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Medical Availability in Delaware High School Athletics

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MEDICAL AVAILABILITY IN DELAWARE HIGH SCHOOL ATHLETICS

by

Heather M. Elder

(Under the Direction of Jim McMillan)

ABSTRACT

The purpose of this study was to assess the current availability of medical personnel, emergency equipment, and medical documentation in Delaware high school athletic programs. A survey was sent via email to the fifty one athletic directors of high schools in Delaware and twenty nine (56.8%) were returned completed. Survey responses show twenty eight (96.5%) Delaware high schools had an athletic trainer available to participating athletes. All schools had either an athletic trainer, physician, or nurse present at football games. For practices, coaches and athletic trainers were the most common professionals available. As required by the Delaware Interscholastic Athletic Association, all coaches had CPR certifications. However, 60.7% of schools reported less than 50% of coaches with current first aid certification. Delaware should require all coaches to complete first aid certification with the CPR certification. They should also require athletic trainers at all sport events instead of just football.

INDEX WORDS: Athletic training, Certified Athletic Trainer, Delaware, High School, Physician

MEDICAL AVAILABILITY IN DELAWARE HIGH SCHOOL ATHLETICS

by

Heather M. Elder

B.A., Capital University, 2000

A Thesis Submitted to the Graduate Faculty of Georgia Southern University in Partial
Fulfillment of the Requirements for the Degree

MASTER OF SCIENCE

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MEDICAL AVAILABILTY IN DELAWARE HIGH SCHOOL ATHLETICS

by

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Electronic Version Approved: May 2009

DEDICATION

I would like to dedicate this paper to my family for all the support and love they have given me in this process.

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I would like to acknowledge Drs. McMillan, Joyner and Ritchie for allowing and helping me to finish this long overdue development. Their support has been instrumental in this project. It has truly been an enlightening and enriching process.

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CHAPTER 1

INTRODUCTION

The number of students participating in high school athletics has increased from 3.9 million in 1971 to almost 7.4 million in 2007 (NFHS). Of the nearly 7.4 million student athletes, nearly 25,000 participated in Delaware athletics during the 2006 – 2007 school year. Today more student athletes participating in high school athletics provides more exposures to the possibility of injury. With larger numbers of athletes and more exposures to injury, the need for proper medical coverage and supplies for medical care also increases.

There is a risk of injury associated with participating in sports and physical activity. The National Electronic Injury Surveillance System All Injury Program (NEISS-AIP) indicated that from July 2000 through June 2001 there were an estimated 4.3 million nonfatal sports and recreation injuries treated in emergency departments in the United States. While the NEISS-AIP data were not limited to organized events, injuries from high school athletes accounted for an estimated 500,000 doctor visits and 30,000 hospitalizations a year (Powell, 1999). However, these numbers did not include injuries that were treated by medical personnel on-site.

With the number of athletes increasing each year, the need for medical care at practices and games also increases. Care of injuries is important so that injuries are properly treated, will heal properly, activities of daily living are maintained and loss of competition time is minimized. Deciding whether or not to return an injured athlete to competition may be a difficult. Without competent, trained medical personnel, improper

management of athletic injuries can lead to extra time away from sport, loss of function, paralysis or even death (Candon, 2008).

According to the American Medical Association (AMA), an adequate Athletic Medical Unit (AMU) should be formed in high schools with athletics (1998). Included in this AMU should be a licensed physician, a Certified Athletic Trainer (ATC) and other personnel as deemed necessary. Certified Athletic Trainers are recognized by the American Medical Association as allied health professionals trained in preventing, evaluating, treating and rehabilitating injuries associated with physical activity. Certified Athletic Trainers must complete a four-year degree from an accredited program and pass the Board of Certification Exam. Athletic training education and practice revolves around six domains. These domains include: prevention, recognition and evaluation, immediate care, treatment and rehabilitation, health care administration, and professional development. Through learning skills based on competencies from these domains ATCs work to prevent, reduce the risk of re-injury and decrease the amount of time away from activity. A survey conducted at Columbus Children's Hospital in Ohio found that 1.4 million injuries were reported to a Certified Athletic Trainer during the 2005 – 2006 school year (CDC, 2006).

From one of the domains, ATCs are trained in assessing and managing injuries. First responders are trained in basic first aid, CPR and AED usage. This does not include the athletic training domains for musculoskeletal sprains, strains, taping or padding. Also, there is no background for concussion assessments. First responders do not have the education or clinical experience to make decisions about allowing an athlete to return to the field of play after sustaining an injury. Without the proper knowledge and experience,

returning athletes to play before they are ready can put the student athlete at an increased risk.

Previous studies have documented the degree of medical coverage in high school athletics in South Carolina (Carek, Dunn & Hawkins, 1999), Illinois (Bell, Prendergast, Schlichting, Mackey and Mackey, 2005), North Carolina (Aukerman, Aukerman, and Browing, 2006), Chicago (Tonino & Bollier, 2004), Georgia (Ussery, 2007) and Southern California (Vangsness, Hunt, Uram, & Kerlan, 1994). These studies examined the availability of physicians, athletic trainers, and equipment for high school athletics in each state. However, no such survey has been completed for Delaware.

Therefore, the purpose of this study was to determine: 1) the current medical personnel available for high school athletes during games and practices in Delaware, 2) the percentage of coaches that had current CPR and first aid certifications, 3) the availability of emergency equipment, and 4) if schools kept injury records and required pre-participation examinations.

CHAPTER 2

REVIEW OF LITERATURE

Introduction

Athletic participation has increased each year at the high school level, totaling almost four million in 36 years. With the increased exposure comes the increased opportunity for injury. Injuries can range from minor to permanently disabling or even fatal. The management of those injuries can affect their outcome and the athlete's return to athletics. Injury management includes the personnel available to provide care, the equipment available and the maintenance of medical records for each student athlete.

Not all states require a Certified Athletic Trainer be available at all or any high school athletic events. Delaware only requires a health care professional, such as an athletic trainer, nurse or physician, at football games (DIAA, 2008). Several associations, AMA (1998), American Academy of Family Physicians (2007), and the National Athletic Trainers Association (2004) have released statements about appropriate medical coverage for high school athletics. Previous studies show that between 41% to 73% of surveyed schools in Chicago, Southern California, South Carolina, North Carolina, Georgia, and Illinois have an athletic trainer. No study has been done in Delaware about the medical coverage available for high school athletics. Therefore the purpose of this literature review is to substantiate the need for medical coverage by reviewing research related to injury statistics and to examine current recommendations and previous studies concerning medical coverage, equipment availability, and injury documentation for high school athletes.

Athletic injuries

The Center for Injury Research and Policy at Columbus Children's Hospital in Columbus, Ohio conducted a study sponsored by the Centers for Disease Control (2006) using an internet injury surveillance system. The purpose of this study was to collect data about injury occurrences at practices and games. The participants included one hundred high schools and were representative of location and size for the nation. They found that injuries were reported to athletic trainers at a rate of 2.44 injuries per 1,000 athlete exposures during the 2005-2006 school year. An athlete exposure was defined as either practice or competition. Data was collected from nine sports; five male (baseball, basketball, football, soccer, and wrestling) and four female (basketball, soccer, softball, and volleyball). These nine sports accounted for nearly 1.5 million injuries to high school athletes for the 2005-2006 school year.

This study had a few areas that limited the responding statistics. First, only those high schools that had a Certified Athletic Trainer were selected for the study. Without an ATC, that school's information could not be included. This excluded those schools that had other health care providers available. The ATC collected and submitted the injury and athlete exposure information that was entered in the internet program. Secondly, only those injuries that were brought to the ATC's attention were counted. All injuries that sought medical attention in physicians' offices, emergency departments, or other providers without seeing an ATC prior were not included in the results.

