

EILBACHER, CRAIG A., Ed.D. North Carolina High School Football First Responders' Perceived Knowledge and their Likelihood to Perform Athletic Health Care Behaviors. (2010)

Directed by Dr. Jolene Henning and Dr. Kathleen Williams. 130 pp.

A great deal of scrutiny had been placed on the current level of on-site health care provided at North Carolina public high schools, in particular care given by first responders working with football. The purpose of this study was to: (a) identify North Carolina high school football first responders' perceived knowledge of a variety of athletic health care skills and behaviors, and (b) determine the likelihood that first responders would actually perform specific skills and behaviors when provided the opportunity to do so during the football season. The author also investigated if differences existed between those with four or more years of experience and those with three or less years of experience. An original survey instrument was designed and pilot tested to assess perceived knowledge and likelihood of behaviors. The questionnaire was administered to first responders attending the first day of the summer 2009 Injury Management Workshop (IMW) in Greensboro, North Carolina which yielded a sample of  $N = 93$ . For ease of analysis data regarding perceived knowledge and the likelihood of skills and behaviors were reduced into five content areas: (a) upper extremity; (b) lower extremity; (c) head, neck, cervical spine and low back; (d) general medical/internal; and (e) environmental conditions. Separate multivariate analyses (MANOVA) were conducted to examine perceived knowledge and the likelihood to perform behaviors in first responders with four or more years of experience ( $n = 32$ ) and those with three or less years of experience ( $n = 61$ ). A bivariate correlation was conducted to determine the

relationship between perceived knowledge and the likelihood to perform athletic health care behaviors. An alpha level of .05 was set to determine significance.

Results indicated that first responders perceived themselves to have enough knowledge in all content areas except head, neck, cervical spine, and low back content area ( $M = 1.47$ ,  $SD = .29$ ). There was no significant difference for perceived knowledge between groups regarding years of experience ( $p = .136$ ). First responders were likely to perform athletic health care skills and behaviors in all content areas when given the opportunity to do. There was a significant difference between the groups (Wilks  $\lambda = .87$ ,  $F_{(1,91)} = 2.66$ ,  $p < .05$ ) for likelihood to perform behaviors. Analysis at the univariate level revealed a statistically significant difference in environmental conditions only ( $F_{(1,91)} = 5.90$ ,  $p = .01$ ). Participants with four or more years of experience ( $M = 3.58$ ,  $SD = .48$ ) were more likely to perform skills and behaviors associated with environmental conditions than those with three or less years of experience ( $M = 3.28$ ,  $SD = .60$ ). This study found a moderate to high positive correlation for all five knowledge and likelihood of skills and behaviors content areas. Therefore, indicating first responders were likely to perform athletic health care skills and behaviors only if they perceived themselves to be knowledgeable in those areas. These findings indicate that first responders perceived themselves to be knowledgeable in most content areas and likely to perform athletic health care skills and behaviors for North Carolina high school football athletes. In addition it has set the foundation for future research in this area to be conducted to ensure that proper medical care is being provided to high school athletes.

NORTH CAROLINA HIGH SCHOOL FOOTBALL FIRST RESPONDERS'  
PERCEIVED KNOWLEDGE AND THEIR LIKELIHOOD TO  
PERFORM ATHLETIC HEALTH CARE BEHAVIORS

by

Craig A. Eilbacher

A Dissertation Submitted to  
the Faculty of The Graduate School at  
The University of North Carolina at Greensboro  
in Partial Fulfillment  
of the Requirements for the Degree  
Doctor of Education

Greensboro  
2010

Approved by

Dr. Jolene Henning  
Committee Co-Chair

Dr. Kathleen Williams  
Committee Co-Chair

To my wife Ashley, thank you for your support and patients in this process. You sacrificed a lot for me to pursue my dream. I could not have done it without you.

To my children, Harrison and Ella Grace, I hope one day you will understand what persistence and hard work means in order to reach your goals.

To my parents, brothers, sister, and in-laws, thank you for your support and encouragement, I made it!

APPROVAL PAGE

This dissertation has been approved by the following committee of the Faculty of  
The Graduate School at The University of North Carolina at Greensboro.

Committee Co-Chair Dr. Jolene Henning

Committee Co-Chair Dr. Kathleen Williams

Committee Members Dr. Thomas Martinek

Dr. Kirk Brown

April 5, 2010  
Date of Acceptance by Committee

March 16, 2010  
Date of Final Oral Examination

## ACKNOWLEDGMENTS

I would like to thank all that have contributed to my success in this process. To my committee members: Dr. Jolene Henning, Co-chair, who took a chance on me. Your guidance, mentorship, and support is greatly appreciated; Dr. Kathleen Williams, for your guidance throughout my entire doctoral experience, you never gave up on me; thank you; Dr. Kirk Brown, for your willingness to join the committee while being at UNCW, I appreciate your mentorship and insight into this process; and Dr. Thomas Martinek, for your assistance and thoughtful insight.

To my colleagues at Guilford College for their support, constant encouragement, and for being my sounding board, especially Dr. Lavon Williams, Dr. Robert Malekoff, and Dr. Kathy Tritschler. Additional thanks to my friends and colleagues who supported me in this process, especially, Dr. Michelle Lesperance and Dr. BC Charles-Liscombe. A special thanks to Scott Barringer and Elton Hawley for providing access to the North Carolina Injury Management Workshop for data collection.

## TABLE OF CONTENTS

	Page
LIST OF TABLES .....	viii
CHAPTER	
I. INTRODUCTION .....	1
Statement of the Problem.....	1
Qualifications of the Athletic Trainer versus the First Responder .....	2
Injury Management Workshop .....	4
Purpose.....	5
Definition of Terms.....	8
Limitations .....	9
Delimitations.....	9
Independent Variable .....	10
Dependent Variable .....	10
II. LITERATURE REVIEW .....	11
Purpose of the Review .....	11
Participation and Injury Rates in High School Sports .....	11
Historical Perspective on the NCSBE Athletic Injury Management Policy and Workshops .....	15
Reasonable Care.....	19
Past and Present Care across the United States .....	20
California .....	22
New York.....	22
Wisconsin.....	23
Virginia .....	23
South Carolina .....	24
Texas .....	24
Illinois .....	25
Current North Carolina Care in High Schools.....	26
Athletic Trainer Education.....	28
First Responder .....	30
Athletic Trainer Compared to First Responder.....	32
III. METHOD .....	36

