Arkansas, explained the impact student-athlete death had on the catalyst to change, sharing,

\begin{quote}
It was something that our State Association had been working towards ever since the NATA Position statement had come out but at that time you know High School Coaches Association, the arts activities, you know nobody was willing to do change. You know they acknowledged it, they saw it but they saw it as you know athletic trainers meddling again and so…and once we had the high profile you know incidents where we had three kids within one week collapse, two football players, one basketball player…. I mean it really, really you know made our state look bad. And so with all that happened… you know we’ve had a legislative task force on athletic training in secondary school settings for going on
\end{quote}
our 10th year, and so we’ve been already trying to move towards those changes, but were meeting opposition, from people. But once all that happened in 2011, finally everybody you know came to the table and it’s like what do we have to do.

Dan’s comments reflected the experiences of Tyler Davenport, Will James and Logan Johnson in August 2010. On August 11, 2010 15-year old Tyler Davenport collapsed during football practice in the small rural Arkansas town of Lamar. He was treated on scene by his coaches before being transported to the local hospital, then airlifted to Arkansas Children’s Hospital in Little Rock. He had suffered exertional heat stroke, and by the time he reached the first hospital, his core temperature was 108 degrees Fahrenheit. Two days later, on August 13, 2010 Will James was also participating in preseason football practice with his team, in Little Rock, when he collapsed, also suffering from exertional heat stroke. Will was cared for by the school’s certified athletic trainer on scene before being transported to the local hospital where his temperature was still 105 degrees Farhenheit. He was then transferred to Arkansas Children’s Hospital, which was still treating Tyler Davenport. Also on August 13, 2010, Logan Johnson was participating in a basketball practice in an un-air-conditioned gym in Paragould. He collapsed in the cafeteria, after leaving the gym to go to the water fountain. He was treated on scene by a school nurse and was transferred to the hospital, but after being released and experiencing complications at home, his parents took him back to the local emergency room. On August 15, he was transferred to Arkansas Children’s Hospital, experiencing complications from exertional heat stroke. Will and Logan survived their heat stroke, each spending weeks in the hospital and suffering from kidney failure. Unfortunately on October 12, 2010 Tyler Davenport passed away from complications of exertional heat stroke. These events gained the attention of the media, including PBS
who did a Frontline episode, Football High. In a letter, the parents of Tyler Davenport recall their experiences in the hospital and ask for changes so this didn’t happen to someone else’s son. Sally, who’s son was one of the three boys who suffered an exertional heat stroke in August 2010, stated when asked about the implementation of policies related to exertional heat illnesses, “I think that’s why Arkansas took it so seriously… because we had an athlete die.” Sue’s opinions, who’s son passed away from exertional heat stroke in 1995, were in accord with information shared by our 3 other Arkansas participants, sharing,

I think, unfortunately, tragedies make people listen. And I think that’s what really helped Arkansas get through the changes. You know, would it have been as easy without a tragedy, I don't know, you know, because I tried 18 years ago and then I talked to people in between, and I could never get it beyond our local school district.

All four Arkansas participants were convinced that the player’s death and two other serious injuries in the secondary school setting, which occurred over a short period of time, was the necessary facilitator for change for the state of Arkansas.

Sudden death appeared to be an indirect facilitator for the state of Georgia, however the main facilitator appears to be data collected on sudden death in sport. At the same time the deaths occurred, a 3-year long research study examining heat illness at the secondary school level was being conducted, which appeared to be the main catalyst for policy change and implementation. John, an athletic trainer who was a main researcher for the study, summarized his perceptions on the change saying,

They [the state of Georgia] actually had two kids in the summer of 2011, they had two kids pass away and one was ruled cardiac, but I think it stemmed from heat. So they had two kids die, one was in Florida in practice….That’s when our study was ongoing. We had a study going on two year before that. So the study we had was a three-year long study. And that was the final year of the study. So what
was happening was the Georgia High School Association was kind of waiting on us to get some data out so they can implement new guidelines based on hard data instead of just kind of throwing out guidelines.”

The incidents that John referenced were the deaths of 16 year-old Donteria (DJ) Searcy and 16 year-old Forrest Jones. On July 25, 2011, Forrest Jones collapsed football practice and passed away in the hospital on August 2, 2011 from exertional heat stroke. Early that morning, in Florida, another Georgia high school athlete was found in his cabin, where his team had be conducting preseason football camp and was pronounced dead at a local hospital. In a media article, covering the deaths, a representative from the Georgia High School Association was quoted supporting their current policies, which were developed after players’ death in 2006. These guidelines stated that all schools must develop their own guidelines, and policies for practicing in the heat and recommended the use of heat index or Wet-Bulb-Globe-Temperature. The representative went on to explain,

They’ve got 30 high schools around the state with state-of-the-art equipment, and they have trainers that are taking readings every 15 minutes, starting before practice until after practice — and then they keep up with any heat-related issues that come up during practice,” [representative] said. “When that study is over, we’ll have hard and fast data that will maybe cause us to change our policy,” he said.

Jack, a leader within the Georgia High School Association explained their previous policy and their realization for the need for change.

We took a step which we thought was a pretty good step, but we determined that it really wasn’t nearly adequate enough, where we said every one of the schools had to establish, had to buy into a heat policy from a recognized national organization. It could be from a national trainer’s organization, it could be from one of the military branches or whatever. But we left it up to the local school district to make its own policy with the understanding that the schools in the North Georgia Mountains are in a whole different set up than the schools in the
swamps of deep-south Georgia. What we found was that it was a little bit inadequate because it gave people some latitude that they were kind of taking advantage of. So then we decided [that] what we really need to do was to determine an actual factual research based policy.

John, the lead researcher for the study explained the 3-year long research study.

We had a three-year long study with the 20 schools all across Georgia in different areas across Georgia. It looked at environmental data. We had injury data. We had demographics. We had everything. We had an athletic trainer at every school pretty much recording everything that was uploaded directly to us. They all used question (inaudible) uploaded directly to us. We got to see environmental data for every 15 minutes for every practice for three years essentially.

With this data, the researchers were able to not only see all the environmental data, but also the injury incidences, including exertional heat illnesses, in comparison with environmental data and practice time. Additionally, the actual numbers of heat illnesses in Georgia was impactful. Jack explained,

The one piece of information that resonated most with the Football sub-committee and the full Board of Control was the fact that Georgia had the most heat-related fatalities since 1990. Most of the policy-makers had been aware that some fatalities had occurred, but had lost track of the actual numbers – even though they all agreed that “one was too many”. The research project revealed important, empirical data about a number of variables that were involved in creating danger situations for student-athletes. The Board of Control believed that data and were willing to step forward to make changes.

