THE ASSESSMENT OF FIRST AID AND INJURY PREVENTION KNOWLEDGE AND THE DECISION MAKING OF YOUTH BASKETBALL, SOCCER, AND FOOTBALL COACHES

By

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ABSTRACT

THE ASSESSMENT OF FIRST AID AND INJURY PREVENTION KNOWLEDGE AND THE DECISION MAKING OF YOUTH BASKETBALL, SOCCER, AND FOOTBALL COACHES

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The purpose of this study was to measure the first aid and injury prevention knowledge of youth basketball, soccer, and football coaches and to assess the decision making ability of these youth coaches in determining the playing status of an injured athlete.

Fifteen coaches (5.17%) out of 290 coaches earned a passing score on the First Aid Assessment (FAA). Such a percentage is appalling. Of the 170 coaches that completed the demographic sheet 21 (12.4%) coaches reported being current first aid certified. Of those 21 coaches only five passed the FAA. This indicates that being currently first aid certified does not significantly increase their first aid knowledge. Apparently the information that is gained during first aid training is not being retained. Coach's decisions to return an injured athlete to competition are dependent upon the game situation and the player involved (starter, backup, or bench player). Youth coaches are making medical decisions without the medical knowledge needed to make such decisions.

The information gained from this study needs to be transferred over into an injury prevention and care program for youth coaches. Once a program is developed, that program needs to be administered and evaluated for its effectiveness in the prevention and care of injuries.

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to a number of individuals who helped me to complete my Masters education.

First I would like to thank my committee who has encouraged and supported me through my Masters degree. To John Powell who has provided me much insight into the research process and the field of athletic training. I would also like to especially thank Marty Ewing, who has probably read this thesis just as many times as I have. Marty stepped in and aided me when I was stuck and unable to move.

To my friends (especially Heidi, Peggy, and Jen), who have been there through it all. They have pushed me when I needed to be pushed, were an ear when I needed to vent, and kept on me to complete my degree.

Lastly I would like to thank my family. Even though we do not always see eye to eye, they are always there to support me. Their enduring support and never ending love has helped me accomplish this and my many other goals in life.

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Introduction

Overview of the Problem

Participation in organized sports is important in the lives of many children and adolescents. The level of participation in youth sports is astonishing. According to Malina, Bouchard, and Bar-Or (2004) in the mid 1990s and early 2000s there were approximately 46 million youth involved in some form of sports.

With such a large participation level, it is no wonder that there is a high frequency of sports related injuries among children. According to O'Conner (1998), 40% of the injuries that children experienced in 1988 were sports related. The National Youth Sports Foundation stated the young girls who participate in sports have an estimated injury rate of 20 to 22 per 100 participants per season (as stated in Ostrum, 1993) Boys, on the other hand have a higher rate of injury while participating in youth sports at 39 per 100 participants per season (as stated in Ostrum, 1993).

A study by Chambers (1979) examined the "Orthopedic injuries in athletes (ages 6 to 17)." Eight hundred children participated in the study that was conducted at a US military post. The total number of hours that the young athlete was under the supervision of a coach varied between sports. Football practiced an average of 14.5 hours/week for 12 weeks, making the total number of hours that the athletes were under a coach's supervision 174 hours. Using the same format the total amount of time that an athlete was under the supervision of a coach for other sports are as follows: soccer 120, basketball 72, baseball 201, swimming 416, and gymnastics 16 hours. Using the same idea, exposure per week multiplied by the number of weeks, Brown and Butterfield

(1992) estimated that a high school football player spends an average of 326 hours of practice time under the supervision of a coach during one athletic season.

Because our children are under the supervision of these coaches for such an extended amount of time, these coaches should be trained in basic injury prevention and care. It has been identified that 85 per cent of coaches are parents or others who have no formal training in how to coach (Engh, 1981). The National Youth Sports Safety Foundation (NYSSF), (Coaching Education, 2000) states that there are no federal laws requiring coaching education at any level of competition. Prevention programs, coaching education, and setting standards of practice are vital in the prevention of youth sports injuries. According to the NYSSF, the "United States is the only country in the major sporting world that does not have a national coaching education program" (Coaching Education, 2000). There are no laws that require youth coaches to undergo any formal training on how to coach, teach, develop training sessions, prevent, recognize, and treat injuries. Even though there are no national requirements or regulations, some national and local governing bodies, such as USA Swimming, do require coaching education, which includes safety education. Some states, such as Arkansas and Iowa, require some or all high school sport coaches to have a coaching certification.

Due to the fact there is not a nationally accepted youth first aid injury prevention and care program for coaches to attend, one needs to be developed. Prior to the development of an injury prevention and first aid program, an assessment of the current first aid and injury prevention knowledge that is possessed by the typical youth sports coach must be measured. First aid and injury prevention are the sole aspects that should be included in a first aid and injury prevention program for youth sport coaches.

Need for the Study

To date, no study has been conducted to evaluate the first aid knowledge of youth sports coaches. First aid and injury prevention knowledge of youth coaches need to be evaluated. Additionally, how youth coaches use their first aid knowledge to determine the playing status of an injured athlete needs to be assessed. In order to develop standards for coaches to follow regarding the return of an athlete to activity, an assessment of how coaches use their first aid and injury prevention knowledge to determine the playing status of an injured athlete needs to be evaluated. A youth injury prevention program may be developed from the information that will be gained from such an assessment.

Once a youth injury prevention program is developed, youth coaches should be required to take such a program. Most if not all youth coaches would like to be prepared in case of an injury or emergency. The knowledge that will be gained by coaches taking an injury prevention and care program will hopefully result in a reduction of injuries suffered by the youth athlete during sports participation and increase the level of care provided to those athletes.

Statement of the Problem

The purpose of this study is to measure the first aid and injury prevention knowledge of youth basketball, football, and soccer coaches and to assess the decision making ability of these youth coaches in determining the playing status of an injured athlete.

Research Questions

The following research questions directed this study:

1. What first aid and injury prevention knowledge do youth basketball, soccer, and football coaches possess?
2. Is there a difference in the first aid knowledge based upon the sport that is coached?
3. Is there a difference in the first aid knowledge based upon the coaches' gender?
4. Is there a difference in the first aid knowledge based upon the coaches' age?
5. Is there a difference in the first aid knowledge based upon the number of years of coaching?
6. Is there a difference in the first aid knowledge based upon the number of sports coached?
7. Is there a difference in the first aid knowledge based upon the educational background of the coach?
8. Is there a difference in the first aid knowledge based upon the gender of the athletes coached?
9. Is there a difference in the first aid knowledge based upon prior formal first aid instruction?
10. Is there a difference in the first aid training based upon American Red Cross first aid training?
11. Is there a difference in the first aid knowledge based upon CPR training?
12. Is there a difference in the first aid knowledge based upon current first aid certification?
13. Is there a difference in the first aid knowledge based upon current CPR certification?

14. Is there a difference of when a coach would return an injured athlete to competition based upon: passing/failing the First Aid Assessment (FAA), sport coached, coaches' gender, coaches' age, years of coaching experience, number of sports coached, educational background, gender of athletes coached, formal first aid training, American Red Cross First Aid, CPR training, current first aid certification, and current CPR certification.

Overview of the Research Methods

A testing session will be used to assess the first aid and injury prevention knowledge and the decision-making abilities related to injuries and playing status. Two hundred and ninety youth basketball, soccer, and football coaches, who coach in a basketball league, various soccer leagues, and a pony football league. participated in this study. Each coach signed consent to be tested and evaluated. The coaches filled out a demographic information sheet and the revised American Red Cross First Aid Assessment (Ransone & Dunn-Bennett, 1999) (Appendix A) to determine his/her first aid and injury prevention knowledge. Each coach then completed the Game Situation Data Sheet (Appendix B) to assess his/her decisions in nine different athletic situations that involved sports related injuries and the players return to participation.

Limitations

1. Results of this study are limited to youth basketball, football, and soccer coaches in the mid-Michigan area.
2. The results of the study are only applicable to the first aid knowledge areas in which the coaches were tested.

Assumptions

1. All participants will be truthful with regards to the information that they provide on the demographic information sheet.
2. All participants will try their best on the FAA.
3. All participants will truly reply to the Game Situation Data Sheet.

CHAPTER II

Review of Literature

Participation in Youth Sports

Statistics of Youth Sport Involvement

In today's society, young male and female athletes can choose from a variety of sport activities. High schools offer as many as 32 male and 27 female competitive scholastic sports. High school is not the only level of competitive sports for young males and females. Approximately three-fourths of American junior and middle schools have significant competitive sports programs (American Academy of Pediatrics, 1981). The level of participation in youth sports had increased dramatically over the years. According the American Academy of Pediatrics (1983), approximately one half of males and one-fourth of females between the ages of 8 and 16 (7 million students) are engaged in some type of competitive scholastic, or organized sport during the school year. Godshall (1975) stated that an additional 20% of children in this age range are involved in community sports programs. DuRant, Pendergrast, Conner, Seymore, and Gillard (1991) reported that 20 million youth between the ages of 6 and 16 participated in organized sports, and that 6 to 7 million high school students participated in school sponsored athletic activity. More recently, in the mid 1990s and early 2000s there were approximately 46 million youth involved in some form of sports (Malina, Bouchard, & Bar-Or, 2004)

The level of female participation in sports has grown quite rapidly since the Title IX Education Assistance Act of 1972, that required equal athletic opportunities for both males and females. The enactment of this legislation boosted the involvement of women in sports. According to Stanitski (1988), there was a 700% increase in the sport participation of women from 1978 to 1988. In 1981, C. Carson Condrad, Executive Director of the President's Council on Physical Fitness and Sports, stated that participation in exercise and sports had more than doubled in the past 20 years and that more than one third of the participates were female (as cited in Mueller & Blyth, 1982)

Benefits and Risks of Participation in Youth Sports

Participation in organized sports is an important activity in the lives of many children and adolescents. Participation in youth sports comes with its own benefits and risks. Coaches and parents must be made aware of the potential benefits and risks of youth sport participation so they can maximize the positives and help reduce the negative aspects of sports. Brown, Clark, Ewing, and Malina (1998) have identified the benefits and risks of sports participation. The benefits of sport participation reported are regular physical activity, physical/physiological benefits, and the social and psychological benefits. The risks associated with sport participation that were reported are the effects on growth and maturation, psychological, potential for child abuse, injury, and the female athlete triad.

Malina (2001) goes into detail about the benefits and risks involved in youth sports participation. He states that benefits of youth sports participation include growth and maturation, regular physical activity, motor skill and physical fitness, self-concept, social competence, moral development, and ethical competence. Sports participation can positively influence body mass and body composition. Athletics also provides an opportunity for a child to socialize with peers, learn what is wrong and right, and learn how to play within the rules of the game. The possible risks of youth sports participation deal with psychological stress and risk of injury. The psychological stresses that Malina (2001) describe are "low self-esteem, elevated anxiety, aggressive behavior, possible increased risk for injury and burn out" (p. 206).

Youth Sports Injuries

Types of Injuries in Youth Sports

There are three general categories of injury that could result from youth sport participation: acute, overuse, and chronic. By definition an acute injury is one that has "rapid onset, severe symptoms and a short course, not chronic" (Thomas, 1997, p. 34). Examples of acute injuries include ankle sprains, fractures, and dislocations. Overuse injuries are "caused by accumulated micro traumatic stress placed on a structure of body area" (Starkey & Ryan, 1996, p.542). Tendonitis and stress fractures are two examples of overuse injuries. Chronic injuries have a long onset and duration. Chronic injuries are developed over time.

Youth athletes are unique individuals. In addition to acute, overuse, and chronic injuries, youth athletes also experience age-related injuries. Age-related injuries are those injuries that are experienced by an individual at certain age or biological maturation. Youth athletes have age-related injuries that are the result of how their growing, developing, and maturing body interacts with sport participation. Growth, maturation, and development are three different aspects of a child and each aspect needs to be understood and evaluated. Growth is the increase in size of the body, maturation is the "progress towards the biologically mature state," and development is "the acquisition of behavioral competence" (Malina, 2001). The presentation of an age-related injury may either have rapid onset (acute), due to repetitive stresses placed upon the body (overuse), or gradually developed over time (chronic injury). Age-related injuries are unique in that they are due to the interaction of the athlete and their growing, developing, and maturing body and the activities of sport. Osgood-Schlatter disease and Sever's disease are examples of age-related injuries that are commonly found in youth sports participants.

In 1903, "Osgood and Schlatter described the traumatic disturbances in the development of the tibial tuberosity" (Kujala, 1985, 236). Osgood-Schlatter disease (OSD) can be related to the skeletal immaturity of the young athlete. Some young athletes try to perform as their adult counterparts. Their bodies are not ready to perform at that level, and in the process they injure their bodies. Girls develop OSD between the ages of 8 to13, and boys develop OSD between the ages of 10 to 15. The development of OSD is related to the adolescent growth spurt. OSD is most commonly found in athletes whose sports require repetitive running, jumping, and squatting.

Severe's Disease (SD), also an age-related injury, is similar to OSD. Severe's Disease is an inflammatory condition of the apophysis of the calcaneus and occurs in children that are actively engaged in sports (Stanitski, 1993). Presentation of this condition is between the ages of 7 and 14, most commonly in the 10- to 11-year age group. SD has a resolution time of 12 to 18 months.

Stress fractures are "a hairline fracture that appears without evidence of soft tissue injury" (Thomas, 1997). Stress fractures are due to repetitive low load microtraumas caused by such activities as running and jumping. There are many factors that are part of the development of a stress fracture. Such factors are improperly fitting shoes, hard surfaces, insufficient rest time between activity sessions, insufficient warm up and stretching, and improper conditioning.

Youth coaches need to know the different types of injuries, and be able to recognize these injuries in the youth athlete. The knowledge of the different types of injuries that youth athletes may experience may help coaches to recognize these injuries. In addition, the knowledge of the injuries may help to reduce the prevalence and severity of injury.

Incidence of Injury in Youth Sports

According to one study, the incidence of injury is extremely low in preadolescent organized tackle football (Roser & Clauson, 1970). Two thousand seventy-nine boys aged 9 to 15 participated in a tackle football program in 1968. Of those participants 48 (2.3%) sustained an injury that kept them out of a game or practice. Fractures, sprains, and strains accounted for 70% of the injuries that occurred; contusions accounted for 17% of the injuries. Roser and Clauson's (1970) study was done thirty years ago and prior to the enactment of Title IX. Since that time there has been a large increase in youth sports participation and injuries that are related to sports participation. Due to the increased participation in youth sports, there has also been a rise in the incidence of sport injuries (Cheng, 2000; Rome, 1995). According to Bijur, Trumble, Harel, Overpeck, Jones, and Scheidt (1995), 32.3 per cent of all serious injuries to children ages 5 to 17 years are due to sports and recreational activities. A serious injury was defined as injuries resulting in hospitalization, surgical treatment, missed school, or half a day or more in bed.

Gallagher, Finson, Guyer, and Goodenough (1984) conducted a yearlong study of 23 hospitals in Massachusetts. They found that one out of every 14 teenagers presented to the hospital suffered an acute injury that was sustained from a sports accident. Football (19.9%) and basketball (17.4%) had the highest injury rates of those that required hospitalization.

In the United States the National Ambulatory Medical Care Survey (NAMCS) and the National Hospital Medical Care Survey (NHAMCS) collected data on the amount of ambulatory medical care that is provided by physician offices, hospital outpatient and emergency departments (Hootman, 2000). In 1997, the information that was gathered by the NAMCS and the NHAMCS revealed that the 8-18 year old population accounted for 12.5 million ambulatory medical care visits. Of the 12.5 million visits, approximately 5 million (39%) visits were due to injuries that were acquired during participation in sport and recreational activities. Physician office visits accounted for 53% of the sports related visits, while hospital accounted for 41% of the sports related visits.

Approximately three to 11% of children are injured while participating in youth sports (Goldberg, 1989). Additionally, sports injuries account for seven to 13% of the acute injuries to children who are treated in hospitals (Gallagher, 1982; Micheli, 1983; Muller, 1982). Youth sports injuries are a major issue that needs to be considered and explored.

Injury Rate and Age

Numerous studies have determined that there is a positive relationship between injury rate and age, i.e., increases in injury rate are noted with increases in age (American Academy of Pediatrics, 1983; DeHaven & Lintner, 1986; Halpern, Thompson,

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& Curl, 1987; Keller, Noyes, & Buncher, 1987; Martin, Yesalis, & Foster, 1987; Mueller & Blyth, 1982; Pettrone & Ricciardelli, 1987; Silverstein, 1979; Stricevic, Patel, Olazaki, & Swain, 1983; Sullivan, Gross, Grana, & Grarcias-Moral, 1980; and Zaricznyj, Shattuck, Mast, Roberton, & D'Elia, 1980). The increase in injury rate that is associated with increased age is actually associated with the increased body size and speed of the participants. In addition the increased injury rate is associated with the adolescent growth spurt. According to Bijur et al. (1995) the injury rate for girls is stable from five to eight years of age but is four times higher during the ages of eight and twelve. The injury rate for boys is stable from five to eleven years of age, but increases threefold during the ages of eleven to fifteen. Adding to the increased injury rate, is the increased intensity and magnitude of competition, improper or non existent training techniques, poor coaching, poor equipment, and unsafe sites of play (Halpern et al., 1987; Hoff & Martin, 1986; and Jackson, Jarrett, Bailey, Kausek, & Swanson, 1978).

One aspect of the positive relationship between injury rate and age is the natural skeleton growth and maturation. As the body grows and develops, there are demands and stresses that are placed upon it that could result in injury. Participation in youth sport activities may increase the incidence of such natural growth syndromes and injuries. A study by Orava and Saarel (1978) found that the pain associated with overuse sports injuries in children is typical of a syndrome proportional to age in one-third of the injuries (Sever's disease and Osgood-Schlatter's disease).

Severity of Injuries at the Youth Sports Level

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activity. The study consisted of over 3,000 participants in 19 high school sports. The incidence of injury in this population was 39.3 per 100 athletes, of which 40% were referred to a physician. When seen by a physician, 71% required diagnostic injury x-rays. Of the 1197 injuries identified, only 25 athletes were hospitalized, and 21 of the 25 were hospitalized for operative procedures. Also, 29% of those injured missed only 1 day of participation, 70% missed 5 or less, and fewer than one third of all injured athletes missed more than 5 days.

Powell and Barber-Foss (1999) conducted a study examining the injury rates in high school sports. During the three year study there were 75,298 player seasons and 23,566 reportable injuries. A reportable injury was one in which the athlete was removed from participating in that practice or game, where the athlete was not able to fully participate in the following day's activities, all fractures and dental injuries, and any mild brain injury that required observation. Football had the highest case rate per 1000 athlete exposures, 8.1, followed by boys and girls soccer, 5.6 and 5.3 respectifully. Boys basketball had a case rate per 1000 athlete exposures of 4.8, while girls basketball had a case rate of 4.4.

The NAMCS and NHAMCS found that ankle sprain/strain, pelvis sprain/strain, and closed phalangel fracture were the top three physicians' diagnoses (Hootman, 2000). Injury prevention counseling/education was ordered or provided for only 16.4% of the visits to either the physician's office or hospital visits. From the information that was gathered by NAMCS and the NHAMCS, Hootman (2000) recommends, "public health injury prevention programs should be targeted towards the teenage population engaged in sports and recreation activities" (p. s-16).

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Factors that are Related and Cause Injury to Youth Athletes

Factors that contribute to injury can be classified as two different types: intrinsic or extrinsic. Intrinsic injury factors are related to the athlete and come from the athlete. Extrinsic injury factors are outside factors that are related to sports participation and may cause or lead to injury to the athlete. Malina (2001) reported the following as intrinsic injury factors: "physique, problems with structural alignment, lack of flexibility, lack of muscular strength or strength imbalance, marginal or poor skill development, behavioral factors, injury history, adolescent growth spurt, and maturity"(p. 224-225).

Micheli (1983) cites a multitude of factors that contribute to injury in youth sport participants. The factors that are described are: the individual's equipment, playing environment, training, coaching miscues, rules and officials, and parental stresses. Malina (2001) reports similar extrinsic factors as Micheli (1983) but also reports inadequate rehabilitation from prior injury, training errors, playing conditions, equipment, age groups, coach behaviors, parent behaviors, and sports organizations as extrinsic injury factors. Inadequate rehabilitation from previous injury can result in a loss of conditioning, strength, and flexibility of not only the injured body part but also the body as a whole. This decrease in conditioning strength, and flexibility is a predisposing factor for re-injury of the same body part or injury to another body part. Age groups are a major extrinsic injury factor. Teams are usually based upon grade and or chronological age. Basing teams on these principles does not take into consideration biological age.

There is difference in biological or skeletal age and chronological age. Skeletal age reflects the maturity of the body as it relates to the biological development that the body has attained. Chronological age is the number of years since one's birth. Tanner

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(1962) discussed the concept of using skeletal age over chorological age. Tanner (1962) states that the Tanner classification of physical maturity must be considered during pre-participation evaluation and team formation. Teams should be created based on physical maturity, rather than chronological age to prevent potential injury. Kreipe and Gewanter (1985) stated that physical maturity and skeletal age are more important than chronological age when determining if a child should be able to play a sport and at what level this child should play the sport.

Kreipe and Gewanter (1985) conducted a "study to develop a screening criteria that would enable nonphysicians to determine physically immature boys prior to their participation in sports". Three hundred and seventy-four boys ages 12 to 18 participated in the study. For this study a self-assessed Tanner stage of development was given, grip strength was measured, and a physician-assessed Tanner stage was determined. Each participant compared himself with standard photographs to determine the self-assessed Tanner stage. Grip strength was determined by a spring dynamometer. One physician was used to determine the physician-assessed Tanner stage of development. The correlation between self-assessed and physician-assessed Tanner stage was .788. The correlation between grip strength and physician-assessed Tanner stage was .803. "When self-assessed Tanner stage and grip strength were discordant, grip correctly predicted the level of maturity more often than did self-assessed Tanner stage" (Kreipe & Genwanter, 1985).

According to Stanitski (1989), the greatest source of sports injuries in the preadolescent and adolescent age groups is training errors. Children and adolescents are becoming more involved in sport at earlier ages and with higher levels of intensity (Roser

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& Clauson, 1970). Children are not just smaller forms of adults. A youth athlete cannot train nor play as an adult athlete. Most often the problem is that young athletes try to do too much and in the process injure themselves.

Safety Equipment in Youth Sports

Safety equipment is vitally important in the prevention of athletic injuries. For youth sports all of the participants should have equipment that is of the highest quality. At times, the players that are not starters end up with equipment that is of a lower quality. There is a team hierarchy, the best players get the best equipment, the good players get the good equipment, and the okay players get the leftovers or whatever is available. In addition some leagues do not provide the safety equipment for the participants, thus the parents must purchase the safety equipment. The average cost to outfit a youth football player in new equipment is $200-$250. Children are always growing and developing, and the equipment that was worn the previous year may not fit, causing the parents to bear the cost of outfitting the player year in and year out. For this reason many parents and leagues purchase previously used equipment. There is no way of making sure that the previously used equipment meets all safety requirements. Possessing the safety equipment is only one part in the injury prevention. Equipment also needs to be used properly and correctly. Coaches, parents, and officials are in charge of making sure that the athletes both use the equipment and use it properly.

The second aspect of safety equipment is the sporting environment. There are many things out there that help to reduce the risk of injury while on the playing field, for instance breakaway bases. Janda, Wojtys, Hankin, and Benedict (1988) report that breakaway bases in softball have helped to decrease the number of foot and ankle injuries

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Coaching Education

It is not always the child's fault. Coaches in youth leagues are most often volunteers who have little education in strength and conditioning, prevention of injuries, and how to treat injuries. According to the National Youth Sport Safety Foundation (NYSSF), "less than 10% of the two and a half million volunteer coaches, and less than one-third of the interscholastic coaches in the United States have had any type of coaching education" ("Did You Know," 2000). These coaches very rarely are given any educational background on how to conduct conditioning and practice. This lack of training may have and could result in injuries. Two stress-related injuries that can result by the excessive demands of these coaches are stress fractures (Dickson & Kichline, 1987) and tendonitis (Curwin & Stanish, 1984). These coaches are not educated on how to condition and train an athlete, nor do they know about injury prevention, detection, and treatment of injuries. According to Stanitski (1989), the ignorance of the types of injuries or inability to recognize injuries other than grossly incapacitating ones are commonly seen in volunteer or supposedly trained coaches.

Prevention Programs

There are not many injury prevention programs for youth sports, where the main topics are first-aid and injury prevention and care. There are some groups and organizations that have developed programs that address the topics of first-aid and injury youth coaches

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prevention and care. Some counties such as Anne Arundel, Maryland have seminars for youth coaches. To be a youth sports coach in this county, one must attend the seminar. Upon completion of the seminar coaches receive a certificate that must be renewed every three years (Steele, 1996).

Those groups that have developed programs are the National Youth Sports Coaches Association (NYSCA), American Coaching Effectiveness Program (ACEP), Youth Sports Institute (YSI), and Little League Baseball. The National Youth Sports Coaches Association's, (NYSCA), offers a six-hour training program. The goal of the NYSCA's program is to help train volunteer coaches to deal with issues within youth sports. Such issues include psychological aspects of coaching, first aid, care and prevention of injuries, and some sport-specific skills (Quain, 1989). The American Coaching Effectiveness Program (ACEP) deals with the physiological and psychological aspects of youth, and sports medicine (Quain, 1989). Little League Baseball provides training for coaches in the areas of teaching skills and understanding child psychology (Quain, 1989).