Design and Setting .....	36
Participants.....	37
Instrumentation .....	37
Pilot Test.....	38
Procedures.....	40
Data Reduction.....	40
Data Analysis .....	42
 IV. RESULTS .....	 45
Overview of Statistical Analysis.....	45
Descriptive Data.....	45
Descriptive Statistics.....	51
Perceived Content Knowledge.....	51
Likelihood of Behaviors .....	52
Research Questions One & Two: Perceived Knowledge .....	53
Research Questions Three & Four: Likelihood to Perform Behaviors .....	54
Research Question Five: Content Area Relationships .....	55
 V. DISCUSSION .....	 58
Perceived Knowledge .....	58
Likelihood of Skills and Behaviors.....	61
Content Area Relationship.....	64
Current State of Health Care for High School Athletes.....	64
Limitations .....	65
Delimitations.....	66
Recommendations for Future Research .....	66
Application of Study.....	68
Conclusion .....	68
 REFERENCES .....	 70
 APPENDIX A.    NORTH CAROLINA STATE BOARD OF EDUCATION INJURY MANAGEMENT POLICY .....	  77
 APPENDIX B.    ATHLETIC TRAINING AND FIRST RESPONDER EDUCATION.....	  79
 APPENDIX C.    NORTH CAROLINA ATHLETIC TRAINERS’ PRACTICE ACT.....	  80



APPENDIX D-1.	NATIONAL FEDERATION OF STATE HIGH SCHOOL ASSOCIATION: PARTICIPATION GRAPH .....	87
APPENDIX D-2.	NATIONAL FEDERATION OF STATE HIGH SCHOOL ASSOCIATION: FOOTBALL PARTICIPATION GRAPH.....	88
APPENDIX E.	AMA SPORTS MEDICINE POLICY .....	89
APPENDIX F.	PROPOSED NORTH CAROLINA HIGH SCHOOLS ATHLETIC TRAINING BILL .....	90
APPENDIX G.	IRB APPROVAL AT UNCG.....	92
APPENDIX H.	VERIFICATION LETTER .....	94
APPENDIX I.	SURVEY .....	95
APPENDIX J.	FIRST RESPONDERS PILOT COVER LETTER.....	112
APPENDIX K.	ATHLETIC TRAINING EDUCATION PROGRAM EDUCATOR PILOT COVER LETTER .....	113
APPENDIX L.	IRB CONSENT FORM: LONG FORM.....	114
APPENDIX M.	ADDITIONAL RESULTS TABLES.....	116

## LIST OF TABLES

	Page
Table 1. Participant Demographics.....	46
Table 2. Employment Characteristics.....	47
Table 3. Certifications and Licenses.....	48
Table 4. Continuing Education.....	49
Table 5. Participant Coursework.....	50
Table 6. Job Responsibilities.....	51
Table 7. Descriptive Statistics for Perceived Knowledge in each Content Area.....	52
Table 8. Descriptive Statistics for Likelihood of Behaviors Content Areas.....	53
Table 9. Multivariate Analysis of Variance (MANOVA) Results for Likelihood of Behaviors.....	56
Table 10. Pearson Correlations of Content Areas.....	57
Table 11. Mean Score for Participants in Content Area: Environmental Conditions.....	116
Table 12. Mean Score for Participants in Content Area: General Medical Conditions and Internal Conditions.....	117
Table 13. Mean Score for Participants in Content Area: Upper Extremity.....	118
Table 14. Mean Score for Participants in Content Area: Lower Extremity.....	120
Table 15. Mean Score for Participants in Content Area: Head/Neck/Cervical Spine and Low Back.....	122
Table 16. Multivariate Analysis of Variance (MANOVA) Result for Knowledge.....	123
Table 17. Mean Score for Participants in Content Area: Environmental Conditions.....	124

Table 18. Mean Score for Participants in Content Area: General Medical Conditions and Internal Conditions .....	125
Table 19. Mean Score for Participants in Content Area: Upper Extremity .....	126
Table 20. Mean Score for Participants in Content Area: Lower Extremity.....	128
Table 21. Mean Score for Participants in Content Area: Head/Neck/Cervical Spine and Low Back .....	130

## **CHAPTER I**

### **INTRODUCTION**

#### **Statement of the Problem**

In 1986 there were approximately five million high school students participating in interscholastic sports. As of 2006-2007 there were more than 7.4 million interscholastic athletes across the United States (National Federation of High School Association, 2008). With participation reaching 2 million athletes nationwide and 192,000 in North Carolina alone, it is assumed the risk of athletic injuries will also increase drastically (National Federation of High School Association, 2008). Based on 1996-1999 injury data from 100 North Carolina high schools it is estimated that approximately 10,531 injuries occur per year in high school athletics (Knowles, Marshall, Bowling, et al., 2006). With participation and the risk of injury in athletics continually rising, a closer investigation into who is providing health care for high school athletes in North Carolina is essential.

In the wake of the deaths of three interscholastic football athletes in North Carolina high schools during the fall of 2008, much scrutiny has been placed on the current level of on-site health care provided at North Carolina public high schools (Candon & Medlin, 2008; Letchworth, 2008; Stevens & Van Der Horst, 2008). Currently, the North Carolina State Board of Education (NCSBE) mandates that either a licensed athletic trainer (AT) or a first responder be on site to provide medical coverage at all high

school football games and practices (see Appendix A, North Carolina State Board of Education Injury Management Policy). There is a vast difference in professional training between the AT and first responder, with the AT having an extensive background in athletic related health care. Studies published between 2004 and 2008 have estimated that only 10-50% of NC high schools employ ATs (Aukerman, Aukerman, McManama, & Browning, 2006; Eilbacher & Tritschler, 2004; Stevens & Van Der Horst, 2008). This wide range, coupled with the death of three athletes in 2008, led the North Carolina High School Athletic Association (NCHSAA) to inquire about the actual number of ATs employed in schools—resulting in a mandate in November 2008 that all athletic directors provide the NCHSAA with the name of the AT or first responder employed by their school.

According to Ken Brown (Secondary Committee Chair for the North Carolina Athletic Trainers' Association) noted that Que Tucker, Deputy Director of the NCHSAA, spearheaded the data collection and reported that only 41% of high schools employed the services of an AT, while the rest of the state's 59% of interscholastic athletic programs were under the medical guidance of a first responder. This information was disseminated at the North Carolina Athletic Trainers' Association state meeting March 2009. With a large percentage of first responders providing care it is necessary to examine the level of care provided.