Another similar injury surveillance study was conducted for the high school sport seasons of 1995 – 1997. Powell and Barber-Foss (1999) evaluated the injury patterns in ten high school sports over the course of three seasons. The sports were the same as the

nine sports in the study from the Center for Injury Research and Policy at Columbus Children's Hospital with field hockey added for females. From the data collected, female sports accounted for 44.5% of injuries in practices, and games. Football was found to have the highest number of reported injuries at 50.0 per 100 players, whereas baseball had the lowest at 13.2 per 100 players. Overall, 55.5% of injuries occurred during practices with the highest from women's volleyball and the lowest from boy's soccer. Although the percentage of injuries during practice was higher for all ten sports combined, nine of the ten had a higher occurrence during games with women's volleyball as the exception.

When the researchers evaluated injuries per body area, they found some interesting trends. The lower extremity was the most commonly injured at nearly 60% and the occurrence in the upper extremity was approximately 21% in all sports except wrestling. Wrestling had more injuries to the upper extremity than the lower. As for head, neck and spine injuries, football accounted for more than any of the other sports. Football head, neck, and spine injuries occurred in 13.3% of the time and the next highest was wrestling at 9.5%. The most common type of injuries were sprains, a stretch or tear of ligaments. This accounted for 51.1% of injuries in women's volleyball, closely followed by women's and men's basketball at 45.2% and 44.8% respectively. This data showed that injuries were a significant component of athletic participation. These numbers demonstrated the need for qualified personnel such as Certified Athletic Trainers to properly manage injuries when they occur and to create prevention programs to minimize the risk of injury during participation.

Medical Coverage

Jaquan Waller, a high school student in Greenville, North Carolina, died September 20, 2008, from what the medical examiner determined to be Second Impact Syndrome (Stevens and Van Der Horst, 2008). Waller sustained a mild concussion at football practice on Wednesday. He was evaluated by the school's first responder and did not see a physician. He was cleared to play by the first responder and during the game on Friday of the same week, sustained another impact to his head, walked off the field, and collapsed on the sideline. The combination of the two hits proved to be fatal for Jaquan Waller (Stevens and Van Der Horst, 2008). The North Carolina High School Athletic Association (NCHSAA) requires that either a Certified Athletic Trainer or a first responder be present at all football practices and games. North Carolina defines a first responder as having CPR certification, first aid certification and an injury prevention and management course. In light of Jaquan Waller's death and two other high school football deaths in less than six weeks, the association is now recommending that all high schools have a Certified Athletic Trainer. North Carolina has also instituted new policy concerning head injuries. All athletes with head injuries, regardless of severity, are required to be cleared by a physician before the athlete is allowed to return to any activity.

Ensuring the student athlete's safety includes both evaluating and treating injuries sustained during activity. Management of injuries due to participation in athletic events should be performed by those educated, trained and adequately certified or licensed to provide these services (NATA, 2004). Certified Athletic Trainers are allied health care professionals that focus on the six domains of athletic training, specifically the

prevention, diagnosis, treatment, and rehabilitation of injuries associated with physical activity. The ATC, working with a physician, routinely has to make return-to-play decisions based on his/her education, experience and the state practice act. The Appropriate Medical Care for the Secondary School-Age Athlete task force (AMCSSAA) recommended that the ATC is the best option to provide injury management services (NATA, 2004). In addition, the American Academy of Family Physicians encouraged high schools to have a Board of Certification certified or registered/licensed athletic trainer as an integral part of the high school athletic program (2007).

Proper management of athletic injuries is important so that there is a minimal loss of time from sport, proper healing, and no permanent damage from the injury that could hinder the athlete's daily activities. Having unqualified personnel can have catastrophic consequences when a serious injury occurs. For example, Certified Athletic Trainers have the training and background to recognize and evaluate mild traumatic brain injuries such as concussions. Another benefit of an ATC's education is the knowledge about when an athlete can safely return to activity. ATC's work under the supervision of a physician and are in contact with a team physician when available.

First responders are not be qualified to make all return to play decisions. First responder training only includes the basics of first aid and injury management, such as wound care and pre-hospital care for emergencies. First responders do not have the background in assessing complicated injuries such as sprains or strains. First aid and CPR training for first responders does not include deciding when it would be safe for an injured athlete to return to activity. Also, there is no education for rehabilitation or

conditioning for the athletes before they return to activity. First responders do not work directly with a physician and there is no legislation for the practice of first responders.

The Delaware Interscholastic Athletic Association requires a certified athletic trainer or a registered nurse to be present at all interscholastic football games. It is the host school's responsibility to provide this service (DIAA handbook, 2008). Neither athletic trainers nor first responders are required for other competitions or for daily practices nor are first responders. Since not all injuries occur during football games, athletic trainers need to be available to all sports.

In the absence of a Certified Athletic Trainer, coaches are commonly the first or only adults available when an athlete is injured. However, Delaware requires only that all coaches complete CPR certification (DIAA, 2008). They are not required to take a first aid or injury management course. Therefore coaches may not be the most appropriate person in all situations. The American College of Sports Medicine (2004) completed a study that put coaches through a ten-week course about sports injuries. Following the course the coaches were tested and found to have scored higher on the test after the ten-week course than before. Even though there was an improvement of coaches' injury management knowledge, the study found coaches still scored almost 20 points lower than Certified Athletic Trainers. This shows that athletic trainers are more knowledgeable about managing sports injuries and therefore should be on-site to provide the best possible care to the athletes.

Emergency medical equipment

With the risk of injury that accompanies playing sports also comes the need for proper injury management. Some injuries, such as contusions, sprains and strains, may be

minor while other injuries, such as compound fractures or dislocations, can be serious. The equipment available to properly manage these conditions in their acute stage is important and may affect healing. The AMCSSAA recommended the minimum athletic emergency equipment accessible should include: vacuum splints, a spine board, hard neck collars, facemask removal equipment, resuscitation masks, a shoulder immobilizer, blankets, crutches, blood pressure cuff with stethoscope, gloves, and a first aid kit (NATA, 2004). They also advise that an Automated External Defibrillator (AED) be accessible during practices and competition.

The DIAA provides a list of minimum supplies that all DIAA teams should have available at all practices, scrimmages, and games. The list includes items such as tape, gauze, band-aids, bandages, gloves, CPR mask, slings, scissors, foam/felt, and hand cleaner (DIAA, 2008). These supplies allow the coaches trained in first aid or other first responders to treat minor injuries when they happen during activity.

Daniels, Kary, and Lane provided (2005) other medical equipment lists that were directed to physicians offering direct coverage at the event. There were different lists depending on the location and purpose of the equipment. The emergency bag list was very similar to the DIAA recommended list. There was also a suggested list of medications for the physician to carry that included antibiotics, antihistamines, anti-inflammatories, inhalers, and acetaminophen. The wound management kit should contain dressings, bandages, wound cleaners, steri-strips, and a suture kit. An eye and ear list suggested supplies specific to eye and ear injuries. Finally, the splint bag included casting material, crutches, splints, knee immobilizers, elastic wraps, slings, and tape to secure materials.