The Youth Sports Institute of Michigan State University, East Lansing, MI offers a coaches education program called PACE (Program for Athletic Coaches' Education). PACE is a program that is endorsed by Michigan High School Athletic Association and Michigan Interscholastic Athletic Administrator Association. PACE is a 12-hour program that covers a wide array of topics, after the program coaches are given a test and upon passing the test coaches receive certification. Some topics that are covered during the PACE program are; Legal Responsibilities of a coach, Emergency Procedures for Victims of Accidents and Injuries, Essential Medical Records for Interscholastic Athletes, Prevention, Ca

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Prevention, Care and Rehabilitation of Sports Injuries, Planning, Conducting and Evaluating Effective Instruction, Physical Conditioning and Contraindicated Activities, Motivating Athletes, and Positive Coaching. The PACE program is a good stepping stone to the development of a first-aid and injury prevention program. A program that has a solo emphases on first aid and injury prevention in youth sports, needs to be developed and required for youth athletic coaches. Many articles and studies have cited the need for the development of an injury prevention program for youth sports, or the increase in education for coaches, parents, and participant (Antich, Clive & Brewster, 1985; Congeni, 1994; Stanitski, 1993; Wall, 1998; Wells & Bell, 1995; Whiteside, Andrews, & Fleisig, 1999).

Currently there are a number of ways to become a certified coach. One such way is to complete a degree program in coaching at a college or university. There is also a National Governing Body of Sports certification program that one can complete and receive a certificate stating that they have met the standards set forth to be a coach. There was no national standard of coaching education until 1996, when the National Association for Sport and Physical Education (NASPE) developed national coaching education standards. NASPE is in the process for developing an accredited program in coaching education.

Currently there is a manual entitled "Sideline Help" (Steele, 1996) that can be used to aid coaches in dealing with injuries and emergency situations. Included in the manual is information on the prevention, immediate care, treatment, and rehabilitation of youth sports injuries. In addition to the information that is contained in Dr. Steele's mind, there

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manual, there are pretests and posttests to check one's understanding and mastery of the topic and the information given.

Stephens (1991) suggests that parents and guardians should find coaches that have a safety and first aid certification. Stephens continues on to say that there are a number of organizations that are available that could provide accurate and adequate instruction for youth sports programs such as the American College of Sports Medicine and the National Athletic Trainers Association.

Luschen and Moore (1987) state seven guidelines to make people more aware of their responsibilities as a youth coach, youth league representative, or a youth sports director. Three of the guidelines given are to provide a safety manual, provide safe facilities and equipment, and provide proper care for sports injuries. Luschen and Moore (1987) go on to state, "coaches and physical education instructors have the duty of providing reasonable medical assistance" (p. 3). The same durty applies to youth sport coaches at all levels.

There has been a call for the involvement of many groups of people to help with the prevention of youth sport injuries. Stanitski (1983, 1993) reported that the orthopedist must take an active role in preventive sports medicine to minimize the risks of youth sport participation and accentuate the benefits of participation. According to the American Academy of Pediatrics Committee on Pediatric Aspects of Physical Fitness, Recreation and Sports (1981), orthopedic sports medicine specialists must act as a strong positive voice for the high benefits and limited risks involved with sports for children and adolescents. Also, Bernhardt and Landry (1995) noted that pediatricians and other primary care providers need to take an active role in youth sports. Pediatricians and other primary care providers should enhance their knowledge of the common sports-related injuries and offer to be a medical advisor for youth sports programs.

Emergency First Aid Care

The American Red Cross offers a number of courses to train people in first aid. Some of the courses offered are Cardiopulonmary Resuscitation (CPR) for infants, children, and adults, Basic First-Aid, Community First-Aid and Safety, and the Sport Safety Training. The Basic First-Aid course by the American Red Cross, which includes four hours of instruction, teaches individuals "how to recognize emergencies, how to treat wounds, burns, poisoning, sudden illness, muscle, bone, and joint injuries, splinting methods, and weather related emergencies" (American Red Cross, 2001). In order to pass the basic first aid class, one must pass all skill testing and a multiple-choice test. The Community First-Aid and Safety course, nine hours of training, differs from the Basic First Aid course by the addition of CPR instruction. For certification in Community First-Aid and Safety, one must pass all skills testing and a multiple-choice exam. The American Red Cross in conjunction with the U.S. Olympic Committee developed the sport safety-training course, up to nine hours of instruction. During the sport safety training course one learns the "principles of sports injury prevention, first aid steps for all sport related injuries, including weather-related emergencies and sudden illness" (American Red Cross, 2001).

First Aid Knowledge of High School Coaches.

In 1986 Rowe and Robertson developed and administered a first aid test to Alabama high school coaches. Only 34 (27%) of the 127 coaches tested earned a passing score. In 1991 Rowe and Miller administered the same test to Georgia high school coaches. Fif

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coaches. Fifty (38%) of the 130 Georgia high school coaches passed the first aid test, in light of 116 (89%) of the coaches having current first aid certification.

A recent study by Ransone and Dunn-Bennett (1999) assessed the first-aid knowledge and decision-making of high school athletic coaches. Ransone and Dunn-Bennett (1999) used an adapted form of American Red Cross's First-Aid Assessment and the Game Situation Data Sheet (Flint & Weiss, 1992) to assess the first aid knowledge and decision making of 104 high school athletic coaches. Ninety-two percent of the coaches surveyed had current first-aid certification, which is required by California state law. Only 63% of the coaches received a passing grade on the First-Aid Assessment, which shows that more than just first aid and CPR certification is needed. Coaches that passed the First-Aid Assessment were more likely to return an injured starter back to play than the coaches who did not pass the Assessment. Interestingly enough in most cases "coaches returned the injured athlete to play regardless of the game situation" (Ransone & Dunn-Bennett, 1999, p. 270). From the results of their study Ransone and Dunn-Bennett (1999) recommended that coaches receive "additional knowledge on the treatment and rehabilitation of athletic injuries" (p. 271), which will aid in the decision making on playing status of an injured athlete.

Decision Making of High School Coaches

In many cases youth coaches will be determining if an injured athlete is to return to competition. Flint and Weiss (1992) assessed the decisions made by high school coaches of when they would return an injured athlete to competition. Coaches were presented with varying game situations (clearly winning, clearly losing, or close game) and differing player status (starter, first off the bench, bench player). Coaches were asked whether

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asked whether they would return the injured athlete to competition. The decision to return an athlete to competition depended upon player status and game situation. In a game situation where the outcome was already determined coaches were more likely to return a first substitute or bench player than a starter. In a close game situation coaches were more likely to return a starter than a bench player or first substitute.

Summary

With the increased participation in youth sports there is has been a rise in the number of sports related injuries. Youth sport coaches are the individuals that are present at the time of injury and need to be armed with the knowledge of how to handle these situations. Not only do coaches need to be able to handle injury and emergency situations but they also need to be able to prevent such situations. To enhance the knowledge base of youth coaches, an injury prevention and care program needs to be developed. Prior to the development of such a program the knowledge base of youth coaches needs to be assessed.

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CHAPTER III

Methods

Research Design

The research design for this study was a static group comparison design, with data collection consisting of the results of the First-Aid Assessment and Game Situation Data Sheet. The independent variable was youth basketball, soccer, and football coaches. The dependent variables were the responses to the First-Aid Assessment and Game Situation Data Sheet. The static group comparison design was chosen for the current study because it will illustrate the current first aid and injury prevention knowledge of youth basketball, soccer, and football coaches, and assess situations in which coaches would return an injured athlete to activity. Also, the static group comparison design allowed for a comparison between coaches of different ages, towns, sports, number of years coaching, and educational background.

Participants

A total of 290 youth football (N = 236), basketball (N = 35), and soccer (N = 19) coaches participated in this study. Of the 290 coaches, 170 coaches, with a mean age of 39.61 years (*SD* = 6.30), completed the demographic information sheet. At some of the testing sessions the demographic sheet was unavailable for use. Coaches at these testing sessions were mailed a copy of the demographic sheet and a self addressed stamped envelope. Not all of the coaches returned the completed demographic sheet, thus the reason for the missing information on those coaches. Unless otherwise noted, analysis was conducted on the 170 coaches that completed the demographic sheet. One hundred and fifty-two were male, 15 were female, and three did not report a gender.

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The mean years of coaching experience were 6.65 years (SD = 5.55), with a range of 0-27 years. Participants reported an average of 2.71 sports coached which ranged from 0-7. The breakdown of the educational background information of the participants by sport is reported in Table 1. Seven (4.11%) coaches, more than expected, reported having a doctoral degree. Ninety-seven (57.1%) coaches reported having been trained in American Red Cross First Aid and/or CPR (47.7%), American Heart CPR (5.3%), or Emergency Medical Technician (4.1%). Twenty-seven (15.9%) reported having PACE (Program for Athletic Coaches' Education), physical therapy, or other type of training. However, only twenty-one (12.4%) coaches reported being currently certified in First Aid and 30 (17.6%) coaches reported being currently certified in CPR. The distribution of formal first aid training can be seen in Table 2.

Table 1

Educational Background of Coaches by Sport Coached

	Football N	Basketball N	Soccer N	Total N	%
High School Diploma	58	13	6	77	45.3
High School Equivalent	2	0	0	2	1.2
Associates Degree	19	4	1	24	14.1
Bachelors Degree	26	8	7	41	24.1
Masters Degree	3	5	2	10	5.9
Doctoral Degree	1	3	3	7	4.1
Other	2	0	0	2	1.2
Some High School	2	0	0	2	1.2
Some College	1	1	0	2	1.2
Not Specified	2	1	0	3	1.8
Total				170	100.1*

* total percentage exceeds 100 due to rounding

Table 2

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Table 2

Numbers and Percentages of First Aid Training

Type of Training	N	Frequency
American Red Cross First Aid and CPR	61	35.9%
American Red Cross First Aid	4	2.4%
American Red Cross CPR	16	9.4%
American Heart CPR	9	5.3%
Emergency Medical Technician	7	4.1%
Pace Training	8	4.7%
Physical Therapy	3	1.8%
Other Training	16	9.4%
None	75	44.1%
Total	199*	117.1%**

* Total exceeds 170 because a coach can be trained in more than one organization/area
** Total exceeds 100 because a coach can be trained in more than one organization/area

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Demographic Information Sheet

The Demographic Information Sheet (see Appendix C) was used to determine if there were any differences in the youth basketball, soccer, and football coaches' knowledge of first-aid and injury prevention based upon age, years of coaching, terminal degree, age of the athletes he/she coaches, gender of athletes coached, sport coached, and prior first aid knowledge.

First Aid Assessment Test

The American Red Cross developed the First-Aid Assessment (Appendix A) in 1988 to measure an individual's proficiency after the completion of the Basic First-Aid and Sport Injury courses. The test consisted of 38 multiple-choice questions. The competency areas covered by the assessment are: anatomy, care and treatment, prevention, assessment, equipment, and heat/cold related factors. For certification a score of 80% or higher is required. Ransone and Dunn-Bennett (1999) revised the American Red Cross First-Aid Assessment to assess the first-aid knowledge of high school athletic coaches. The validity of the revised First-Aid Assessment was established by expert review to determine the most appropriate questions related to athletic competition.

Game Situation Data Sheet

Flint and Weiss (1992) developed the Game Situation Data Sheet (Appendix B) to assess an individual's decision making in hypothetical athletic situations. Composed of nine different athletic situations, the Game Situation Data Sheet asks the individual whether or not they would allow an athlete to return to activity. Participants check yes or or as to wh

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no as to whether they would return an athlete to competition. The athletic situations included players of different ranking (i.e., starter, first off the bench, or bench warmer). In addition the athletic situations involved a number of different game situations, such as close or blow out games, winning, and losing.

Data Collection Procedures

This study was conducted during the youth football 2001 fall season, the youth basketball 2001-2002 winter season, and youth soccer 2002 spring season. The participants were all coaches in the Mid-Michigan Basketball League, various soccer leagues, and the Mid-Michigan Pony Football League, Inc. The coaches/leagues were selected to be participants based upon community support, participant willingness, and proximity to the research institution.

The individual towns within the Mid-Michigan Basketball and Mid-Michigan Pony Football League have a number of general coaches' meetings at which time the tests were administered. At the coaches meeting, the description of the study and the consent form were explained to the participants. The participants were free to ask any questions about the study. The participants were asked to sign the consent form (Appendix D) indicating whether they agree or decline to participate in the study after the researcher had gone over the description of the study, the consent form, and allowed the participants to ask any questions regarding the study. Coaches could choose to withdraw their consent at any time prior, during, or after the collection of data. The coaches signed the consent form. One coach was a minor; consent was given by his father to participate in the study. The coaches were then asked to take the First-Aid Assessment and to complete the Game Situation Data Sheet. These tests took approximately 30 minutes to complete. After completing the First-Aid Assessment and the Game Situation Data Sheet the coaches were thanked for their time. Upon request of the individual towns and sports, a 30-60 minute lecture on first aid procedures was given.

Due to the original soccer league deciding not to participate, various individual soccer teams were approached to participate in the current study. The researcher would approach a soccer coach, ask for a minute of his/her time, describe the study, and ask if the coach would like to participate in the study. If the coach agreed to participate, the researcher reviewed the informed consent form, First-Aid Assessment test, and the Game Situation Data Sheet. After answering any questions from the coaches the researcher asked the coach to sign the informed consent and complete the First-Aid Assessment and the Game Situation Data Sheet. After completing the tests coaches were thanked for their time and their help. If coaches refused to participate, they were thanked for their time and the researcher left the coach alone.

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CHAPTER IV

Results

First Aid Assessment

On the First Aid Assessment (FAA) coaches scored an average of 24.96 points (SD = 3.58) out of a possible 38 points, with the scores ranging from 10 to 33. Table 3 indicates the average, range, and standard deviation on the FAA score by the sport coached. The sport coached was known for all 290 participants. The range of scores for the football coaches was very large, i.e., 10 to 32. Soccer coaches possessed more knowledge (M = 26.74) than the football (M = 24.73) or basketball (M = 25.51) coaches. The mean score on the FAA for male participants was 25.42 (SD = 3.41) with scores ranging from 14-33. The mean score on the FAA for female participants was 25.40 (SD = 3.20) with scores ranging from 21-31.

Research question one inquired about the first aid knowledge that youth basketball, soccer, and football coaches possess. Of interest was whether a coach earned a passing score on the FAA. A score of 31 (80%) or higher is required to pass the FAA. Fifteen coaches (5.17%) earned a passing score (range 31 – 33). Of these 15 coaches nine coached football (3.81%), one coached basketball (2.86%), and five coached soccer (26.32%). Of the 15 coaches that passed the FAA, 13 coaches were male, one was female, and one gender was not reported. Table 4 reports the frequency of coaches that passed the FAA and the type of training that they possessed. Twelve (80%) coaches reported having some form of formal first aid training, nine (60%) reported having been trained in CPR, and five (33%) reported being currently first aid or CPR certified. The

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five people that had current first aid certification were also the five that had current CPR certification.

Table 3

First Aid Assessment Score by Sport Coached

	N	Range	Mean	SD
Football	236	10-32	24.73	3.57
Basketball	35	17-31	25.51	3.38
Soccer	19	21-33	26.74	3.68
Total	290	10-33	24.96	3.58

Table 4

Type of Training for Coaches that Passed the FAA

Type of Training	Yes	No	Missing
Formal First Aid Training	12	2	1
American Red Cross First Aid Training	4	10	1
CPR Training	9	5	1
Current First Aid Certification	5	9	1
Current CPR Certification	5	9	1

To assess the reliability of the FAA Chrombac's alpha was conducted on all 38 FAA questions. Chrombac's alpha for the FAA was .5387, less than what was hoped for .70 (Nunnelly, 1978). The reason why Chrombac's alpha was so low may be due the fact that the participants scored so low on the FAA. The end results needs to be interrupted with caution.

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The questions on the FAA are broken down into five constructs: Injury prevention, injury identification/general medical knowledge, CPR, injury management, and wound care. The means and standard deviations for each of the constructs are reported in Table 5. Coaches on average answered correctly 77% of the injury prevention questions, 52% of the injury identification/general medical knowledge questions, 58% of the CPR questions, 70% of the injury management questions, and 78% of the wound care information questions. The results of the analysis are reported in terms of the individual constructs.

To assess the reliability of the FAA contructs, Chrombac's alpha was calculated on the five FAA constructs. The Chrombac's alpha's for the FAA constructs were: injury prevention .2132, injury identification/general medical knowledge .1856, CPR .0946, injury management .2750, and wound care .2394. The reason why Chrombac's alpha was so low may be due the fact that the participants scored so low on the FAA.

Table 5

Means and Standard Deviation for the Five FAA Constructs

	Number of Questions	Mean	SD	% Correct
Injury Prevention	9	6.90	1.15	76.67
Injury Identification/General Medical Knowledge	10	5.18	1.52	51.80
CPR	4	2.32	0.90	58.00
Injury Management	9	6.29	1.20	69.89
Wound Care	6	4.69	0.98	78.17

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First Aid Constructs by Sport Coached

The second research question of this study was whether coaches differed in knowledge on the five first aid constructs by sport that was coached. The means and standard deviations of the five constructs by sport coached are presented in Table 6. A one-way ANOVA with the injury prevention construct as the dependent variable and the sport coached as the independent variable revealed no significant difference, $F(2,287) = 2.76$, $p > 0.05$. A one-way ANOVA with the injury identification/general medical knowledge construct as the dependent variable and the sport coached as the independent variable exposed a significant difference, $F(2,287) = 5.99$, $p = .003$. Table 7 reports the results of a post hoc Scheffe test. The post hoc Scheffe test revealed that there was a significant difference at the $p = 0.05$ level only between football and soccer coaches. A one-way ANOVA with the CPR construct as the dependent variable and the sport coached as the independent variable revealed no significant difference, $F(2,287) = 0.000$, $p = 1.0$. No significant difference was found when an ANOVA was run that had the injury management construct as the dependent variable and the sport coached as the independent variable, $F(2,287) = .596$, $p = .552$. A one-way ANOVA with the wound care construct as the dependent variable and the sport coached as the independent variable exposed no significant difference, $F(2,287) = 0.07$, $p = 0.933$.

In summary the first aid knowledge of the youth coaches, by sport coached, differed for the injury identification/general medical knowledge construct only. This difference was found for football and soccer coaches. No difference was found between football and basketball coaches or between basketball and soccer coaches. No other knowledge differences were found.

Table 6

Means and Standard Deviations of Five FAA Constructs by Sport Coached

	Football		Basketball		Soccer	
	Mean	SD	Mean	SD	Mean	SD
Injury Prevention	6.87	1.23	6.83	0.98	7.53	1.12
Injury Identification/ General Medical Knowledge	4.82*	1.56	5.37	1.42	5.95*	1.84
CPR	2.37	0.92	2.37	0.91	2.37	0.83
Injury Management	6.08	1.28	6.31	1.25	6.21	1.13
Wound Care	4.60	1.06	4.63	0.91	4.68	1.00

* significant difference at the p = 0.05 level

Table 7

Post hoc Sheffe test for Injury identification/General Medical Knowledge and Sport Coached

Sport Coached		Mean Difference	Std Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Football	Basketball	-0.55	0.28	0.149	-1.25	0.14
	Soccer	-1.13*	0.37	0.011	-2.05	-0.21
Basketball	Football	0.55	0.28	0.149	-0.14	1.25
	Soccer	-0.58	0.45	0.434	-1.67	0.52
Soccer	Football	1.13*	0.37	0.011	0.21	2.05
	Basketball	0.58	0.45	0.434	0.52	1.67

* the mean difference is significant at the p = 0.05 level

First Aid Constructs by Gender of Coaches

Research question three pertained to whether coaches differed in their knowledge of the five first aid constructs by the gender of the coaches. The means and standard deviations of the five constructs by gender are presented in Table 8. Several one-way ANOVA's were run using each construct as the dependent variable and gender as the independent variable. None of the ANOVA's were significant: injury prevention, $F(1,165) = .279$, $p = .598$; injury identification/general medical, $F(1, 165) = 1.668$, $p = .198$; CPR, $F(1,165) = .078$, $p = .780$; injury management, $F(1, 165) = 1.420$, $p = .235$; and wound care, $F(1,165) = .993$, $p = .321$. Knowledge of the five first aid constructs did not differ by the gender of the coach.

Table 8

Means and Standard Deviations of Five FAA Constructs by Gender

	N	Injury Prevention		Injury identification/ General Medical Knowledge		CPR		Injury Management		Wound Care	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Males	152	6.00	1.17	5.13	1.53	2.34	0.91	6.32	1.20	4.73	0.99
Females	15	7.07	0.96	5.67	1.50	2.27	0.88	5.93	1.28	4.47	0.83

First Aid Constructs by Age of Coaches

The fourth research question of this study was whether coaches differed in knowledge of the five first aid constructs by age. The mean age was 39.61 ($SD = 6.30$)

and ages ranged from 15 to 61. Coaches were divided into five groups based upon age; The distribution of the five groups is presented in Table 9. The five groups were composed to have a similar number of group members across the five groups.

Table 9

Distribution of Coaches Based Upon Five Age Groups

Age Group	N	%
15-35	34	20
36-38	35	20.59
39-41	35	20.59
42-43	30	17.64
44-61	36	21.18
Total	170	100

The means and standard deviations of the five constructs by age groups are presented in Table 10. A one-way ANOVA with the injury prevention construct as the dependent variable and age group as the independent variable revealed no significant difference, F (4,165) = .868, p = .484. A one-way ANOVA with the injury identification/general medical knowledge construct as the dependent variable and age group as the independent variable revealed no significant difference, F (4,165) = .894, p = .469. A one-way ANOVA with the CPR construct as the dependent variable and age group as the independent variable exposed a significant difference, F (4,165) = 2.502, p = .04. The results of a post hoc Scheffe test are reported in Table 11. The post hoc Scheffe test revealed that there was no significant difference at the p = 0.05 level for any of the age groups. The largest mean difference was between the oldest and youngest age groups of coaches. No significant difference was found when a one-way ANOVA was run with injury management construct as the dependent variable and age group as the independent variable, $F(4,165) = 2.132$, $p = .079$. A one-way ANOVA with the wound care construct as the dependent variable and age group as the independent variable exposed no significant difference, $F(4,165) = 1.051$, $p = 0.383$.

In summary a significant difference in knowledge of the five first aid constructs, based upon coaches' age, was found only for the CPR construct. The conservative post hoc Scheffe test, on the CPR construct, failed to reveal differences between the oldest and youngest age groups which had the largest and smallest means respectively.

Table 10

Means and Standard Deviations of Five FAA Constructs by Age

	15-35		36-38		39-41		42-43		44-61	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Injury Prevention	6.65	1.12	6.80	1.11	6.91	0.92	7.10	1.47	7.06	1.12
Injury identification/ General Medical Knowledge	5.38	1.33	5.49	1.48	5.06	1.64	5.03	1.54	4.92	1.61
CPR	2.62	0.85	2.17	0.79	2.34	0.87	2.50	0.86	2.03	1.03
Injury Management	5.88	1.04	6.34	1.03	6.14	1.38	6.67	1.32	6.47	1.13
Wound Care	4.44	1.02	4.91	1.04	4.71	0.96	4.73	0.98	4.64	0.90

Table 11

Post hoc Sheffe test for the CPR and Age

Age Group		Mean Difference	Std Error	Significance	95% Confidence Interval Lower Bound	Upper Bound
15-35	36-38	.45	.21	.361	-.22	1.11
	39-41	.27	.21	.797	-.39	.94
	42-43	.12	.22	.991	-.57	.81
	44-61	.59	.21	.106	-6.98E-02	1.25
36-38	15-35	-.45	.21	.361	-1.11	.22
	39-41	-.17	.21	.956	-.83	.49
	42-43	-.33	.22	.695	-1.01	.36
	44-61	.14	.21	.976	-.51	.80
39-41	15-35	-.27	.21	.797	-.94	.39
	36-38	.17	.21	.956	-.49	.83
	42-43	-.16	.22	.972	-.84	.53
	44-61	.32	.21	.691	-.34	.97
42-43	15-35	-.12	.22	.991	-.81	.57
	36-38	.33	.22	.695	-.36	1.01
	39-41	.16	.22	.972	-.53	.84
	44-61	.47	.22	.329	-.21	1.15
44-61	15-35	-.59	.21	.106	-1.25	6.98E-02
	36-38	-.14	.21	.976	-.80	.51
	39-41	-.32	.21	.691	-.97	.34
	42-43	-.47	.21	.329	-1.15	.21

First Aid Constructs by Years of Coaching Experience

Research question five inquired if coaches differed in knowledge of the five first aid constructs by the number of years of coaching experience. Three coaches did not report the number of years of coaching experience and were excluded from the analyses. The mean years of coaching experience, of the 167 that reported coaching experience, was 6.65 (SD = 5.55) with a range of 0-27 years. Coaches were divided into four nearly

equal groups based upon the number of years of coaching experience. Table 12 presents the distribution of the four groups. The means and standard deviations of the five constructs by coaching experience are presented in Table 13. Several one-way ANOVA's were run using each construct as the dependent variable and years of coaching experience as the independent variable. The ANOVA with injury prevention as the dependent variable and the years of coaching experience as the independent variable was significant, F (3,163) = 4.796, p = .003. Table 14 reports the results of a post hoc Scheffe test. The post hoc Scheffe test revealed that there was a significant difference at the p = 0.05 level only between coaches with 5-9 years of coaching experience and coaches with 10-27 years of coaching experience. The other four ANOVA's were not significant: injury identification/general medical, F (3, 163) = .388, p = .762; CPR, F (3,163) = .1.031, p = .380; injury management, F (3, 163) = 1.609, p = .189; and wound care, F (3,163) = 1.021, p = .385.