### ***Qualifications of the Athletic Trainer versus the First Responder***

The National Athletic Trainers' Association states, "Athletic trainers are nationally certified allied health care professionals who specialize in the prevention,

diagnosis, and intervention of emergency, acute, and chronic medical conditions involving impairment, functional limitations, and disabilities” (National Athletic Trainers’ Association, n.d.-b). Through a combination of formal classroom and clinical instruction as well as extensive clinical experience, the AT is prepared to provide health care within specific content areas (see Appendix B, Athletic Training and First Responder Training). In contrast, the American Red Cross (ARC) defines a first responder as a person trained only in emergency care (e.g., rescue breathing, CPR) who may be required to provide care in the community or at a place of employment (The American Red Cross, 2005).

The differences between an AT and a first responder become even more evident when examining the stark contrast in their formal preparation. ATs must graduate from an entry-level undergraduate or master’s degree program accredited by the Commission on Accreditation of Athletic Training Education (CAATE). In addition, ATs must pass the National Athletic Trainers’ Association Board of Certification (BOC) examination and in many states (including North Carolina) apply for a license to practice as an athletic trainer. In contrast, first responder training is conducted by the non-profit ARC or the American Heart Association (AHA) with fewer than 10 hours of instruction.

Another distinct difference between the AT and first responder other than their professional training is that the state of North Carolina requires licensed ATs to practice under the supervision of a licensed physician (see Appendix C, North Carolina Athletic Trainers’ Practice Act); whereas there are no regulations mandating any form of supervision of first responders. As a result, first responders are placed in a less than

desirable position of providing medical care (perhaps beyond their scope of training) without any physician supervision.

### ***Injury Management Workshop***

First responders began filling the void caused by a lack of certified athletic trainers in the high school setting during the mid 1980s (personal communication, former Department of Public Instruction (DPI) sports medicine employee, Robbie Lester). To ensure that first responders were qualified and high school athletic programs abided by the NCSBE Injury Management Policy the North Carolina Coaches Association (NCCA), in conjunction with the NCHSAA, implemented a series of injury management workshops. The workshops were designed to provide first responders the opportunity to review, update, and gain further knowledge to maximize the care, they could provide to high school athletes. Additionally, the injury management policy required each first responder to attend the twenty hour workshop every year.

Organized by level of knowledge and skills and placed by their years of experience, first responders are provided content well beyond the scope of the initial training obtained in an ARC or AHA course. First time participants primary focus in the Level I workshop is first aid and basic injury management. According to workshop coordinators, individuals are made aware of actions they should not perform due to lack of appropriate experience and training. After completion of Level I and a year of field experience as a first responder, Level II participants primarily focus on rehabilitative techniques and exposure to skills that enable more advanced care to be provided. Advancing to Level III after two years of experience and completion of the Level I & II

workshops, participants are further educated to address additional medical challenges and receive more advanced training to aid them in providing health to high school athletes. The course outline used by the workshop coordinators for Level I and Level II parallels the athletic training domains an AT might be exposed to in an entry level athletic training program. Surprisingly, this intense 20-hour workshop does not lead to further professional certification, but merely demonstrates their compliance of the Injury Management Policy.

For years first responders have been attending the IMW to receive training that prepares them to provide athletic health care for high school football. Little is known about first responders in North Carolina, and what they perceive to know and do beyond attaining twenty hours of training and being sent out to provide care. Therefore, it is assumed that years of experience would impact their perceived knowledge and the likelihood they would provide care. With the push from the North Carolina Athletic Trainers' Association to provide ATs in every high school it is necessary to begin to understand the first responder population that is providing the majority of care to high school athletes.

### **Purpose**

The overarching purposes of this study are twofold: (a) to identify North Carolina high school football first responders' perceived knowledge of a variety of athletic health care skills and behaviors, and (b) to determine the likelihood that first responders would actually perform specific skills and behaviors when provided the opportunity to do so during the football season. Therefore, the following questions guided this study.



Research Question 1: What is the perceived knowledge of first responders providing athletic health care for football players in North Carolina high schools?

There was no direct hypothesis for this question because it is descriptive in nature.

Research Question 2: What is the effect of first responders' years of experience on perceived knowledge?

Hypothesis 2: First responders with four or more years of experience will perceive themselves to be more knowledgeable than those with three or fewer years of experience.

Rationale: The goal of this section was to determine whether first responders perceive they had the knowledge to provide athletic health care coverage for high school football players. Because first responders are placed in the workshop according to their years of experience and the previous level attended, it was assumed that first responders with 4 or more years of experience had completed all levels of the workshop resulting in 60+ hours of continuing education and would therefore perceive to be more knowledgeable than those with fewer years of experience. With the absence of current research and literature for NC this data would provide administrators as well as coaches an overview of the status for the knowledge first responders perceived they had.

Research Question 3: What is the likelihood that first responders will actually perform specific athletic health care skills and behaviors when provided the opportunity to do so during the football season?

There was no direct hypothesis for this question because it is descriptive in nature.

Research Question 4: What is the effect of first responders' years of experience on the likelihood they would perform specific athletic health care skills and behaviors when provided the opportunity to do so during the football season?

Hypothesis 4: First responders with four or more years of experience will be more likely to perform skills and behaviors than those with three or fewer years of experience.

Rationale: Based on first responders' prior years of experience, they would be assigned to their appropriate workshop level. It was assumed that as a first responder gets more workshop training and years of experience, they would be more likely to perform specific health care behaviors.

Research Question 5: What is the relationship between perceived knowledge of athletic health care skills and behaviors and a first responders' likelihood to perform those skills and behaviors?

Hypothesis 5: There will be a strong positive correlation between those skills and behaviors that first responders perceived to be most knowledgeable about and their likelihood to perform those skills.

Rationale: It was assumed that first responders that perceived to have knowledge were just as likely to perform those tasks if exposed to them during the football season. Additionally, important to identify if participants did not perceive to have knowledge but were likely to perform those same tasks. This would identify whether first responders are in an athletic health care position where they would or would not provide care when necessary.

### **Definition of Terms**

**National Athletic Trainers' Association Board of Certification Inc. (BOC)** - Sets the standards for the practice of athletic training. The BOC is the only accredited certifying body for athletic trainers in the United States.

**Certified Athletic Trainer (AT)** - An athletic trainer is a person who meets the qualifications set by a state licensure and/or the Board of Certification, Inc. and practices athletic training under the direction of a physician. Also defined as health care professional who collaborate with physicians to optimize activity and participation of patients and clients (National Athletic Trainers' Association, n.d.-a).