Documentation

Keeping accurate records is a staple to many professions and can serve many uses. One of the six domains of athletic training education is Organization and Administration and a main component to this domain is record keeping. The most common records that should be kept are pre-participation examinations, medical history, personal information, and injury reports (Prentice, 2006). Pre-participation examinations should be performed at least once every year. These should be performed a few weeks prior to activity. This allows time to further evaluate and treat any problems discovered during the examination before the season begins. The components of a pre-participation exam should include the athlete's personal information, medical history, physical exam, and orthopedic screening. The medical history section includes questions about previous medical conditions, medications or existing problems such as asthma, allergies, heart conditions, and heat illness. The physical examination should include height, weight, blood pressure, pulse, vision, eye, ear, nose, skin, heart and lung assessments. Further assessment could include maturity index, urinalysis, and blood tests. Orthopedic testing should include strength, range of motion and joint stability for all the major joints of the body (ACSM, 2002). Any concerns that arise during these examinations should be followed up with a doctor and possibly referred to a specialist (Kurowski & Chandran, 2000).

Another important component to documentation is an injury report. An initial and follow-up injury report provides information for further reference when questions arise. Injury reports should include the date, time, location, and the details about what occurred. When the injury is evaluated, notes should be written about what tests are performed and

the results of each test (Prentice, 2006). While keeping records will not keep an ATC out of the courtroom, it will provide a record of what occurred in the event of a lawsuit. Lawsuits can occur several years after the injury occurred and after the student has graduated. Maintaining accurate injury records helps to provide information when the memory fails after so many years.

Some injuries necessitate a visit to a physician for further evaluation. In those cases, athletic trainers need to obtain written orders from the physician so there is no confusion about the athlete's injury status. These orders often include treatments, restrictions, or rehabilitation protocols. Release of this information requires authorization from a parent or guardian (HIPPA, 1996). Many schools have a section of the pre-participation exam that allows the parent or guardian to sign authorizing the release of medical information to school medical personnel. After the injury has been diagnosed and treatment begins, written notes can show an athlete's progress following an injury and maintain records of daily rehabilitation exercises. These records can provide room to note any complications during treatment or rehabilitation. Another important part of the notes allow a place for the athlete and athletic trainer to set short-term and long-term goals for return to play. Before the athlete can return to active participation and competition, there should be a written release on file from the doctor giving clearance to return to normal activity.

The DIAA requires that teams carry an emergency information card complete with each student athlete's personal information. The card has three sections of pertinent information. The first contains the demographic information for the student athlete and emergency contact persons. The second section includes any medical conditions,

allergies, or previous severe injuries. A third section of the card allows for the parent or guardian to authorize treatment and release of information among medical professionals. (DIAA, 2008).

Additional State Studies

Studies done in South Carolina (Carek, Dunn & Hawkins, 1999), Illinois (Bell, Prendergast, Schlichting, Mackey and Mackey, 2005), North Carolina (Aukerman, Aukerman, and Browing, 2006), Chicago (Tonino & Bollier, 2004), Southern California (Vangsness, Hunt, Uram, & Kerlan, 1994), and Georgia (Ussery, 2007) assessed the medical coverage, equipment available to manage injuries sustained by high school athletes and the documentation kept about those injuries. The researchers sent surveys to the athletic director of each high school with questions regarding the medical coverage for the athletic program. The surveys included questions relative to the presence of an athletic trainer, team physician, medical equipment, and the CPR and first aid certification of the coaches.

One such study (Carek, et.al., 1999) surveyed the medical coverage of football programs relative to school size and/or classification of South Carolina high schools. Their initial questions were about health care providers. They found that 68% of South Carolina high schools had an identified team physician and 28% had more than one. They found that 55% of the schools surveyed had an athletic trainer working with the football program. Of the schools with an athletic trainer, 89% were available to the female athletes. Carek et al. (1999) did not investigate the presence of a physician or an athletic trainer available for other sports; their questions pertained only to football. The study did not find a difference between private and public high schools in identifying a team

physician. However, it was determined that smaller schools were less likely than larger schools to have either a physician or athletic trainer available.

Regarding other personnel available to the student athletes, Carek et al. (1999) also asked about the CPR and first aid certifications of the coaches. They found that only 30% of coaches surveyed had current CPR certifications. First aid certifications of coaches were slightly higher at 41%. It was found that smaller schools were more likely to have coaches trained in CPR and first aid than larger schools. The opposite trend for the school size occurred with coaches' certification than it did for the presence of a physician or athletic trainer. Where the larger schools were more likely to have physician or an athletic trainer, here they were less likely to have coaches certified in first aid and CPR.

Finally, Carek et al. (1999) also evaluated the written records of injuries, permission to treat forms, and release of liability documentation. Documentation of injuries was minimal at ten percent and the permission to treat injuries and the release of liability forms were not much more at 16% and 22%, respectively. When they asked about medical equipment, they found it was only available at some high schools. Bolt cutters for the football facemask were available at 59 % of schools while splints, 74%, and first aid kits, 84%, were more common. Carek et al. (1999) also found that school size affected availability and/or type of medical equipment. Smaller schools were less likely to have splints, spine boards, stretchers or bolt cutters available than larger schools.

A study performed by Bell et. al. (2005) looked at the availability of a medical professional in Illinois high schools. Bell et al. (2005) began by examining the basic life saving ability of the high school coaches. They found only 40% of schools required that

the coaches hold a current CPR certification. Also, only 36% of schools required the coaches to be first aid certified. Twelve of the schools without an athletic trainer, nurses, or physician, did not require any life saving certifications of the coaches.

Primary health care providers for Illinois high school athletes were primarily athletic trainers at 73%, nurses at 61%, and physicians were available at 43% of schools surveyed. Twenty seven schools (8.5%) of the surveyed schools did not have a health care professional available. Medical coverage differed between practices and games. The study determined that no health care professional was available at practices 33% of the time or at games 16%. However, 31% of schools had someone at all practices and 49% had personnel at all games. The survey found the results for the presence of an ambulance were better. Bell et al. found that 69% of schools surveyed had an ambulance on-site for games. However, the majority of those were only available for football. (Bell et al., 2005)

Bell et al. (2005) examined the differences of having an athletic trainer relative to geographic location as well as the size of schools. Contrary to Carek et al., (2005) the researchers found significant differences in those schools that have an athletic trainer in Illinois. The schools in larger cities were more likely (94%) to have the services of an athletic trainer than rural schools (62%). Bell et al. (2005) did find similar significant differences regarding the size of the school and presence of an athletic trainer. The smaller schools were less likely (59%) to have the services of an athletic trainer compared to the larger schools (87%).

Different from the other studies examined, Bell et al. (2005) investigated Automated External Defibrillator (AED) certification. They found that only a small percentage, 18.7%, of coaches was certified in AED operation. They did not find a

significant difference in location or in size of the school for first aid, CPR or AED certifications. This study did not evaluate any other emergency medical equipment schools may have available to student athletes at practices or games.

Aukerman et. al. (2006) surveyed North Carolina to assess the medical coverage available at athletic events. Their results indicated that 48% of schools did not have an ATC available leaving the majority of schools without an athletic trainer. They did not report differences in practice or game coverage by athletic trainers. Physicians, most commonly an orthopedist, covered some events at 78 % of surveyed schools. Of these schools with physician coverage, 65 % only worked with football. Other than football, the physician coverage was minimal at 13% for other men's teams and 12% for women's teams. Other medical coverage was also evaluated. Twenty six percent of the schools did not have an ambulance at football games and 51 percent relied on non-licensed, noncertified personnel for coverage (Aukerman, 2006). Aukerman et al. (2006) posed a new question in contrast of other studies about the perception of medical coverage. Forty-nine percent of schools reported having inadequate coverage. Upon analysis, the presence of a certified athletic trainer was the only significant predictor of perception of adequate coverage (Aukerman, 2006). Those schools without an ATC felt the medical coverage was not adequate for high school athletes.