In summary, of the five first aid constructs, a statistical difference was found only for the injury prevention construct based upon the years of coaching experience. This difference was only between coaches with 5-9 years of coaching experience and coaches with 10-27 years of coaching experience.

Table 12

Distribution of Coaches Based Upon Four Coaching Experience

Years of Coaching Experience	N	%
0-2	37	22.16
3-4	40	23.95
5-9	45	26.95
10-27	45	26.95
Total	167	100

Table 13

Means and Standard Deviations of Five FAA Constructs by Coaching Experience

	Years of Coaching Experience							
	0-2		3-4		5-9		10-27	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Injury Prevention	6.73	1.10	6.78	1.29	6.60*	1.21	7.42*	0.84
Injury Identification/ General Medical Knowledge	5.11	1.41	5.30	1.73	5.00	1.43	5.29	1.56
CPR	2.51	0.77	2.27	0.96	2.38	0.89	2.18	0.96
Injury Management	6.16	1.07	6.12	1.20	6.22	1.33	6.62	1.13
Wound Care	4.65	1.09	4.85	0.95	4.49	1.01	4.73	0.89

* significant at the $p = 0.05$ level

Table 14
Post hoc Scheffe test for Injury Prevention Construct and Years of Coaching Experience

Age Group	Age Group	Mean Difference	Std Error	Significance	95% Confidence Interval Lower Bound	Upper Bound
0-2	3-4	-4.53E-02	.26	.999	-.77	.68
	5-9	.13	.25	.965	-.57	.83
	10-27	-.69	.25	.055	-1.39	8.93E-03
3-4	0-2	4.53E-02	.26	.999	-.68	.77
	5-9	.18	.24	.915	-.51	.86
	10-27	-.65	.24	.073	-1.33	3.96E-02
5-9	0-2	-.13	.25	.965	-.83	.57
	3-4	-.18	.24	.915	-.86	.51
	10-27	-.82*	.24	.008	-1.49	-.16
10-27	0-2	.69	.25	.055	-8.93E-03	1.39
	3-4	.65	.24	.073	-3.96E-02	1.33
	5-9	.82*	.24	.008	.16	1.49

* the mean difference is significant at the $p < 0.05$ level

First Aid Constructs by the Number of Sports Coached

Research question six inquired if knowledge of the five first aid constructs differed by number of sports coached. The mean number of other sports coached was 2.71 sports (SD = 1.57), ranging from 0 to 7. Coaches were divided into four nearly equal groups based upon the number of sports coached. Table 15 displays the distribution of coaches based upon the number of sports coached. The means and standard deviations of the five FAA constructs by number of sports coached for each of the four groups are presented in Table 16. Several one-way ANOVA's were run using each construct as the dependent variable and number of sports coached as the independent variable.

None of the ANOVA's were significant: injury prevention, F (3,166) = 1.854, p = .139; injury identification/general medical, F (3, 166) = .313, p = .816; CPR, F (3,166) = 1.004, p = .392; injury management, F (3, 166) = 1.178, p = .320; and wound care, F (3,166) = .049, p = .986. Knowledge of the five first aid constructs did not differ by the number of sports coached.

Table 15

Distribution of Coaches Based Upon Number of Sports Coached

Number of Sports Coached	N	%
0-1	44	25.9
2	33	19.4
3	43	25.3
4-7	50	29.4
Total	170	100

Table 16

Means and Standard Deviations of Five Constructs by Number of Sports Coached

	0-1		2		3		4-7	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Injury Prevention	6.80	1.25	6.58	1.25	7.16	1.04	6.98	1.04
Injury Identification/ General Medical Knowledge	5.05	1.45	5.36	1.45	5.23	1.80	5.12	1.41
CPR	2.48	0.88	2.12	0.96	2.35	0.81	2.30	0.95
Injury Management	6.09	1.03	6.21	1.34	6.28	1.14	6.54	1.28
Wound Care	4.68	1.03	4.64	0.93	4.72	0.98	4.70	0.99

First Aid Construct by the Educational Background of Coaches

Research question seven examined the issue of whether knowledge of the five first aid constructs differed based upon a coach's educational background. The means and standard deviations of the five constructs by coach's educational background are presented in Table 17. Several one-way ANOVA's were run using each construct as the dependent variable and educational background as the independent variable. The ANOVA with injury identification/general medical knowledge was significant, F (9, 160) = 1.979, p = .045. Appendix F reports the results of a post hoc Scheffe test. The post hoc Scheffe test revealed that there was no significant difference at the p = 0.05 level. The largest mean difference was between the doctoral degree and high school equivalent groups. The results of the post hoc Scheffe test need to be interpreted with caution due to the low number of members in the high school equivalent, other, some high school, some college and not specified groups. The ANOVA with injury management was significant $F(9, 160) = 3.320, p = .001$. Appendix G reports the results of a post hoc Scheffe test. The post hoc Scheffe test revealed that there was no significant difference at the $p = 0.05$ level. The largest mean difference was between the doctoral degree and some high school groups. The results of the post hoc Scheffe test need to be interpreted with caution due to the low number of members in the high school equivalent, other, some high school, some college, and not specified groups. The other three ANOVA's were not significant: Injury Prevention, $F(9, 160) = 1.335, p = .223$; CPR, $F(9,160) = .482, p = .885$; and wound care, $F(9,160) = 1.262, p = .262$.

Table 17

Means and Standard Deviations of the Five FAA Constructs by Educational Background

	N	Injury Prevention		Injury Identification/ General Medical Knowledge		CPR		Injury Management		Wound Care	
		M	SD	M	SD	M	SD	M	SD	M	SD
High School Diploma	77	6.74	1.23	4.81	1.47	2.21	0.95	5.94	1.20	4.56	1.01
High School Equivalent	2	7.00	0.00	3.50	0.71	2.50	0.71	6.00	0.00	4.50	0.71
Associates Degree	24	7.25	0.99	5.50	1.25	2.50	0.78	6.21	1.06	4.96	0.86
Bachelors Degree	41	6.93	1.08	5.46	1.61	2.44	0.92	6.61	1.00	4.83	1.00
Masters Degree	10	7.10	1.52	6.00	1.76	2.20	1.14	7.40	1.07	4.70	1.06
Doctoral Degree	7	7.57	0.53	6.29	1.38	2.57	0.53	7.43	0.79	5.14	0.90
Other	2	7.00	0.00	5.00	1.41	2.00	1.41	7.00	2.83	4.00	0.00
Some High School	2	7.50	0.71	4.50	2.12	2.50	0.71	5.50	0.71	5.00	1.41
Some College	2	5.50	0.71	5.00	1.41	2.50	0.71	6.00	1.41	3.50	0.71
Not Specified	3	6.00	0.00	4.67	0.58	2	0.00	6.00	1.73	4.00	0.00
Total	170	6.90	1.15	5.18	1.52	2.32	0.90	6.29	1.20	4.69	0.98

Research question seven can also be examined using four groups; high school, college, advanced degree, and other/not specified. The high school group would include

aches that had some high school, graduated high school, or had a high school quivalent. The college group contains those coaches that had some college experience, n associate's degree, or a bachelor's degree. The advance degree group would consist of those that have earned either a master's or doctoral degree. The last group would consist of those that had other types of education or that did not specify their educational background. The means and standard deviations of the five constructs by coach's educational background are presented in Table 18. Several one-way ANOVA's were run using each construct as the dependent variable and the four educational background groups as the independent variable. The ANOVA with injury identification/general medical knowledge was significant, F (3, 166) = 5.404, p = .001. Table 19 reports the results of a post hoc Scheffe test. The post hoc Scheffe test revealed that there was a significant difference at the p = 0.05 level, between the high school and college groups and between the high school and advanced degree groups. The ANOVA with injury management was significant, F (3, 166) = 8.944, p = .000. Table 20 reports the results of a post hoc Scheffe test. The post hoc Scheffe test revealed that there was a significant difference at the p = 0.05 level. The statistical difference was found between the high school and advanced degree groups and between the college and advanced degree groups. The other three ANOVA's were not significant: injury prevention, F (3, 166) = 1.535, p = .207; CPR, F (3,166) = .1.097, p = .352; and wound care, F (3,166) = 1.990, p = .117.

In summary, of the five first aid constructs a significant difference was found for the injury identification/general medical knowledge and injury management constructs, based upon educational background. The significant difference for the injury identification/general medical knowledge was found between the high school and college groups and between the high school and advanced degree groups. The significant difference for injury management was between the high school and advanced degree groups and between college and advanced degree groups.

Table 18

Means and Standard Deviations of Five Constructs by Educational Background Groups

	N	Injury Prevention		Injury Identification/ General Medical Knowledge		CPR		Injury Management		Wound Care	
		M	SD	M	SD	M	SD	M	SD	M	SD
High School	81	6.77	1.21	4.77*	1.47	2.22	0.94	5.93*	1.17	4.57	1.00
College	67	7.00	1.07	5.46*	1.47	2.46	0.86	6.45*	1.03	4.84	0.96
Advanced Degree	17	7.29	1.21	6.12*	1.58	2.35	0.93	7.41*	0.94	4.88	0.99
Other/Not Specified	5	6.40	0.55	4.80	0.84	2.00	0.71	6.40	1.95	4.00	0.00
Total	170	6.90	1.15	5.18	1.52	2.32	0.90	6.29	1.20	4.69	0.98

* significant at the $p < 0.05$ level

Table 19

Post hoc Scheffe test for Injury Identification/General Medical Knowledge Construct and Four Educational Background Groups

Educational Group	Educational Group	Mean Difference	Std Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
High School	College	-.70*	.24	.044	-1.38	-1.25E-02
	Advanced Degree	-1.35*	.39	.009	-2.46	-.25
	Other/Not Specified	-3.46E-02	.68	1.000	-1.95	1.88
College	High School	.70*	.24	.044	1.25E-02	1.38
	Advanced Degree	-.65	.40	.443	-1.78	.47
	Other/Not Specified	.66	.68	.814	-1.26	2.58
Advanced Degree	High School	1.35*	.39	.009	.25	2.46
	College	.65	.40	.443	-.47	1.78
	Other/Not Specified	1.32	.75	.378	-.79	3.43
Other/Not Specified	High School	3.46E-02	.68	1.000	-1.88	1.95
	College	-.66	.68	.814	-2.58	1.26
	Advanced Degree	-1.32	.75	.378	-3.43	.79

* the mean difference is significant at the $p < 0.05$ level

Table 20

Post hoc Scheffe test for Injury Management Construct and Four Educational Background Groups

Educational Group	Educational Group	Mean Difference	Std Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
High School	College	-.52	.19	.051	-1.05	2.07E-03
	Advanced Degree	-1.49*	.30	.000	-2.33	-.64
	Other/Not Specified	-.47	.52	.840	-1.94	.99
College	High School	.52	.19	.051	-2.07E-03	1.05
	Advanced Degree	-.96*	.31	.021	-1.83	-.10
	Other/Not Specified	4.78E-02	.52	1.000	-1.42	1.52
Advanced Degree	High School	1.49*	.30	.000	.64	2.33
	College	.96*	.31	.021	.10	1.83
	Other/Not Specified	1.01	.57	.374	-.60	2.63
Other/Not Specified	High School	.47	.52	.840	-.99	1.94
	College	-4.78E-02	.52	1.000	-1.52	1.42
	Advanced Degree	-1.01	.57	.374	-2.63	.60

* the mean difference is significant at the $p < 0.05$ level

First Aid Constructs by Gender of Athletes Coached

Research question eight was concerned with whether coaches differed in knowledge of the five constructs by the gender of the athletes they coached. The gender of the athletes coached was known for all 290 participants. Table 21 illustrates the distribution of coaches based upon the gender of athletes coached. Table 22 illustrates the distribution of gender of athletes coached by gender of coach. The means and standard deviations of the five FAA constructs by gender of athletes coached are presented in Table 23. Several one-way ANOVA's were run using each construct as the dependent variable and gender of athletes coached as the independent variable. The ANOVA with injury identification/general medical knowledge was significant, F (2, 287) = 4.017, p = .019. Table 24 reports the results of a post hoc Scheffe test. The post hoc Scheffe test revealed that there was a significant difference at the p = 0.05 level only between the coaches that coached predominantly male and predominantly female athletes. The results of the post hoc Scheffe test need to be interpreted with caution due to the low number of coaches in the even mix of males and females group. The other four ANOVA's were not significant: Injury Prevention, F (2, 287) = .661, p = .517; CPR, F (2,287) = .549, p = .578; injury management, F (2, 287) = 2.156, p = .118; and wound care, F (2,287) = .065, p = .937.

Table 21

Distribution of Coaches by Gender of Athletes Coached

Gender of Athletes	N	%
Predominantly Male	252	86.90
Predominantly Female	31	10.69
Even Mix of Males & Females	7	2.41
Total	290	100

Table 22

Distribution of Gender of Athletes by Gender of Coaches

Gender of Athletes	Gender of Coach		
	Female	Male	Missing
Predominantly Male	2	128	122
Predominantly Female	11	20	0
Even Mix of Males & Females	2	4	1
Total	15	152	123

Table 23

Means and Standard Deviations of Five Constructs by Gender of Athletes Coached

	Predominantly Male		Predominantly Female		Even Mix of Males and Females	
	Mean	SD	Mean	SD	Mean	SD
Injury Prevention	6.88	1.22	7.13	1.12	6.71	0.76
Injury identification/ General Medical Knowledge	4.86*	1.55	5.61*	1.65	5.71	1.98
CPR	2.37	0.91	2.32	0.91	2.71	0.76
Injury Management	6.07	1.27	6.55	1.21	5.86	1.07
Wound Care	4.60	1.05	4.65	0.91	4.71	1.11

* significant at the $p < 0.05$ level

Table 24

Post hoc Sheffe test for Injury identification/ General Medical Knowledge Construct and Gender of Athletes Coached

Gender of Athletes Coached		Mean Difference	Std Error	Significance	95% Confidence Interval Lower Bound	Upper Bound
Predominantly Male	Predominantly Female	-.76*	.30	.043	-1.49	-1.93E-02
	Even Mix of Males and Females	-.86	.60	.365	-2.34	.63
Predominantly Female	Predominantly Male	.76*	.30	.043	1.93E-02	1.49
	Even Mix of Males and Females	-.10	.66	.988	-1.72	1.52
Even Mix of Males and Females	Predominantly Male	.86	.60	.365	-.63	2.34
	Predominantly Female	.10	.66	.988	-1.52	1.72

* the mean difference is significant at the p = 0.05 level

First Aid Constructs by Formal First Aid Training

Research question nine was concerned with whether coaches differed in knowledge of the five constructs by formal first aid training. Coaches reported if they had ever had any type of formal first aid training. The means and standard deviations of the five constructs by formal first aid training are presented in Table 25. Several one-way

ANOVA's were run using each construct as the dependent variable and formal first aid training as the independent variable. The ANOVA with injury prevention as the dependent variable was close to being significant, $F(1, 168) = 3.397, p = .067$. The ANOVA with injury identification/general medical knowledge as the dependent variable was significant, $F(1, 168) = 4.223, p = .041$. The ANOVA with injury management was significant, $F(1, 168) = 5.382, p = .022$. The ANOVA with wound management was significant $F = (1, 168) = 5.702, p = .018$. The ANOVA with CPR was not significant, $F = .033, p = .856$. In summary knowledge of injury identification/general medical knowledge, injury management, and wound management differed by whether a coach had previous formal first aid training, with those that had previous formal first aid training having more knowledge.

Table 25

Means and Standard Deviations of Five Constructs by Formal First Aid Training

	Formal First Aid Training			
	Yes		No	
	Mean	SD	Mean	SD
Injury Prevention	7.04	1.15	6.72	1.13
Injury Identification/ General Medical Knowledge	5.39*	1.64	4.91*	1.32
CPR	2.31	0.94	2.34	0.85
Injury Management	6.48*	1.29	6.05*	1.03
Wound Care	4.84*	1.00	4.49*	0.93

* significant at the $p < 0.05$ level

First Aid Constructs by American Red Cross First Aid Training

Research question ten was concerned with whether first aid training by the American Red Cross altered the responses to the questions on the FAA. There are three classes that one can take to become American Red Cross First Aid Trained, i.e., Basic First Aid Training, Infant/Child/Adult CPR with First Aid Training, or Community First Aid. The three ways to be certified were combined for the analysis of the first aid constructs by American Red Cross first aid training. Sixty-two coaches reported having been American Red Cross first aid trained. The mean for the trained coaches was 25.58 ($SD = 3.85$) and ranged from 14-33. The means and standard deviations of the five FAA constructs by those trained in American Red Cross first aid training and those not trained are presented in Table 26. Several one-way ANOVA's were run using each construct as the dependent variable and American Red Cross first aid training as the independent variable. None of the ANOVA's were significant: injury prevention, $F(1,168) = .518$, $p = .473$; injury identification/general medical, $F(1, 168) = .012$, $p = .912$; CPR, $F(1,168) = .799$, $p = .373$; injury management, $F(1, 168) = .010$, $p = .919$; and wound care, $F(1,168) = 2.848$, $p = .093$. Knowledge of the five first aid constructs did not differ by whether a coach was American Red Cross first aid trained.

Table 26

Means and Standard Deviations of Five FAA Constructs by American Red Cross First Aid Training

	American Red Cross First Aid Training			
	Yes		No	
	Mean	SD	Mean	SD
Injury Prevention	6.98	1.19	6.85	1.13
Injury Identification/ General Medical Knowledge	5.19	1.68	5.17	1.44
CPR	2.24	0.92	2.37	0 .89
Injury Management	6.31	1.28	6.29	1.16
Wound Care	4.85	1.01	4.59	0.96

First Aid Constructs by CPR Training

Research question eleven inquired if there was a difference in the knowledge of the first aid constructs based on having CPR training. In the demographic sheet coaches were asked if they had been American Red Cross CPR trained and/or American Heart CPR trained. For this analysis it was not important where the coaches received their training but rather was there a difference in the first aid knowledge based upon a coach either being CPR trained or not being CPR trained. Coaches that were American Red Cross and American Heart CPR trained were combined into one group, those having been CPR trained. Seventy-nine coaches reported having been CPR trained, and had a mean score on the FAA of 26.11, (SD = 3.70) with a range of 14-33. Table 27 illustrates the distribution of coaches that had first aid training and CPR.

The means and standard deviations of the five FAA constructs by CPR training are presented in Table 28. A one-way ANOVA with injury prevention construct as the dependent variable and CPR training as the independent variable revealed no significant difference, $F(1,168) = 2.141$, $p = .145$. A one-way ANOVA with the injury identification/general medical knowledge construct as the dependent and CPR training as the independent variable revealed a significant difference, $F(1,168) = 4.609$, $p = .033$. A one-way ANOVA with the CPR construct as the dependent variable and CPR training as the independent variable revealed no significant difference, $F(1,168) = 1.255$, $p = .264$. A nearly significant difference was found when a one-way ANOVA was run that had the injury management construct as the dependent variable and CPR training as the independent variable, $F(1, 168) = 3.637$, $p = .058$. A significant difference was found when a one-way ANOVA was run that had the wound care construct as the dependent variable and CPR training as the independent variable, $F(1, 168) = 7.959$, $p = .005$.

In summary a significant difference in knowledge of the five first aid constructs, based upon CPR certification, was found for injury identification/general medical knowledge and wound care. Coaches that were CPR trained had a higher mean score on the injury identification/general medical knowledge and wound care constructs. While knowledge of injury prevention, CPR, and injury management did not differ by a coach being CPR trained.

Table 27

Distribution of First Aid Training by CPR Training

		CPR Training Yes	CPR Training No	Total
First Aid Training	Yes	61	18	79
	No	1	90	91
	Total	62	108	170

Table 28

Means and Standard Deviations of Five Constructs by CPR Training

	CPR Training			
	Yes		No	
	Mean	SD	Mean	SD
Injury Prevention	7.04	1.17	6.78	1.12
Injury identification/ General Medical Knowledge	5.44*	1.62	4.95*	1.41
CPR	2.24	0.91	2.40	0.89
Injury Management	6.48	1.29	6.13	1.10
Wound Care	4.91*	0.94	4.49*	0.98

* significant at the $p < 0.05$ level

First Aid Constructs by Current First Aid Certification

Differences in the knowledge of the first aid constructs based upon currently being First Aid certified was the focus of research question twelve. The means and standard deviations of the five FAA constructs by current first aid certification are presented in Table 29. The mean score on the FAA, for the twenty-one coaches that reported being currently first aid certified, was 26.14 (SD = 5.28) with scores ranging from 14-33. Several one-way ANOVA's were run using each construct as the dependent variable and current first aid certification as the independent variable. The one way ANOVA with the wound care construct as the dependent variable and current first aid certification as the independent variable exposed a significant difference, F (1, 168) = 6.491, p = .012. The other four ANOVA's were not significant: injury prevention, F (1,168) = .148, p = .701; injury identification/general medical, F (1, 168) = .2.032, p = .156; CPR, F (1,168) = .521, p = .471; and injury management, F (1, 168) = .025, p = .873.

In summary, wound care knowledge differed by current first aid certification. Those having current first aid certification had a higher mean score on the wound care construct. The other four first aid constructs did not differ by whether a coach was currently first aid certified.

Table 29

Means and Standard Deviations of Five Constructs by Current First Aid Certification

	Current First Aid Certification			
	Yes		No	
	Mean	SD	Mean	SD
Injury Prevention	6.81	1.44	6.91	1.11
Injury Identification/ General Medical Knowledge	5.62	1.94	5.11	1.45
CPR	2.19	1.03	2.34	0.88
Injury Management	6.33	1.65	6.29	1.13
Wound Care	5.19*	1.12	4.62*	0.94

* significant at the $p < 0.05$ level

First Aid Constructs by Current CPR Certification.

Research question thirteen investigated whether there was a difference in knowledge of the five first aid constructs based upon whether a coach was currently CPR certified. Thirty coaches reported being current CPR certified, $M = 26.33$ ($SD = 4.25$), with scores ranging from 14-33. The means and standard deviations of the five constructs by current CPR certification are presented in Table 30. A one-way ANOVA with the injury prevention construct as the dependent variable and current CPR certification as the independent variable revealed no significant difference, $F(1,168) = .122$, $p = .727$. A one-way ANOVA with the injury identification/general medical knowledge construct as the dependent variable and current CPR certification as the independent variable revealed an almost significant difference, $F(1,168) = 3.830$, $p = .052$. A one-way ANOVA with the CPR construct as the dependent variable and current CPR certification as the independent variable revealed no significant difference, *F*

(1,168) = .683, p = .410. No significant difference was found when a one-way ANOVA was run that had the injury management construct as the dependent variable and current CPR certification as the independent variable, F (1, 168) = .752, p = .387. A significant difference was found when a one-way ANOVA was run that had the wound care construct as the dependent variable and current CPR certification as the independent variable, F (1, 168) = 9.088, p = .003.

In summary, wound care knowledge differed based upon whether a coach was currently CPR certified. Coaches that were currently CPR certified had a higher mean score than those that were not currently CPR certified. Knowledge about the other four first aid constructs did not differ based upon current CPR certification.

Table 30

Means and Standard Deviations of Five Constructs by Current CPR Certification

	Current CPR Certification			
	Yes		No	
	Mean	SD	Mean	SD
Injury Prevention	6.83	1.32	6.91	1.12
Injury identification/ General Medical Knowledge	5.67	1.84	5.07	1.43
CPR	2.20	1.00	2.35	0.88
Injury Management	6.47	1.38	6.26	1.16
Wound Care	5.17*	.83	4.59*	0.98

* significant at the p = 0.05 level

Game Situation Data Sheet

The Game situation Data Sheet was completed by 284 (97.9%) of the 290 coaches. All nine of the scenarios were responded to by 223 (76.9%) of the 290 coaches. Table 31 indicates the frequency of responses to each of the game scenarios. Coaches returned an injured athlete 25% of the time. Coaches varied considerably based upon game situations when deciding to return a starter to play. In a game that the team was clearly winning, 31.7% of the coaches returned the starter, while when the team was clearly losing the game, only 14.8% of coaches returned the starter. However, when the game situation had their team was down by five points, 45.4% of the coaches returned the starter. In a clearly winning situation or clearly losing situation, 13.4% and 10.9% of coaches, respectively, returned a backup player. Similar to the close game situation with a starter, 45.3% of coaches returned a backup player when it was a close game situation. Coaches' decisions to return a bench player varied based upon game situation and varied from the decisions made for starters and backup players. In a game that the team is clearly winning, 13.4% of the coaches returned an injured bench player, while in a game that the team is clearly losing, 32.7% of the coaches returned an injured backup player. When the game situation had the team down by four points, 23.2% of coaches returned an injured back up player. The percentage of coaches that returned an injured athlete to play varied not only by the game situation but the type (starter, backup, or bench player) of athlete involved. To assess the reliability of the GSDS, Chrombac's alpha was calculated. Chrombac's alpha for the nine game scenarios was .5445. The results need to interrupted with caution.