**First Responder** - The first medically trained person to arrive at the scene of an emergency (Schottke, 2001). A first aid responder is a person trained in emergency care that may be required to provide care in the community or at a place of employment (The American Red Cross, 2005).

**Licensed Athletic Trainer (LAT)**- A certified athletic trainer with a certificate that provides evidence of approval by the North Carolina Board of Athletic Trainer Examiners NCBATE that a person has successfully completed the requirements set forth in G.S. 90-528 that individual to perform the functions and duties of an athletic trainer (North Carolina Board of Athletic Trainer Examiners).

**Local Education Agency (LEA)** - Synonymous with a local school system or a local school district, indicating that a public board of education or other public authority maintains administrative control of the public schools in a city or county (Department of Public Instruction).

**National Athletic Trainers' Association (NATA)** – The professional membership association for certified athletic trainers and others who support the athletic training profession (National Athletic Trainers' Association).

**North Carolina Board of Athletic Trainer Examiners (NCBATE)** - The organization that licenses certified athletic trainers in the state (North Carolina Board of Athletic Trainer Examiners).

**North Carolina Department of Public Instruction (NCDPI)** - The NCDPI administers the policies adopted by the State Board of Education and offers instructional, financial, technological and personnel support to all public school systems in the state (Department of Public Instruction).

**North Carolina High School Athletic Association (NCHSAA)** - A voluntary, non-profit corporation which administers the state's interscholastic athletic programs (North Carolina High School Athletic Association).

**North Carolina State Board of Education (NCSBE)** - The State Board of Education is charged with supervising and administering “the free public school system and the educational funds provided for its support” (North Carolina State Board of Education).

### **Limitations**

1. The study was limited to the number of first responders who attended the workshop. The investigator had no control over who attended the workshop and consented to participate.
2. The study was also limited regarding the prior years of experience first responders entered the workshop with. There was no way of knowing if there would be an equal distribution of first responders for the two years of experience groups.
3. It was impossible to control how well participants interpreted and responded to the questionnaire.
4. Late arrivals could not participate, thereby decreasing the number of participants.

### **Delimitations**

1. Because no two states have the same policy for high school first responder coverage the ability to generalize the results beyond North Carolina would be challenging.

**Independent Variable**

First responders' years of experience.

**Dependent Variable**

First responders' perceived duties and likelihood of skills and behaviors.

## **CHAPTER II**

### **LITERATURE REVIEW**

#### **Purpose of the Review**

The purpose of this literature review is to provide an understanding of the health care provided to NC high school athletes. A closer look at how athletic participation and the risk of injuries continue to rise year after year will provide an understanding why an examination into the quality of care in high school sports is critical. Additionally, the history of the North Carolina Board of Education Injury Management Policy, the development of the Injury Management Workshops, and differences between first responders and athletic trainers will be discussed. With the limited amount of research in North Carolina regarding the type of medical coverage, an additional look at the way other states have evolved in the type and quality of coverage being provided will demonstrate the importance of medical coverage in high schools.

#### ***Participation and Injury Rates in High School Sports***

There are approximately 7.4 million student athletes competing at the high school level in the United States each year (Gessel, Fields, Collins, Dick, & Comstock, 2007; Nelson, Collins, Yard, Fields, & Comstock, 2007). With steady growth in the number of high school athletes (see Appendix D-1, National Federation of State High School Association: Participation Graph), the risk of injury is likely to increase (Nelson et al., 2007; Rauh, Marshall, Powell, Mueller, & Queale, 2001). Specifically, football

participation has experienced continual growth since 1996 (see Appendix D-2, National Federation of State High School Association Participation Graph) with the highest incidence of injuries (Powell & Barber-Foss, 1999; Rowe & Miller, 1991). During 2005-2006 approximately 1.4 million athletic injuries were sustained in high school sports, most notably 517,726 football injuries (Rechel, Yard, & Comstock, 2008; Shankar, Fields, Collins, Dick, & Comstock, 2007).

Research indicates that sprains and strains are the most common type of injury followed by concussions and fatalities (Nelson et al., 2007; Ramirez, Schaffer, Haikang, Kashani, & Kraus, 2006; Rechel et al., 2008; Shankar et al., 2007). Powell and Barber-Foss (1999) classified sprains and strain injuries by time loss from practice and competition. Ramirez et al. (2006) found that 45.1% of the injuries were to the lower extremity and 23.2% were to the upper extremity (shoulder). Head injuries accounted for 12.4%, while concussions were 10.8%. Shankar et al. (2007) found 31.2% of injuries were ligament sprains, 16.5% were muscle/tendon strains, with the ankle being the most injured joint (22.4%). Of the 11.5% of head and face injuries, 96.1% were diagnosed as concussions. Rechel et al. (2008) confirmed earlier studies noting 57.2% to lower extremities, 21.5% of injuries to upper extremities; and 14.6% to the head and face. Sprains and strains accounted for 52.1% of injuries and the ankle was injured 22.7% and concussions at 9.1% of the time. The risk of catastrophic head injuries or fatalities during football is greater in high schools than college (Boden, Tacchetti, Cantu, Knowles, & Mueller, 2007). Mueller and Colgate's (2007) annual survey of football injury research tracks fatalities during high school football across the US. Mueller and Colgate (2007)

classified fatalities as either direct or indirect. From 2000-2007 football recorded a total 107 fatalities, direct or indirect (Herman, 2007; Mueller & Colgate, 2007). According to Mueller (2007) there has been at least one recorded football fatality each year since 1965. During the 2008-2009 football season there were a recorded 12 direct or indirect fatalities nationally during football competition and practice (Bostic & Hunt, 2008). Of the 12 fatalities, North Carolina and New Jersey each had three and another eight fatalities not related to football were also documented (Bostic & Hunt, 2008). Of the three deaths in North Carolina, one was the result of heat illness.

Environmental illnesses such as heat stroke, exhaustion, and cramps are a major concern for athletes, especially in hot and humid weather. Exertional heat stroke is the third leading cause of death in high school athletes across the United States (Coris, Walz, Konin, & Pescasio, 2007). Because environmental issues in football can be catastrophic, it is imperative that those providing care for high school athletes be highly trained in prevention, recognition, and treatment of heat illnesses. Anecdotally, the general public seems to be gaining awareness of the dangers of heat stroke and heat exhaustion due to extensive media coverage that occurs during the summer months each year. In an effort to educate the public and provide guidelines for practicing health care providers, the National Athletic Trainers' Association's Secondary School Athletic Trainers' Committee in conjunction with the Inter-Association Task Force for Preseason Secondary School Athletics recommend preseason heat acclimatization guidelines for athletic programs to follow in preventing and managing heat related illnesses (Casa et al., 2009).