The North Carolina study looked for relationships between medical personnel available and school size. Aukerman et al. (2006) found there was a significant difference in the availability of an athletic trainer in relation to the size of schools. The larger schools tended to have an athletic trainer more than the smaller schools. Most of the surveyed schools did not have coaches that were CPR or first aid certified. Unlike the

other studies, North Carolina did not have a relationship between the size of schools and coaches that were first aid or CPR certified. Similarly, concerning physicians, there were slightly more available at larger schools although they were more widespread than the researchers anticipated.

Tonino & Bollier (2004) surveyed Chicago high schools with football and examined the medical coverage at practice and games. Regarding coverage at games, the researchers found that only 8.5 % had a certified athletic trainer available at home varsity events, junior varsity was not measured. Physician availability was slightly higher at 10.6 % for home games. While the ATC and physician numbers were low, the presence of a paramedic was much higher at games (89.4 %).

At high school practices, there was very little medical coverage available. No school had a physician or paramedic present and only one school out of 47 had an athletic trainer present (Tonino, 2004). The only personnel available to provide medical attention at practices were the coaches. Tonino & Bollier (2004) found that the percentage of CPR and first aid certified coaches was 89.4 % in high schools with football. Therefore the majority of personnel most commonly present when injuries occur were trained in basic procedures. Personnel with advanced training were not accessible at practices except for one school surveyed.

Vangsness et. al. (1994) surveyed high schools in Southern California about the medical coverage available for the football athletes. Vangsness et. al. (1994) found that physicians were available at 71.2 % of surveyed schools. Of these schools, 64.3 % had one physician present and 36.3 percent had multiple physicians. For practices and scrimmages, a physician was on-call at 26.2 % of schools. A higher percentage of

emergency response was found and an ambulance was on call at 56.2 % surveyed.

Vangness et al. (1994) found very similar results for athletic trainers; 68.8 % were designated only to the football team and present at games. Other sports did not have an athletic trainer available. Game coverage by physicians occurred at 72.2 % of schools.

Vangness et al. (1994) found that other professionals provided care at some schools during games. A nurse was available at 7.6 percent of schools, 6.5 percent had a chiropractor and 17.6 percent provided a paramedic or physician assistant. Emergency response included an ambulance at home games 37.5 % of the time and on call at 24.4 % of schools. Coaches were CPR certified at 90.7 % of schools and 81.4 % had first aid certifications. (Vangness et al., 1994)

Another aspect of the survey questions was about medical equipment and its accessibility at practice. A spine board was available at 62.5 % of the surveyed schools, 79.1 % had splints, 89 % had first-aid kits and 56.3 % had bolt cutters for face mask removal. These pieces of equipment are used in emergency situations to stabilize the athlete and limit further complications.

Documentation was evaluated through the survey conducted by Vangness et al. (1994) and found that 68.3 % kept reports of injuries and 96 % required written documentation from a physician before the player could return to activity. High results were found with other forms of documentation as well. The “permission to treat” and “release of liability” forms both were on file at more than 99 percent of schools. Finally, all schools required a pre-season physical exam for all football players.

Georgia

In 2007, Ussery studied the Athletic Medical Unit (AMU) in Georgia high school athletic programs. As part of the AMU, Ussery examined the personnel available, specifically physicians, ATCs, coaches. This study found that 54.6% of surveyed schools had a team physician. The majority of these, 76.3%, were orthopedic physicians and 25.4% were family physicians. Physicians attending practice was not common in Georgia. Half of the schools did not have a physician at practice and another 41.4% did not have one present less than half of the time. In terms of football games, three classifications indicated a physician present 100% of the time. The other two classifications had a physician present 60% in the smallest, and 83.3% in the second largest. Physicians were the most likely to provide follow-up care following an injury (82.6%), and make the decision when to return the athlete to play (85.3%).

The availability of an ATC was slightly higher than that of a physician. Ussery (2007) found that 61.4% of schools had an ATC present on staff. There were no significant differences found between public or private schools and having an ATC. Similarly there was no significant difference for the classification of schools either. A trend was noticed in that the smaller classifications of schools were less likely to have an ATC available at football practices. This trend did not present as a significant difference. Other sports did show significant differences in having an ATC available at practices or games. Ussery did observe a significant difference in girls' basketball home games in the schools' classifications. There was no ATC present during home games for three-A schools. Also, only 42.9% of single-A schools had an ATC for home wrestling matches. Following an injury, the ATC was 58.7% most likely the person that provided follow-up

care. Also, were most likely, following the physician, to make the return to play decision.

The employment of the ATCs in Georgia high schools was another area of examination for Ussery (2007). Clinics or hospitals accounted for 58.2% of employers for the ATCs working in the high schools. Specifically looking at the five-A classification, they were more likely to have ATCs come from a sports medicine clinic at 40% or within the school at 33.3%. The four-A and one-A classifications were most likely to have an ATC from the school system (42.9%).

When an ATC was not on staff, coaches served this role 70% of the time. Five-A schools were the most likely to have a coach substitute as an athletic trainer at 83% and one-A and three-A schools followed close behind at 75%. The smaller classifications tended to have a physician fill the role of an athletic trainer and physical therapists were found in the absence of an ATC 30% of the time. Nurses and EMTs were the least likely to take the responsibility, 17.5% and 20% respectively.

When examining coaches, it was found that 46.4% had first-aid and CPR training across all five classifications. When AED training was added, the percent increased to 53.6%. Also, coaches were also found to be the most common of any other health care provider to provide immediate care for injured athletes at practice 70.6% of the time. (Ussery, 2007)

The American Medical Association, the American Academy of Family Physicians, and the Center for Disease Control have formally made recommendations regarding the need for an athletic trainer at high school athletic events. Athletic trainers are specifically educated and trained in the prevention, evaluation and management of

injuries sustained when participating in athletics. The previous studies discussed examined the current status of medical personnel, medical equipment, and documentation. The lack of medical personnel available at many high school athletic programs, specifically athletic trainers, shows the need for new recommendations and increased medical coverage at high school events. Having certified athletic trainers available at high school athletic events and practices can make the difference in an athlete's participation, quality of life or death.

CHAPTER 3

METHODS

Participants

Participants for this study were volunteer athletic directors from Delaware high schools. These athletic directors were from the 51 high schools of the Delaware Interscholastic Athletic Association (DIAA) which included charter, private, public, and vocational-technical and institutions. The DIAA schools were not divided into divisions except for the end-of-season tournament in football. The enrollment the DIAA uses to divide the schools into divisions for football was used to divide the participants into two groups for analysis. The large group was specified as schools having an enrollment above 1100 and the small group had an enrollment below 1099 students.

Procedures

The Georgia Southern University Institutional Review Board approved the survey and procedures prior the survey being sent. The athletic director for each member high school of the DIAA was sent an email. Contained in the email was an informed consent letter that explained the purpose of the survey, that completion provided consent, and all responses were confidential. The email also had the link to the Survey Monkey website where the survey was located. The participants clicked the hyperlink, and then completed the survey by reading the questions and clicking on the appropriate answers to each question. Once they had answered each question, the participants clicked the submit button at the end of the survey.

The survey was made available on the Survey Monkey website and at the end of the two weeks, a reminder email was sent to the athletic directors with the link to the

website. One week after the reminder emails, the athletic directors who had not completed the survey were each called by the investigator. The call explained the purpose for the survey and again asked for their participation. Following the phone call, a final email was sent to the participants with the link to the survey. Survey Monkey compiled the surveys and the results were collected from the website. All data were then used for analysis by grouping the respondents, examining the medical coverage, and tabulating the medical equipment available.