Table 31

Frequency of Responses to Game Situation Data Sheet

Game Situation	Yes	No	Not Answered	Total
Player that is third off the bench in a clearly losing situation	31	253	6	290
Starter in a clearly winning situation	90	194	6	290
Bench player in a clearly winning situation	38	246	6	290
Starter in a game that the team is down by 5 points	129	155	6	290
Bench player in a game that the team is down by 4 points	66	218	6	290
Backup player in a clearly winning situation	38	246	6	290
Starter in a clearly losing situation	42	242	6	290
Backup player in a close winning situation	101	122	67	290
Bench player in a clearly losing situation	73	150	67	290
Total	608	1826	176	2610

Game Situation Data Sheet by First Aid Assessment Pass/Fail

The first question pertaining to the Game Situation Data Sheet was whether or not coaches differed in returning an injured athlete to competition based upon passing or failing the First Aid Assessment. Chi-square analysis was conducted on the nine game situations by pass/fail of First Aid Assessment. Table 32 presents the Pearson Chi-

Square value and the probability for each of the situations. Appendix H and Table 33 illustrate the actual and expected counts for each game situation.

Coaches differed by whether or not they passed or failed the First Aid Assessment in returning an injured starter in a clearly winning game. Examining Table 34 (Starter in a Clearly Winning Competition Situation by Pass/Fail First Aid Assessment), more coaches that failed the First Aid Assessment than expected returned the injured starter, while more coaches that passed the assessment than expected did not return the injured starter.

In summary, when the team was clearly winning those that failed the First Aid Assessment were more likely to return the starter to play. Those that passed the First Aid Assessment were more likely not to return the starter in a clearly winning situation. Coaches did not differ, by passing/failing of First Aid Assessment, on the other eight game situations.

Table 32

Pearson Chi-Square for Game Situation Data Sheet by Pass/Fail First Aid Assessment

Situation	Pearson Chi-Square Value	df	p
Player that is third off the bench in a clearly losing situation	.294	1	.588
Starter in a clearly winning situation	4.581	1	.032*
Bench player in a clearly winning situation	.616	1	.433
Starter in a game that the team is down by 5 points	.188	1	.665
Bench player in a game that the team is down by 4 points	.104	1	.747
Backup player in a clearly winning situation	.616	1	.433
Starter in a clearly losing situation	2.748	1	.097
Backup player in a close winning situation	.847	1	.357
Bench player in a clearly losing situation	.060	1	.806

* significant at the p = 0.05 level

Table 33

Starter in a Clearly Winning Competition Situation by Pass/Fail of First Aid Assessment

First Aid Assessment		Game Situation Two		Total
		Yes	No	
Fail	Count	89	180	269
	Expected Count	85.2	183.8	269
Pass	Count	1	14	15
	Expected Count	4.8	10.2	15
Total	Count	90	194	284
	Expected Count	90	194	284

Game Situation Data Sheet by Sport Coached

The second question related to the Game Situation Data Sheet is whether there is a difference when coaches return an injured athlete to competition based upon the sport that they coach. Chi-square analysis was conducted on the nine game situations by sport coached. Table 34 presents the Pearson Chi-Square value and the probability for each of the situations. Appendix I and Table 35 illustrate the actual and expected counts for each game situation. Coaches differed by sport in returning an injured bench player in a clearly losing game situation. Table 35 (Bench Player in a Clearly Losing Situation by Sport) reveals that more soccer coaches than expected returned the injured bench player, while less than expected basketball and football coaches returned the injured bench player. Soccer coaches were more likely than expected to return an injured bench player to competition in a clearly losing game situation, while basketball and football coaches were less likely than expected to return the same athlete in the same situation back to competition.

In summary, compared to football and basketball coaches, soccer coaches were more apt to return an injured bench player in a losing game situation. Coaches did not differ, by sport coached, in returning an injured athlete to play in the other eight game situations.

Table 34

Pearson Chi-Square for Game Situation Data Sheet by Sport

Situation	Pearson Chi-Square Value	df	p
Player that is third off the bench in a clearly losing situation	.128	2	.938
Starter in a clearly winning situation	.474	2	.789
Bench player in a clearly winning situation	2.288	2	.319
Starter in a game that the team is down by 5 points	1.861	2	.394
Bench player in a game that the team is down by 4 points	1.044	2	.593
Backup player in a clearly winning situation	.308	2	.857
Starter in a clearly losing situation	2.305	2	.316
Backup player in a close winning situation	4.779	2	.092
Bench player in a clearly losing situation	6.073	2	0.48*

* significant at the p = 0.05 level

Table 35

Bench Player in a Clearly Losing Situation

Sport		Game Situation Nine		Total
		Yes	No	
Football	Count	57	125	182
	Expected Count	59.6	122.4	182
Basketball	Count	6	18	24
	Expected Count	7.9	16.1	24
Soccer	Count	10	7	17
	Expected Count	5.6	11.4	17
Total	Count	73	150	223
	Expected Count	73	150	223

Game Situation Data Sheet by Gender

It is of interest whether coaches differed by gender in returning an injured athlete to competition. Chi-square analyses were conducted on the nine game situations by gender. Table 36 presents the Pearson Chi-Square value and the probability for each of the situations. Appendix J and Tables 37 and 38 illustrate the actual and expected counts for each game situation. Coaches differed by gender in returning an injured starter in a clearly winning game and a close game. Examining Table 37 (Starter in a Clearly Winning Competition Situation by Gender) more males than expected did not return the

injured starter, while more females than expected returned the injured starter. Examining Table 38 (Starter in a Game that the Team is Down by 5 Points by Gender) more males than expected returned the injured starter while more females than expected did not return the injured starter.

In summary, male and female coaches differed in returning an injured starter to play in two situations. When the team was clearly winning, more female coaches than expected returned the athlete to play, while more male coaches than expected did not return the athlete to play. However, when the game is close and their team is down by five points, more males than expected returned the injured athlete, while more females than expected did not return the athlete to play. Coaches did not differ, by gender, in returning an injured athlete in the other seven game situations.

Table 36

Pearson Chi-Square for Game Situation Data Sheet by Gender

Situation	Pearson Chi-Square Value	df	p
Player that is third off the bench in a clearly losing situation	.461	1	.497
Starter in a clearly winning situation	6.936	1	.008*
Bench player in a clearly winning situation	.091	1	.764
Starter in a game that the team is down by 5 points	4.194	1	.041*
Bench player in a game that the team is down by 4 points	.391	1	.532
Backup player in a clearly winning situation	.457	1	.499
Starter in a clearly losing situation	.581	1	.446
Backup player in a close winning situation	.377	1	.539
Bench player in a clearly losing situation	2.506	1	.113

* significant at the p = 0.05 level

Table 37

Starter in a Clearly Winning Competition Situation by Gender

Gender		Game Situation Two		Total
		Yes	No	
Male	Count	40	107	147
	Expected Count	44.5	102.5	147
Female	Count	9	6	15
	Expected Count	4.5	10.5	15
Total	Count	49	113	162
	Expected Count	49	113	162

Table 38

Starter in a Game that the Team is Down by 5 Points by Gender

Gender		Game Situation Four		Total
		Yes	No	
Male	Count	70	77	147
	Expected Count	66.2	80.8	147
Female	Count	3	12	15
	Expected Count	6.8	8.2	15
Total	Count	73	89	162
	Expected Count	73	89	162

Game Situation Data Sheet by Age

The fourth question related to the Game Situation Data Sheet is whether there is a difference when coaches return an injured athlete to competition based upon coaches' age. Chi-square analyses were conducted on the nine game situations by age. Table 39 presents the Pearson Chi-Square value and the probability for each of the situations. Appendix K and Table 40 illustrate the actual and expected counts for each game situation. Coaches differed by age in returning an injured bench player in a clearly losing game situation. Table 40 (Bench Player in a Clearly Losing Situation by Sport) reveals that more coaches than expected in the 44-62 age group withheld a bench player in a

clearly losing situation, while more coaches than expected in the 37 and below age group returned an injured bench player in the same situation.

In summary, coaches in the 44-62 age group were more likely to keep an injured bench player from returning in a game that they were clearly losing. However, coaches in the 37 years of age and below group were more likely to return an injured bench player in a losing contest. Coaches did not differ in returning an injured athlete in the other eight game situations.

Table 39

Pearson Chi-Square for Game Situation Data Sheet by Age

Situation	Pearson Chi-Square Value	df	p
Player that is third off the bench in a clearly losing situation	1.891	3	.595
Starter in a clearly winning situation	3.778	3	.286
Bench player in a clearly winning situation	.864	3	.834
Starter in a game that the team is down by 5 points	4.250	3	.236
Bench player in a game that the team is down by 4 points	2.362	3	.501
Backup player in a clearly winning situation	.554	3	.907
Starter in a clearly losing situation	.215	3	.975
Backup player in a close winning situation	2.795	3	.424
Bench player in a clearly losing situation	9.969	3	.019*

* significant at the p = 0.05 level

Table 40

Bench Player in a Clearly Losing Situation by Age

Age		Game Situation Nine Yes	No	Total
37 and below	Count	18	22	40
	Expected Count	13.6	26.4	40
38-40	Count	16	19	35
	Expected Count	11.9	23.1	35
41-43	Count	6	21	27
	Expected Count	9.2	17.8	27
44-62	Count	5	25	30
	Expected Count	10.2	19.8	30
Total	Count	45	87	132
	Expected Count	45	87	132

Game Situation Data Sheet by Years of Coaching

The fifth question related to the Game Situation Data Sheet is whether there is a difference when coaches return an injured athlete to competition based upon years of coaching experience. Chi-square analyses were conducted on the nine game situations by years of coaching experience. Table 41 presents the Pearson Chi-Square value and the probability fo

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probability for each of the situations. Appendix L and Table 42 illustrate the actual and expected counts for each game situation. Coaches differed by years of coaching in returning a starter in a game when their team was down by 5 points. Table 42 (Starter in a Game that the Team is Down by 5 Points) shows that more coaches than expected in the 0-2 years of coaching experience group withheld the starter in a close game situation, while more coaches than expected in the 5-9 years of coaching experience group returned an injured starter in the same situation.

In summary coaches with 0-2 years of coaching experience were more likely to keep an injured starter from returning in a close game. However, coaches with 5-9 years of coaching experience were more likely to return an injured starter in a close contest. Coaches did not differ on the other eight game situations by years of coaching experience.

Table 41

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Table 41

Pearson Chi-Square for Game Situation Data Sheet by Years of Coaching

Situation	Pearson Chi-Square Value	df	p
Player that is third off the bench in a clearly losing situation	7.393	3	.060
Starter in a clearly winning situation	4.048	3	.256
Bench player in a clearly winning situation	4.095	3	.251
Starter in a game that the team is down by 5 points	8.768	3	.030*
Bench player in a game that the team is down by 4 points	3.145	3	.370
Backup player in a clearly winning situation	2.952	3	.399
Starter in a clearly losing situation	.863	3	.834
Backup player in a close winning situation	1.784	3	6.18
Bench player in a clearly losing situation	1.605	3	.658

* significant at the p = 0.05 level

Table 42

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Table 42

Starter in a Game when the Team is Down by 5 Points

Years of Coaching		Game Situation Four		Total
		Yes	No	
0 - 2	Count	10	25	35
	Expected Count	16	19	35
3 - 4	Count	16	24	40
	Expected Count	18.3	21.7	40
5 - 9	Count	26	17	43
	Expected Count	19.6	23.4	43
10 - 27	Count	22	22	44
	Expected Count	20.1	23.9	44
Total	Count	74	88	162
	Expected Count	74	88	162

Game Situation Data Sheet by Number of Sports Coached

The sixth question associated with the game situation data sheet was whether there was a difference in when a coach would return an injured athlete to competition based upon the number of sports that the coach had experience coaching. Chi-square analyses were conducted on the nine game situations by number of sports coached. Table 43 presents the Pearson Chi-Square value and the probability for each of the situations.

Appendix M illustrates the actual and expected counts for each game situation. Coaches did not differ on the nine game situations by number of sports coached.

Table 43

Pearson Chi-Square for Game Situation Data Sheet by Number of Sports Coached

Situation	Pearson Chi-Square Value	df	p
Player that is third off the bench in a clearly losing situation	1.065	3	.785
Starter in a clearly winning situation	2.274	3	.517
Bench player in a clearly winning situation	6.005	3	.111
Starter in a game that the team is down by 5 points	3.944	3	.268
Bench player in a game that the team is down by 4 points	2.708	3	.439
Backup player in a clearly winning situation	.918	3	.821
Starter in a clearly losing situation	3.729	3	.292
Backup player in a close winning situation	.920	3	.821
Bench player in a clearly losing situation	2.570	3	.463

Game Situation Data Sheet by Educational Background

The seventh question related to the Game Situation Data Sheet is whether there was a difference when coaches return an injured athlete to competition based on education

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educational background. Chi-square analyses were conducted on the nine game situations by educational background. Table 45 presents the Pearson Chi-Square value and the probability for each of the situations. Appendix N illustrates the actual and expected counts for each game situation. Coaches did not differ on the nine game situations by educational background.

Table 44

Pearson Chi-Square for Game Situation Data Sheet by Educational Background

Situation	Pearson Chi-Square Value	df	p
Player that is third off the bench in a clearly losing situation	5.778	3	.123
Starter in a clearly winning situation	4.022	3	.259
Bench player in a clearly winning situation	1.269	3	.737
Starter in a game that the team is down by 5 points	.940	3	.816
Bench player in a game that the team is down by 4 points	1.216	3	.749
Backup player in a clearly winning situation	1.921	3	.589
Starter in a clearly losing situation	2.882	3	.410
Backup player in a close winning situation	4.519	3	.211
Bench player in a clearly losing situation	2.320	3	.509

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Game Situation Data Sheet by Gender of Athletes

The eighth question pertaining to the Game Situation Data Sheet is whether there was a difference when coaches return an injured athlete to competition based upon gender of the athletes. Chi-square analyses were conducted on the nine game situations by gender of the athletes coached. Table 46 presents the Pearson Chi-Square value and the probability for each of the situations. Appendix O illustrates the actual and expected counts for each game situation. Coaches did not differ on the nine game situations by gender of athletes coached.

Table 45

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Table 45

Pearson Chi-Square for Game Situation Data Sheet by Gender of Athletes

Situation	Pearson Chi-Square Value	df	p
Player that is third off the bench in a clearly losing situation	2.801	2	.246
Starter in a clearly winning situation	1.967	2	.374
Bench player in a clearly winning situation	1.820	2	.403
Starter in a game that the team is down by 5 points	2.848	2	.241
Bench player in a game that the team is down by 4 points	3.877	2	.144
Backup player in a clearly winning situation	.332	2	.847
Starter in a clearly losing situation	.094	2	.954
Backup player in a close winning situation	1.414	2	.493
Bench player in a clearly losing situation	3.321	2	.190

Game Situation Data Sheet by Formal First Aid Training

Whether there was a difference in when a coach returns an injured athlete to competition based upon the coaches' formal first aid training was of interest to this study. Chi-square analyses were conducted on the nine game situations by formal first aid training. Table 47 presents the Pearson Chi-Square value and the probability for each of the situatio

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Table 46

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the situations. Appendix P illustrates the actual and expected counts for each game situation. Coaches did not differ on the nine game situations by formal first aid training.

Table 46

Pearson Chi-Square for Game Situation Data Sheet by Formal First Aid Training

Situation	Pearson Chi-Square Value	df	p
Player that is third off the bench in a clearly losing situation	.303	1	.582
Starter in a clearly winning situation	3.521	1	.061
Bench player in a clearly winning situation	.007	1	.935
Starter in a game that the team is down by 5 points	.515	1	.473
Bench player in a game that the team is down by 4 points	1.574	1	.210
Backup player in a clearly winning situation	.002	1	.963
Starter in a clearly losing situation	1.373	1	.241
Backup player in a close winning situation	2.778	1	.096
Bench player in a clearly losing situation	.164	1	.685

Game Situation Data Sheet by American Red Cross First Aid Training

The tenth question related to the Game Situation Data Sheet is whether there was a difference when coaches return an injured athlete to competition based on the coaches'

American Red Cross first aid training. Chi-square analysis was conducted on the nine game situations by American Red Cross first aid training. Table 48 presents the Pearson Chi-Square value and the probability for each of the situations. Appendix Q illustrates the actual and expected counts for each game situation. Coaches did not differ on the nine game situations by American Red Cross first aid training.

Table 47

Pearson Chi-Square for Game Situation Data Sheet by American Red Cross First Aid Training

Situation	Pearson Chi-Square Value	df	p
Player that is third off the bench in a clearly losing situation	.010	1	.919
Starter in a clearly winning situation	1.496	1	.221
Bench player in a clearly winning situation	1.117	1	.291
Starter in a game that the team is down by 5 points	.008	1	.930
Bench player in a game that the team is down by 4 points	.164	1	.685
Backup player in a clearly winning situation	.486	1	.486
Starter in a clearly losing situation	.004	1	.950
Backup player in a close winning situation	3.405	1	.065
Bench player in a clearly losing situation	2.769	1	.096

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Game Situation Data Sheet by CPR Training

The eleventh question related to the Game Situation Data Sheet is whether there was a difference when coaches return an injured athlete to competition based on whether the coach had CPR training. Chi-square analyses were conducted on the nine game situations by CPR training. Table 49 presents the Pearson Chi-Square value and the probability for each of the situations. Appendix R and Table 50 illustrates the actual and expected counts for each game situation. Table 50 (Backup Player in a Close Winning Situation by CPR Training) reveals that more coaches than expected that had CPR training would return the backup player in a close winning situation, while more coaches than expected that did not have CPR training withheld the injured back up player in the same situation. Coaches did not differ on the other eight game situations by CPR training.

In summary, coaches that had CPR training were more likely to return an injured backup player to a close game that they were winning. However, coaches that were not CPR trained were more likely not to return an injured backup player in a close winning contest. Coaches did not differ in returning an injured athlete in the other eight game situations.

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Table 48

Pearson Chi-Square for Game Situation Data Sheet by CPR Training

Situation	Pearson Chi-Square Value	df	p
Player that is third off the bench in a clearly losing situation	.046	1	.831
Starter in a clearly winning situation	1.522	1	.217
Bench player in a clearly winning situation	.092	1	.762
Starter in a game that the team is down by 5 points	1.233	1	.267
Bench player in a game that the team is down by 4 points	.901	1	.342
Backup player in a clearly winning situation	.003	1	.954
Starter in a clearly losing situation	.412	1	.521
Backup player in a close winning situation	4.960	1	.026*
Bench player in a clearly losing situation	.881	1	.348

*significant at the p = 0.05 level

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Table 49

Backup Player in a Close Winning Situation by CPR Training

CPR		Game Situation Eight Yes	No	Total
Yes	Count	35	25	60
	Expected Count	28.6	31.4	60
No	Count	28	44	72
	Expected Count	34.4	37.6	72
Total	Count	63	69	132
	Expected Count	63	69	132

Game Situation Data Sheet by Current First Aid Certification

Of interest to this study was whether there is a difference when coaches return an injured athlete to competition based on whether their first aid certification is current or not. Chi-square analyses were conducted on the nine game situations by current first aid certification. Table 51 presents the Pearson Chi-Square value and the probability for each of the situations. Appendix S and Table 52 illustrates the actual and expected counts for each game situation. Table 52 (First off the Bench in a Clearly Losing Competition Situation by Current First Aid Certification) reports that more coaches than expected that had current first aid certification would return the backup player in a clearly losing situation, while more coaches than expected that did not have a current first aid certification did not return the injured back up player in the same situation. No statistical difference was found for the other eight game situations by current first aid certification.

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In summary, coaches that are currently certified in first aid were more likely to return an injured backup player to a game that they were clearly losing. However, coaches that were not first aid certified trained were more likely not to return an injured backup player in a clearly losing contest. Coaches did not differ in returning an injured athlete in the other eight game situations.

Table 50

Pearson Chi-Square for Game Situation Data Sheet by Current First Aid Certification

Situation	Pearson Chi-Square Value	df	p
Player that is third off the bench in a clearly losing situation	7.278	1	.007*
Starter in a clearly winning situation	.105	1	.746
Bench player in a clearly winning situation	1.175	1	.278
Starter in a game that the team is down by 5 points	1.326	1	.250
Bench player in a game that the team is down by 4 points	.661	1	.416
Backup player in a clearly winning situation	.523	1	.469
Starter in a clearly losing situation	.302	1	.583
Backup player in a close winning situation	.038	1	.846
Bench player in a clearly losing situation	.065	1	.798

*significant at the p = 0.05 level

Table 51

First off the Bench in a Clearly Losing Competition Situation by Current First Aid Certification

Current First Aid Certification		Game Situation One		Total
		Yes	No	
Yes	Count	5	16	21
	Expected Count	1.8	19.2	21
No	Count	9	135	144
	Expected Count	12.2	131.8	144
Total	Count	14	151	165
	Expected Count	14	151	165

Game Situation Data Sheet by Current CPR Certification

The thirteenth question related to the Game Situation Data Sheet was whether there was a difference when coaches return an injured athlete to competition based on whether the coach was currently CPR certified. Chi-square analyses were conducted on the nine game situations by CPR certification. Table 53 presents the Pearson Chi-Square value and the probability for each of the situations. Appendix T illustrates the actual and expected counts for each game situation. Coaches did not differ in returning an injured athlete based upon the nine game situations.

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Table 52

Pearson Chi-Square for Game Situation Data Sheet by Current CPR Certification

Situation	Pearson Chi-Square Value	df	p
Player that is third off the bench in a clearly losing situation	3.161	1	.075
Starter in a clearly winning situation	.159	1	.690
Bench player in a clearly winning situation	1.585	1	.208
Starter in a game that the team is down by 5 points	3.129	1	.077
Bench player in a game that the team is down by 4 points	.295	1	.587
Backup player in a clearly winning situation	.227	1	.634
Starter in a clearly losing situation	.000	1	1.00
Backup player in a close winning situation	.221	1	.638
Bench player in a clearly losing situation	.006	1	.939

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CHAPTER V

Discussion

The purpose of this study was to measure the first aid and injury prevention knowledge of youth basketball, soccer, and football coaches and to assess the decision-making ability of these youth coaches in determining the playing status of an injured athlete. A revised American Red Cross First Aid Assessment (Ransone & Dunn-Bennett, 1999) was used to evaluate the first aid and injury prevention knowledge of the youth coaches. The Game Situation Data Sheet (Flint & Weiss, 1992) was used to assess the decision-making ability of the youth coaches in deciding whether or not to return an injured athlete back to competition.

Currently, there is no nationally recognized injury prevention program that is required of youth coaches. In order to determine if there is a need for such a program, the first aid and injury prevention knowledge that youth coaches possess needed to be evaluated. The research questions of this study were: what is the first aid and injury prevention knowledge of youth coaches; is there a difference in the first aid knowledge based upon what sport was coached, coaches' gender, coaches' age, number of years coaching experience, educational background, and first aid and CPR training; when would a coach return an injured athlete to competition; and is the decision to return an injured player different based upon passing/failing the FAA, sport that was coached, coaches' gender, coaches' age, number of years coaching experience, educational background, and first aid and CPR training.

First Aid Assessment

Fifteen coaches (5.17%) out of 290 coaches earned a passing score on the First Aid Assessment (FAA). Such a percentage is appalling. Youth coaches have our children under their supervision for approximately 2-10 hours a week. One would not bring their child to a daycare where only five percent of the staff had passed a first aid examination, why would parents allow their child to be coached by such inept coaches?

Most youth sport organizations require that a parent sign a medical release form. This medical release form is to be used in case their child needs to be treated at a hospital and they are not available. Youth coaches are the ones that will be determining whether or not to call the parent, take the child to the hospital, or alert the emergency medical services if an injury occurs during a practice or game. Youth coaches are making medical decisions without the medical knowledge needed to make such decisions.

Of the 170 coaches who completed the demographic sheet 96 reported having some type of formal first aid training. Eighty-four (87.5%) of those coaches who reported having formal first aid training failed the FAA. This indicates that having formal first aid training at some time during one's life does not increase their first aid knowledge. Apparently the information that is gained during first aid training is not being retained. Those taking the first aid courses may be learning the material in order to pass the examination that is given to become certified; they are not retaining the information well enough to be competent in dispensing first aid.

Twenty-one (12.4%) coaches reported being current first aid certified. Of those 21 coaches only five passed the FAA. Being currently first aid certified does not improve one's score on a first aid examination. Currently, first aid certification has to be renewed

every three years. Three years is a long time for one's knowledge to be retained. Additionally, first aid re-certification does not challenge one's first aid knowledge. Rather it is a matter of checking off skills and taking a short written examination. If one does not practice the first aid skills that are taught during the first aid courses or that are reviewed during re-certification courses, one is unlikely to be able to recall the necessary skills when they are needed. Because many people do not practice their first aid skills on a daily or weekly bases, first aid re-certification should be conducted more frequently. Currently CPR re-certification is conducted on a yearly bases. Those in charge of CPR certification see the need to review CPR skills on a yearly bases. First aid certification should be done yearly, like CPR, and should be more comprehensive and challenging to enhance the chance that the knowledge is retained.