Every year approximately 60,000 athletes sustain a concussion during high school football (Broglio et al., 2009; Majerski, Mihalik, Ren, & Collins, 2008). Treating an athlete who has sustained a concussion is extremely complex and should be handled by a trained professional who is able to recognize the signs and symptoms, and properly determine when the athlete is well enough to return to play (Boden et al., 2007; Mueller, 2001). Out of the twelve direct and indirect national high school football fatalities in 2008-2009, half were the result of a head injury (NATA News, 2008). Additionally, two out of the five NC deaths during the 2008-2009 season were the result of head trauma where a licensed athletic trainer was not present (Letchworth, 2008). Football players who sustain a concussion are 3 times more likely to sustain a second one in the same season (Guskiewicz, Weaver, Padua, & Garrett, 2000). This alone demonstrates the importance of having the proper medical personnel to recognize, assess, and properly manage concussions during practices and games.

There has been debate as to whether the occurrence of injury is greater in practices or games. Research in the late 1980s and early 1990s indicated that injuries were more likely to occur in practice (Powell, 1987; Rowe & Miller, 1991). However, the trend has changed in the last ten years indicating injuries are more likely to occur in competition rather than practice (Boden et al., 2007; Gessel et al., 2007; McGuine, 2006; Ramirez et al., 2006; Rechel et al., 2008; Shankar et al., 2007) due to increased play intensity, increased legal and illegal contact, and increased risk of high-risk activities such as tackling (Rechel et al., 2008). With approximately 42% of the public high schools

in North Carolina employing an AT (Mihoces, 2008), there is room to question whether adequate care is being provided during high schools.

### ***Historical Perspective on the NCSBE Athletic Injury Management Policy and Workshops***

The utilization of an AT for high school sports dates back to the early 1970s (Ebel, 1999). At that time, there was no policy requiring that high schools employ an AT. Approximately forty years later, in 2009, states such as North Carolina still do not require that every high school employ an AT. In order to gain a better understanding of the early history of the NCSBE Injury Management Policy and the injury management workshops, I interviewed Robbie Lester, a Physician Assistant (PA) and one of the original directors of the Sports Medicine Program (SMP) created by the Department of Public Instruction (DPI) in 1972. Mr. Lester shared information with me regarding the history of sports medicine in NC and more specifically noted the following (personal communication, March 8, 2008):

A University of North Carolina (UNC) football player died from heat stroke. A program known as the Sport Medicine Program (SMP) was created by the NC DPI and would be funded by the NC legislature and ultimately housed in DPI. The program's goal was to educate high school teachers in the management of sports related injuries. The overall focus was to have a teacher-athletic trainer (TAT) at every high school. The TAT would be educated in the care, prevention, and reconditioning of high school athletes. Additionally, placing a TAT in every school would shift the responsibility of injury prevention and care away from the football coaches. The first courses for the TAT, taught by NATA certified athletic trainers, were offered in the spring through the community college system and pre-taped courses that utilized the UNC television system to reach as many teachers that were interested in becoming a TAT. It was later recognized that the NCCA summer clinic would provide the best opportunity to provide a session for TATs to take an athletic training course. There would be only one level of the athletic training course taught until 1978 when three levels: basic AT; advanced

AT-I; and advanced AT-II were introduced. The move to three levels of workshop provided an advancement of knowledge for those who would continue in the role of medical care provider. The levels were designed to progress participants from basic to advanced levels of training in a three year period. Also offered at this time at the NCCA conference was a 3-day student trainer (ST) clinic. The 3-day workshop utilized the expertise of local NATA certified athletic trainers to educate high school students to provide medical coverage at their schools. In 1979 the SMP created the Teacher Athletic Trainer Instruction Program (TATIP). The TATIP was a 3 week, 3 year program that met all the NATA curriculum guidelines so that at the completion of the program the TAT would be eligible to sit for the NATA national certification exam. The 3-week program would be held at North Carolina State University (NCSU) and was ultimately moved to the Wake Forest University Bowman Gray School of Medicine. The last TATIP class was in 1993. In 1980 Representative David Diamont sponsored legislatures to provide funding for the TAT and also supported House Bill 618, otherwise known as policy 16 NCAC 6E.0203 (see Appendix A), in 1986. House Bill 618 was designed for the SMP to offer the necessary courses to qualify teachers to serve as TATs. The courses required were First aid, CPR, basic athletic training, and advanced athletic training.

The original policy did not specifically mention first responders or ATs. The terms “sports medicine” and “teacher athletic trainer” were used to identify the type of person eligible to provide care. The sports medicine person was required to complete the injury management workshop which provided continuing education credits (CEUs), equivalent to 30 contact hours of training in sports medicine services each school year. The wording of the original policy remained the same for many years until an athletic training state licensure law initiated the change.

As the number of ATs increased in the early 1990s, the TAT program phased out and eventually ended in 1993. In 1997, The North Carolina Athletic Trainers’ Association (NCATA) was successful in pursuing an athletic trainer licensure bill. House Bill 824 (Article 33) “Athletic Trainer Licensing Act” later known as Senate Bill 660 (Article 34) (see Appendix C, North Carolina Athletic Trainers’ Practice Act), specified

regulations for persons offering athletic trainer services. Athletic trainer licensure was necessary to ensure minimum standards and competencies (North Carolina Board of Athletic Trainer Examiners). In 2001, after collaboration with the DPI, NCHSAA, NCATA, and the North Carolina Medical Society, the North Carolina State Board of Education's policy 16 NCAC 06E.0203 was amended to comply with the North Carolina athletic trainer's practice act of 1997. The amendment mandated removing the terms "teacher athletic trainer," "sports medicine person," while adding "licensed athletic trainer" and "first responder." The amended policy eliminated potential incentives for first responders to attend the summer workshop because they would no longer receive CEUs. Rather, they would be *required* to complete 20 hours of staff development each year in order to provide first responder services. This could come in the form of the injury management workshop during the summer or a 20 hour training session conducted by an athletic trainer. The curriculum is the same whether it is at the IMW or another training site in the state. Since the policy's inception in 1986, it has only been amended one time (2001) with minimal changes.