This was essential in helping them create their policy. Ed, an athletic trainer involved in the research study, described the importance of evidence in making policy changes in combination with the deaths. He shared,

Their [leader, Jack] was very interested in making an evidenced based policy rather than just responding to public opinion. And you know we both came under, he more than I, but there’s a lot of pressure from media, particularly in 2010 or 11, when we had a death and you know the Georgia High School Association stood strong, and said, we’re in a three year study, we’re going to collect the three years of data and then we’re going to make policy changes.
Having hard evidence was impactful for the state of Georgia in making policy changes to protect the student-athlete.

New Jersey, on the other hand, was much more proactive about implementing the policy, as they were the first state to do so. Additionally, a search of the media found no documented deaths from exertional heat stroke in recent years. Andrew, a high school athletic trainer supported this finding by stating,

We didn’t have anything documented. But I can tell you that I received phone calls from people saying that you know listen we had [to]send a kid to the ER today and it was things like that were really just never documented but we knew that problems were out there. He agreed, however, that there were no high profile deaths (as in Arkansas and Georgia). Lauren, an athletic trainer who served on the Sports Medicine Advisory Committee stated,

I also sat on that committee with [Andrew- our other participant from New Jersey who is a high school athletic trainer and served on the Sports Medicine Advisory Committee] and they just wanted to be proactive about it, let’s get it out there, let’s keep the kids protected, that’s the job of our medical advisory committee.

New Jersey was also concerned with litigation, as the national policies were now public. Andrew explained,

We spoke to quite a few attorneys from across the country and they all said the same thing, which is, now that there are national guidelines, if an athlete goes down with a catastrophic injury, we’re going to approach two people. One is the State Association and we’re going to say, there are national guidelines out there, why didn’t you follow them? You’re going to be held accountable. And the second group we’re going approach is the school district, with the same question. So what I told my State Association was, listen if you pass these guidelines it washes your hands, liability-wise, because you’re doing what you should do. Now it’s up to the school district. And all the administrators looked at each other and they said, you know what, you’re right, we don’t need this problem.
As shown, the catalyst was very different for each of the states, however the overall concept of protecting the student-athlete from injury was the over-arching reason all three states choose to implement the heat acclimatization policies. A member of the high school athletic association in Georgia, Jack, explained,

All of our coaches, that’s a common theme when you get coaches together, they had this haunting fear that they were going to lose a kid in August. That’s what you hear a lot, and so I think before we even did this policy our coaches were more aware than ever before about the problems that were involved.

A member of the high school athletic association in Arkansas, Lenny, mimicked Jack’s thoughts when he said, “…You want to try to make sure that you keep your students safe”. Arkansas, it appears was initially motivated by an external force- the death and catastrophic injury of student athletes. This external force, however appears to have spurred the internal motivation of the leaders in the state to take action. Georgia appears to be a blend of both external and internal forces. While they had 2 student athletes die immediately prior to the policy being implemented, and other heat illness deaths in previous years, they also utilized data from a three year long research study to create their policies. New Jersey, however appears to be complete internally driven forces, as there were no heat illness deaths or catastrophic injuries in the state. Therefore, while the specific catalyst and driver for change in each state was different, the overarching goal of protecting student athletes was apparent.

**Policy Selection**

The catalyst for change was different for each state, however the policy selected and subsequently implemented was very similar, as shown in Table 4. The use of recommended practices as outlined by such organizations as the National Athletic Trainers’ Association, the American College of Sports Medicine, and the National
Collegiate Athletic Association guided policy selection and development. Each state’s sports medicine advisory committee presented policies to other members of the high school athletics association that were based off the National Athletic Trainers’ Association’s Consensus Statement: Preseason Heat-Acclimatization Guidelines for Secondary Schools. When describing what they used as a starting point for their policy development Ed, from Georgia, stated,

We started with the National Athletic Trainers’ Association [Consensus] Statement on high school athlete [National Athletic Trainers’ Association Consensus Statement on Preseason heat acclimatization for the secondary school athlete], …and the National Collegiate Athletic Association policy and we started …with that as our baseline and then we worked to find some good areas [to start with].

Georgia was unique in that they had data from their research studies (cite abstracts) to also help guide their policy development. After starting with the national guidelines, our participants described looking at the data to make state specific modifications. This was particularly important for the addition of Wet-Bulb Globe Temperature modifications and practice duration. Lauren’s (from New Jersey) thoughts also compared to Ed’s when she stated, “we said you know what, if we’re going to implement these, we should be implementing exactly the way they’re written in the National Athletic Trainers’ Association and then we went and did that.” Ken, from New Jersey, stated, “Once the national federation adopts a policy that you know we can adopt, we can change our policy [to match] the national federation’s policy.” They also based their policies off other published guidelines and current research including that of the Korey Stringer Institute (a non-profit organization founded to prevent sudden death in sport through education, research and advocacy). Lenny, from Arkansas, stated,

We had, pretty early on had of course looked through research and had found that the Korey Stringer Institute was the… leaders in this field, so we… went through
and looked at their recommendations and research and that’s what we based it of off.

Andrew, from New Jersey, explained these guidelines helped when questions arose and gave credibility to the policy,

Whenever there were questions with the [state organization] they could always fall on, well we got this from the National Athletic Trainers’ Association, it’s a national guideline. It’s not something that we just developed in the back room of our own little association.

As shown, the states relied heavily on the existing guidelines created by national governing bodies.

**Change Process**

Once the decision to implement change was made and the policies to be adopted had been agreed upon, the states had several similarities: barriers and utilizing shared authority/leadership and open communication between the sports medicine advisory committee and the leadership of the high school athletic association as means to facilitate the change and overcome those barriers.

**Barriers.** Our participants described both actual as well as the perceived possible resistance to change, particularly from coaches. An athletic trainer, Dan from Arkansas explained some of the resistance they encountered as they attempted to develop and implement the policy. Dan shared,

Coaches are coaches and…they don’t want to be told what to do... They are “football coaches and nobody tells them what to do” and “we do what we do” and you know even the coaches…were pro-athletic trainer and things like that. …you know they would come in and say, “You know yes, I’m going listen to my athletic trainer and I’m going to do what they you know advise me to do. But I do not want a policy that handcuffs me in what I can and can’t do.”...They kept seeing it as if they were going to be handcuffed [being told] how they could run their practices, when they could have their practices, you know stuff like that.
The high school athletic association representative from Georgia, Jack, recalled, “I’m certain that there was some grumbling going on about having to change the way we’ve been doing business for some time at football practice”. The confusion and resistance to change occurred in New Jersey. Andrew, the athletic trainer from New Jersey described their first year as, “well it was actually mixed feelings. But I think it was just chaos that first year, for them [coaches] trying to understand what’s going on and…once they [the coaches] understood it, trying to accept it.” Because most members of the state high school athletic association were coaches or former coaches, this resistance could have had a serious impact on the outcome. If coaches within the organizations opposed the policy, it would not have been implemented. While there appeared to be some resistance to the policy, our participants did not acknowledge it as something that prevented them from creating or implementing the heat acclimatization guidelines in their state. They went on to describe how they were overcome, or preemptively reduce the resistance utilizing shared authority/leadership and open communication.