Similar results have been found in previous investigations. Ransone and Dunn-Bennett (1999) reported having a higher percentage of coaches passing the FAA. Thirty-eight (36%) of the 104 coaches that participated passed the FAA. Of those 104 high school coaches 96 (92%) were currently certified in first aid, as required by California law. In 1986 Rowe and Robertson developed and administered a first aid test to Alabama high school coaches. Only 34 (27%) of the 127 coaches tested earned a passing score. In 1991 Rowe and Miller administered the same test to Georgia high school coaches. Fifty (38%) of the 130 Georgia high school coaches passed the first aid test, in light of 116 (89%) of the coaches having current first aid certification.

The results of this study and other similar studies have found that, for some, a coach's score on a first aid examination does not appear to be enhanced by being currently first aid certified or having formal first aid training. As previously mentioned, a per

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person may have not retained the information that they received during their first aid certification. Additionally, some coaches may have been certified for many years and others may have just been certified. Those coaches who have been certified for many years have had more time to be exposed and to refine their first aid knowledge and techniques. While those that have only been certified for a year or two may not have had enough time and practice for the information to be retained.

Just because the coaches did not pass the FAA does not mean that they do not possess the information or are capable of handling a situation in which they would need to perform first aid skills, but it is less likely that they have the first aid knowledge. Some coaches were nervous taking the examination. Nervousness in taking an exam may transfer over to that coach being nervous and unable to handle a situation in which they would need to provide first aid to a youth athlete. When dealing with youth athletes the first aid provider needs to be calm, cool, and collected in order to aid the child in dealing with the injury. Children are able to sense if an adult is nervous, and if they sense that the adult is nervous they will be more upset, be unable to deal with the pain, or even go into shock. Children are interesting people, if the person helping them are calm and reassuring, the youths are able to better handle the situation. None-the-less, further steps need to be taken to enhance the first aid knowledge base of youth coaches.

Injury prevention is just as important as being able to provide first aid care. Courses such as the American Red Cross Basic First Aid, Community First Aid, and First Aid with CPR do not address the issue of injury prevention. Youth coaches may be putting their athletes in undue risk by the way they conduct practice. From the type of drills they conduct, the amount of time they have the athletes do the drills, or to how

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many water breaks they provide for the athletes may all put the athlete at risk of injury. Over the years it has been determined that some drills that were done in the past are not safe. Youth coaches who have no formal training on how to coach will rely on how they were coached, thus they might have the athletes perform unsafe drills. Having the athletes do repetitive movements (drills) may put the athlete at risk for an overuse injury. Overuse injuries are injures that require a lot of time, patience, and proper technique to heal. Some coaches use water breaks as rewards for their team performing well. Thus, if their team is not performing well, they will not get a water break. Such punishment puts the athletes at risk for heat-related injuries. Such injuries could be fatal.

Youth coaches and youth organizations are placing themselves at risk for liability lawsuits. Youth coaches are liable for taking care of the youth athletes under their supervision. That includes if the athlete gets hurt. In Duda v. Gaines, a high school coach was found negligent for improper care when a football player dislocated his shoulder (Shroyer, 1982). Rather than summoning emergency medical services the coach relocated the shoulder. Three days later the child's shoulder dislocated again, causing more damage than the first dislocation. In the 1975 Thompson v. Seattle Public School District case, Thompson was awarded 6.4 million because the high school coaches did not warn him of the danagers of participating in football and for teaching improper tackling techniques (Lubell, 1987). As a result Thompson was left as a quadriplegic. Such cases can not only occur at the high school level but also at the youth level.

The youth coach needs to be able to not only prevent injuries from occurring but they have to be able to perform basic first aid care for the injured athlete. Youth coaches are most likely able to identify major injuries such as a fractured femur, due to the

extreme pain and deformity that is associated with such an injury. In such cases youth coaches know that further medical attention is needed and are able to ascertain such help. There are many other major injuries that are not as obvious. Youth coaches need to know when further medical attention is needed and be able to send for such help. In order to know when further medical attention is needed a youth coach needs to be able to identify an injury as being serious. Youth coaches may not be able to tell the difference between a sprain and a contusion. Basic first aid courses do not distinguish between such injuries; those that take such classes are instructed to treat all injuries as though they were the most serious of injuries (fractures/dislocations). Additionally, youth coaches are not knowledgeable in determining if the youth athlete can return to participation. Many organizations do not have set standards or protocols for when an athlete can return to participation following an injury.

There were significant findings when considering the five first aid constructs as the dependent variables and the following independent variables: sport coached, coaches' age, years of coaching experience, educational background, gender of athletes coached, formal first aid training, CPR certification, and current first aid or CPR certification. Not all of the dependent variables (injury prevention, injury identification/general medical knowledge, CPR, injury management, and wound care) were found to have a significant relationship with each of the previously mentioned variables.

The injury identification/general medical knowledge was significantly different between soccer and football coaches. One reason for the difference in knowledge between soccer and football coaches may be due in part to the fact that travel soccer coaches in this study are required to have first aid training. It appears that such training

increases a coach's injury identification/general medical knowledge, but does not significantly increase their injury prevention, CPR, injury management, and wound care knowledge. The training that the soccer coaches receive may focus on injury identification rather than on the prevention and care of such injuries. The type of training that travel soccer coaches undergo is not known. Such training may be conducted by organizations other than the American Red Cross. Such programs may be conducted in such a manner that allows for skills to be practiced.

No difference was found between soccer and basketball coaches or between basketball and football coaches. Due to the fact that both basketball and football programs do not require their coaches to have first aid training may be the reason for not finding a difference between those groups. Thus, those that are not required to be trained possess the same amount of first aid knowledge independent of whether they coach basketball or football. The low number of basketball and soccer coaches may have been a reason for not finding a significant difference between those two groups. Further research is needed to examine this issue to determine the reason(s) for the differences in injury identification/general medical knowledge between soccer and football coaches and if there is really a difference between soccer and basketball coaches. The difference in knowledge may be due to the additional coaches' training that soccer coaches receive.

Knowledge of injury prevention was significantly different based upon the years of coaching experience. Post hoc analysis revealed a difference between the coaches in the five to nine years and the 10-27 years of coaching experience groups. One would think that the difference would have been between the coaches with the fewest years of coaching experience and the coaches with the most coaching experience. The coaches

with 10-27 years of experience may have gained more injury prevention knowledge through coaching over the years. Those coaches that have not been coaching very long, zero to two years, may have benefited from injury prevention techniques that they were exposed to during high school or college classes. Those that have coached between five and nine years may not have benefited from coaching experience, nor have they benefited from the latest injury prevention knowledge that is readily available at many high schools and colleges.

Educational background impacts a coach's score on some of the first aid constructs. Coaches were divided into groups based upon their educational experience. Coaches that had either graduated from high school, earned a high school equivalent, or had some high school experience were grouped in the high school group. Those with any college experience, an associates degree, or a bachelors degree were grouped under the title of college. Those coaches that had earned an advanced degree, Masters or Ph.D, were classified as the advanced degree group. All others composed the other category.

There was a significant difference among the educational background groups for the injury identification/general medical knowledge and the injury management constructs. There was no significant difference for the other three constructs with the independent variable educational background.

The injury identification/general medical knowledge construct was significant. The results of the post hoc Scheffe test indicated that there was a significant difference between the high school and the college categories and between the high school and advanced degree categories. Injury identification/general medical knowledge increases from high school to college, but does not increase from college to an advanced degree

education. Those that enter college may have taken classes related to such knowledge compared to those that only completed some or all of high school. Advanced education, college or advanced degrees, may refine a person's ability to correctly answer questions on a test.

An advanced degree does not increase a coach's injury identification/general medical knowledge, however, one reason for this non-significant result between the college and advanced degree groups may be explained by the type of education that one has received. Earning an advanced degree in business most likely will not increase one's knowledge in the identification of injuries.

Injury management knowledge differed between the high school and advance degree groups and between the college and advanced degree groups. This finding was interesting, in that there is a difference between the college and advanced degree groups. Thus, education beyond some college experience, an Associate's or a Bachelor's degree, improves one's injury management knowledge. One reason for this improvement may be the area in which those with advanced degrees attained their degrees. Those that earned a Ph.D. may have earned such degree in a field that deals with aspects of injury management, such as large animal sciences. There was at least one coach that was in the field of study that dealt with the raising of cattle. This persons' knowledge of injury management in dealing with cattle may have transferred over to injury management knowledge of youth athletes.

The injury identification/general medical knowledge construct was significantly different for the gender of athletes coached. This difference was only found between those coaches who coached predominantly male athletes and predominantly female athle

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athletes. Coaches who coached predominantly female athletes scored significantly higher than those that coached predominantly male athletes. Eleven (73%) of the fifteen female coaches coached predominately female teams. While only 20 (13%) of the 152 male coaches coached predominantly female teams. One reason for the difference in knowledge maybe due to the fact that females are the primary caretakers of children. These women may have a maternal instinct or have more experience in handling general medical issues compared to their male counterparts. The attitudes of coaches may differ based upon the gender of their athletes. Those that coach female athletes may think of their athletes being delicate and want to be over protective. While those that coach predominately male athletes may have the mind set that it is alright to play with pain, or that one should show that he is a man by playing through the pain.

Formal first aid training enhances the knowledge of youth sport coaches in some of the first aid constructs. Injury identification/general medical knowledge, injury management, and wound care constructs were significantly different between those that had some form of formal first aid training and those that did not have training. Those coaches with the formal first aid training possessed more knowledge in those constructs compared to those coaches that did not have formal first aid training. The injury prevention construct approached significance.

The injury identification/general medical knowledge, injury management, and wound care constructs were significantly different, and were areas that youth sport coaches will encounter most often. It is important that these coaches know how to prevent injuries from happening, identify injuries when they do happen, and manage those injuries and wounds. Very rarely will a youth coach be in a situation that they will have t

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have to perform CPR. If a coach was in a situation that CPR needed to be performed, he/she would contact the emergency medical services. Emergency medical services are typically not contacted for minor injuries such as lacerations, abrasions, sprains, and strains, but youth coaches need to be able to prevent, identify, and care for such injuries.

Youth sport coaches receiving CPR training had increased knowledge in the areas of injury identification/general medical knowledge and wound care. Of the 79 coaches that reported being CPR trained, 61 (77%) coaches had reported having formal first aid training. CPR training may have occurred in conjunction with first aid training. This maybe the reason for the significant difference in injury identification/general medical knowledge and wound care.

Interestingly, coaches who did not have CPR training had a higher mean score on the CPR construct. This difference was not significant. One possible reason for this finding is that those without CPR training may have randomly guessed correctly. The mean score of the CPR construct was just over 50% correct for both groups for the four CPR questions. The technique of CPR can be seen almost daily on television or on posters in the work place. Those that are not CPR trained may have been influenced by other factors or other ways of learning the basic technique of CPR.

Coaches with current first aid certification had a higher score on the injury prevention, injury identification/general medical knowledge, injury management, and wound care constructs compared to those coaches without training. The difference between the two groups was significant for the wound care construct only. The majority of first aid training stresses injury and wound management. The fact that there was a

significant difference in wound care knowledge, shows that first aid certification really does enhance some of the areas that it focuses on.

It was surprising that there was not a significant difference in the injury management construct. A reason for not finding a significant difference in the injury management construct may be due to the low number, 21 (12%), of coaches that had current first aid certification. Another reason for such a difference is that coaches are more likely to treat the majority of non-wound injuries in the same cautious manner, using RICE (rest, ice, compression, and elevation).

Coaches without first aid certification scored higher on the CPR construct than coaches with first aid certification. First aid certification does not necessarily improve one's CPR knowledge. Most first aid certification processes do not contain information about CPR. Theoricially, only those that are both CPR and first aid certified would have done better on the CPR certification section. Out of the 21 coaches that were currently first aid certified, 20 were currently CPR certified. Thus, there must be another reason for this finding. One such reason for this finding may be due to coaches that are not currently certified may have randomly selected the correct answers to the four CPR construct questions. Additionally, those that are not currently CPR certified may have been certified earlier in life and retained the knowledge necessary to answer the questions on the FAA.

Like those that are currently first aid certified, those that are currently CPR certified had a significantly higher knowledge level in the wound care construct compared to coaches that were not CPR certified. Of the 30 coaches that were CPR certified, 20 (67%) of these coaches also had current first aid certification. One reason why

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why those with CPR certification scored higher on the wound care construct may be due to a cross-over effect of being currently first aid certified. Interestingly, those that are currently CPR certified scored lower on the CPR construct. As stated previously, this may be due to non-certified coaches correctly guessing on the CPR questions. Additionally, 55 (70%) of the 79 coaches that reported having been trained in CPR were currently not CPR certified. Thus, those coaches may have been using prior knowledge to answer the CPR construct questions.

Game Situation Data Sheet

Coach's decisions to return an injured athlete to competition are dependent upon the game situation and the player involved (starter, backup, or bench player). The results of the Game Situation Data Sheet in this study were similar to the results reported by Flint and Weiss (1992). Youth coaches are likely to return an injured starter to competition 14.8%, 31.7%, and 45.4% when the game situation is that their team is clearly losing, clearly winning, or in a close competition respectively. In a clearly winning situation or clearly losing situation 13.4% and 10.9% of coaches, respectfully returned a first substitute. While in a close game situation, 45.3% of coaches would return the first substitute to the game. When the injured athlete is a bench player, coaches are likely to return them 32.7%, 13.4%, and 23.2% of the time in a clearly losing, clearly winning, or close game situation respectively.

In a close game, coaches were more apt to return an injured starter and first substitute to the game than an injured bench player. A reason for these decisions by the coaches could be due to a role conflict. Many coaches feel that it is their main responsibility is to win the game, and they would do anything to succeed at that goal.

Coaches want their best athletes on the court/field at the time when the game is in the balance. That is why coaches would return an injured starter or first substitute while keeping an injured bench player out in a close game situation.

A coach's responsibility is not only to win the competition but to enhance the skills of lesser players. In a clearly losing situation youth coaches are more likely to return an injured bench player than a starter or first substitute. A clearly losing situation is a perfect opportunity to allow the players with less skill a chance to have game experience and refine their skills in a game situation.

Youth coaches differ from high school coaches in their decisions to return athletes to competition in a game situation that they are clearly winning. High school coaches (Flint & Weiss, 1992) were more likely to return an injured bench player and first substitute than a starter in a clearly winning situation. A good reason for doing so is not to put the starter in a situation that they may further injure themselves when the game is already determined. Youth coaches on the other hand were more likely to return an injured starter, compared to first substitute and bench player, to a clearly winning situation. High school coaches appear to err on the side of caution with their starters in a clearly winning situation. Youth coaches do not follow their high school counterparts. Youth coaches are more likely to return an injured starter to a winning contest. One reason for returning an injured starter to competition in a game in which the team is winning is to maintain the lead. Youth coaches may replace the injured starter towards the end of the contest when the final game outcome has been determined.

There were significant findings when considering the nine game scenarios and the following: pass/fail the FAA, sport coached, coaches' gender, coaches' age, years of

coaching experience, CPR training, and current first aid certification. Not all of the game situations were found to have a significant relationship with each of the previously mentioned variables.

The decision to return an injured starter to a winning competition differed by whether a coach passed or failed the FAA. Coaches that passed the FAA were more likely to not return the injured starter, while those that failed the FAA were more likely to return the injured starter. The coaches that passed the FAA had a better understanding of the injury, the game situation, and the rank of the injured player. The game situation was one in which the team was winning easily. A prudent coach would not risk further injury to a player that is good enough to start.

Those that passed the FAA had more of a first aid knowledge base to make the decision on whether or not to return the injured starter to competition. The injury in this particular situation was that the athlete had a dislocated finger that was reduced and checked for a fracture. All dislocations should be evaluated by a doctor for reduction and examination for fractures or other potentially serious injuries. Thus keeping the injured athlete out was the correct decision to make no matter what the rank of the player. Coaches that did not pass the FAA either did not understand the severity of the injury or were affected by the athlete wishing to return to competition.

Youth coaches not only have the coach/first aid provider conflict, what to do as a coach and what to do as a first aid provider, but they also have to deal with the youth athletes themselves and the parents of those athletes. Coaches may be affected by how the youth athlete acts or what they say. A youth athlete may lie and say that they are not in any pain in order to return to the game. A youth coach may also be pressured by

parents to return an athlete to competition. It is up to the coach to be able to read the athletes' other behaviors to determine if the athlete is really experiencing pain. When in doubt the coach should always err on the side of caution.

Soccer coaches were more apt to return an injured bench player to a losing competition than basketball and football coaches. Out of the 15 coaches that passed the FAA five (33.33%) of them were soccer coaches, this is an interesting finding because there were so few soccer coaches in the subject pool. The youth soccer coaches possessed significantly more injury identification/general medical knowledge than football and basketball coaches. Soccer coaches also possessed more injury prevention and wound care knowledge, though these differences were not significant. The increase in the knowledge base of soccer coaches made them feel more able to evaluate an injured athlete and decide whether to return them to competition. Youth basketball and football coaches lacked the first aid knowledge in being able to identify this injury, but this lack of knowledge lead them to be more likely to withhold the injured athlete.

Soccer coaches may have been affected by the coach/first aid provider role conflict in a game situation that involves a losing contest and an injured bench player. A losing contest is a perfect opportunity for those with less skill to gain real game experience. Soccer coaches value the game experience over the care for an injured athlete.

The injured bench player had a groin pull that was not causing more than some minor discomfort for the player. As long as the athlete is experiencing pain they should not be allowed to return to competition, especially if the injury had just happened (as in this game situation). With all three sports there is sprinting involved, such explosive

maneuvers may cause additional injury to the groin. The athlete in this situation should not have been returned to competition.

Male and female coaches differed in returning an injured starter in a clearly winning and a close game situations. When their team was clearly winning, more female coaches than expected returned the athlete to play, while more male coaches than expected did not return the athlete to play. When the game is close and their team is down by five points, more males than expected returned the injured athlete, while more females than expected did not return the athlete to play. These results need to be evaluated with respect to the low number of female coaches that participated in this study and the type of injury the athlete suffered.

With the team clearly winning and the injury being a dislocated finger, more female coaches than expected returned the injured starter to competition, while more males than expected did not return the injured starter in the same game scenario. Males were more reluctant to return an injured starter when they are easily winning the game. Either the male coaches do not want to risk further injury to one of their best athletes or realized the severity of the injury. On the other hand female coaches returned the injured athlete despite the athlete having a dislocated finger. All dislocations need to be seen by a doctor for reduction and further evaluation. Female coaches may have wanted their starter to continue playing to possibly make sure that they continue to easily win this competition.

When the team is down by four points and the injury is a sprained ankle, more male coaches than expected returned the injured starter, while more female coaches than expected withheld the athlete. It appears that the male coaches were influenced by the game situation in their decision to return the athlete or not to return the athlete. Female coaches are not affected by the game situation, but rather are concerned with the injury the athlete has suffered.

In both game situations the injured body segment was supported with tape and the athlete either asks to return the game or assures the coach that they are fine. Male and female coaches seem to be influenced by the combination of the game situation and the athlete informing them that they are all right.

The decisions made by the female coaches are intriguing. It does not make sense to return an athlete with a dislocated finger and withhold an athlete with a sprained ankle. This would lead one to think that the female youth coaches do not understand the serious nature of a dislocation injury. They know that an ankle sprain is not a minor injury, and that an athlete with such an injury should be held out, but they do not know that a player with a dislocated finger should be sent to the hospital.

Older coaches, age categories 41-43 and 44-62, were more likely to err on the side of caution when a bench player was injured in a clearly losing situation. Coaches in the younger two age categories were more likely to return the injured athlete to the game. This may be due to more life experience with age or the older coaches having a better perspective on a game situation and an injured athlete. The injury in this game situation was a groin pull that appears to be causing minor discomfort. This athlete should have been withheld from competition due to them experiencing pain. The younger coaches see this as an opportunity for this player to have game experience.

When a starter is injured in a close game situation coaches with zero to two years of coaching experience are more cautious about returning the athlete back to competition

compared to coaches with five to nine years of coaching experience. Coaches with five to nine years of coaching experience may have relied on their observations of other athletes that a child can play with a minor ankle sprain. Coaches in the five to nine years of coaching experience had the lowest injury prevention knowledge. Their knowledge was significantly less than that of the coaches with 10-27 years of coaching experience. The lack of injury prevention knowledge may have transferred over to them thinking that a sprained ankle is a minor injury that can be played with even if it is causing pain.

Just a few more coaches than expected with 10-27 years of coaching experience returned the injured starter in the same game situation. It appears that an increase in coaching experience increases one's confidence in deciding that an injured athlete may return to participation.

Coaches who had CPR training were more likely to return an injured backup player to a close game that they were winning. CPR training does not enhance one's knowledge of low back injuries. Coaches may have become over confident due to their training. This finding is interesting due to the fact that there was no significant finding for coaches that were currently CPR certified. Thus, those coaches that have had CPR training but are not currently CPR certified are more likely to return an injured backup player.

Coaches who were currently first aid certified were more cautious about returning an injured back up player in a clearly losing game situation. The knowledge gained through being currently first aid certified transferred over to youth coaches being careful about returning an injured bench player with a hyper-extended elbow injury. One would think that the knowledge gained from current first aid certification would cause a youth coach to be cautious in returning any level athlete in any game situation. From these results youth coaches that are certified in first aid certification also experience the coach/first aid provider conflict.

Points of Interest

First Aid Assessment

Examination of the score on the first aid assessment in relationship to gender, number of sports coached, coaches' age, and American Red Cross First Aid Training revealed no statistically significant differences. There were no significant findings for all five of the first aid constructs when considering these variables. One would not expect there to be a difference in first aid knowledge based upon the number of sports coached. Increased knowledge would be expected with the coach's gender, an increase in age, and if the coach had been American Red Cross First Aid Trained.

Increased number of sports does not significantly increase first aid knowledge. Exposure to the potential for more injuries does not mean that one's knowledge would be improved. A youth coach may have coached three different sports, each for one season, but that does not mean that he/she has had more experiences with injuries compared to a coach that has coached for 5 years. Years of coaching experience is a more important variable than the number of sports coached. Coaches may not have experienced many injuries during their time as a coach. Most parents attend games and many parents attend practices on a regular bases. Parents of children may be present at practices and games and are able to care for their injured child. Additionally, there may be a parent that is in charge of providing first aid to the athletes, thus the coach does not have to worry about taking care of an injured athlete.

Knowledge of the five first aid constructs did not differ by the gender of the coach. Females are the primary care takers for children. One would expect that females would have a higher first aid knowledge than their male counterparts because of their experiences. One possible reason for these non-significant results may be due to the low number of female participants in this study. There were only 15 coaches that reported being female out of the 170 that completed the demographic sheet.

When comparing the age groups of coaches and their knowledge on the five first aid constructs only the CPR construct was significant. Further analysis using the Scheffe test failed to reveal a significant difference. One reason may be due to the fact that the Scheffe test is a very conservative test. If there was to be a significant difference, it would have been between the lowest and highest mean scores, youngest and oldest age groups, with the oldest group having more knowledge. The oldest coaches may have more knowledge on the CPR construct because of more exposure to being trained, at one time during their life, in CPR. Younger coaches may not have as many opportunities to learn CPR when compared to older coaches.

American Red Cross First Aid training did not significantly improve one's knowledge of the five first aid constructs. The mean score for those coaches with American Red Cross First Aid training was higher, although not statistically different, than the mean scores for those coaches without the training for four of the constructs: injury prevention, injury identification/general medical knowledge, injury management, and wound care. American Red Cross first aid training will not enhance a coach's CPR knowledge.

American Red Cross First Aid courses may not be taught in the best possible manner. Courses offered through the American Red Cross are lecture based classes. Such a format focuses on providing the students with the information, in a short amount of time (4-8 hours), about how to perform a skill with very little time devoted to the practice of such skills. Perhaps an alteration in the way first aid courses are taught would lead to people being able to retain more of the information and feel more confident in being able to apply their skills in real life situations. Students should be given the book prior to attending class and asked to read over the necessary material. That way class time can be utilized for review, demonstration, the practicing of the skills, and scenarios. Scenarios will allow those taking the course to evaluate a situation and determine what steps need to be taken to aid the injured party.

Game Situation Data Sheet

Examination of the variable, whether to return an injured athlete to competition, in relationship to the variables; number of sports coached, coaching location, education, gender of athletes coached, formal first aid training, American Red Cross first aid training , and if a coach was currently CPR certified revealed no statistically significant difference. There were no significant findings for all nine of the game situations when considering these variables.

There was no significant difference of when a coach would return an injured athlete based upon the number of sports coached. The more sports that the coach has coached does not in turn mean more coaching experience. A coach may have coached 3 different sports each for a season, which does not mean that they have more experience in knowing when to return an injured athlete to play. Years of coaching experience is a more important variable than the number of sports coached.

Advanced education does not alter the decisions of a youth coach to return an injured athlete to competition. Coaches must use other knowledge, besides the knowledge gained from further education, to decide on whether or not to return an injured athlete to competition. Advanced education does not change the role conflict that youth coaches have in deciding to return an injured athlete. No matter the educational background of a youth coach there is still a role conflict, between what to do as a coach and what is best for the injured athlete. This poises a problem, because with advanced education one should be able to objectively see the situation and make the best possible decision concerning the safety of the injured athlete.

A coach's decision to return an injured athlete did not differ based upon the gender composition of the team that they were coaching. Whether a coach is coaching an all female, all male, or an even mix of males and females team, they did not differ in when to return an injured athlete to competition. Thus coaches treat males and females in the same manner with respect to returning them to competition from an injury. This finding is interesting because one would think that those coaching predominately male athletes would be more inclined to return an injured athlete. The socially accepted idea of playing through the pain is seen throughout male sports or that a male athlete needs to show that he is a man by playing through the pain. Another possible explaination of this finding is that those that coach female athletes have the same old fashion mind set of playing through the pain no matter the gender of the athlete.