The current workshops are still similar to those held thirty years ago where they were intended to provide teacher educators an avenue toward an athletic training certification (an option no longer available due to changes in BOC certification requirements). Still separated into three levels, the course content is organized to prepare first responders in the care and prevention of athletic injuries. This preparation is beyond the basic level of training from the American Red Cross or American Heart Association. The course outlines for Level I and II contain a considerable amount of content for a first

responder to obtain in 20 hours. According to a workshop coordinator, the course content was organized in a similar fashion than an introduction to athletic training course taught at a college or university (personal communication, December 9, 2008). The workshop content is broken down into five identified themes: recognition, prevention, treatment, evaluation, and rehabilitation of athletic injuries. First time participants in the workshop enter Level I. According to Elton Hawley, co-director of the Injury Management Workshop, Level I (personal communication, December 9, 2008):

concentrates on the basics of first aid and injury management. With this group we spend a lot of time telling them what not to do as well. We encourage them to develop a plan within their school and medical community to have injured athletes seen by someone with more expertise than they will get in a 20 hour workshop.

First responders in their second year of experience would enter Level II, which

entails more rehab than level I. The hope has been that with the work in level I and a year in the field they will be ready for some rudimentary rehab protocols.

After completion of Level II and two years of experience, first responders move to Level III if they choose to continue in the injury management role. Level III focuses on current issues in the field of athletic training via lectures and presentations given by ATs, physicians, and other allied health care professionals. Were an individual to continue to work in the same capacity beyond three years they would be required to attend Level III each year thereafter. Therefore, first responders with four or more years of experience are more than likely to have completed all three levels of training.

### ***Reasonable Care***

The NCSBE Injury Management Policy states that reasonable care in high schools is employing a licensed athletic trainer or providing services of a first responder at all football games and practices. For years professional organizations like the American Medical Association (AMA) and the NATA have called for the employment of a licensed athletic trainer. The AMA Policy H-470.995 (see Appendix E, AMA Sports Medicine Policy), 1998, indicates that:

the Board of Education and the Department of Health of the individual states should encourage that every high school develop an appropriate “Athletic Medicine unit”. The team should be comprised of a licensed physician, an ATC, and other personnel available to provide care.

The National Athletic Trainers’ Association position statement on care at the high school level (National Athletic Trainers' Association, n.d.-a) states:

The best way to protect the public is to allow only Board Certified athletic trainers and state licensed athletic trainers to practice. Athletic trainers have the education and skills to properly assess and treat athletic injuries. In coordination with the team physician, they are qualified to make decisions regarding return to play. Other allied health professionals are not qualified to perform these tasks. Most situations that athletic trainers encounter should not be left to a coach or layperson that does not have the proper training.

Additionally, the NATA’s *Appropriate Medical Care for the Secondary School-Age Athletes Consensus Statement* indicates that the athletic health care team should be comprised of ATs, physicians, school nurses, physical therapists, emergency medical services (EMS), and other health professions (NATA, 2007). A major focus of the consensus statement calls for day-to-day care of athletes in addition to game day

coverage. The health care team is charged with: (a) determining readiness to play, (b) promoting safe and appropriate practice, (c) developing emergency action plans, (d) developing injury and illness prevention strategies, and (e) facilitating rehabilitation and reconditioning. First responders are not trained to carry out all of these duties, and therefore, do not meet NATA standards.

### ***Past and Present Care across the United States***

North Carolina is not alone in its struggle to ensure adequate health care for high school student-athletes, with inconsistent care long being the national norm (Aukerman et al., 2006; Bell, Cardinal, & Dooley, 1984; Culpepper, 1986; Vangsness, Hunt, Uram, & Kerlan, 1994). As of October 2008, there were approximately 6,599 athletic trainers working in secondary schools across the United States (NATA News, 2008), but many state officials acknowledge an inadequate level of care and slow progress in developing policies that would mandate even minimal acceptable coverage (Aukerman et al., 2006; Bell et al., 1984; Culpepper, 1986; Koabel, 1995; Lackland et al., 1985; Lindaman, 1992; Mathews & Esterson, 1983; Porter, Noble, Bachman, & Hoover, 1980; Redfern, 1980; Sherman, 1985; Vangsness et al., 1994; Wrenn & Ambrose, 1980). It may be helpful to review what states have done and are doing in terms of injury prevention and care. Additionally, identifying the most current status of health care for high school athletics indicates that student athletes' care is a priority across the United States.

As of 2009 Athletic training legislation practice acts or regulations exist in 46 states to insure that all AT professionals provide care within the limits of their training (National Athletic Trainers' Association). This reduces the chances of a first responder

claiming to provide services of an athletic trainer. Coaches typically rely more on their personal experiences to train and condition athletes rather than a background grounded in knowledge of the field (Flint & Weiss, 1992). A coach's background is most likely an undergraduate teaching degree in physical education (Stapleton, Tomlinson, Shepard, & Coon, 1984; Rowe & Miller, 1991; Rowe & Robertson, 1986), where basic injury care and prevention was not part of the curriculum.

To gain a better understanding of the type of health care being provided in high schools across the United States, literature was explored from 1980-1990. An extensive literature search resulted in studies conducted in California, New York, Wisconsin, Virginia, South Carolina, Texas, and Illinois. Therefore, these studies allowed for a comparison of each state's past and current status of care being provided. The current status of care was determined from individual state athletic trainers' association websites and by contacting the Secondary School Committee Chair or president of the association. It was assumed that they could provide the most current and up to date information regarding high school medical coverage and any policies specifying the type of coverage required. The following questions were provided to all identified individuals from each state:

1. Does (insert state here) mandate an ATC during football practices and games in high schools?
2. Does the state mandate a first responder be available for practices and games?
3. What is the State Board of Education's policy about medical coverage in high school sports?



**California.** In 1978, California considered a bill that would require a coaching certification for football and basketball (Hage & Moore, 1981). The bill was defeated. Since then, paid coaches in California are required to obtain current CPR and Basic First Aid certification (Vangness et al., 1994). However, Vangness et al. (1994) noted that only 90.7% of paid football coaches were actually certified in CPR and 81.4% in first aid. According to Stacey Ritter (personal communication, July 2, 2008), California State Representative for Secondary Schools:

Currently, each district has identified its own minimum level of coverage which includes an EMT during football games. Often, EMTs are replaced by DC, PT, non-certified parent volunteer. The state does still require all coaches to be certified in first aid and CPR. Therefore, the coach is essentially the first responder. Financial constraints vary widely throughout the state which has caused the inability to develop a universal policy.