Shared authority/leadership. Our participants described sharing authority and leadership between medical professionals and the other members of the high school athletic association. For the purpose of our study, shared authority/leadership has been operationally defined as power and leadership responsibility given to members who would not normally have it based on their pre-defined roles within the organization. Our participants acknowledged the process was made possible by teamwork. Dan stated, 

It has to be a team approach for a state-wide implementation. Even if you are trying to make changes just within your school, clinic, our wherever you are employed it is best to have individuals that can help you. Just having other opinions, thoughts, ways of doing things, helps you see answers to obstacles that
as an individual you might not see. Sometimes you cannot see the trees for the
forest in front of you.

Lauren from New Jersey shared similar beliefs when she stated, “For change to be
successful, everyone has to buy into the program and understand the rationale behind the
change.”

Our participants highlighted the importance of placing the right people in roles
where they could succeed at leaders and empowering others to assist in the change
process. When asked about his leadership style, Lenny from Arkansas explained that his
style, in this process consisted of bringing experts and leaders from various professions
and organizations together to discuss, design and implement the appropriate policies.

   You have to get the leaders in those areas together. People that can make a
decision and people that can get the message to their people or to their entity
about the importance of the matter and why we have to do it this way in a
practical manner.

   He also explained, “Well our whole objective was that we felt like it had to be a
team approach, a global approach if you will.” Lenny described the process in Arkansas,

   We’d put committees together to look at this research and you know of course
with people having schools and schedules and people all over the state, we had to
do this over like a five, six month period… And that was, you know where we
kind of go every body on board, all the different groups that are affected within
the schools and provided research and talked about how we can make this work
the best, most practical way. You know those… that’s one of the things you forget
about, is that piece of it, whenever we had the different committees of coaches,
officials, principles, superintendents, parents, groups coming in to get their buy-in.

   Jack, from Georgia, explained that by having multiple people involved in the
writing of the policy they were able to incorporate the needs of all stakeholders and they
created a very practical policy,

   I really feel like that maybe compared to some other states that are looking at this,
we tried to balance the sports concerns and medical concerns… so what we tried
to do was something [that] was medically sound and at the same time was
athletically practical and I think that’s what we’ve been able to come up with.

Georgia also utilized the team approach as the sports medicine advisory
committee and those who conducted the research study described their meeting with the
high school athletic association, John explained, “we made it very important that it was
not as much of a scolding and yelling at you for doing the wrong stuff as it was, ‘this is,
more generally, this is what we should be doing.’” Andrew from New Jersey also shared
a similar perspective when explaining some of the personal skills needed to help facilitate
the change.

No one ever likes to be “told” what to do. I’ve found that it’s much easier to get
what you want by being a teacher presenting facts, listening to the concerns of
your audience then spinning it by having the audience believe it’s their idea.

All of our participants spoke about teamwork and consistently used “we” and
“our” which really highlighted the shared authority and leadership style. Overall, this
shared leadership/authority was a major contributing factor to the success of these three
states.

Open communication. The importance of communication emerged in regards to
policy implementation, specifically maintaining open communication between all
stakeholders during the change process. Open communication encompassed
communicating directly with those impacted by the change. In Georgia for example,
when the data from the three-year study was being presented members of the executive
board all attended a meeting to hear the results, which made sure everyone understood
the results; which was the catalyst for change in Georgia, Jack explained,

We took our football subcommittee off our Board of Control over to the
University of Georgia to see the results of the study….so we had administrators
and coaches and athletic directors all involved and going out there and hearing this.

In the state of New Jersey, identifying a figurehead as a means to promote open communication was found to be effective way during the change process. Andrew, one of our participants from New Jersey, was the go-to person for questions regarding the policy creation, development, and implementation. Andrew explained that if a coach had a question, they contacted him directly, “and I explained anything I needed to explain to [him/her].” He reflected, “I think by doing that… doing it that way, it became less formal, less strict, because now they’re speaking to someone and it became a very informal conversation”

Open communication was helpful in reducing resistance to the policy implementation. For example, when asked about whether there was much resistance from anyone in the state of Arkansas, Lenny stated,

There is no resistance, just logistics. Like I said, you know we wanted to hit the main groups, the schools, coaches, parents, students, and medical personnel, just logistics of trying to work through and get in touch with. You know the proper folks in the medical field help us broadcast our message and our concerns.

When asked about communication and how that positively impacted the change process, John explained his thoughts on what went really well in the state of Georgia, “I think where we really did a good job…is getting all the different influences that can have an effect on student safety, in regards to heat illness, trying to get everyone in the loop. I think is what we did best.” In addition to sharing authority and leadership responsibilities, ensuring that all stakeholders were informed was an important aspect of each state’s change process.
DISCUSSION

Data from the National Center for Catastrophic Sports Injury Research has demonstrated the consistency in death and serious injuries in sport throughout the years, thereby illustrating the need for policies and guidelines to ensure athlete safety.\textsuperscript{1} Figure 1 demonstrates the dichotomy between secondary school and collegiate catastrophic injuries.\textsuperscript{1} The data presented in this figure may be attributed to many factors, including the increased participation at the secondary school level or increased accessibility to medical staff and national policies and guidelines at the collegiate level. At the high school level, the creation and implementation of policies must come from the individual state level. Our study provides insight into the heat acclimatization policy development and implementation strategies used by three different states in May 2011 through June 2012. Specifically, we chose the implementation of heat acclimatization guidelines because documented cases of exertional heat stroke appear to be increasing\textsuperscript{3}, and the fact that instituting heat acclimatization guidelines financially cost the organization little money.

Our results indicate that while each of our three states had different catalysts, which stimulated the need for change, one fundamental factor bridged the states together: protecting the student-athlete. The change process was supported by the each state’s recognition of the necessity to place the well fare of the student-athlete first. Once the need for a change was realized, the medical professionals, who were involved in state organizations, recommended guidelines that mirrored those established by various national organizations, but most specifically the National Athletic Trainers’ Association.\textsuperscript{4} Our participants indicated that the process was mediated, and barriers were overcome, by
the professional relationships and open communication that had been established between the medical personnel and the state high school athletic association representatives. A discussion each of these themes occurs next.