There were no significant findings when considering the nine game situations with respect to whether a coach had formal first aid training. This finding is interesting because there was a significant difference in the first aid knowledge of youth coaches based upon whether they had formal first aid training. One would think that the coaches with the formal first aid training would use that knowledge and err on the side of caution when dealing with an injured athlete. Coaches with formal first aid training still experience the coach/first aid provider conflict, what to do as a coach and what to do as the first aid provider for the injured athlete. Future research is needed to examine the coach/first aid provider conflict.

Criteria of when to return an injured athlete to competition is not covered in formal first aid training. So it is not surprising that there was no difference when coaches would return an injured athlete to competition based upon whether they had formal first aid training. First aid training for youth coaches needs to address the issue of when it is safe to allow an injured athlete to return to competition. Additionally first aid training for youth coaches need to instruct coaches on how to bring an injured athlete back to competition.

In many youth sports it is required that before an athlete can return from an injury they must have a doctor's note saying that it is safe for them to return to activity. Caution needs to be taken when a child presents such notification. The doctor has evaluated them and found that they are structurally sound, but they may not be ready for full competition. If the athlete has been out for any amount of time, they will need to be reconditioned and reintroduced into the sporting environment.

American Red Cross first aid training does not alter the decision making of youth coaches. Coaches that have been first aid trained by the American Red Cross return injured athletes to participation in the same manner as those coaches without the training. One reason for not finding a significant difference is that those coaches with training may be utilizing their first aid knowledge to assess and care for the injured athlete. Being able to assess and care for some of the minor injuries that happen in youth sports allow those coaches to return athletes to competition with the knowledge that the youth athlete is all right to participate. Those coaches, without American Red Cross first aid training, that return the injured athletes are doing so without the knowledge that the athlete is going to be safe.

American Red Cross training does not include specifications on when to return an injured athlete. The majority of the first aid training offered by the American Red Cross focuses on the immediate care of injuries and not the decision process to determine if a person can continue activity. Youth coaches are constantly determining the playing status of athletes. They need to be instructed on when and how to return an injured athlete back to competition.

Coaches did not differ in returning an injured athlete in the nine game scenarios based upon them being currently CPR certified. Because none of the game scenarios dealt with an athlete needing CPR, one would think that there would be no difference in deciding to return and injured athlete to participation based upon being currently CPR certified.

Implications

Youth coaches lack the first aid and injury prevention knowledge needed to prevent, evaluate, and care for sporting injuries. Injury prevention and care needs to not only be addressed at the coaching level but rather at all levels within the youth sporting environment. Youth coaches, administrators, parents, professionals (doctors/certified athletic trainers), and professional organizations (National Athletic Trainer's Association/Michigan Athletic Trainer's Association) all need to take an active role in the prevention and care of youth sport injuries.

Youth coaches need to take an active role in learning the necessary skills to aid them in injury prevention and care. Coaches should improve their coaching techniques through programs that help to develop age appropriate practice programs. This will not only help to prevent injuries from occurring but will also aid in the children learning about the sport. By advancing their first aid skills coaches will not only benefit from increased knowledge but they will also feel more comfortable when dealing with an injury situation. The ability to handle an injury situation is just as important, if not more important, than being able to perform the first aid skills to aid the injured athlete.

Youth sport administrators should not only encourage youth coaches but should provide opportunities for coaches to advance their first aid knowledge. Youth administrators are the ones that are in charge of developing the rules and regulations of the youth sports program. Those administrators can decide that in order for someone to be a coach they must take a course that is related to injury prevention and care. Youth administrators can organize such courses on the local level with the help of physicians, emergency medical technicians, and certified athletic trainers.

Parents should demand that their children's coaches be knowledgeable in the areas of injury prevention and care. Parents need to voice their concerns about the safety of their children. Safety is one of the top priorities for most parents. If parents only knew that their child's coach was not knowledgeable in injury prevention and care, they may not allow their child to participate.

Certified athletic trainers (ATC's) need to take an active role in youth sports. Most youth sport programs do not have access to an ATC. Certified athletic trainers need to make themselves available to the youth sports programs. For a nominal fee ATC's can be a first aid liaison or teach injury prevention and care programs for youth coaches. Groups such as the Michigan Athletic Trainers Association (MATS) have developed an injury prevention presentation. Such programs need to be administered at the youth level.

The information gained from this study needs to be transferred over into an injury prevention and care program. Such a program should be developed to stress the areas in which youth coaches are deficient. Once a program is developed, that program needs to be administered and evaluated for its effectiveness in the prevention and care of injuries. Additionally rules and regulations need to be developed for coaches to follow when deciding to return an injured athlete to competition. Further research needs to be conducted on the FAA, to evaluate if it truly assesses the first aid knowledge of coaches.

APPENDICES

APPENDIX A

First Aid Assessment

First Aid Assessment

1. Water should be
   a. Withheld during practices, available during games.
   b. Withheld during games, available during practices.
   c. Available only on hot days.
   d. Available at all times.

2. The behavior of the first aid provider
   a. Should be calm and reassuring.
   b. Should be hurried and tense.
   c. Does not matter because it has no effect on the injured athlete.
   d. Both a and b

3. Ice should always be used __________ after an injury occurs, unless otherwise directed by a physician or athletic trainer.
   a. After the first 48 hours
   b. During the first 48 hours
   c. During the first 24 hours only
   d. During the first 12 hours only

4. Shock is
   a. Not life-threatening.
   b. Possible with all types of injuries.
   c. Possible with head and heat-related injuries only.
   d. More likely in chronic injuries.

5. An athlete who is knocked unconscious may return to play if he or she
   a. Regains consciousness within 2 minutes.
   b. Presents no signs and symptoms of a head injury.
   c. Is cleared by a physician.
   d. Feels capable of returning to play.

6. Twisting or stretching a joint beyond its normal range of motion is the most common cause of
   a. Sprains.
   b. Fractures.
   c. Strains.
   d. Contusions.

7. Heat stroke can result from
    a. Too little salt.
    b. Too high carbohydrates.
    c. Dehydration.
    d. Hyperhydration.

8. A musculotendinous tissue injury is a
    a. Fracture.
    b. Sprain.
    c. Strain.
    d. Contusion.

9. Contusions occur most frequently to the
    a. Chest.
    b. Quadriceps.
    c. Abdomen.
    d. Shin.

10. The greatest danger for an athlete who has mononucleosis is
    a. Seizures.
    b. A punctured liver.
    c. A ruptured spleen.
    d. Shock.

11. Proper treatment for chronic problems, such as shin splints, is
    a. Ice before activity, ice after activity.
    b. Heat before activity, heat after activity.
    c. Ice before activity, heat after activity.
    d. Heat before activity, ice after activity.

12. Standard first aid for a sprained ankle does not include
    a. Ice.
    b. Compression.
    c. Percussion.
    d. Elevation.

13. Pregame meals should contain foods
    a. High in carbohydrates.
    b. High in protein.
    c. Low in carbohydrates.
    d. Balanced in protein and carbohydrates.

14. Mouth guards protect an athlete against
    a. Tooth fractures and tongue lacerations.
    b. Jaw fractures.
    c. Concussions.
    d. Both a and c.

15. Characteristics of heat exhaustion include
    a. Slow pulse.
    b. Pale, cool, clammy skin.
    c. Red, hot, sweaty skin.
    d. Bounding pulse.

16. Heat stroke is
    a. Preventable.
    b. Unpreventable.
    c. Not life-threatening.
    d. Seldom seen in athletics.

17. Heat stroke is best prevented by
    a. Limited salt intake.
    b. Limited water breaks.
    c. Unlimited water intake
    d. No way to prevent it.

18. Dressings and bandages are used to
    a. Reduce pain.
    b. Reduce internal bleeding.
    c. Help control bleeding and prevent infection.
    d. Make it easier to move the injured athlete.

19. You have tried to control bleeding with direct pressure and elevation, but bleeding does not stop. Where would you apply pressure to slow the flow of blood to a wound on the forearm?
    a. Outside of the arm midway between the shoulder and elbow
    b. On the inside of the elbow
    c. Inside of the arm midway between the shoulder and elbow
    d. Any of the above will slow the flow of blood

20. How can you reduce the risk of disease transmission when caring for open, bleeding wounds?
    a. Wash your hands immediately after giving first aid.
    b. Avoid direct contact with blood and other body fluids.
    c. Use protective barriers such as gloves or plastic wrap.
    d. All of the above.

21. Which is the first step in caring for bleeding wounds?
    a. Apply direct pressure on the wound with a clean or sterile dressing.
    b. Apply pressure at the pressure point.
    c. Apply bulky dressings to reinforce blood-soaked bandages.
    d. Elevate the wound above the level of the heart.

22. What should you do if you think an athlete has internal bleeding?
    a. Apply heat to the injured area.
    b. Call your local emergency phone number for help.
    c. Place the victim in a sitting position.
    d. Give fluids to drink to replace the blood loss.

23. Which should be part of your care for a severely bleeding open wound?
    a. Allow the wound to bleed in order to cleanse it and minimize infection.
    b. Apply direct pressure and elevate the injured area, if no broken bones.
    c. Use a tourniquet to stop all blood flow.
    d. Both b and c.

24. After being tackled, an athlete does not get up. The conscious athlete is face down and appears badly hurt. First, you send someone for help. Then, you
    a. Roll the athlete to his side, in case he starts to vomit.
    b. Roll the athlete to his back and elevate the head and chest.
    c. Position the athlete so he is in a comfortable position.
    d. Have the athlete remain still.

25. Which should you do when caring for someone having a seizure?
    a. Remove nearby objects that might cause injury.
    b. Place small object, such as a rolled-up piece of cloth between the individual's teeth.
    c. Try to hold the person still.
    d. All of the above.

26. Generally, a splint should be
    a. Loose, so that the injured athlete can still move the injured limb.
    b. Snug, but not so tight that it slows circulation.
    c. Tied with fasteners directly over the injured area.
    d. None of the above.

27. An athlete who is a diabetic is drowsy and seems confused. He is not sure if he took his insulin today. What should you do?
    a. Suggest he rest for an hour or so.
    b. Tell him to go take his insulin.
    c. Give him some sugar.
    d. Both a and b.

28. Two soccer players collide on the field. Although there is no visible bleeding, the upper left leg of one player is very red and swelling fast. She probably has what type of wound?
    a. Abrasion
    b. Bruise
    c. Strain
    d. Sprain

29. When caring for an athlete with hypothermia, you should
    a. Rewarm the body gradually.
    b. Remove wet clothes.
    c. Give warm fluids if fully conscious.
    d. All of the above.

30. What should you do for an athlete who is experiencing heat exhaustion?
    a. Force the athlete to drink lots of cool water.
    b. Get the athlete into a cooler environment.
    c. Have the athlete rest until the feeling passes.
    d. All of the above.

31. An athlete has a severe muscle cramp in the calf. Proper care would be to
    a. Bend the knee and point the toes and foot.
    b. Bend the knee and flex toes and foot.
    c. Straighten the knee and point the toes and foot.
    d. Straighten the knee and flex the toes and foot.

32. An athlete's front teeth are knocked out during practice. The teeth should be
    a. Washed in water and replaced in the sockets.
    b. Stored in saline until dentist can replace.
    c. Stored in milk until dentist can replace.
    d. Any of the above is acceptable.

33. An athlete comes to you after being stepped on by an opponents spikes. The type of injury you suspect is a (n)
    a. Abrasion.
    b. Puncture.
    c. Avulsion.
    d. Laceration.

34. Before attempting to resuscitate an athlete using CPR, which of the following conditions must exist?
    a. Dilated pupils
    b. Absence of breathing
    c. Unconscious
    d. Irregular respirations

35. At what rate should chest compressions be performed during CPR efforts on an adolescent?
    a. 50 -70 compressions per minute
    b. 80 – 100 compression per minute
    c. 100 – 120 compression per minute
    d. 60 – 80 compression per minute

36. What is the breath (ventilation) to compression ratio when performing CPR on an adolescent?
    a. 12 compressions to 2 ventilations
    b. 5 compressions to 1 ventilation
    c. 15 compressions to 2 ventilations
    d. 10 compressions to 2 ventilations

37. The first action that should be taken when approaching a collapsed, injured athlete is to
    a. Move the athlete off of playing surface.
    b. Determine responsiveness.
    c. Check for breathing.
    d. Check for pulse.

38. Complications which may occur as a result of external chest compressions when properly performed include
    a. Rib and sternum fractures.
    b. Punctured lungs and liver lacerations.
    c. Both a and b
    d. None of the above

APPENDIX B

Game Situation Data Sheet

Game Situations		Return to Game	
1.	During the last 10 minutes in the game with your team clearly losing, your 8^{th} player (usually 3^{rd} into the game) gets a hand in the way of a hard pass and hyperextends an elbow. It is checked and taped. The player is eager to get back on the floor.	____ Yes	____ No
2.	One of your starters, during a game you are winning easily, suffers a dislocated finger. After reduction (being returned to its normal position) the finger is checked for fractures. It doesn't appear as if there are any fractures present. The finger is given some support and the player asks to return to the game.	____ Yes	____ No
3.	One of the bench players, who rarely sees the floor, finally gets a chance to play during a game you are winning easily. After two minutes on the floor the player suffers a hamstring strain. It doesn't appear to be a serious problem after some treatment on the bench. The player is eager to return and shows that the muscle injury only causes a minor limp.	____ Yes	____ No
4.	In a game in which you are only down by 5 points, your starting guard goes down with a sprained ankle. It appears to be a mild sprain and taping has given it some support. The player assures you everything is fine and can perform cuts and turns with only minor discomfort.	____ Yes	____ No
5.	The game is close and your team is down by 4 points. You have a "bench player" on the floor replacing a tired starter when the bench player begins hyperventilating. After being helped at the bench, the player indicates everything is okay.	____ Yes	____ No
6.	Your team is winning handily when your backup center grabs a rebound, but comes down awkwardly on a teammates foot. It appears as if the center has a strained Achilles tendon. After being check and a mild strain indicated, taping is used for support. The player appears eager to play again.	____ Yes	____ No
7.	Your starting guard dives after a loose ball and bruises the right kneecap. The game is far out of your team's reach at this point. The knee is slightly stiff and is showing some signs of a bruise, but the player can move fairly well without too much problem. The player indicated a readiness to return to the game.	____ Yes	____ No

8. With 10 minutes to go in a close game, and your team up by only 3, your starting guard needs a rest. The backup player at that position had gone out with a strained lower back muscle. The backup player has been moving around behind the bench and appears fine. It appears to be only a mild strain and isn't causing the player a great deal of problems. The backup player wants to play again in the game.

____ Yes ____ No

9. In a losing cause, you want to platoon in all 5 of the players who have seen less than 2 minutes in the game. Your 10th player had played very briefly early in the game, but suffered a "groin pull". The muscle strain appears to be mild and isn't causing more than some minor discomfort at this point. The player wants a chance to play more in the game.

____ Yes ____ No

APPENDIX C

Demographic Sheet

The Assessment of First-Aid and Injury Prevention Knowledge and the Decision Making of Youth Basketball, Soccer and Football Coaches

Your Gender
- O Male
- O Female

Your Age ☐☐

How many years have you been a coach? ☐☐

Office Use Only
ID Number ☐☐☐

Highest Degree Attained
- O High School Diploma
- O High School Equivalent
- O Associates Degree (2 years post high school)
- O Bachelor's Degree (4 years post high school)
- O Master's Degree (6 years post high school)
- O Doctoral Degree (10 years post high school)
- O Other (please specify) ________________

Coaching Location

O Bellevue	O Ionia	O Pewamo-W.
O Catholic Central	O Lansing	O Portland
O Charlotte	O Mason	O St. Johns
O DeWitt	O Maple Valley	O Saranac
O Eaton Rapids	O Okemos	O Springport
O Fulton-Middleton	O Olivet	O Waverly
O Grand Ledge	O Ovid-Elsie	
O Holt	O Perry	

Athletes you are coaching this season?
- O Predominantly Male
- O Predominantly Female
- O Even mix of males & females

Grade Currently Coaching

O 4th & 5th grades	O 8th grade
O 6th grade	O 9th grade
O 7th grade	O 10th grade or higher

Grades Previously Coached

O 4th & 5th grades	O 8th grade
O 6th grade	O 9th grade
O 7th grade	O 10th grade or higher

Sports Coached in the last 10 years

O Soccer	O Wrestling
O Basketball	O Swimming
O Football	O Ice Hockey
O Tee-ball	O Field Hockey
O Baseball	O Volleyball
O Softball	O Other

Have you ever had any formal first-aid training? If yes, please fill in circle of all that apply and please provide the date of certification.

	Month/Year
O American Red Cross First-Aid and CPR Training	☐☐ / ☐☐
O American Red Cross First-Aid Training	☐☐ / ☐☐
O American Red Cross CPR Training	☐☐ / ☐☐
O American Heart Association CPR Training	☐☐ / ☐☐
O MSU-PACE (Program for Athletic Coaches Education)	☐☐ / ☐☐
O EMT (Emergency Medical Technician Training)	☐☐ / ☐☐
O Paramedical Training	☐☐ / ☐☐
O Other (please specify) ________________	☐☐ / ☐☐

Are you currently certified in first-aid? (completed the course or a refresher course in the last 3 years)

O Yes O No

If yes please write the date that your certification will expire. Month/Year

☐☐ / ☐☐

Are you currently certified in CPR? (completed the course or a refresher course in the last year)

O Yes O No

If yes please write the date that your certification will expire. Month/Year

☐☐ / ☐☐

62465

APPENDIX D

Informed Consent Form

INFORMED CONSENT FORM
Michigan State University

The Assessment of First-Aid and Injury Prevention Knowledge and the Decision Making of Youth Basketball, Soccer, and Football Coaches

Primary Investigators:	John Powell, Ph.B., ATC Department of Kinesiology 40 IM Sports Circle (517) 432-5018 powellj4@msu.edu	Mary Barron Department of Kinesiology 38 IM Sports Circle (517) 353-0892 barronm3@msu.edu

Project Description:

This study assesses the first-aid and injury prevention knowledge of youth coaches. Addtionally how a coach uses their first aid and injury prevention knowledge in determining if an injured athlete can return to practice or competition will also be assessed.

Your participation will involve filling out a demographic information sheet to inform the researchers of sport, gender, and age of athletes you coach, number of year's coached, previous first-aid knowledge and your educational background. You will also be asked to take the revised American Red Cross First-Aid Assessment. The American Red Cross Assessment measures a persons' knowledge in a number of areas such as anatomy, care and treatment, prevention, and assessment of injuries. You will also be asked to take the Game Situation Data Sheet. The Game Situation Data Sheet will present different scenarios in which you will be asked whether an injured player should be allowed to return to practice/competition.

All identities and information gathered from the study will remain confidential. You will be provided with an identification number at the beginning of the study. All data will be analyzed using individual identification numbers. Participants will remain anonymous in any reporting of the data from the study. All data will be maintained in a secure location, accessible only to the investigators of the study. You will be shown group and individual results at the conclusion of the study. Your privacy will be protected to the maximum extent possible. Participation in this study is voluntary. You may choose to withdraw from the study at any time. Any questions concerning participation in this study should be directed to Mary Barron, ATC, 517 349-0487 or John Powell, ATC, 517 432-5018.

Informed Consent: This section indicates that you are giving your informed consent to participate in the research.

Participant: I have read and agree to participate in the research study as described above.

Name: ________________________ Signature: ________________________ Date:__________

For addition information and the rights and roles of participants in research projects please fell free to contact:

David E. Wright. Ph.D.
Chair Person
University Committee on Research Involving Human Subjects
246 Administration Building
(517) 355-2180

Researcher: I certify that the informed consent procedure has been followed, and that I have answered any and all questions from the participants as fully as possible.

Name: ________________________ Signature: ________________________ Date:__________

APPENDIX E

Post hoc Sheffe test for Injury ID/General Medical Knowledge Construct and

Educational Background.

Educational Background	Educational Background	Mean Difference	Std Error	Significance	95% Confidence Interval Lower Bound	Upper Bound
High School Diploma	High School Equivalent	1.31	1.06	.997	-3.14	5.75
	Associates Degree	-.69	.35	.909	-2.15	.76
	Bachelors Degree	-.66	.29	.810	-1.86	.54
	Masters Degree	-1.19	.50	.765	-3.28	.89
	Doctoral Degree	-1.48	.59	.701	-3.93	.97
	Other	-.19	1.06	1.000	-4.64	4.25
	Some High School	.31	1.06	1.000	-4.14	4.75
	Some College	-.19	1.06	1.000	-4.64	4.25
	Not Specified	.14	.87	1.000	-3.51	3.79

Educational Background	Educational Background	Mean Difference	Std Error	Significance	95% Confidence Interval Lower Bound	Upper Bound
High School Equivalent	High School Diploma	-1.31	1.06	.997	-5.75	3.14
	Associates Degree	-2.00	1.09	.947	-6.57	2.57
	Bachelors Degree	-1.96	1.08	.948	-6.46	2.53
	Masters Degree	-2.50	1.15	.856	-7.31	2.31
	Doctoral Degree	-2.79	1.19	.790	-7.76	2.19
	Other	-1.50	1.49	.999	-7.71	4.71
	Some High School	-1.00	1.49	1.000	-7.21	5.21
	Some College	-1.50	1.49	.999	-7.71	4.71
	Not Specified	-1.17	1.36	1.000	-6.83	4.50

Educational Background	Educational Background	Mean Difference	Std Error	Significance	95% Confidence Interval Lower Bound	Upper Bound
Associates Degree	High School Diploma	.69	.35	.909	-.76	2.15
	High School Equivalent	2.00	1.09	.947	-2.57	6.57
	Bachelors Degree	3.66E-02	.38	1.000	-1.56	1.63
	Masters Degree	-.50	.56	1.000	-2.84	1.84
	Doctoral Degree	-.79	.64	.997	-3.45	1.88
	Other	.50	1.09	1.000	-4.07	5.07
	Some High School	1.00	1.09	1.000	-3.57	5.57
	Some College	.50	1.09	1.000	-4.07	5.07
	Not Specified	.83	.91	1.000	-2.97	4.63

Educational Background	Educational Background	Mean Difference	Std Error	Significance	95% Confidence Interval Lower Bound	Upper Bound
Bachelors Degree	High School Diploma	.66	.29	.810	-.54	1.86
	High School Equivalent	1.96	1.08	.948	-2.53	6.46
	Associates Degree	-3.66E-02	.38	1.000	-1.63	1.56
	Masters Degree	-.54	.52	.999	-2.73	1.65
	Doctoral Degree	-.82	.61	.993	-3.36	1.72
	Other	.46	1.08	1.000	-4.03	4.96
	Some High School	.96	1.08	1.000	-3.53	5.46
	Some College	.46	1.08	1.000	-4.03	4.96
	Not Specified	.80	.89	1.000	-2.92	4.51

Educational Background	Educational Background	Mean Difference	Std Error	Significance	95% Confidence Interval Lower Bound	Upper Bound
Masters Degree	High School Diploma	1.19	.50	.765	-.89	3.28
	High School Equivalent	2.50	1.15	.856	-2.31	7.31
	Associates Degree	.50	.56	1.000	-1.84	2.84
	Bachelors Degree	.54	.52	.999	-1.65	2.73
	Doctoral Degree	-.29	.73	1.000	-3.34	2.77
	Other	1.00	1.15	1.000	-3.81	5.81
	Some High School	1.50	1.15	.995	-3.31	6.31
	Some College	1.00	1.15	1.000	-3.81	5.81
	Not Specified	1.33	.98	.993	-2.75	5.42

Educational Background	Educational Background	Mean Difference	Std Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Doctoral Degree	High School Diploma	1.48	.59	.701	-.97	3.93
	High School Equivalent	2.79	1.19	.790	-2.19	7.76
	Associates Degree	.79	.64	.997	-1.88	3.45
	Bachelors Degree	.82	.61	.993	-1.72	3.36
	Masters Degree	.29	.73	1.000	-2.77	3.34
	Other	1.29	1.19	.999	-3.69	6.26
	Some High School	1.79	1.19	.986	-3.19	6.76
	Some College	1.29	1.19	.999	-3.69	6.26
	Not Specified	1.62	1.03	.980	-2.66	5.90

Educational Background	Educational Background	Mean Difference	Std Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Other	High School Diploma	.19	1.06	1.000	-4.25	4.64
	High School Equivalent	1.50	1.49	.999	-4.71	7.71
	Associates Degree	-.50	1.09	1.000	-5.07	4.07
	Bachelors Degree	-.46	1.08	1.000	-4.96	4.03
	Masters Degree	-1.00	1.15	1.000	-5.81	3.81
	Doctoral Degree	-1.29	1.19	.999	-6.26	3.69
	Some High School	.50	1.49	1.000	-5.71	6.71
	Some College	.00	1.49	1.000	-6.21	6.21
	Not Specified	.33	1.36	1.000	-5.33	6.00

Educational Background	Educational Background	Mean Difference	Std Error	Significance	95% Confidence Interval Lower Bound	Upper Bound
Some High School	High School Diploma	-.31	1.06	1.000	-4.75	4.14
	High School Equivalent	1.00	1.49	1.000	-5.21	7.21
	Associates Degree	-1.00	1.09	1.000	-5.57	3.57
	Bachelors Degree	-.96	1.08	1.000	-5.46	3.53
	Masters Degree	-1.50	1.15	.995	-6.31	3.31
	Doctoral Degree	-1.79	1.19	.986	-6.76	3.19
	Other	-.50	1.49	1.000	-6.71	5.71
	Some College	-.50	1.49	1.000	-6.71	5.71
	Not Specified	-.17	1.36	1.000	-5.83	5.50

Educational Background	Educational Background	Mean Difference	Std Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Some College	High School Diploma	.19	1.06	1.000	-4.25	4.64
	High School Equivalent	1.50	1.49	.999	-4.71	7.71
	Associates Degree	-.50	1.09	1.000	-5.07	4.07
	Bachelors Degree	-.46	1.08	1.000	-4.96	4.03
	Masters Degree	-1.00	1.15	1.000	-5.81	3.81
	Doctoral Degree	-1.29	1.19	.999	-6.26	3.69
	Other	.00	1.49	1.000	-6.21	6.21
	Some High School	.50	1.49	1.000	-5.71	6.71
	Not Specified	.33	1.36	1.000	-5.33	6.00

Educational Background	Educational Background	Mean Difference	Std Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Not Specified	High School Diploma	-.14	.87	1.000	-3.79	3.51
	High School Equivalent	1.17	1.36	1.000	-4.50	6.83
	Associates Degree	-.83	.91	1.000	-4.63	2.97
	Bachelors Degree	-.80	.89	1.000	-4.51	2.92
	Masters Degree	-1.33	.98	.993	-5.42	2.75
	Doctoral Degree	-1.62	1.03	.980	-5.90	2.66
	Other	-.33	1.36	1.000	-6.00	5.33
	Some High School	.17	1.36	1.000	-5.50	5.83
	Some College	-.33	1.36	1.000	-6.00	5.33

APPENDIX F

Post hoc Sheffe test for Injury Management Construct and Educational Background.