As of 2009, the California Board of Education did not have a policy requiring a certain level of health care, but relies heavily on the California Interscholastic Federation which governs high school sports to set the minimum standards.

**New York.** Koable (1995) assessed the need for ATs in New York high schools. Ninety percent of administrators reported employment of an AT was necessary. Athletic trainers specialization in preventing and treating injuries made them the most qualified to handle medically related athletic issues. Coaches assumed the role of health care provider in the absence of an AT and only 51% of the coaches had certification in CPR and first aid. Approximately 75% of the study group reported litigation concerns due to a lack of knowledge in the field. According to Daniel Dennett (personal communication, July 2, 2008) New York State's Athletic Trainers' Association high school representative:

The state board of education does not currently mandate the employment of an AT in high schools. Rather, they encourage the service of one. A medical doctor or an ambulance is required on the sideline during games. All coaches are required to maintain certification in First Aid/CPR/AED and complete the NYS coaching certification program.

The state does currently have an AT practice act but no mandate for employment in high schools.

**Wisconsin.** The state of Wisconsin has had challenges similar to other states in terms of health care for athletes. Sherman's (1985) study of a unidentified random sample found that high school medical coverage was poorly organized and supervised and noted a lack of physicians, athletic trainers, and coaches with first aid and CPR certification. Approximately 43% of respondents noted that a coach was responsible for first aid and only 26 of the schools mandated first aid certification. According to Michael Lamere (personal communication, July 3, 2008) District 4 Secondary School Committee Representative:

Wisconsin does not mandate an AT or first responder for practices and games. The states athletic association does recommend employing an AT. Out of 507 high schools, 370 have coverage of some sort by an AT (part-time, full-time, clinic outreach) which may at times consist of one visit to the school a week. Due to budget constraints, the struggle to get ATs continues.

**Virginia.** Virginia, as far back as the early 1980s, has had a comparatively strong health care system for high school athletes. Mathews (1983) identified significant support for athletic trainers with one out of every two high schools employing one. In 2008, the care is still strong according to John Almquist, AT in Fairfax (VA) County Public Schools (personal communication, February 6, 2008):

the state board of education does not mandate a certified athletic trainer but some counties have taken it upon themselves to mandate their employment. Overall, medical coverage in the state is noticeably better over the past decade.

*South Carolina.* Lackland and colleagues (1985) reported that nine out of thirty-six schools reported they did have the services of a certified athletic trainer or a team physician. Additionally, physician coverage was greater at games than practices. Nine schools reported no professional medical coverage, and treatment and management of injuries was left to the coaching staff. According to the president of the South Carolina Athletic Trainers' Association, Jerry Shadbolt (personal communication, February 6, 2008), the state:

does not mandate an AT or first responder for football practices and games nor does it have policy by the State Board of Education referencing medical coverage in high schools. The state is currently working with South Carolina's Medical Association to address the issue.

*Texas.* The Texas Coaches Association lobbied for a law that required coaches to have 15 semester hours of instruction in prevention and care of injuries (Hage & Moore, 1981). The Texas Athletic Trainers' Association fought the proposed law arguing that coaches should be trained in first-aid and that follow-up care for athletes should be with an AT or a physical therapist. Rather than preparing coaches to perform duties of licensed athletic trainers, the state association fought for licensure to legally recognize the profession. As of 2009 the state does not mandate a certified athletic trainer at practices or games. According to Spanky Stephens, Texas State Athletic Trainers' Association Executive Director (personal interview, July 3, 2008) there was a law enacted during the

2008 school year requiring every coach to be certified in first aid, CPR, and AED operation. Officials are also considering a mandate that there be one ATC for every 250 student athletes in each high school.

*Illinois.* The state of Illinois has historically focused its attention on preparing coaches to address medical issues in sport (Hage & Moore, 1981). The Illinois chapter for the American Alliance for Health, Physical Education, Recreation, and Dance (AAPHERD) pushed for 14 hours of course work in prevention and care of injuries. Instead of using the term “certification” they called it “minimal standard of academic preparation” intended to provide individuals with the minimum competencies in care and prevention. According to, the Illinois Secondary School Committee Chair, Robert Flynn (personal communication, July 7, 2008) the state:

does not currently mandate an AT or first responder at football games and practices but does recommend some sort of coverage.

With an increase of participation in high school athletics and the increased risk of injury, the slow progression to provide adequate health care such as an AT is troubling. For years Hawaii was thought to be the only state that mandated an AT, as cited in articles from Biddington, Wagner, Lyles, and Brunner (2009); Buxton, Okasaki, Kwok, and McCarthy (1995); and Clairborne, Hou, and Cappaert (2007). According to Judy Pulice, National Manager of Regulations & Legislative Affairs for the National Athletic Trainers’ Association, Hawaii did not mandate an AT in high schools and that no state as of 2009 had a state mandate (personal interview, June 1, 2009). While there has been a great deal of vocal support for ATs in schools, prevention and care of injuries still seem

to be provided by individuals certified only in first aid and CPR. Inadequate care like that observed in NC mirrors the level of care across the US.

### ***Current North Carolina Care in High Schools***

In North Carolina, individual school districts determine who will provide care. It was estimated that 50% of public high schools in NC have access to athletic trainers, compared to the 42% employed nationally (Stevens & Van Der Horst, 2008). However, Ken Brown, North Carolina Athletic Trainers' Association Secondary School Committee Chair, reported that 41% of schools employed an AT while the other 59% utilized the services of a first responder. Budgetary constraints, across the US, are typically cited as the reason for not employing an AT (Agerupm, 1985; Sexton, Schmoldt, & Miles, 1994; Sherman, 1985). A lack of funding, budget cuts, and availability of certified athletic trainers with teaching certificates have been identified as obstacles to hiring an AT in NC (Aukerman et al., 2006; Eilbacher & Tritschler, 2004).

Research examining levels of coverage in North Carolina is extremely limited. The most comprehensive study was done by Aukerman et al. (2006) and indicated that 52% of the 139 schools surveyed had coverage by either a nationally or state certified athletic trainers while 51% of the schools relied on non-certified, non-licensed sports medicine personnel. This is fairly consistent with the NCATAs reported 59% of first responders providing coverage. Physician coverage at games was a reported 71% but only 10% at practices. When care was not being provided by an AT, physician, or first responder, 50% of the coverage was augmented by "student trainers." In all only 27% of the schools surveyed reported that their medical coverage of athletic events could be

considered adequate. Schools that employed an AT reported adequate medical coverage significantly more than schools without.