Survey

The survey consisted of 37 questions about the medical coverage, equipment available, and documentation of medical records at high school athletic practices and games. The survey was adapted from the survey used in Georgia by Ussery (2007). Ussery's study was adapted from other previous studies (Linamen,, 1992; Mills, 1996; Rowe & Robertson, 1986; Sexton, Schmoldt, & Miles, 1994). Ussery examined the survey for format and content by completing two pilot studies. Alterations were made so the questions for the present study were specific to Delaware high schools, types of schools and sizes.

The survey took approximately ten to fifteen minutes to complete. The beginning five questions referred to the size, type, and enrollment of the school as well as the number of male and female athletes that participate in athletics. The following 21 questions referred to the medical personnel available during practices and games. These personnel included; a team physician, a Certified Athletic Trainer and coaches CPR and first aid certifications. The final 11 questions asked about documentation and the accessibility of medical equipment. The documentation questions asked if the schools

required pre-participation examinations, kept injury reports and if the school required a note following a visit to a physician's office. The questions about equipment asked the participants to identify which pieces of equipment were available at practices and games.

The questions provided a list of choices from which the participant selected the most accurate response for their location. The participants may have had multiple answers for the questions about personnel and equipment available and they were able to select all that applied. If certain questions were answered with a "no", specifically the presences of a physician or athletic trainer, the participants were directed to their next relevant question. This eliminated the need for the athletic directors to answer more specific questions that were not applicable to their school.

Data Analysis

Once the data had been collected and downloaded from the website, the results were analyzed using descriptive statistics, primarily percentages of the total number of respondents and the relationships between size groups. Participating schools were grouped by their size, which was based on student enrollment. The large group had student enrollment above 1,200 and the small group was below 1,199. These groups were used to determine relationships with having an athletic trainer, physician, satisfaction of coverage, coaches' CPR/First Aid (FA) certification, and access to an Automated External Defibrillator (AED). If any of the questions did not have a response, the total number of respondents for that question was changed. Results for that question were determined using the new total of responses.

For the availability of medical coverage, descriptive statistics were calculated regarding the personnel available for Delaware's high school athletes. Percentages for

each type of profession that is primarily responsible for care at practices and games were calculated. The most common responses were determined. The percentages of respondents that report having the services of an athletic trainer and a team physician were determined. Those schools having more than one ATC were further analyzed for a relationship with school size and type. The events covered by the physician and the athletic trainer were analyzed using percentages for each sport, practice and games. The most common answers were recorded. The team physician's specialty was determined using percentages for each type represented. In addition, the percentage of athletic trainers employed that have been certified by the Board of Certification was calculated. When an athlete is injured, percentages were calculated for each answer regarding who determines when the athlete may return to activity. Also, the number of schools that have coaches with current CPR/AED and first aid certifications was determined. Lastly, the percentage of athletic directors that feel their medical coverage was currently adequate was determined.

Equipment available for use was evaluated by comparing the number of respondents that have each piece listed to the total number responding. The percentage of schools with access to each piece of equipment was determined as well as the most common responses. Specifically, the availability of an AED at each school was calculated and compared using a percentage of respondents. Relationships were determined using the type of school and size with their access to an AED. The percentage of schools was determined that require the following documentation; a pre-participation physical examination, documentation of injuries, and a release following a visit to a physician. Each of these questions was evaluated for relationships with school size and type.

Relationships for this study were determined using the chi-square analysis. Responses were determined to be significant if the value for chi-square is less than or equal to .05 as a probability level.

CHAPTER 4

RESULTS

Of the 51 schools surveyed, 29 (56.8%) responded. The schools that responded were examined for their type of school. Two schools (6.9%) were charter, 13 (44.8%) were private, 10 (34.5%) were public, and 4 (13.8%) were vocational-technical schools. When grouping for size, using student enrollment, 5 (17.2%) of schools were in the large group and 24 (82.8%) were in the small group of schools. The average enrollment for the large group was 1425.2 (\pm 107.8) and the small group was 597.1 (\pm 328). Specifically looking at athletic participation by gender, the average number of males participating was 205.9 (\pm 126.1) and females was 165.7 (\pm 100.7).

Regarding the personnel available to provide medical assistance at games, Delaware athletic directors indicated that an ATC was the most common at 96.5% of schools (n=28). Following an ATC were physicians or an ambulance with EMT or paramedic each at 20.7% (n=6), and coaches at 10.3% (n=2). One school of the responding twenty nine reported a nurse was the primary coverage at games. Similar numbers were found for primary medical coverage at practices. Again the ATC was the most common at 93.1% (n=27). Coaches were the next most common at 24% (n=7) and a first responder was reported by two schools (6.9%).

The majority of schools reported having a team physician. Twenty of the twenty nine (69%) responses have a team physician, nine (31%) did not. Even though the majority of schools had a physician, the size of the school was not a significant factor ($p > .005$). Of the twenty schools reporting a team physician, sixteen (80%) had a specialty in orthopedics. The remaining four (20%) were from family practice backgrounds. Team

physicians were found to attend all away football games at six of twenty schools (30%), some games at seven (35%) and never attended an away game for seven schools (35%). When asked for which home games the team physician was present, the results varied. Football was the most common at 100% (n=18). Only two other sports had a physician available for home games. These included one school (5.6%) for men's basketball and two schools (11.1%) for wrestling matches. Physicians were rarely at practices: only one school (5%) reported that a physician was available at practices less than 50% of the time. No other schools reported a physician on-site for high school athletic practices.

With one school omitting the question about having an ATC, the remaining twenty eight schools had an athletic trainer. The majority of schools (86.2%) responding had only one ATC employed while four schools (13.8%) reported having two athletic trainers on staff. The employment status of the ATCs was nearly even at 53.6% (n=15) full-time employed and 46.4% (n=12) part-time employed. Eight (30%) ATCs were employed by a physical therapy clinic, one (3.4%) from a sports medicine clinic, and the most, seventeen (65.4%), were employed by the school. Regardless of employment, the ATC was the most likely to determine when an athlete was able to return to activity at 100%. Physicians were listed at 65.5%, and physical therapists, parents and coaches made the decision 3.4 % each.

The DIAA requires that all high school coaches have current CPR certification. This study found exactly that; 100% of schools surveyed responded that all coaches had current CPR certification. Even though the state athletic association does not require AED training or certification, 75% of schools (n=21) required it of their coaches. This coincided with the percentages of coaches who are currently certified in CPR and AED

certifications. Twenty six schools (92.9%) indicated that 76 – 100% of the coaches held current CPR and AED certification. The responses for first aid certification were much different. Only eight (27.6%) of the schools surveyed required that the coaches have first aid certification. On further examination, fifteen schools (53.6%) reported having less than 25% of coaches first aid certified. Two (7.1%) schools had between 26 – 50%, and three (10.7) schools had between 51 – 75% of coaches with current first aid certification. Finally, eight (28.6%) had between 76 – 100% of coaches with first aid certifications. There were no significant differences between larger and smaller schools for coaches with current first aid certification.

Documentation was evaluated at Delaware high schools. Pre-participation physicals were required at all twenty nine schools prior to the athlete participating in any activities. Regarding records of injuries, twenty eight of the twenty nine (96.6%) schools keep these records. Maintaining these records most commonly fell to the ATC at 92.9% of schools. The nurse was the next most common at 46.4% to maintain records. The least common were the coaches at 10.7% and the athletic directors at 14.3%. These records included physicals, injury documentation, and notes. When asked if documentation was required prior to an athlete returning to activity following a visit to a doctor, only one school (3.4%) responded with a “no”. The remaining 96.6% of schools all indicated a release from a physician was required.