					95% Confidence Interval	
Educational Background	Educational Background	Mean Difference	Std Error	Significance	Lower Bound	Upper Bound
High School Diploma	High School Equivalent	-6.49E-02	.81	1.000	-3.45	3.32
	Associates Degree	-.27	.26	.999	-1.38	.83
	Bachelors Degree	-.67	.22	.398	-1.59	.24
	Masters Degree	-1.46	.38	.106	-3.05	.12
	Doctoral Degree	-1.49	.45	.274	-3.36	.37
	Other	-1.06	.81	.995	-4.45	2.32
	Some High School	.44	.81	1.000	-2.95	3.82
	Some College	-6.49E-02	.81	1.000	-3.45	3.32
	Not Specified	-6.49E-02	.67	1.000	-2.85	2.72

Educational Background	Educational Background	Mean Difference	Std Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
High School Equivalent	High School Diploma	6.49E-02	.81	1.000	-3.32	3.45
	Associates Degree	-.21	.83	1.000	-3.69	3.27
	Bachelors Degree	-.61	.82	1.000	-4.03	2.81
	Masters Degree	-1.40	.88	.979	-5.06	2.26
	Doctoral Degree	-1.43	.91	.981	-5.22	2.36
	Other	-1.00	1.13	1.000	-5.73	3.73
	Some High School	.50	1.13	1.000	-4.23	5.23
	Some College	.00	1.13	1.000	-4.73	4.73
	Not Specified	.00	1.03	1.000	-4.32	4.32

Educational Background	Educational Background	Mean Difference	Std Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Associates Degree	High School Diploma	.27	.26	.999	-.83	1.38
	High School Equivalent	.21	.83	1.000	-3.27	3.69
	Bachelors Degree	-.40	.29	.992	-1.62	.81
	Masters Degree	-1.19	.43	.554	-2.97	.59
	Doctoral Degree	-1.22	.49	.708	-3.25	.81
	Other	-.79	.83	1.000	-4.27	2.69
	Some High School	.71	.83	1.000	-2.77	4.19
	Some College	.21	.83	1.000	-3.27	3.69
	Not Specified	.21	.69	1.000	-2.69	3.10

Educational Background	Educational Background	Mean Difference	Std Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Bachelors Degree	High School Diploma	.67	.22	.398	-.24	1.59
	High School Equivalent	.61	.82	1.000	-2.81	4.03
	Associates Degree	.40	.29	.992	-.81	1.62
	Masters Degree	-.79	.40	.914	-2.46	.88
	Doctoral Degree	-.82	.46	.957	-2.75	1.11
	Other	-.39	.82	1.000	-3.81	3.03
	Some High School	1.11	.82	.993	-2.31	4.53
	Some College	.61	.82	1.000	-2.81	4.03
	Not Specified	.61	.68	1.000	-2.22	3.44

Educational Background	Educational Background	Mean Difference	Std Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Masters Degree	High School Diploma	1.46	.38	.106	-.12	3.05
	High School Equivalent	1.40	.88	.979	-2.26	5.06
	Associates Degree	1.19	.43	.554	-.59	2.97
	Bachelors Degree	.79	.40	.914	-.88	2.46
	Doctoral Degree	-2.86E-02	.56	1.000	-2.36	2.30
	Other	.40	.88	1.000	-3.26	4.06
	Some High School	1.90	.88	.857	-1.76	5.56
	Some College	1.40	.88	.979	-2.26	5.06
	Not Specified	1.40	.75	.938	-1.71	4.51

Educational Background	Educational Background	Mean Difference	Std Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Doctoral Degree	High School Diploma	1.49	.45	.274	-.37	3.36
	High School Equivalent	1.43	.91	.981	-2.36	5.22
	Associates Degree	1.22	.49	.708	-.81	3.25
	Bachelors Degree	.82	.46	.957	-1.11	2.75
	Masters Degree	2.86E-02	.56	1.000	-2.30	2.36
	Other	.43	.91	1.000	-3.36	4.22
	Some High School	1.93	.91	.872	-1.86	5.72
	Some College	1.43	.91	.981	-2.36	5.22
	Not Specified	1.43	.78	.947	-1.83	4.69

Educational Background	Educational Background	Mean Difference	Std Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Other	High School Diploma	1.06	.81	.995	-2.32	4.45
	High School Equivalent	1.00	1.13	1.000	-3.73	5.73
	Associates Degree	.79	.83	1.000	-2.69	4.27
	Bachelors Degree	.39	.82	1.000	-3.03	3.81
	Masters Degree	-.40	.88	1.000	-4.06	3.26
	Doctoral Degree	-.43	.91	1.000	-4.22	3.36
	Some High School	1.50	1.13	.994	-3.23	6.23
	Some College	1.00	1.13	1.000	-3.73	5.73
	Not Specified	1.00	1.03	1.000	-3.32	5.32

Educational Background	Educational Background	Mean Difference	Std Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Some High School	High School Diploma	-.44	.81	1.000	-3.82	2.95
	High School Equivalent	-.50	1.13	1.000	-5.23	4.23
	Associates Degree	-.71	.83	1.000	-4.19	2.77
	Bachelors Degree	-1.11	.82	.993	-4.53	2.31
	Masters Degree	-1.90	.88	.857	-5.56	1.76
	Doctoral Degree	-1.93	.91	.872	-5.72	1.86
	Other	-1.50	1.13	.994	-6.23	3.23
	Some College	-.50	1.13	1.000	-5.23	4.23
	Not Specified	-.50	1.03	1.000	-4.82	3.82

Educational Background	Educational Background	Mean Difference	Std Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Some College	High School Diploma	6.49E-02	.81	1.000	-3.32	3.45
	High School Equivalent	.00	1.13	1.000	-4.73	4.73
	Associates Degree	-.21	.83	1.000	-3.69	3.27
	Bachelors Degree	-.61	.82	1.000	-4.03	2.81
	Masters Degree	-1.40	.88	.979	-5.06	2.26
	Doctoral Degree	-1.43	.91	.981	-5.22	2.36
	Other	-1.00	1.13	1.000	-5.73	3.73
	Some High School	.50	1.13	1.000	-4.23	5.23
	Not Specified	.00	1.03	1.000	-4.32	4.32

					95% Confidence Interval	
Educational Background	Educational Background	Mean Difference	Std Error	Significance	Lower Bound	Upper Bound
Not Specified	High School Diploma	6.49E-02	.67	1.000	-2.72	2.85
	High School Equivalent	.00	1.03	1.000	-4.32	4.32
	Associates Degree	-.21	.69	1.000	-3.10	2.69
	Bachelors Degree	-.61	.68	1.000	-3.44	2.22
	Masters Degree	-1.40	.75	.938	-4.51	1.71
	Doctoral Degree	-1.43	.78	.947	-4.69	1.83
	Other	-1.00	1.03	1.000	-5.32	3.32
	Some High School	.50	1.03	1.000	-3.82	4.82
	Some College	.00	1.03	1.000	-4.32	4.32

APPENDIX G

Chi-Square Analysis of Game Situation Data Sheet by Pass/Fail First Aid Assessment

First of the Bench in a Clearly Losing Competition Situation

First Aid Assessment		Game Situation One		Total
		Yes	No	
Fail	Count	30	239	269
	Expected Count	29.4	239.6	269
Pass	Count	1	14	15
	Expected Count	1.6	13.4	15
Total	Count	31	253	284
	Expected Count	31	253	284

Bench Player in a Clearly Winning Situation

First Aid Assessment		Game Situation Three		Total
		Yes	No	
Fail	Count	37	232	269
	Expected Count	36	233	269
Pass	Count	1	14	15
	Expected Count	2	13	15
Total	Count	38	246	284
	Expected Count	38	246	284

Starter in a Game that the Team is Down by 4 Points

First Aid Assessment		Game Situation Four		Total
		Yes	No	
Fail	Count	123	146	269
	Expected Count	122.2	146.8	269
Pass	Count	6	9	15
	Expected Count	6.8	8.2	15
Total	Count	129	155	284
	Expected Count	129	155	284

Bench Player in a Game that the Team is Down by 4 points

First Aid Assessment		Game Situation Five		Total
		Yes	No	
Fail	Count	62	207	269
	Expected Count	62.5	206.5	269
Pass	Count	4	11	15
	Expected Count	3.5	11.5	15
Total	Count	66	218	284
	Expected Count	66	218	284

Backup Player in a Clearly Winning Situation

First Aid Assessment		Game Situation Six		Total
		Yes	No	
Fail	Count	37	232	269
	Expected Count	36	233	269
Pass	Count	1	14	15
	Expected Count	2	13	15
Total	Count	38	246	284
	Expected Count	38	246	284

Starter in a Clearly Losing Situation

First Aid Assessment		Game Situation Seven		Total
		Yes	No	
Fail	Count	42	227	269
	Expected Count	39.8	229.2	269
Pass	Count	0	15	15
	Expected Count	2.2	12.8	15
Total	Count	42	242	284
	Expected Count	42	242	284

Backup Player in a Close Winning Situation

First Aid Assessment		Game Situation Eight		Total
		Yes	No	
Fail	Count	93	116	209
	Expected Count	94.7	114.3	209
Pass	Count	8	6	14
	Expected Count	6.3	7.7	14
Total	Count	101	122	223
	Expected Count	101	122	223

Bench Player in a Clearly Losing Situation

First Aid Assessment		Game Situation Nine		Total
		Yes	No	
Fail	Count	68	141	209
	Expected Count	68.4	140.6	209
Pass	Count	5	9	14
	Expected Count	4.6	9.4	14
Total	Count	73	150	223
	Expected Count	73	150	223

APPENDIX H

Chi-Square Analysis of Game Situation Data Sheet by Sport Coached

First of the Bench in a Clearly Losing Competition Situation

Sport		Game Situation One		Total
		Yes	No	
Football	Count	26	207	233
	Expected Count	25.4	207.6	233
Basketball	Count	3	30	33
	Expected Count	3.6	29.4	33
Soccer	Count	2	16	18
	Expected Count	2	16	18
Total	Count	31	253	284
	Expected Count	31	253	284

Starter in a Clearly Winning Situation

Sport		Game Situation Two		Total
		Yes	No	
Football	Count	73	160	233
	Expected Count	73.8	159.2	233
Basketball	Count	12	21	33
	Expected Count	10.5	22.5	33
Soccer	Count	5	13	18
	Expected Count	5.7	12.3	18
Total	Count	90	194	284
	Expected Count	90	194	284

Bench Player in a Clearly Winning Situation

Sport		Game Situation Three Yes	Game Situation Three No	Total
Football	Count	28	205	233
	Expected Count	31.2	201.8	233
Basketball	Count	7	26	33
	Expected Count	4.4	28.6	33
Soccer	Count	3	15	18
	Expected Count	2.4	15.6	18
Total	Count	38	246	284
	Expected Count	38	246	284

Starter in a Game that the Team is Down by 5 Points

Sport		Game Situation Four Yes	Game Situation Four No	Total
Football	Count	107	126	233
	Expected Count	105.8	127.2	233
Basketball	Count	12	21	33
	Expected Count	15	18	33
Soccer	Count	10	8	18
	Expected Count	8.2	9.8	18
Total	Count	129	155	284
	Expected Count	129	155	284

Bench Player in a Game that the Team is Down by 4 Points

Sport		Game Situation Five		Total
		Yes	No	
Football	Count	52	181	233
	Expected Count	54.1	178.9	233
Basketball	Count	10	23	33
	Expected Count	7.7	25.3	33
Soccer	Count	4	14	18
	Expected Count	4.2	13.8	18
Total	Count	66	218	284
	Expected Count	66	218	284

Backup Player in a Clearly Winning Situation

Sport		Game Situation Six		Total
		Yes	No	
Football	Count	30	203	233
	Expected Count	31.2	201.8	233
Basketball	Count	5	28	33
	Expected Count	4.4	28.6	33
Soccer	Count	3	15	18
	Expected Count	2.4	15.6	18
Total	Count	38	246	284
	Expected Count	38	246	284

Starter in a Clearly Losing Situation

Sport		Game Situation Seven		Total
		Yes	No	
Football	Count	34	199	233
	Expected Count	34.5	198.5	233
Basketball	Count	7	26	33
	Expected Count	4.9	28.1	33
Soccer	Count	1	17	18
	Expected Count	2.7	15.3	18
Total	Count	42	242	284
	Expected Count	42	242	284

Backup Player in a Close Winning Situation

Sport		Game Situation Eight		Total
		Yes	No	
Football	Count	79	103	182
	Expected Count	82.4	99.6	182
Basketball	Count	10	14	24
	Expected Count	10.9	13.1	24
Soccer	Count	12	5	17
	Expected Count	7.7	9.3	17
Total	Count	101	122	223
	Expected Count	101	122	223

APPENDIX I

Chi-Square Analysis of Game Situation Data Sheet by Gender

First of the Bench in a Clearly Losing Competition Situation

Gender		Game Situation One		Total
		Yes	No	
Male	Count	12	135	147
	Expected Count	12.7	134.3	147
Female	Count	2	13	15
	Expected Count	1.3	13.7	15
Total	Count	14	148	162
	Expected Count	14	148	162

Bench Player in a Clearly Winning Situation

Gender		Game Situation Three		Total
		Yes	No	
Male	Count	24	123	147
	Expected Count	23.6	123.4	147
Female	Count	2	13	15
	Expected Count	2.4	12.6	15
Total	Count	26	136	162
	Expected Count	26	136	162

Bench Player in a Game that the Team is Down by 4 points

Gender		Game Situation Five		Total
		Yes	No	
Male	Count	38	109	147
	Expected Count	39	108	147
Female	Count	5	10	15
	Expected Count	4	11	15
Total	Count	43	119	162
	Expected Count	43	119	162

Backup Player in a Clearly Winning Situation

Gender		Game Situation Six		Total
		Yes	No	
Male	Count	20	127	147
	Expected Count	20.9	126.1	147
Female	Count	3	12	15
	Expected Count	2.1	12.9	15
Total	Count	23	139	162
	Expected Count	23	139	162

Starter in a Clearly Losing Situation

Gender		Game Situation Seven		Total
		Yes	No	
Male	Count	19	128	147
	Expected Count	20	127	147
Female	Count	3	12	15
	Expected Count	2	13	15
Total	Count	22	140	162
	Expected Count	22	140	162

Backup Player in a Close Winning Situation

Gender		Game Situation Eight		Total
		Yes	No	
Male	Count	55	61	116
	Expected Count	54	62	116
Female	Count	5	8	13
	Expected Count	6	7	13
Total	Count	60	69	129
	Expected Count	60	69	129

Bench Player in a Clearly Losing Situation

Gender		Game Situation Nine		Total
		Yes	No	
Male	Count	37	79	116
	Expected Count	39.6	76.4	116
Female	Count	7	6	13
	Expected Count	4.4	8.6	13
Total	Count	44	85	129
	Expected Count	44	85	129

APPENDIX J

Chi-Square Analysis of Game Situation Data Sheet by Age

First off the Bench in a Clearly Losing Competition Situation

Age		Game Situation One		Total
		Yes	No	
37 and below	Count	5	47	52
	Expected Count	4.4	47.6	52
38-40	Count	4	38	42
	Expected Count	3.6	38.4	42
41-43	Count	4	32	36
	Expected Count	3.1	32.9	36
44-62	Count	1	34	35
	Expected Count	3	32	35
Total	Count	14	151	165
	Expected Count	14	151	165

Starter in a Clearly Winning Competition Situation

Age		Game Situation Two		Total
		Yes	No	
37 and below	Count	19	33	52
	Expected Count	15.8	36.2	52
38-40	Count	15	27	42
	Expected Count	12.7	29.3	42
41-43	Count	9	27	36
	Expected Count	10.9	25.1	36
44-62	Count	7	28	35
	Expected Count	10.6	24.4	35
Total	Count	50	115	165
	Expected Count	50	115	165

Bench Player in a Clearly Winning Situation

Age		Game Situation Three		Total
		Yes	No	
37 and below	Count	8	44	52
	Expected Count	8.2	43.8	52
38-40	Count	8	34	42
	Expected Count	6.6	35.4	42
41-43	Count	6	30	36
	Expected Count	5.7	30.3	36
44-62	Count	4	31	35
	Expected Count	5.5	29.5	35
Total	Count	26	139	165
	Expected Count	26	139	165

Starter in a Game that the Team is Down by 5 Points

Age		Game Situation Four		Total
		Yes	No	
37 and below	Count	19	33	52
	Expected Count	23.6	28.4	52
38-40	Count	20	22	42
	Expected Count	19.1	22.9	42
41-43	Count	21	15	36
	Expected Count	16.4	19.6	36
44-62	Count	15	20	35
	Expected Count	15.9	19.1	35
Total	Count	75	90	165
	Expected Count	75	90	165

Bench Player in a Game that the Team is Down by 4 Points

Age		Game Situation Five		Total
		Yes	No	
37 and below	Count	10	42	52
	Expected Count	13.6	38.4	52
38-40	Count	11	31	42
	Expected Count	10.9	31.1	42
41-43	Count	12	24	36
	Expected Count	9.4	26.6	36
44-62	Count	10	25	35
	Expected Count	9.1	25.9	35
Total	Count	43	122	165
	Expected Count	43	122	165

Backup Player in a Clearly Winning Situation

Age		Game Situation Six		Total
		Yes	No	
37 and below	Count	6	46	52
	Expected Count	7.2	44.8	52
38-40	Count	6	36	42
	Expected Count	5.9	36.1	42
41-43	Count	5	31	36
	Expected Count	5	31	36
44-62	Count	6	29	35
	Expected Count	4.9	30.1	35
Total	Count	23	142	165
	Expected Count	23	142	165

Starter in a Clearly Losing Situation

Age		Game Situation Seven		Total
		Yes	No	
37 and below	Count	6	46	52
	Expected Count	6.9	45.1	52
38-40	Count	6	36	42
	Expected Count	5.6	36.4	42
41-43	Count	5	31	36
	Expected Count	4.8	31.2	36
44-62	Count	5	30	35
	Expected Count	4.7	30.3	35
Total	Count	22	143	165
	Expected Count	22	143	165

Backup Player in a Close Winning Situation

Age		Game Situation Eight Yes	No	Total
37 and below	Count	20	20	40
	Expected Count	19.1	20.9	40
38-40	Count	20	15	35
	Expected Count	16.7	18.3	35
41-43	Count	10	17	27
	Expected Count	12.9	14.1	27
44-62	Count	13	17	30
	Expected Count	14.3	15.7	30
Total	Count	63	69	132
	Expected Count	63	69	132

APPENDIX K

Chi-Square Analysis of Game Situation Data Sheet by Years of Coaching

First off the Bench in a Clearly Losing Competition Situation

Years of Coaching		Game Situation One		Total
		Yes	No	
0 - 2	Count	2	33	35
	Expected Count	3	32	35
3 - 4	Count	2	38	40
	Expected Count	3.5	36.5	40
5 - 9	Count	8	35	43
	Expected Count	3.7	39.3	43
10 - 27	Count	2	42	44
	Expected Count	3.8	40.2	44
Total	Count	14	148	162
	Expected Count	14	148	162

Starter in a Clearly Winning Competition Situation

Years of Coaching		Game Situation Two		Total
		Yes	No	
0 - 2	Count	13	22	35
	Expected Count	10.4	24.6	35
3 - 4	Count	13	27	40
	Expected Count	11.9	28.1	40
5 - 9	Count	14	29	43
	Expected Count	12.7	30.3	43
10 - 27	Count	8	36	44
	Expected Count	13	31	44
Total	Count	48	114	162
	Expected Count	48	114	162

Bench Player in a Clearly Winning Situation

Years of Coaching		Game Situation Three		Total
		Yes	No	
0 - 2	Count	2	33	35
	Expected Count	5.4	29.6	35
3 - 4	Count	9	31	40
	Expected Count	6.2	33.8	40
5 - 9	Count	7	36	43
	Expected Count	6.6	36.4	43
10 - 27	Count	7	37	44
	Expected Count	6.8	37.2	44
Total	Count	25	137	162
	Expected Count	25	137	162

Bench Player in a Game that the Team is Down by 4 Points

Years of Coaching		Game Situation Five		Total
		Yes	No	
0 - 2	Count	6	29	35
	Expected Count	9.1	25.9	35
3 - 4	Count	11	29	40
	Expected Count	10.4	29.6	40
5 - 9	Count	10	33	43
	Expected Count	11.1	31.9	43
10 - 27	Count	15	29	44
	Expected Count	11.4	32.6	44
Total	Count	42	120	162
	Expected Count	42	120	162

Backup Player in a Clearly Winning Situation

Years of Coaching		Game Situation Six		Total
		Yes	No	
0 - 2	Count	3	32	35
	Expected Count	4.8	30.2	35
3 - 4	Count	5	35	40
	Expected Count	5.4	34.6	40
5 - 9	Count	9	34	43
	Expected Count	5.8	37.2	43
10 - 27	Count	5	39	44
	Expected Count	6	38	44
Total	Count	22	140	162
	Expected Count	22	140	162

Starter in a Clearly Losing Situation

Years of Coaching		Game Situation Seven		Total
		Yes	No	
0 - 2	Count	3	32	35
	Expected Count	4.3	30.7	35
3 - 4	Count	6	34	40
	Expected Count	4.9	35.1	40
5 - 9	Count	6	37	43
	Expected Count	5.3	37.7	43
10 - 27	Count	5	39	44
	Expected Count	5.4	38.6	44
Total	Count	20	142	162
	Expected Count	20	142	162

Backup Player in a Close Winning Situation

Years of Coaching		Game Situation Eight		Total
		Yes	No	
0 - 2	Count	13	14	27
	Expected Count	12.9	14.1	27
3 - 4	Count	16	15	31
	Expected Count	14.8	16.2	31
5 - 9	Count	13	21	34
	Expected Count	16.2	17.8	34
10 - 27	Count	20	18	38
	Expected Count	18.1	19.9	38
Total	Count	62	68	130
	Expected Count	62	68	130

Bench Player in a Clearly Losing Situation

Years of Coaching		Game Situation Nine		Total
		Yes	No	
0 - 2	Count	11	16	27
	Expected Count	9.1	17.9	27
3 - 4	Count	11	20	31
	Expected Count	10.5	20.5	31
5 - 9	Count	12	22	34
	Expected Count	11.5	22.5	34
10 - 27	Count	10	28	38
	Expected Count	12.9	25.1	38
Total	Count	44	86	130
	Expected Count	44	86	130

APPENDIX L

Chi-Square Analysis of Game Situation Data Sheet by Number of Sports Coached

First off the Bench in a Clearly Losing Competition Situation

Number of Sports Coached		Game Situation One		Total
		Yes	No	
0 - 1	Count	3	40	43
	Expected Count	3.6	39.4	43
2	Count	2	30	32
	Expected Count	2.7	29.3	32
3	Count	5	36	41
	Expected Count	3.5	37.5	41
4-7	Count	4	45	49
	Expected Count	4.2	44.8	49
Total	Count	14	151	165
	Expected Count	14	151	165

Starter in a Clearly Winning Competition Situation

Number of Sports Coached		Game Situation Two		Total
		Yes	No	
0 - 1	Count	11	32	43
	Expected Count	13	30	43
2	Count	10	22	32
	Expected Count	9.7	22.3	32
3	Count	16	25	41
	Expected Count	12.4	28.6	41
4-7	Count	13	36	49
	Expected Count	14.8	34.2	49
Total	Count	50	115	165
	Expected Count	50	115	165