Catalyst to Change

Student-athlete death, on-going research and forethought, were identified as initial catalysts to change, however the desire to protect the student-athletes surfaced as the shared catalyst for change. The two states, which had documented recent heat stroke deaths, appear to have been, at least partially, driven by external forces, while internal forces primarily drove New Jersey. Georgia was a blend of both external and internal forces; they were already in the middle of a research study aimed at gathering data to create a policy when two student athletes died. If we studied other states, we can hypothesize those with recent deaths or catastrophic injuries may be more driven by external forces, while those proactively implementing the policy would be more driven by internal forces. Arkansas had one young student-athlete die from exertional heat stroke and two others suffer serious complications from exertional heat stroke.\textsuperscript{19-21} Georgia was in the middle of a 3-year research study examining heat illness in the state of Georgia in the secondary school setting when 2 young student-athletes died on the same day.\textsuperscript{23,24} One was ruled to be from exertional heat stroke, while the other was ruled to be cardiac death, but it is believed to be a complication due to heat stress.\textsuperscript{23,24} In the state of New Jersey, which was the first state to adopt policies that fell within those established by the National Athletic Trainers’ Association\textsuperscript{4,5}, forethought was the primary motivator for change. The state had no recent documented exertional heat illness tragedies.
The state specific data gathered in Georgia seemed to be a major catalyst for change. With the major push towards evidence-based practice in healthcare, obtaining data specific to one’s population can help establish research driven policies. These data driven policies can be increased as researchers continue to focus on injuries and death at the high school level. While, we cannot attribute recent policy changes in Connecticut or North Carolina to research, both states also have universities with research focusing on health and safety in the high school setting.

The institutional theory of change would suggest that policy makers be concerned with maintaining legitimacy through mimicking the actions of organizations they deem successful.\(^6\),\(^7\) In high school athletics, this could be the National Collegiate Athletic Association or other states which may be considered a “powerhouse” in specific sports. Often times, high school athletics want to mimic collegiate athletics due to the prestige or perceived legitimacy. We did find it interesting that very few of our participants seemed influenced by the National Collegiate Athletic Association’s implementation of similar guidelines for all colleges and universities in 2003\(^3\),\(^2\) a finding that is in direct contrast to the institutional theory on change.\(^10\) Other states, including Texas, North Carolina, Florida and Arizona also updated their policies around the same time as Georgia and Arkansas.\(^5\) Despite the close geographical proximity of these states, and potential professional relationships that may exist between athletic training, coaching or administration professionals, none of our participants appeared to be concerned influenced with guidelines that neighboring states were following other states’ decisions which is contradictory to mimetic isomorphism.\(^10\) One explanation could be that they are often times not in direct competition with each other. Rivalries are within state, unlike in
the collegiate atmosphere, which typically stimulates across state and conference competitions.

Another interesting finding was that the sports medicine advisory committee or sports medicine researchers in each state initiated the change. In addition, this group of health care professionals was rather small, indicating that a few individuals can influence change in their state. As health-care providers athletic trainers are charged with protecting and maintaining the well being of the student-athlete. So, the finding that providing care for the student-athlete was another facilitator is not surprising. Moreover, several of our participants were parents, who like athletic trainers, want to protect the well being of their children. Together parents, coaches, athletic trainers, and others involved in the high school state associations must recognize the need to protect the student-athlete by including appropriate and recommended policies. We encourage more athletic trainers to take active roles within their high school athletic associations in order to help initiate positive change.

Media reports can often have significant influence on policy development and in some cases educational programming. For example, athletic training educators are often influenced by hot topics in the media when developing curricula around the topic of sudden death in sport. The NFL has recently made significant changes to their concussion policies\textsuperscript{33}, which may be attributed to the surge in research, past player litigation and media coverage related to sport related concussions. This attention heavily influenced athletic training educators to spend increased time on the topic in the classroom.\textsuperscript{34} This notion of media influence on policy change did not appear to occur in our sample population. However we cannot ignore the fact that our participants had to learn of the
cases of catastrophic injury or death from somewhere. This is particularly true for our healthcare professionals, as none were directly involved in the care of the injured athletes.

The reactive response to tragedy is not uncommon in sports medicine. As shown by a search of policy changes in sports medicine, development or change of a policy is often initiated in response to a death or catastrophic incident. For example, the National Collegiate Athletic Association mandated sickle cell testing for all Division 1 athletes in response to a lawsuit following the exertional sickling death of Rice University athlete Dale Lloyd.\textsuperscript{6} The same reactive response is also seen at the state level. In Washington, concussion law was implemented and named after Zachary Lystadt, a high school student-athlete who suffered a catastrophic brain injury after sustaining a concussion and returning to play the same day.\textsuperscript{7,8} Our results indicated, that death can stimulate a state’s assessment of their health and safety policies, and can positively influence the decision to make change; however as illustrated by New Jersey, proactivity can also foster change.

Policy Selection

In each state, utilizing existing guidelines that had been established and accepted by national governing bodies primarily assisted the policy development. The National Athletic Trainers’ Association Consensus Statement on Preseason Heat Acclimatization Guidelines for the Secondary School Athlete\textsuperscript{4} was the most commonly utilized document, which was not a surprise, as we chose the states to study because they met the guidelines established by the National Athletic Trainers’ Association. Their desire to mimic or adhere to the guidelines established by a national organization and the profession of athletic training is in support of both coercive and normative isomorphism.\textsuperscript{10} As
described previously, coercive isomorphism is guided by recommendations and mandates from governing bodies; while normative isomorphism is driven by the members of a profession, as they decide what is considered acceptable for their profession.\(^\text{10}\) Here, the members of professional organizations, such as the National Athletic Trainers’ Association strove to make their policies match that of their governing body, not only because it is now the established best-practice within the organization, but also to maintain legitimacy. This supports the findings from a study examining change within a Canadian youth sport organization as well as one regarding healthcare changes.\(^\text{35,36}\) In the Canadian youth sport organization study, the youth sport organizations fell more in line with what was recommended by the national organization,\(^\text{35}\) as our states did too.

**Change process**

In addition to explaining why a state choses to change or adopt new heat acclimatization policies, one of the main goals of the study was to explore the strategies they used to overcome any potential barriers or resistance they encountered. Often times with change, barriers will be present, however in our study our participants only note one barrier, which was resistance from coaches within the state. Previous work has shown that budget is often a barrier for optimal athletic health care in the high schools setting.\(^\text{37}\) However, the heat acclimatization guidelines do not place an additional cost on schools. We therefore, were not surprised that coaches’ resistance to change was the only barrier noted by our participants. This barrier however was noted as minimal mostly because of the shared authority and leadership between the medical professionals and the coaches or administrators within the high school athletic association and the use of open communication.
Barriers. Our participants noted that the only barrier that was encountered was mild resistance from sport (mainly football) coaches. Resistance to change was encountered with high school football coaches, mainly, because the established guidelines impact football more than other sports, due to the equipment intensive nature of the sports. It is likely, that the coaches may not have the training or knowledge regarding these established policies, as previous research has demonstrated a lack of understanding regarding exertional heat illness. This could possibly be the reason for resistance, however because we did not specifically study these coaches, we cannot say for certain. Providing support to this supposition it is possible that the secondary school coach has become institutionalized to the way football practices have historically been managed, and therefore may resist the change, as it can break their perception of normative isomorphism, or the process of adhering to what is considered normal or acceptable by a profession.