Participants were asked about equipment available at practices and games. Twenty eight of the twenty nine schools indicated that there was at least one Automated External Defibrillator (AED) on campus. In these schools, there were a total of 71 AEDs. Only one school had a single AED, 18.2% of schools had two, 45.5% had three, 13.6%

had four, and 18.2% had five AEDs on campus. Responsibility for the AEDs fell to the ATC at 50% of surveyed schools. Another 35.7% of schools held the nurse responsible, at 10.7%, the coaches monitored the AED and one school listed the physician as the responsible party. All schools that responded had an AED available for games and practices.

When examining other safety equipment available at practices and games, several items were unanimous first aid kits, phones and ice were accessible at practices and games. Splints were on hand at 82.3% of schools for both practices and games. Similarly, face mask removal tools were available for both practices and games at 79.3% of schools. Differences occurred between practices and games for other equipment. An ambulance was available at 37.9% of games, but only 17.2% of practices. Blood pressure cuffs were on hand at 44.8% of practices and 48.3% of games. Stethoscopes were similar to the blood pressure cuffs. They were available at 41.8% of practices and 48.3% of games. Finally, spine boards were found at 48.3% of schools at practice and 58.6% at games.

When asked about the level of care between the two levels of high schools sports, 25 schools (86.2%) indicated that the junior varsity and varsity teams received the same amount of medical coverage. Only four schools (13.8%) responded that the medical coverage was not the same for both levels. The final question on the survey asked if the athletic directors felt their medical coverage in their high school athletic program was adequate. All schools indicated that there was adequate medical coverage provided to their student athletes participating in sports.

Table 4.1 Medical personnel who provide immediate care

Medical personnel who provide immediate care			
Personnel	Practice	Games	Return to play decision
Ambulance (EMT/Paramedic)		6 (20.7%)	
Athletic Trainer	27 (93.1%)	28 (96.5%)	29 (100%)
Coaches	7 (24.1%)	3 (10.3%)	1 (3.4%)
First Responder (other than coach)	2 (6.9%)	2 (6.9%)	
Nurse		1 (3.4%)	
Parent			1 (3.4%)
Physical Therapist			1 (3.4%)
Physician		6 (20.7%)	19 (65.5%)

Note: Values listed are the total number of responses for each professional. Values located in parentheses indicate the percentage of the total responses.

Table 4.2 Coaches first aid, CPR, and AED certifications

Coaches certifications			
	First Aid	CPR & AED	AED
<u>Have</u>			
0 -25%	15 (53.6%)	2 (7.1%)	
26 - 50%	2 (7.1%)		
51 - 75%	3 (10.7%)		
76 - 100%	8 (28.6%)	26 (92.9%)	
<u>Required</u>			
Yes	8 (27.6%)	29 (100%)	21 (75%)
No	21 (72.4%)		7 (25%)

Note: Values listed are the total number of responses for each professional. Values located in parentheses indicate the percentage of the total responses.

Table 4.3 Medical equipment available at practices and games

Medical Equipment Available		
Equipment	Practices	Games
AED	28 (100%)	28 (100%)
Ambulance	5 (17.2%)	11 (37.9%)
Blood pressure cuff	13 (44.8%)	14 (48.3%)
Face mask removal tools	22 (75.9%)	23 (79.3%)
First aid kit	29 (100%)	29 (100%)
Ice	29 (100%)	29 (100%)
Phone	29 (100%)	29 (100%)
Spine Board	14 (48.3%)	17 (58.6%)
Splints	24 (82.8%)	24 (82.8%)
Stethoscope	12 (41.4%)	14 (48.3%)

Note: Values listed are the total number of responses for each professional. Values located in parentheses indicate the percentage of the total responses.

CHAPTER 5

DISCUSSION

Even with the most technologically advanced equipment and using correct technique for the sport, injuries do occur. The risk of injury is one many are willing to accept when they step on the court or field. While the risk of injury can not be eliminated, the management of the injury after it occurs is critical. Proper management could shorten the amount of time off the field or court, limit the permanent damage sustained and accelerate the athlete's return to play. Athletic trainers are educated and trained specifically to evaluate, prevent and manage athletic injuries.

Previous studies have been done to examine the medical personnel available and equipment accessible in South Carolina (Carek, Dunn & Hawkins, 1999), Illinois (Bell, Prendergast, Schlichting, Mackey and Mackey, 2005), North Carolina (Aukerman, Aukerman, and Browning, 2006), Southern California (Vangsness, Hunt, Uram, & Kerlan, 1994), and Georgia (Ussery, 2007). Carek, et. al. (1999) and Vangsness et. al. (1994) only evaluated the presence of an athletic trainer for football games (55%) and practices (68.8%) at high schools. Aukerman et. al. (2006) found only 52% of North Carolina high schools indicated an athletic trainer was available. Bell et. al. (2005) found higher results in Illinois. Athletic directors in Illinois reported 73% of high schools having an athletic trainer. In Georgia, Ussery (2007) found 61.4% of schools responding reported having an athletic trainer. Tonino & Bollier, (2004) looked at the city of Chicago. Their results were the lowest of all other studies compiled. Only 8.5% of schools surveyed had an athletic trainer for home games and one out of 47 had an athletic trainer for practices. No study has been previously done to examine what medical

personnel and equipment are available to high school athletes in Delaware. This study was designed to assess the medical personnel available, the equipment accessible at practices and games, and the documentation kept in Delaware high school athletic programs.

A survey adapted from Ussery (2007) was emailed to 51 Delaware high school athletic directors. The survey consisted of 37 questions to determine the medical availability at Delaware high school athletic practices and games. Twenty nine completed surveys for a 56.8% response which is comparable to the average response rate from previous studies at 55.7% (Aukerman, Aukerman, and Browning, 2006, Bell, Prendergast, Schlichting, Mackey and Mackey, 2005, Carek, Dunn & Hawkins, 1999, Lindaman, 1992, Tonino, Bollier, 2004, Ussery, 2007, Vangsness, Hunt, Uram, & Kerlan, 1994). Following the initial and first reminder email, only 13 schools had responded. After the researcher called all remaining schools and sent a follow-up email, an additional 16 responses were collected. The personal contact with the athletic directors more than doubled the final response rate.

The results about medical personnel were higher than previous studies done in other states (see table 4.1). All high schools (100%) surveyed indicated having a person in the role of an athletic trainer. This was much higher than any other state studied. Athletic trainers were also the most common person listed as the primary care available for both practices (96.5%) and games (93.1%). They are also a key member in the AMA recommended Athletic Medical Unit that should be in place at high schools sponsoring athletic programs (1998). Athletic trainers are key factors in keeping athletes' safe and helping them return to activity safely. Athletic trainers present at practices and games can

keep a minor injury from getting worse or make sure a major injury does not become catastrophic.

Even though all high schools reported having an athletic trainer, only 14 schools answered the question asking if their athletic trainer was certified by the Board of Certification. The remaining 15 schools skipped the question and no school responded that their athletic trainer was not certified by the Board of Certification. The number of schools that skipped this question was similar to the number of schools that only have athletic trainers in a part-time capacity. If the ATC is hired through another facility and is only on campus for games and some practices, it is likely the athletic director is not familiar with their qualifications. In future studies, an explanation of the Board of Certification may help the response rate for that question. All schools skipped the question asking what other certifications or qualifications the athletic trainer had besides certification from the Board of Certification. This could be attributed to confusion on the part of the athletic directors who completed the survey. They may be unfamiliar with the certifying process for athletic trainers. In future studies, another answer option of “not sure” may eliminate respondents skipping questions.