Bench Player in a Clearly Winning Situation

Number of Sports Coached		Game Situation Three		Total
		Yes	No	
0 - 1	Count	6	37	43
	Expected Count	6.8	36.2	43
2	Count	9	23	32
	Expected Count	5	27	32
3	Count	3	38	41
	Expected Count	6.5	34.5	41
4-7	Count	8	41	49
	Expected Count	7.7	41.3	49
Total	Count	26	139	165
	Expected Count	26	139	165

Starter in a Game that the Team is Down by 5 Points

Number of Sports Coached		Game Situation Four		Total
		Yes	No	
0 - 1	Count	15	28	43
	Expected Count	19.5	23.5	43
2	Count	17	15	32
	Expected Count	14.5	17.5	32
3	Count	22	19	41
	Expected Count	18.6	22.4	41
4-7	Count	21	28	49
	Expected Count	22.3	26.7	49
Total	Count	75	90	165
	Expected Count	75	90	165

Bench Player in a Game that the Team is Down by 4 Points

Number of Sports Coached		Game Situation Five		Total
		Yes	No	
0 - 1	Count	13	30	43
	Expected Count	11.2	31.8	43
2	Count	11	21	32
	Expected Count	8.3	23.7	32
3	Count	9	32	41
	Expected Count	10.7	30.3	41
4-7	Count	10	39	49
	Expected Count	12.8	36.2	49
Total	Count	43	122	165
	Expected Count	43	122	165

Backup Player in a Clearly Winning Situation

Number of Sports Coached		Game Situation Six		Total
		Yes	No	
0 - 1	Count	5	38	43
	Expected Count	6	37	43
2	Count	6	26	32
	Expected Count	4.5	27.5	32
3	Count	5	36	41
	Expected Count	5.7	35.3	41
4-7	Count	7	42	49
	Expected Count	6.8	42.2	49
Total	Count	23	142	165
	Expected Count	23	142	165

Starter in a Clearly Losing Situation

Number of Sports Coached		Game Situation Seven		Total
		Yes	No	
0 - 1	Count	4	39	43
	Expected Count	5.7	37.3	43
2	Count	2	30	32
	Expected Count	4.3	27.7	32
3	Count	8	33	41
	Expected Count	5.5	35.5	41
4-7	Count	8	41	49
	Expected Count	6.5	42.5	49
Total	Count	22	143	165
	Expected Count	22	143	165

Backup Player in a Close Winning Situation

Number of Sports Coached		Game Situation Eight		Total
		Yes	No	
0 - 1	Count	13	19	32
	Expected Count	15.3	16.7	32
2	Count	12	13	25
	Expected Count	11.9	13.1	25
3	Count	18	18	36
	Expected Count	17.2	18.8	36
4-7	Count	20	19	39
	Expected Count	18.6	20.4	39
Total	Count	63	69	132
	Expected Count	63	69	132

Bench Player in a Clearly Losing Situation

Number of Sports Coached		Game Situation Nine		Total
		Yes	No	
0 - 1	Count	9	23	32
	Expected Count	10.9	21.1	32
2	Count	11	14	25
	Expected Count	8.5	16.5	25
3	Count	10	26	36
	Expected Count	12.3	23.7	36
4-7	Count	15	24	39
	Expected Count	13.3	25.7	39
Total	Count	45	87	132
	Expected Count	45	87	132

APPENDIX M

Chi-Square Analysis of Game Situation Data Sheet by Educational Background

First off the Bench in a Clearly Losing Competition Situation

Educational Background		Game Situation One		Total
		Yes	No	
High School	Count	11	69	80
	Expected Count	6.8	73.2	80
College	Count	2	63	65
	Expected Count	5.5	59.5	65
Advanced Degree	Count	1	15	16
	Expected Count	1.4	14.6	16
Other/Not Specified	Count	0	4	4
	Expected Count	.3	3.7	4
Total	Count	14	151	165
	Expected Count	14	151	165

Starter in a Clearly Winning Competition Situation

Educational Background		Game Situation Two		Total
		Yes	No	
High School	Count	30	50	80
	Expected Count	24.2	55.8	80
College	Count	16	49	65
	Expected Count	19.7	45.3	65
Advanced Degree	Count	3	13	16
	Expected Count	4.8	11.2	16
Other/Not Specified	Count	1	3	4
	Expected Count	1.2	2.8	4
Total	Count	50	115	165
	Expected Count	50	115	165

Bench Player in a Clearly Winning Situation

Educational Background		Game Situation Three		Total
		Yes	No	
High School	Count	12	68	80
	Expected Count	12.6	67.4	80
College	Count	12	53	65
	Expected Count	10.2	54.8	65
Advanced Degree	Count	2	14	16
	Expected Count	2.5	13.5	16
Other/Not Specified	Count	0	4	4
	Expected Count	.6	3.4	4
Total	Count	26	139	165
	Expected Count	26	139	165

Starter in a Game that the Team is Down by 5 Points

Educational Background		Game Situation Four		Total
		Yes	No	
High School	Count	39	41	80
	Expected Count	36.4	43.6	80
College	Count	28	37	65
	Expected Count	29.5	35.5	65
Advanced Degree	Count	6	10	16
	Expected Count	7.3	8.7	16
Other/Not Specified	Count	2	2	4
	Expected Count	1.8	2.2	4
Total	Count	75	90	165
	Expected Count	75	90	165

Bench Player in a Game that the Team is Down by 4 Points

Educational Background		Game Situation Five		Total
		Yes	No	
High School	Count	23	57	80
	Expected Count	20.8	59.2	80
College	Count	14	51	65
	Expected Count	16.9	48.1	65
Advanced Degree	Count	5	11	16
	Expected Count	4.2	11.8	16
Other/Not Specified	Count	1	3	4
	Expected Count	1	3.0	4
Total	Count	43	122	165
	Expected Count	43	122	165

Backup Player in a Clearly Winning Situation

Educational Background		Game Situation Six		Total
		Yes	No	
High School	Count	11	69	80
	Expected Count	11.2	68.8	80
College	Count	11	54	65
	Expected Count	9.1	55.9	65
Advanced Degree	Count	1	15	16
	Expected Count	2.2	13.8	16
Other/Not Specified	Count	0	4	4
	Expected Count	.6	3.4	4
Total	Count	23	142	165
	Expected Count	23	142	165

Starter in a Clearly Losing Situation

Educational Background		Game Situation Seven		Total
		Yes	No	
High School	Count	14	66	80
	Expected Count	10.7	69.3	80
College	Count	7	58	65
	Expected Count	8.7	56.3	65
Advanced Degree	Count	1	15	16
	Expected Count	2.1	13.9	16
Other/Not Specified	Count	0	4	4
	Expected Count	.5	3.5	4
Total	Count	22	143	165
	Expected Count	22	143	165

Backup Player in a Close Winning Situation

Educational Background		Game Situation Eight Yes	No	Total
High School	Count	26	37	63
	Expected Count	30.1	32.9	63
College	Count	31	22	53
	Expected Count	25.3	27.7	53
Advanced Degree	Count	5	7	12
	Expected Count	5.7	6.3	12
Other/Not Specified	Count	1	3	4
	Expected Count	1.9	2.1	4
Total	Count	63	69	132
	Expected Count	63	69	132

Bench Player in a Clearly Losing Situation by Age

Educational Background		Game Situation Nine		Total
		Yes	No	
High School	Count	19	44	63
	Expected Count	21.5	41.5	63
College	Count	22	31	53
	Expected Count	18.1	34.9	53
Advanced Degree	Count	3	9	12
	Expected Count	4.1	7.9	12
Other/Not Specified	Count	1	3	4
	Expected Count	1.4	2.6	4
Total	Count	45	87	132
	Expected Count	45	87	132

APPENDIX N

Chi-Square Analysis of Game Situation Data Sheet by Gender of Athletes

First off the Bench in a Clearly Losing Competition Situation

Gender of Athletes		Game Situation One		Total
		Yes	No	
Predominantly Male	Count	27	220	247
	Expected Count	27	220	247
Predominantly Female	Count	2	28	30
	Expected Count	3.3	26.7	30
Even Mix of Males & Females	Count	2	5	7
	Expected Count	.8	6.2	7
Total	Count	31	253	284
	Expected Count	31	253	284

Starter in a Clearly Winning Competition Situation

Gender of Athletes		Game Situation Two		Total
		Yes	No	
Predominantly Male	Count	77	170	247
	Expected Count	78.3	168.7	247
Predominantly Female	Count	12	18	30
	Expected Count	9.5	20.5	30
Even Mix of Males & Females	Count	1	6	7
	Expected Count	2.2	4.8	7
Total	Count	90	194	284
	Expected Count	90	194	284

Bench Player in a Clearly Winning Situation

Gender of Athletes		Game Situation Three		Total
		Yes	No	
Predominantly Male	Count	31	216	247
	Expected Count	33	214	247
Predominantly Female	Count	5	25	30
	Expected Count	4	26	30
Even Mix of Males & Females	Count	2	5	7
	Expected Count	.9	6.1	7
Total				
	Count	38	246	284
	Expected Count	38	246	284

Starter in a Game that the Team is Down by 5 Points

Gender of Athletes		Game Situation Four		Total
		Yes	No	
Predominantly Male	Count	113	134	247
	Expected Count	112.2	134.8	247
Predominantly Female	Count	11	19	30
	Expected Count	13.6	16.4	30
Even Mix of Males & Females	Count	5	2	7
	Expected Count	3.2	3.8	7
Total	Count	129	155	284
	Expected Count	129	155	284

Bench Player in a Game that the Team is Down by 4 Points

Gender of Athletes		Game Situation Five		Total
		Yes	No	
Predominantly Male	Count	56	191	247
	Expected Count	57.4	189.6	247
Predominantly Female	Count	10	20	30
	Expected Count	7	23	30
Even Mix of Males & Females	Count	0	7	7
	Expected Count	1.6	5.4	7
Total	Count	66	218	284
	Expected Count	66	218	284

Backup Player in a Clearly Winning Situation

Gender of Athletes		Game Situation Six		Total
		Yes	No	
Predominantly Male	Count	34	213	247
	Expected Count	33	214	247
Predominantly Female	Count	3	27	30
	Expected Count	4	26	30
Even Mix of Males & Females	Count	1	6	7
	Expected Count	.9	6.1	7
Total	Count	38	246	284
	Expected Count	38	246	284

Starter in a Clearly Losing Situation

Gender of Athletes		Game Situation Seven		Total
		Yes	No	
Predominantly Male	Count	36	211	247
	Expected Count	36.5	210.5	247
Predominantly Female	Count	5	25	30
	Expected Count	4.4	25.6	30
Even Mix of Males & Females	Count	1	6	7
	Expected Count	1	6	7
Total	Count	42	242	284
	Expected Count	42	242	284

Backup Player in a Close Winning Situation

Gender of Athletes		Game Situation Eight		Total
		Yes	No	
Predominantly Male	Count	86	109	195
	Expected Count	88.3	106.7	195
Predominantly Female	Count	11	11	22
	Expected Count	10	12	22
Even Mix of Males & Females	Count	4	2	6
	Expected Count	2.7	3.3	6
Total	Count	101	122	223
	Expected Count	101	122	223

Bench Player in a Clearly Losing Situation

Gender of Athletes		Game Situation Nine		Total
		Yes	No	
Predominantly Male	Count	60	135	195
	Expected Count	63.8	131.2	195
Predominantly Female	Count	11	11	22
	Expected Count	7.2	14.8	22
Even Mix of Males & Females	Count	2	4	6
	Expected Count	2	4	6
Total	Count	73	150	223
	Expected Count	73	150	223

APPENDIX O

Chi-Square Analysis of Game Situation Data Sheet by Formal First Aid Training

First off the Bench in a Clearly Losing Competition Situation

Formal First Aid Training		Game Situation One		Total
		Yes	No	
Yes	Count	7	87	94
	Expected Count	8	86	94
No	Count	7	64	71
	Expected Count	6	65	71
Total	Count	14	151	165
	Expected Count	14	151	165

Starter in a Clearly Winning Competition Situation

Formal First Aid Training		Game Situation Two		Total
		Yes	No	
Yes	Count	23	71	94
	Expected Count	28.5	65.5	94
No	Count	27	44	71
	Expected Count	21.5	49.5	71
Total	Count	50	115	165
	Expected Count	50	115	165

Bench Player in a Clearly Winning Situation

Formal First Aid Training		Game Situation Three		Total
		Yes	No	
Yes	Count	15	79	94
	Expected Count	14.8	79.2	94
No	Count	11	60	71
	Expected Count	11.2	59.8	71
Total	Count	26	139	165
	Expected Count	26	139	165

Starter in a Game that the Team is Down by 5 Points

Formal First Aid Training		Game Situation Four		Total
		Yes	No	
Yes	Count	45	49	94
	Expected Count	42.7	51.3	94
No	Count	30	41	71
	Expected Count	32.3	38.7	71
Total	Count	75	90	165
	Expected Count	75	90	165

Bench Player in a Game that the Team is Down by 4 Points

Formal First Aid Training		Game Situation Five		Total
		Yes	No	
Yes	Count	28	66	94
	Expected Count	24.5	69.5	94
No	Count	15	56	71
	Expected Count	18.5	52.5	71
Total	Count	43	122	165
	Expected Count	43	122	165

Backup Player in a Clearly Winning Situation

Formal First Aid Training		Game Situation Six		Total
		Yes	No	
Yes	Count	13	81	94
	Expected Count	13.1	80.9	94
No	Count	10	61	71
	Expected Count	9.9	61.1	71
Total	Count	23	142	165
	Expected Count	23	142	165

Starter in a Clearly Losing Situation

Formal First Aid Training		Game Situation Seven		Total
		Yes	No	
Yes	Count	10	84	94
	Expected Count	12.5	81.5	94
No	Count	12	59	71
	Expected Count	9.5	61.5	71
Total	Count	22	143	165
	Expected Count	22	143	165

Backup Player in a Close Winning Situation

Formal First Aid Training		Game Situation Eight		Total
		Yes	No	
Yes	Count	41	35	76
	Expected Count	36.6	39.7	76
No	Count	22	34	56
	Expected Count	26.7	29.3	56
Total	Count	63	69	132
	Expected Count	63	69	132

Bench Player in a Clearly Losing Situation

Formal First Aid Training		Game Situation Nine		Total
		Yes	No	
Yes	Count	27	49	76
	Expected Count	25.9	50.1	76
No	Count	18	38	56
	Expected Count	19.1	36.9	56
Total	Count	45	87	132
	Expected Count	45	87	132

APPENDIX P

Chi-Square Analysis of Game Situation Data Sheet by American Red Cross First Aid Training

First off the Bench in a Clearly Losing Competition Situation

American Red Cross First Aid Training		Game Situation One		Total
		Yes	No	
Yes	Count	5	56	61
	Expected Count	5.2	55.8	61
No	Count	9	95	104
	Expected Count	8.8	95.2	104
Total	Count	14	151	165
	Expected Count	14	151	165

Starter in a Clearly Winning Competition Situation

American Red Cross First Aid Training		Game Situation Two		Total
		Yes	No	
Yes	Count	15	46	61
	Expected Count	18.5	42.5	61
No	Count	35	69	104
	Expected Count	31.5	72.5	104
Total	Count	50	115	165
	Expected Count	50	115	165

Bench Player in a Clearly Winning Situation

American Red Cross First Aid Training		Game Situation Three		Total
		Yes	No	
Yes	Count	12	49	61
	Expected Count	9.6	51.4	61
No	Count	14	90	104
	Expected Count	16.4	87.6	104
Total	Count	26	139	165
	Expected Count	26	139	165

Starter in a Game that the Team is Down by 5 Points

American Red Cross First Aid Training		Game Situation Four		Total
		Yes	No	
Yes	Count	28	33	61
	Expected Count	27.7	33.3	61
No	Count	47	57	104
	Expected Count	47.3	56.7	104
Total	Count	75	90	165
	Expected Count	75	90	165

Bench Player in a Game that the Team is Down by 4 Points

American Red Cross First Aid Training		Game Situation Five		Total
		Yes	No	
Yes	Count	17	44	61
	Expected Count	15.9	45.1	61
No	Count	26	78	104
	Expected Count	27.1	76.9	104
Total	Count	43	122	165
	Expected Count	43	122	165

Backup Player in a Clearly Winning Situation

American Red Cross First Aid Training		Game Situation Six		Total
		Yes	No	
Yes	Count	10	51	61
	Expected Count	8.5	52.5	61
No	Count	13	91	104
	Expected Count	14.5	89.5	104
Total	Count	23	142	165
	Expected Count	23	142	165

Starter in a Clearly Losing Situation

American Red Cross First Aid Training		Game Situation Seven		Total
		Yes	No	
Yes	Count	8	53	61
	Expected Count	8.1	52.9	61
No	Count	14	90	104
	Expected Count	13.9	90.1	104
Total	Count	22	143	165
	Expected Count	22	143	165

Backup Player in a Close Winning Situation

American Red Cross First Aid Training		Game Situation Eight		Total
		Yes	No	
Yes	Count	27	19	46
	Expected Count	22	24	46
No	Count	36	50	86
	Expected Count	41	45	86
Total	Count	63	69	132
	Expected Count	63	69	132

Bench Player in a Clearly Losing Situation

American Red Cross First Aid Training		Game Situation Nine		Total
		Yes	No	
Yes	Count	20	26	46
	Expected Count	15.7	30.3	46
No	Count	25	61	86
	Expected Count	29.3	56.7	86
Total	Count	45	87	132
	Expected Count	45	87	132

APPENDIX Q

Chi-Square Analysis of Game Situation Data Sheet by CPR Training

First off the Bench in a Clearly Losing Competition Situation

CPR Training		Game Situation One		Total
		Yes	No	
Yes	Count	7	71	78
	Expected Count	6.6	71.4	78
No	Count	7	80	87
	Expected Count	7.4	79.6	87
Total	Count	14	151	165
	Expected Count	14	151	165

Starter in a Clearly Winning Competition Situation

CPR Training		Game Situation Two		Total
		Yes	No	
Yes	Count	20	58	78
	Expected Count	23.6	54.4	78
No	Count	30	57	87
	Expected Count	26.4	60.6	87
Total	Count	50	115	165
	Expected Count	50	115	165

Bench Player in a Clearly Winning Situation

CPR Training		Game Situation Three		Total
		Yes	No	
Yes	Count	13	65	78
	Expected Count	12.3	65.7	78
No	Count	13	74	87
	Expected Count	13.7	73.3	87
Total	Count	26	139	165
	Expected Count	26	139	165

Starter in a Game that the Team is Down by 5 Points

CPR Training		Game Situation Four		Total
		Yes	No	
Yes	Count	39	39	78
	Expected Count	35.5	42.5	78
No	Count	36	51	87
	Expected Count	39.5	47.5	87
Total	Count	75	90	165
	Expected Count	75	90	165

Bench Player in a Game that the Team is Down by 4 Points

CPR Training		Game Situation Five		Total
		Yes	No	
Yes	Count	23	55	78
	Expected Count	20.3	57.7	78
No	Count	20	67	87
	Expected Count	22.7	64.3	87
Total	Count	43	122	165
	Expected Count	43	122	165

Backup Player in a Clearly Winning Situation

CPR Training		Game Situation Six		Total
		Yes	No	
Yes	Count	11	67	78
	Expected Count	10.9	67.1	78
No	Count	12	75	87
	Expected Count	12.1	74.9	87
Total	Count	23	142	165
	Expected Count	23	142	165

Starter in a Clearly Losing Situation

CPR Training		Game Situation Seven		Total
		Yes	No	
Yes	Count	9	69	78
	Expected Count	10.4	67.6	78
No	Count	13	74	87
	Expected Count	11.6	75.4	87
Total	Count	22	143	165
	Expected Count	22	143	165

Bench Player in a Clearly Losing Situation

CPR Training		Game Situation Nine		Total
		Yes	No	
Yes	Count	23	37	60
	Expected Count	20.5	39.5	60
No	Count	22	50	72
	Expected Count	24.5	47.5	72
Total	Count	45	87	132
	Expected Count	45	87	132

APPENDIX R

Chi-Square Analysis of Game Situation Data Sheet by Current First Aid Certification

Starter in a Clearly Winning Competition Situation

Current First Aid Certification		Game Situation Two		Total
		Yes	No	
Yes	Count	7	14	21
	Expected Count	6.4	14.6	21
No	Count	43	101	144
	Expected Count	43.6	100.4	144
Total	Count	50	115	165
	Expected Count	50	115	165

Bench Player in a Clearly Winning Situation

Current First Aid Certification		Game Situation Three		Total
		Yes	No	
Yes	Count	5	16	21
	Expected Count	3.3	17.7	21
No	Count	21	123	144
	Expected Count	22.7	121.3	144
Total	Count	26	139	165
	Expected Count	26	139	165

Starter in a Game that the Team is Down by 5 Points

Current First Aid Certification		Game Situation Four		Total
		Yes	No	
Yes	Count	12	9	21
	Expected Count	9.5	11.5	21
No	Count	63	81	144
	Expected Count	65.5	78.5	144
Total	Count	75	90	165
	Expected Count	75	90	165

Bench Player in a Game that the Team is Down by 4 Points

Current First Aid Certification		Game Situation Five		Total
		Yes	No	
Yes	Count	7	14	21
	Expected Count	5.5	15.5	21
No	Count	36	108	144
	Expected Count	37.5	106.5	144
Total	Count	43	122	165
	Expected Count	43	122	165

Backup Player in a Clearly Winning Situation

Current First Aid Certification		Game Situation Six		Total
		Yes	No	
Yes	Count	4	17	21
	Expected Count	2.9	18.1	21
No	Count	19	125	144
	Expected Count	20.1	123.9	144
Total	Count	23	142	165
	Expected Count	23	142	165

Starter in a Clearly Losing Situation

Current First Aid Certification		Game Situation Seven		Total
		Yes	No	
Yes	Count	2	19	21
	Expected Count	2.8	18.2	21
No	Count	20	124	144
	Expected Count	19.2	124.8	144
Total	Count	22	143	165
	Expected Count	22	143	165

Backup Player in a Close Winning Situation

Current First Aid Certification		Game Situation Eight		Total
		Yes	No	
Yes	Count	8	8	16
	Expected Count	7.6	8.4	16
No	Count	55	61	116
	Expected Count	55.4	60.6	116
Total	Count	63	69	132
	Expected Count	63	69	132

Bench Player in a Clearly Losing Situation by Age

Current First Aid Certification		Game Situation Nine		Total
		Yes	No	
Yes	Count	5	11	16
	Expected Count	5.5	10.5	16
No	Count	40	76	116
	Expected Count	39.5	76.5	116
Total	Count	45	87	132
	Expected Count	45	87	132

Appendix S

Chi-Square Analysis of Game Situation Data Sheet by Current CPR Certification

First off the Bench in a Clearly Losing Competition Situation

Current CPR Certification		Game Situation One		Total
		Yes	No	
Yes	Count	5	25	30
	Expected Count	2.5	27.5	30
No	Count	9	126	135
	Expected Count	11.5	123.5	135
Total	Count	14	151	165
	Expected Count	14	151	165

Starter in a Clearly Winning Competition Situation

Current CPR Certification		Game Situation Two		Total
		Yes	No	
Yes	Count	10	20	30
	Expected Count	9.1	20.9	30
No	Count	40	95	135
	Expected Count	40.9	94.1	135
Total	Count	50	115	165
	Expected Count	50	115	165

Bench Player in a Clearly Winning Situation

Current CPR Certification		Game Situation Three		Total
		Yes	No	
Yes	Count	7	23	30
	Expected Count	4.7	25.3	30
No	Count	19	116	135
	Expected Count	21.3	113.7	135
Total	Count	26	139	165
	Expected Count	26	139	165

Starter in a Game that the Team is Down by 5 Points

Current CPR Certification		Game Situation Four		Total
		Yes	No	
Yes	Count	18	12	30
	Expected Count	13.6	16.4	30
No	Count	57	78	135
	Expected Count	61.4	73.6	135
Total	Count	75	90	165
	Expected Count	75	90	165

Bench Player in a Game that the Team is Down by 4 Points

Current CPR Certification		Game Situation Five		Total
		Yes	No	
Yes	Count	9	21	30
	Expected Count	7.8	22.2	30
No	Count	34	101	135
	Expected Count	35.2	99.8	135
Total	Count	43	122	165
	Expected Count	43	122	165

Backup Player in a Clearly Winning Situation

Current CPR Certification		Game Situation Six		Total
		Yes	No	
Yes	Count	5	25	30
	Expected Count	4.2	25.8	30
No	Count	18	117	135
	Expected Count	18.8	116.2	135
Total	Count	23	142	165
	Expected Count	23	142	165

Starter in a Clearly Losing Situation

Current CPR Certification		Game Situation Seven		Total
		Yes	No	
Yes	Count	4	26	30
	Expected Count	4	26	30
No	Count	18	117	135
	Expected Count	18	117	135
Total	Count	22	143	165
	Expected Count	22	143	165

Backup Player in a Close Winning Situation

Current CPR Certification		Game Situation Eight		Total
		Yes	No	
Yes	Count	12	11	23
	Expected Count	11	12	23
No	Count	51	58	109
	Expected Count	52	57	109
Total	Count	63	69	132
	Expected Count	63	69	132

Bench Player in a Clearly Losing Situation by Age

Current CPR Certification		Game Situation Nine		Total
		Yes	No	
Yes	Count	8	15	23
	Expected Count	7.8	15.2	23
No	Count	37	72	109
	Expected Count	37.2	71.8	109
Total	Count	45	87	132
	Expected Count	45	87	132

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