Cunningham suggests that organizations who have a tradition of doing things the same way, such as athletic organizations, are candidates for the process of deinstitutionalization. These organizations that have formed and institutionalized become accustomed to doing things the same way, or the way things have always been done. Kikulis, in a study of Canadian national sport organizations, explained that these organizations had to deinstitutionalize when the current practices were out of date as a means to facilitate change. Various pressures can exude themselves on the organizations that make members of the organization question or rethink the habits or tradition that guide the organization. In our study it appears the way football practice has traditionally occurred was deinstitutionalized for the states of Arkansas, Georgia, and
New Jersey after the internal and external pressures previously described. Our participants had to do this in order to reduce resistance, overcome the barriers and help the coaches realize the current way of doing things was no longer acceptable and a change was needed. It is therefore, important to discuss the factors that helped them reduce the resistance and overcome the perceived barrier and deinstitutionalize the current way of doing things.

*Shared Authority/Leadership.* One interesting finding was the diversity of our participants. As shown in Table 1 we had parents, administrators and medical professionals all participating in the change process. Many held no official leadership role with the their state athletic association. Those that did also credited the work of others with the success of implementing the heat acclimatization guidelines. This supports the both the theory of transformational leadership and theory of shared leadership. Shared leadership diverges from the traditional perspective of a single leader who leads a group of individuals towards a common goal or vision, but rather is a seen as a collective effort, whereby leadership resides with a group of individuals.\(^{41}\) Our participants consistently used words such as “we” and “our” to reflect this collective effort and often credited others in the success. Shared leadership commonly occurs in situations when there is no set or assigned leader, as defined by titles or roles,\(^{42,43}\) but may also occur naturally based on the setting. In shared leadership at least two individuals work together to help move the organization towards a common goal.\(^{42,44}\) Based on the task at hand, leaders emerge from the organization’s membership as determined by their expertise, knowledge and previous experiences.\(^ {42}\) Additionally, this form of leadership was been shown to be useful when many different groups or
organizations come together to work towards a common cause. This is particularly important in creating health and safety changes in high school athletics, as our participants discussed the need for multiple professions including school administration, coaching, athletic training and physicians must work together to create practical, yet medically sound policies. Our participants were comprised of practicing athletic trainers, researchers, physicians, parents, and administrators within the high school athletic association. Typically, the high school athletic associations are comprised of current and former coaches, athletic directors and administrators and are the governing body for the high school athletics. While these organizations have established leaders, many of the participants from our study were not in defined leadership roles, but rather emerged due to their expertise in this area. This supports the notion that shared leadership occurs most when members of an organization are needed based on their knowledge, previous experiences or skills. Heidorn and Hall examined the shared leadership model in the context of an overall school wellness policy, primarily targeting youth obesity. Many of the overarching themes including empowering and utilizing the right professionals including administrators and teachers, while still ensuring everyone plays a role were also observed in our study. Within an athletics model, the utilization and effectiveness of shared leadership has been shown within amateur sports through the empowerment of board members and committees. Inglis also noted the importance of volunteers (i.e. those not in formal leadership roles) during times of change.

Each of the three states we studied had an established and respected sports medicine advisory committee comprised of athletic trainers, physicians and other health care professionals, which are a subset of the athletic association and are responsible for
creating recommendations for the health and safety of the student-athletes. We first encourage high school athletic associations without sports medicine advisory committees to establish them, as they appear to valuable resources during the creation and implementation of health and safety policies.

Our participants shared the process of creating the policy between medical professionals and coaches and administrators, which reduced resistance. Many described their leadership style adaptive and often address the needs of their audience or subordinates based on the task at hand. This informal assessment of their leadership style is indicative of a transformational leadership style. Transformational leadership is characterized as “appealing to the ideals and values of subordinates”\(^\text{9}\) and can help a group work collectively together towards a common goal; in this case policy development and implementation. Additionally, in transformational leadership, leaders emerge as they are passionate about a specific topic/mission.\(^{45}\) By using these common goals and values, the leaders are able to facilitate the change.\(^{9}\) Our participants served as role models for change, as they firmly believed in the health and safety of the high school aged student-athlete and this enabled them to spearhead change, with little resistance. A previous study has shown that transformational leadership is commonplace in athletic training, as head athletic trainers and other leaders in the athletic training profession utilize this style.\(^{46}\) This supports the findings of Aarons and Somerfield\(^{38}\), which examined leadership during the implementation of evidence-based practices within a nursing community. Transformational leadership styles were more evident in those groups implementing the evidence-based practice initiative.\(^{47}\) This created more innovation and more positive feelings towards the practices.\(^{47}\) This echoed the
suggestions by Luzinski\textsuperscript{48}, who recommended utilizing transformational leadership when navigating change in the nursing field.\textsuperscript{48} This is important to note because the health and safety policies that are being advocated for the secondary school are a direct implementation of evidence-based practice, only within the athletic training and sports medicine community. It is then comforting to know that leaders within the athletic training profession have been shown to be transformational leaders.\textsuperscript{46}

\textit{Open Communication.} Effective leadership is often associated with open, clear communication.\textsuperscript{49} De Vries found that effective, specific, open communication was the biggest factor in the leaders’ perceived performance and satisfaction.\textsuperscript{50} Our findings suggest that the leaders of these organizations had strong communication skills, which helped facilitate the change. Neufeld also found that transformational leadership and open communication increased confidence in the leader, as well as increased the leader’s perceived performance.\textsuperscript{51} Because communication is an integral skill for health care professionals, especially athletic trainers, we aren’t surprised to see that communication was a positive attribute utilized to lessen resistance to change. Our participants utilized open communication through discussions, meetings, awareness of the new changes and addressing concerns. We contend that any state high school athletic association looking to change existing or adopt new policies be very open throughout the process and allow ample time for questions and discussion. Because coaches (including those in leadership positions) may not have the knowledge as that of a sports medicine professional,\textsuperscript{38} communicating the intentions and rationale is important. In Georgia, members of the leadership within the high school athletic association all attended a meeting where the data from their research study was being presented. This allowed the members of the
leadership board to understand the data, which became the rationale behind the guidelines they created. In New Jersey, an athletic trainer served as the contact-person for any questions. This assisted because then the person who was answering questions or concerns regarding the policy was a medical professional with the knowledge of the rational behind the guidelines.