The other main component of the AMU is a team physician. Sixty nine percent of responding schools have a team physician, and were identified as the second most common personnel available for games at 20.7%. Of the schools with a team physician, 80% were identified as an orthopedist and 20% were from a family practice. Orthopedic physicians are best suited to deal with athletic injuries and therefore the optimal choice for the AMU due to the high numbers of sprains, strains and fractures suffered during athletics. The presence of a physician is important to the legal practice of athletic training

because ATCs work under the supervision of and by the referral of a physician. Since nearly 100% of schools indicated having an athletic trainer, there should be a physician supervising the ATC. Having a physician at games keeps the lines of communication open and ensures the best care for the athletes.

The coaches were identified as the second most common personnel to provide care at practices at 24.1% of schools. The DIAA requires that all coaches have CPR certification. Results from the study support the DIAA regulation (see table 4.2). However, first aid certification is not required by the DIAA and the number of coaches with current certification was less than ideal. Since coaches were indicated as the second most likely to give immediate care, they all should have the proper training. Also, all schools had a first aid kit available, but not all the coaches had current first aid certifications. These results suggest that since it is not a requirement of the state, it does not appear to be a priority for the schools. Furthermore, since all schools have indicated an athletic trainer available for practices and games, the coaches are not likely to be the person responsible for the management and care of the injuries sustained. All coaches should have first aid training to properly manage injuries that may occur during activity. There were no significant differences found for coaches with first aid certification in different size schools.

Regarding documentation, all schools required a pre-participation examination before the athlete was allowed to participate. This follows the requirements of the DIAA and is consistent with the recommendations by the AMA (1998) and AAFP (2001). Requiring physicals before the athlete participates helps to prevent further injuries by identifying any conditions prior to the activity. If conditions are found, the timing of the

physical allows for further examination or treatment before the season begins. One school skipped the remaining documentation questions, but the 28 that answered were unanimous in keeping injury records and requiring documentation following a doctor's visit. All documentation should be kept at all schools because these documents are important in case the injury becomes a legal issue. The injury report can be a record of what happened and what was done following the injury. Athletic trainers are required to work under the supervision of a physician and the document from the office after the athlete visits keeps the lines of communication open and ensures that the doctor's orders are followed.

There was some variety of individuals regarding who kept the documentation for each school surveyed. Most schools, 92.9%, identified the athletic trainer as the person responsible for maintaining the records. The nurse was also chosen at 46.4% of responding schools to keep the documentation. The nurse was usually available during the day while the student athletes are in class and has other documentation of the students such as immunization records. The documentation should be kept in a secure location and accessible only to those that are qualified and involved in the student athlete's care.

Automated External Defibrillators can save a person's life when it used in the first few minutes of a cardiac episode. All schools that responded have an AED accessible on campus for practices and games. The athletic trainer, nurse, and coaches were identified as the people responsible for the AED. All schools have an AED available, many have multiple AEDs available, but not all coaches are AED trained and certified. It is important for coaches to be trained in using the equipment they are responsible for. Commonly AED certification is obtained with CPR certification, but it is not an

automatic combination. The DIAA requires CPR certification of coaches and should also require AED certification so that coaches are trained in the equipment that is available. Future studies should also examine the locations for the AEDs on the school's campus and athletic fields to ensure they are readily available.

Other equipment was identified at both practices and games (see table 4.3). The results were low for advanced equipment such as spine boards. Only 14 schools (48.3%) have a spine board available at practices. In order to use a spine board, it involves several people and hours of practice and training. When there are only one or two people available, the athletic trainer and coach, using the spine board would not be feasible until more help arrived. Also, spine boards can be expensive compared to other basic first aid supplies. Schools with small budgets may not be able to provide this equipment.

The amount of equipment available increased when examined for games. For instance, where five schools had an ambulance accessible for practices, eleven schools had an ambulance for games. Interestingly, there were two schools that reported less equipment at games than was available at practices; splints and spine boards at practice but not for games. One of these schools did have an ambulance listed as available for games which would account for the difference in the emergency medical equipment the school provided. Schools size did not play a role in the amount or type of medical equipment available.

These results are very encouraging and show appropriate and trained medical personnel are available to high school athletes participating in Delaware. These results are consistent with the AMA recommendation for having an Athletic Medical Unit present in all high school athletic programs (1998). The AMU should have a physician

and an athletic trainer to provide care to injured athletes during high school events. This study has shown that the athletic programs in Delaware high schools have adequate medical personnel available for injury management. While the personnel are in place to provide care, having the appropriate equipment is crucial. These materials can help to determine the extent of or stabilize an injury. Also, proper documentation was kept in nearly all Delaware high schools. These documents could keep an athlete from suffering a preventable injury or protecting the school in the event of a lawsuit. The pre-participation exam can identify potential dangers to participating and injury reports can show progress during treatment and rehabilitation.

A further direction of study could include specifying individual sports and what personnel and equipment are available for each, during practices and games. Future studies could examine any discrepancies between sports, junior varsity and varsity or even between male and female teams. With more information about these events and determining where the need for competent personnel is, would further support legislation requiring ATC's in all high schools. Having the appropriate personnel with the proper equipment can make the difference in an athlete's career. The proper management of injuries is critical to athletic participation. According to Charlie Adams, executive director of the NCHSAA, "we want to do everything we can do to minimize" the tragic loss of a student athlete. He further said, "I don't think there's any question we need a Certified Athletic Trainer at every school" (Candon and Medlin, 2008).

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APPENDIX A

Research Questions

1. Is there a certified athletic trainer available at practices and games, if so, how many?
2. Is there a physician available at practices and games for the high school athletes?
3. Who most commonly determines when an athlete may return to activity following an injury?
4. Do the coaches have CPR and First Aid certifications?
5. Are there differences in medical personnel available between school sizes?
6. How many schools have an AED accessible to athletic activities?
7. Is emergency medical equipment available for use when needed?
8. Are there differences between school sizes for the emergency medical equipment available?
9. Are records kept of pre-participation exams and athlete's injuries?

Limitations

1. The Spam filters on the schools' email network may block the emailed survey.
2. The participants will answer the survey honestly.
3. A low response rate may be due to Athletic Directors limited availability.

Delimitations

1. The participants will be selected from a list by the Delaware Interscholastic Athletic Association.
2. This study will be limited to the high schools in the state of Delaware.

Assumptions

1. The survey is valid and reliable.
2. The participants' responses are honest.
3. The participants are responding with full effort.