**Griener’s Patterns of Organizational Change**

Griener’s Patterns of Organizational Change is another theoretical framework that could be used to explain our results. In this model, there are 6 stages that the organization travels through during the change process, each with an input and reaction to that input. “Pressure and arousal”, the first stage, is the reason for the change. It is during this step that the reasons and frameworks why an organization may change come into play. Here, environmental pressures, stakeholder influence and the need for resources can all play into the pressure to change. This pressure has to elicit a change in the leadership. Our data indicated that athlete death, data and the pressure from the Sports Medicine Advisory Committee members to protect student-athletes was the pressure needed to elicit change and spur the reaction from the leadership of the high school athletic association. Greiner also states that typically there has to be a change in power, as often times- without this the pressure goes ignored. In these three states, the power was given to the medical professionals to develop and present a policy to the high school athletic association.

After this redistribution of power, Greiner explains that change is still not guaranteed. Typically, an outside perspective needs to be brought in with this change of power to truly ensure change will occur. This outsider has to be high enough in the
organization to be able to make decisions, but because they are an outsider, they have a fresh and unbiased perspective of the organization and what the flaws are. Our Sports Medicine Advisory Committee, specifically athletic trainers provided enough of an outside perspective, as they brought the knowledge and perspective of a healthcare professional who also understood the context of sport. This suggests that perhaps these people get complacent in the status quo and cannot see that things are not as good as perceived. The organization must be then reorganized so that this person is able to make decisions and address the issues.

In the third stage, the organization is critiqued and the true root of the issue is uncovered. This stage is often difficult, Greiner explains, as oftentimes the information is uncomfortable or unwelcomed. The issue with this step is the real issue needs to be diagnosed or the change process will not be as effective. Greiner explained that in unsuccessful change, this was often ignored. This is very important for state athletic associations to realize, as it is often easier to give a quick assessment and change a policy that seems good at the time but unless the root of the problem is fixed, the organization is still at risk and deficient. An example of this can be seen in Kentucky when the state athletic association created a policy in response to the death of a student-athlete and subsequent criminal charges against the coach. This policy simply required that coaches undergo more advanced training in heat illness and other sport related injuries. While this seems like a good solution, the root of the problem was not addressed. One of these issues is the lack of appropriate medical coverage- this policy simply covered that up. Another issue was the lack of heat acclimatization and unmodified practice in hot and humid conditions. These were also not addressed. In our states, heat acclimatization
was addressed, but other policies, including WBGT monitoring (Georgia) or emergency action plans (Arkansas) were also implemented. We, for the purpose of this study, however, focused only on heat acclimatization.

Once the root of the issue is uncovered, the appropriate solution must be developed. Greiner explained the need to have unique and new solutions to these problems, rather then reverting back to old ways. Rather, something different and new is needed to actually create a change. This decision needs to be made and agreed upon by all involved. In our states, these solutions were the heat acclimatization guidelines. In step 6, these solutions are tested and the results are analyzed. Our participants are still analyzing the results from the implementation, but our participants noted positive feedback. Additionally, a search of media outlets revealed no deaths or catastrophic injury due to heat stroke in these three state since the implementation. After all the data is analyzed, and the policy is implemented, the change needs to be reinforced. With the positive reinforcement, less resistance will occur, therefore it is more likely to be accepted by all the stakeholders.

PRACTICAL APPLICATIONS

One practical application that can be drawn from this information is that those individuals, especially sports medicine professionals who wish to initiate change within their high school state athletic association, must involve sport coaches and administrators and foster the working professional organization. While many of our health care professionals had an idea of a policy they wanted implemented, the involvement and input of the sport coaches and administrators is what helped the policies become adopted. Additionally, in order for states to create medically sound, evidence based policies,
administrators from the high school athletic associations must also involve medical professionals. Along with this shared leadership and authority, open communication, is also necessary in reducing resistance. This open communication occurred must occur professional meetings and group discussions about the specifics of the guidelines. We also suggest medical professionals and researchers focusing on health and safety in high school sports work with the high school athletic associations in their states to create state specific guidelines. However, the need for a national governing body at the secondary school level is apparent due to the individuality allowed within each state. Additionally, because of some of the unique challenges of working in the secondary school setting, such as budget, medical coverage, and competitiveness, we suggest establishing policies independent to the secondary school, especially considering the reliance upon them by our participants as a model for acceptable guidelines. Because our participants seemed to rely heavily on the nationally established guidelines created specifically for the secondary school setting, we suggest that the National Athletic Trainers’ Association develop more secondary school specific guidelines, such as the National Athletic Trainers’ Association Position Statement on Preventing Sudden Death in the Secondary School Setting. Additionally, we recommend that states who are looking to update or create policies to refer to existing guidelines as they not only are a great resource, but also add legitimacy to the state organization.

LIMITATIONS AND FUTURE RESEARCH

We acknowledge there are several limitations to the current study. We only, retrospectively studied three states that have already adopted heat acclimatization guidelines. At the beginning of the study, however, very few states had implemented
these guidelines. Now that more states have implemented guidelines, future research should expand the current study to include more states. The time lapsed since the development and implementation of these policies to when we interviewed the participants was meant to allow time for reflection, but specific details of the experience may have been forgotten. Future research should focus on states which are currently developing and trying to implement health and safety policies, as their current perceptions and experiences may serve as another perspective; used to enhance those gained from the retrospective view of states who were able to implement the desired policy.

Studying states who, either do not wish to change existing health and safety policies may give better insight into the catalyst (or lack there-of). The small number of states in itself is a limitation, as we cannot speculate if our results would be found among all states, which have not adopted heat acclimatization guidelines. All three of the states were purposely chosen for their adoption of heat acclimatization guidelines that meet those established by the National Athletic Trainers’ Association. Because of this targeted sample, future researchers should also focus attention on the development and implementation of policies established to reduce other causes of injury or illnesses in sport. Also, state athletic organizations that have not been able to pass health and safety policy changes, or whose policy changes do not follow or meet existing national standards should be studied to gain different perspectives on barriers encountered and resources utilized. Because our small, targeted sample focused on those in leadership positions during the change process, gaining a more global perspective from each state through the use of quantitative surveys may give more insight from those involved and
affected including coaches, medical staff, parents and administrators. We also did not study the specific leadership style of our participants. Future researchers may consider examining the specific leadership style of those in high school athletic associations and sports medicine advisory committees as their particular state is creating or implementing policies to gain an accurate understanding of the leadership style used at the time.

CONCLUSION

While our study specifically studied the creation and implementation of heat acclimatization guidelines at the secondary school level, we hope this information serves as a resource as other states begin to implement health and safety policies. Athletic training and sports medicine is a unique field, in that healthcare is being provided, but within the context of sport. When examining health and safety policy implementation within a high school athletic association, one must reference both healthcare and sport literature. Our findings mirror the institutional theory of change, particularly normative and coercive isomorphism.10 We recommend that each state’s high school athletics association form a sports medicine advisory committee to assist with the development and implementation of health and safety policies. If state organizations and medical professionals come together to realize their catalyst to change, keeping the secondary school student-athlete safe, use existing resources and nationally established guidelines as templates and work together using shared leadership and open communication, the change process may assist in the change process.
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49. Laurent TG, Bradney DA. Leadership behaviors of athletic training leaders compared with leaders in other fields. *JAT.* 2007;42(1):120–125.


Figure 1. Differences between college and high school fatalities, non-fatal injuries and serious injuries broken into 5-year blocks.¹
Catalyst to Change: *Death, research and forethought; Keeping student athlete’s safe*

- RQ1: What contributed to the decision to implement health and safety policies regarding student-athletes at the high school level?

Policy Decision: *Recommendations from national organizations*

- RQ2: How did the states of Georgia, New Jersey and Arkansas successfully implement their health and safety policies?
- RQ4: What resources were needed to create and implement the health and safety policies at the high school level?

Change Process: *Barriers, Shared Authority/Leadership and Open Communication*

- RQ3: How did they overcome any barriers to this implementation?
- RQ4: What resources were needed to create and implement the health and safety policies at the high school level?

*Figure 2: The Process of Change in the Secondary School Setting*
<table>
<thead>
<tr>
<th>Pseudonym</th>
<th>State</th>
<th>Gender</th>
<th>Role</th>
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<tbody>
<tr>
<td>Bill</td>
<td>N/A</td>
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<td>Athletic Trainer</td>
</tr>
<tr>
<td>Dan</td>
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<td>Male</td>
<td>Athletic Trainer</td>
</tr>
<tr>
<td>Sue</td>
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<td>Female</td>
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</tr>
<tr>
<td>Lenny</td>
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</tr>
<tr>
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<tr>
<td>Lauren</td>
<td>New Jersey</td>
<td>Female</td>
<td>Athletic Trainer</td>
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</table>

Table 1. Participant overview.
<table>
<thead>
<tr>
<th>Interview Guide:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Can you describe your current policies for heat acclimatization in high school</td>
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<tr>
<td>athletes?</td>
</tr>
<tr>
<td>2. Can you please discuss what factors influenced the decision for [New Jersey,</td>
</tr>
<tr>
<td>Georgia, Arkansas] to implement changes to the existing heat acclimatization</td>
</tr>
<tr>
<td>policies?</td>
</tr>
<tr>
<td>3. In your opinion, how did [New Jersey, Georgia, Arkansas] decide what new</td>
</tr>
<tr>
<td>policies or updates to existing policies should include?</td>
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<tr>
<td>4. Please detail the change process. How did the state implement the new heat</td>
</tr>
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<td>acclimatization policies?</td>
</tr>
<tr>
<td>a. What were the key steps that you followed?</td>
</tr>
<tr>
<td>b. What resources contributed to the success of the change?</td>
</tr>
<tr>
<td>c. Where there any resources that were lacking, but could have aided in the</td>
</tr>
<tr>
<td>change process?</td>
</tr>
<tr>
<td>5. Could you describe your role in the change process?</td>
</tr>
<tr>
<td>6. Who were the other influential people in the change process?</td>
</tr>
<tr>
<td>a. Can you discuss why they were important in the change?</td>
</tr>
<tr>
<td>7. What barriers did the state encounter during the change process?</td>
</tr>
<tr>
<td>a. Did the state have resistance to the new policies being developed?</td>
</tr>
<tr>
<td>b. Can you discuss what steps were necessary to overcome the barriers</td>
</tr>
<tr>
<td>and/or resistance encountered during the change process?</td>
</tr>
<tr>
<td>8. Once the policy was approved, how was the information disseminated to all the</td>
</tr>
<tr>
<td>appropriate individuals influenced by the policy changes and developments (such</td>
</tr>
<tr>
<td>as…coaches, athletic directors, athletic trainers and other medical personnel,</td>
</tr>
<tr>
<td>parents, media, etc.)?</td>
</tr>
<tr>
<td>9. Can you discuss how are the policies enforced?</td>
</tr>
<tr>
<td>10. Are you aware of any penalties or consequences for not complying with the</td>
</tr>
<tr>
<td>policies implemented by [Georgia, New Jersey, Arkansas]?</td>
</tr>
<tr>
<td>11. If someone from another state asked you for advice on undertaking a similar</td>
</tr>
<tr>
<td>change, what would you tell him or her?</td>
</tr>
<tr>
<td>12. Reflecting back on the policy change, is there anything you would change or</td>
</tr>
<tr>
<td>any information that you wish you knew at the start of the process that you</td>
</tr>
<tr>
<td>do now?</td>
</tr>
<tr>
<td>13. Do you plan to make any further changes within the state regarding athlete</td>
</tr>
<tr>
<td>health and safety?</td>
</tr>
<tr>
<td>a. Probe: If so, how do you think this experience will affect you?</td>
</tr>
<tr>
<td>14. Would you like to discuss anything else regarding the policy changes that</td>
</tr>
<tr>
<td>occurred regarding the Health and Safety of High School Student-Athletes?</td>
</tr>
</tbody>
</table>

**Follow Up Questions:**

<table>
<thead>
<tr>
<th>Follow Up Questions:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Describe how your leadership style helped to overcome challenges encountered during the</td>
</tr>
<tr>
<td>process of creating changes in the state?</td>
</tr>
<tr>
<td>a. How would you describe your leadership style?</td>
</tr>
<tr>
<td>b. Why do you believe you or others perceived that you played such an integral role in</td>
</tr>
<tr>
<td>the change process?</td>
</tr>
<tr>
<td>2. What personal skills or personal behaviors did you find to be most helpful in</td>
</tr>
<tr>
<td>implementing this change?</td>
</tr>
<tr>
<td>3. Do you believe the change process was the result of a team of people working</td>
</tr>
</tbody>
</table>
together?
4. In what way did you facilitate teamwork during the change process?
5. In what way did you share responsibility with others during the change process?
6. What do you think allowed the changes to be successfully adopted in the state (i.e., what made the environment open to change)?
   a. What made this time different?