Definitions

1. Certified Athletic Trainer (ATCs) – health care professionals who specialize in preventing, recognizing, managing and rehabilitating injuries that result from physical activity. (www.nata.org, 2008)
2. Delaware Interscholastic Athletic Association – The Delaware Interscholastic Athletic Association (DIAA) is an association of 90 schools (41 high schools, 34 middle schools and 15 K-12 schools) encompassing 105 athletic programs which has been designated by the Secretary of Education to regulate and oversee the conduct of interscholastic athletics in the state of Delaware. The membership consists of 67 public schools, including six vocational-technical schools and nine charter schools, and 23 private schools, including 16 faith-based schools. (www.doe.k12.de.us/programs/diaa)
3. Large group – student enrollment above 1100
4. Small group – student enrollment below 1100

APPENDIX B

Medical Coverage in Delaware High Schools

1. Classification of your High School is:
 - a. Public
 - b. Private
 - c. Charter
 - d. Vocational-technical
2. Is your school
 - a. 10-12
 - b. 9-12
 - c. other
3. What is the total enrollment at your high school _____?
4. Please estimate the number of male students that participate in athletics throughout the year. _____
5. Please estimate the number of female students that participate in athletics throughout the year. _____
6. At sanctioned interscholastic games, who primarily provides medical coverage to the athletes? (select all that apply)
 - a. Ambulance (EMT/Paramedic)
 - b. Athletic trainer
 - c. Chiropractor
 - d. Coaches
 - e. First Responder (other than coach with First aid &/or CPR certification)
 - f. Nurse
 - g. Parent
 - h. Physical Therapist
 - i. Physician
 - j. Other _____
7. At sanctioned practices, who primarily provides medical coverage to the athletes? (select all that apply)
 - a. Ambulance (EMT/Paramedic)
 - b. Athletic trainer
 - c. Chiropractor
 - d. Coaches
 - e. First Responder (other than coach with First aid &/or CPR certification)
 - f. Nurse
 - g. Parent
 - h. Physical Therapist
 - i. Physician
 - j. Other _____
8. Does your school have a team physician?
 - a. Yes
 - b. No (If no, go to # 14)

9. If yes, what is your team physician's specialty?
 - a. Family practice
 - b. Pediatrics
 - c. Orthopedics
 - d. Other _____
10. Is your team physician present for away football games?
 - a. Always
 - b. Sometimes (more than 50%)
 - c. Occasionally (less than 50%)
 - d. Never
11. Is your team physician present at the following home games? (select all that apply)
 - a. Baseball
 - b. Basketball Men's
 - c. Basketball Women's
 - d. Cross Country
 - e. Football
 - f. Soccer Women's
 - g. Soccer Men's
 - h. Softball
 - i. Tennis
 - j. Track
 - k. Volleyball
 - l. Wrestling
 - m. Other _____
12. Is your team physician present for organized practices?
 - a. Always
 - b. Sometimes (more than 50%)
 - c. Occasionally (less than 50%)
 - d. Never
13. Does your school have a person in the role of an athletic trainer?
 - a. Yes
 - b. No (If no, go to # 21)
14. If you have an athletic trainer, is he/she certified by the Board of Certification (BOC)?
 - a. Yes (If yes, go to #16)
 - b. No

15. If they are not certified, what qualifications do they possess? (select all that apply)
- a. Ambulance (EMT/Paramedic)
 - b. Athletic trainer
 - c. Chiropractor
 - d. Coaches
 - e. First Responder (other than coach with First aid &/or CPR certification)
 - f. Nurse
 - g. Parent
 - h. Physical Therapist
 - i. Physician
 - j. Other _____
16. How many Certified Athletic Trainers are employed at your high school?
- a. 1
 - b. 2
 - c. 3
 - d. 4
 - e. 5 or more
17. What is the employment status of the Certified Athletic Trainer?
- a. Full-time
 - b. Part-time
18. How long has your school had a Certified Athletic Trainer?
- a. 0-5 years
 - b. 6-10 years
 - c. 11-15 years
 - d. 16 or more years
19. If your school does have an athletic trainer, who employs this position?
- a. School
 - b. Sport medicine clinic
 - c. Doctor's office
 - d. Physical therapy clinic
 - e. Hospital
 - f. University/College

20. If your school does have an athletic trainer, please indicate what events they attend on a regular basis?

a. Baseball	Home game	Away game	Practice
b. Basketball Men's	Home game	Away game	Practice
c. Basketball Women's	Home game	Away game	Practice
d. Cross Country	Home game	Away game	Practice
e. Football	Home game	Away game	Practice
f. Soccer Women's	Home game	Away game	Practice
g. Soccer Men's	Home game	Away game	Practice
h. Softball	Home game	Away game	Practice
i. Tennis	Home game	Away game	Practice
j. Track	Home game	Away game	Practice
k. Volleyball	Home game	Away game	Practice
l. Wrestling	Home game	Away game	Practice
m. Other _____	Home game	Away game	Practice

21. Do varsity and junior varsity teams have the same level/amount of coverage?

- a. Yes
- b. No

22. Who determines if an athlete can return to practice/game after an injury? (select all that apply)

- a. Ambulance (EMT/Paramedic)
- b. Athletic trainer
- c. Chiropractor
- d. Coaches
- e. First Responder (other than coach with First aid &/or CPR certification)
- f. Nurse
- g. Parent
- h. Physical Therapist
- i. Physician
- j. Other _____

23. Are the coaches required to have current first aid certification?

- a. Yes
- b. No

24. What percentage of coaches have current certifications in first aid?

- a. < 25%
- b. 26 - 50%
- c. 51 - 75%
- d. 76 - 100%

25. Are the coaches required to have current CPR certifications?

- a. Yes
- b. No

26. Are the coaches required to have current AED certifications?

- a. Yes
- b. No

27. What percentage of coaches have current certification in CPR/AED?
- < 25%
 - 26 - 50%
 - 51 - 75%
 - 76 - 100%
28. Are pre-participation physical examinations required of all athletes before they may begin activity?
- Yes
 - No
29. Are records kept of athletic injuries?
- Yes
 - No
30. Who keeps track of all documentation (notes, physicals, etc.)?
- Ambulance (EMT/Paramedic)
 - Athletic trainer
 - Chiropractor
 - Coaches
 - First Responder (other than coach with First aid &/or CPR certification)
 - Nurse
 - Parent
 - Physical Therapist
 - Physician
 - Other _____
31. Does your school require documentation before an athlete can return to activity when they have visited a doctor?
- Yes
 - No
32. Is there an AED on school campus?
- Yes If yes, how many 1 2 3 4
 - No (skip to #35)
33. Who is responsible for the AED?
- Ambulance (EMT/Paramedic)
 - Athletic trainer
 - Chiropractor
 - Coaches
 - First Responder (other than coach with First aid &/or CPR certification)
 - Nurse
 - Parent
 - Physical Therapist
 - Physician
 - Other _____
34. Is an AED accessible for practices?
- Yes
 - No

35. Is an AED accessible for games?
- Yes
 - No
36. Please select the safety equipment that is readily available for practices? (Select all that apply)
- Ambulance
 - Blood pressure cuff
 - Face mask removal tools
 - First aid kit
 - Ice
 - Phone
 - Spine Board
 - Splints
 - Stethoscope
37. Please select the safety equipment that is readily available for games? (select all that apply)
- Spine Board
 - Face mask removal tools
 - Splints
 - Phone
 - First aid kit
 - Ice
 - Blood pressure cuff
 - Stethoscope
 - Ambulance
38. Do you feel that your school has adequate medical coverage for athletic activities?
- Yes
 - No

APPENDIX C

Dear Athletic Director,

My name is Heather Elder and I am a graduate student at Georgia Southern University. I am working on my master's thesis by surveying Athletic Directors about the medical coverage at Delaware all high school athletic programs. This study and all its procedures have been approved by the Georgia Southern University Institutional Review Board.

Completing the survey will take less than 10 minutes. There is no obligation to take the survey, however your responses are important the completion of the research. Your responses will be kept confidential and anonymous. Once you submit the survey, no names will be associated with the answers given. Please follow the directions and answer the questions honestly and appropriately for your school. The link to the survey will be open for two weeks. The survey can be accessed by clicking the following link: <http://www.surveymonkey.com/> By clicking the hyperlink below and completing the survey you are giving consent that your responses to be used in this study.

Please feel free to contact me at hclougherty@hotmail.com if you would like a copy of the results.

Thank you for your time.

Sincerely,

Heather Elder, ATC, LAT
Graduate Student
Georgia Southern University