Table 2: Interview guides
### Open Coding

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer (single thought)</th>
<th>Initial Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>How did you overcome the barriers you encountered?</td>
<td>&quot;We let [coaches] address the…you know all the football coaches in the state&quot;</td>
<td>Other coaches</td>
</tr>
<tr>
<td>&quot;We’d put committees together to look at this research&quot;</td>
<td>Committees</td>
<td></td>
</tr>
<tr>
<td>&quot;Our whole objective was that we felt like it had to be a team approach, a global approach if you will&quot;</td>
<td>Team approach</td>
<td></td>
</tr>
</tbody>
</table>

### Selective Coding

<table>
<thead>
<tr>
<th>Initial Categories</th>
<th>Related Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utilized other coaches to speak with coaches</td>
<td></td>
</tr>
<tr>
<td>Organized committees to help develop the new guidelines</td>
<td></td>
</tr>
<tr>
<td>Utilized a team approach when developing and implementing the guidelines</td>
<td>Shared authority/leadership</td>
</tr>
</tbody>
</table>

### Axial Coding

<table>
<thead>
<tr>
<th>Related Categories</th>
<th>Confirm of Category</th>
<th>Major Theme/Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shared leadership/authority was utilized to overcome an barriers</td>
<td>Shared leadership/authority was utilized to overcome an barriers</td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Data analysis process.
<table>
<thead>
<tr>
<th>Policy Type</th>
<th>National Athletic Trainer’s Association&lt;sup&gt;4&lt;/sup&gt;</th>
<th>New Jersey State Interscholastic Athletic Association&lt;sup&gt;29&lt;/sup&gt;</th>
<th>Georgia High School Association&lt;sup&gt;30&lt;/sup&gt;</th>
<th>Arkansas Activities Association&lt;sup&gt;31&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>June 2009</td>
<td>May 2011</td>
<td>March 2012</td>
<td>June 2012</td>
</tr>
<tr>
<td>Requirements</td>
<td>“1. Days 1 through 5 of the heat-acclimatization period consist of the first 5 days of formal practice. During this time, athletes may not participate in more than 1 practice per day. 2. If a practice is interrupted by inclement weather or heat restrictions, the practice should recommence once conditions are deemed safe. Total practice time should not exceed 3 hours in any 1 day. 3. A 1-hour maximum walk-through is permitted during days 1–5 of the heat-acclimatization period. However, a 3-”</td>
<td>“1. Days 1 through 5 of the heat-acclimatization period consist of the first 5 days of formal practice. During this time, athletes may not participate in more than 1 practice per day. 2. If a practice is interrupted by inclement weather or heat restrictions, the practice should recommence once conditions are deemed safe. Total practice time should not exceed 3 hours in any 1 day. 3. A 1-hour maximum walk-through is permitted during days 1–5 of the heat-acclimatization period. However, a 3-”</td>
<td>“1. In the first five days of practice for any student, the practice may not last longer than two (2) hours, and the student may wear no other protective football equipment except helmet and mouthpieces. NOTE: a. The time for a session shall be measured from the time the players report to the practice or workout area until they leave that area. b. During acclimatization practices, teams may hold a walk-through as long as there is at least a two-hour break between the two activities. 2. Beginning “1. Football practice may begin on Monday of week #5. 2. Practice on days 1 and 2 of week #5; a. Shall be conducted without any contact equipment except helmets, b. 1 practice with a maximum of 3 hours in length, c. no contact, d. 1 hour walk through is permitted following practice but must be separated by a 1 hour rest and recovery period. 3. Practice on days 3-5 of week #5; a. Shall be conducted with helmets and shoulder pads as the only...”</td>
<td></td>
</tr>
</tbody>
</table>
hour recovery period should be inserted between the practice and walk-through (or vice versa).

4. During days 1–2 of the heat-acclimatization period, in sports requiring helmets or shoulder pads, a helmet should be the only protective equipment permitted (goalies, as in the case of field hockey and related sports, should not wear full protective gear or perform activities that would require protective equipment).

During days 3–5, only helmets and shoulder pads should be worn. Beginning on day 6, all protective equipment may be worn and full contact may begin.

A. Football only: On days 3–5, contact with blocking equipment,

August 1st, any student may practice in full pads and may practice a maximum of two times in a single calendar day under the following stipulations:

b. 1 practice with a maximum of 3 hours in length,
c. contact can be with blocking sleds/dummies only,
d. 1 hour walk through is permitted following practice but must be separated by a 1 hour rest and recovery period.

4. Practice after day 5;

a. Schools can practice with full equipment.
b. Schools cannot have consecutive days of “two-a-day” practices.
c. Student athletes shall not engage in more than three hours of practice activities on those days during which one practice is conducted.
d. Student athletes shall not engage in more than five
sleds and tackling dummies may be initiated.

B. Full-contact sports: 100% live contact drills should begin no earlier than day 6.

5. Beginning no earlier than day 6 and continuing through day 14, double-practice days must be followed by a single-practice day. On single-practice days, 1 walk-through is permitted, separated from the practice by at least 3 hours of continuous rest. When a double-practice day is followed by a rest day, another double-practice day is permitted after the rest day.

6. On a double-practice day, neither practice should exceed 3 hours in duration, and student-athletes should not participate in more than 5 total hours of sessions.

iv. There may not be consecutive days of two-a-day practice sessions. All double-session days must be followed by a single-session day or a day off.

v. A walk-through may not be held on days when two practices are conducted.

These procedures are derived from recommendations created by the Inter-Association Task Force for Preseason Secondary School Athletics Participants in the paper "Preseason Heat-Acclimatization Guidelines for Secondary School Athletes."

3. From the end of school in the spring until the first day of preseason practice,
practice. Warm-up, stretching, cool-down, walk-through, conditioning, and weight-room activities are included as part of the practice time. The 2 practices should be separated by at least 3 continuous hours in a cool environment.

7. Because the risk of exertional heat illnesses during the preseason heat-acclimatization period is high, we strongly recommend that an athletic trainer be on site before, during, and after all practices.”

players may wear no other protective football equipment except helmets and mouthpieces for all voluntary workouts and passing league games. Institutional heat policies are also in effect for voluntary workouts supervised by school personnel.

4. Team camps that have been approved in writing by the Executive Director may allow participants to wear shoulder pads for blocking drills. Coaches for these players must verify that the participants have had acclimatization practices for five weekdays immediately preceding the camp.”

Other Policy also mandates Also implemented a
modifications based on the WBGT readings at the specific practice site. Law that mandates emergency action plans and coaching education. Other medical providers, including emergency medical services companies and hospitals also implemented state-wide exertional heat illness policy changes.

|---|---|---|---|---|

Table 4. Overview of each state’s policy, as compared to the National Athletic Trainers’ Association Consensus Statement on Pre-season heat acclimatization for the secondary school athlete.⁴,²⁹-³¹