North Carolina high school football experienced a record breaking and tragic three deaths during the 2008 football season. The fatalities put health care of athletes in the state under a microscope by organizations such as the NCHSAA and the NCATA. The NCHSAA's Sports Medicine Committee is responsible for addressing issues related to the health and safety of athletes. Therefore, after the third death an ad hoc committee, Athletic Safety Task Force, was assembled to develop safety and well being recommendations that would be submitted December 2008 to the NCHSAA Board of Directors in consultation with the NCHSAA's Sports Medicine Committee, the head of the NCSBE, superintendents, principals, ADs, coaches, and ATs statewide. While the Athletic Safety Task Force collaborated with professionals across the state to tackle health care issues, the NCHSAA mandate requiring that all high schools submit the name of the AT or first responder by November 1<sup>st</sup> 2008. This was the first effort to identify the exact number of ATs and first responders providing care for high school athletes and to determine which schools did not have someone in place. According to James Scifers, President of the NCATA, the number of ATs and first responders could not be provided with confidence (personal communication, October 10, 2008). The Task Force's recommendations were forwarded to the NCHSAA Board of Directors, urging the passage of immediate legislation that would mandate all NCHSAA high schools employ an AT by August 2011 (see Appendix F, Proposed North Carolina High Schools Athletic Training Bill). Additionally, each school was to develop an Emergency Action Plan

(EAP) and submit it to the NCHSAA by January 1<sup>st</sup>, 2009. In all, nine recommendations were provided to the Board of Directors for review and immediate implementation.

### ***Athletic Trainer Education***

Athletic trainers have been around for many decades. From the “jack of all trades” to the individual who is specialized in care for athletic injuries, their evolution demonstrates the type of professional preparation they receive and why they are highly recommended to care for athletic injuries in high schools (Ebel, 1999). Athletic training emerged from the roots of physical education in the early 1950s. In the early 1960s, there was an observed need for athletic trainers at the secondary school level. Therefore, a specialized curriculum prepared students as teachers of physical education and health and athletic training (Ebel, 1999). The curriculum contained a care and prevention course to provide physical educators the basic knowledge and skills to manage injuries during class or on the athletic field. There were minimal amounts of formal education in athletic training; as a result, knowledge was typically gained through hands on experiences such as an internship or apprenticeship. Over a 40 year period the AT profession went through a number of changes that directly impacted the preparation of athletic trainers. The implementation of the NATA accredited programs and the BOC exam in 1970 had a major impact in the profession gaining recognition (Ebel, 1999). It was in 1982 that the Role Delineation Study identified appropriate AT content to be studied in academic curriculums. Additional role delineation studies in 1989 and 1993 assured athletic training students were competent after completion of their educational programs. The inclusion of an accrediting agency such as the committee on Allied Health and Education

and Accreditation (CAHEA) as recommended by the American Medical Association added credibility within the allied health fields (Delforge & Behnke, 1999). Finally, in 2004 the internship certification route was eliminated and athletic training was aligned with other allied health fields in offering only one route to certification.

Professional preparation to become an AT in 2009 is more complex than the academic training required 10-40 years ago. Many institutions offer an academic major accredited by the Commission on Accreditation of Athletic Training Education (CAATE). CAATE is responsible for ensuring that colleges and universities are developing, maintaining, and promoting the minimum standard necessary for preparing entry-level athletic training professionals. Professional preparation is guided by approximately 600 educational competencies and clinical proficiencies (National Athletic Trainers' Association). Educational competencies and clinical proficiencies are mastered through a combination of formal coursework, clinical instruction and clinical experiences that address the specific content (see Appendix B, Athletic Training and First Responder Education) necessary to provide appropriate health care. In addition, ATs hold certification status as professional rescuers which include skills necessary to perform basic first aid, cardiopulmonary resuscitation (CPR), and use an automated external defibrillator (AED). The path to becoming an AT requires a bachelor's or master's degree from an accredited professional athletic training education program and passing a comprehensive test administered by the Board of Certification (National Athletic Trainers' Association, n.d.-b). Retaining one's professional certification requires 75 hours of continuing education credits every three years. Continuing education credits can be



earned by attending professional conferences, publishing research in the field, post graduate athletic training coursework, and professional speaking engagements at athletic training conferences and symposiums. Additionally, upholding and adhering to the Standard of Professional Practice and maintaining a current Professional Rescuer certification from the ARC or Basic Life Support from the American Heart Association is required.

### ***First Responder***

Training to become a first responder is administered by organizations such as the American Red Cross (ARC), the American Academy of Orthopedic Surgeons (AAOS), and the American Heart Association (AHA). According to the ARC, a first responder is a person trained in emergency care that may be required to provide care in the community or at a place of employment (The American Red Cross, 2005). The primary role of the first responder is to recognize that an emergency exists, deciding to act, calling 911, and providing care until medical help arrives. According to Schottke (2001) and the AAOS, the “first responder” is the first medically trained person to arrive at the scene of an emergency. In NC, there are no data to indicate which organization is the most widely used to obtain certification. Therefore, a brief description as to how first responders are trained is necessary to demonstrate that only a foundation of basic emergency knowledge is provided.

Training by the AAOS is conducted in a formal classroom setting that includes the acquisition of knowledge and skills necessary to treat injured trauma patients and sufferers of illness or serious medical problems. The skills required by the AAOS for first

responders include: controlling airway, breathing, and circulation; controlling bleeding; treating shock, wounds, splinting and stabilizing injuries; recognize, stabilize, and provide initial treatment for heart attacks, seizures, poisonings, bites and stings, childbirth, alcohol and drug abuse, behavioral or psychological crises, and emergency childbirth.

The ARC offers a variety of courses from First Aid, CPR and Automated External Defibrillator (AED); First Aid-Responding to Emergencies; First Aid & Preparedness Training; First Aid/CPR/AED for the Workplace; and CPR/AED for the Professional Rescuer (required of all ATs). The topics covered in 9.5 hour Standard First Aid with CPR/AED-Adult course are: before giving care (30 minutes), checking an ill or injured person (60 minutes), breathing emergencies and conscious choking (20 minutes), cardiac emergencies (20 minutes), CPR and unconscious choking (80 minutes), Automated External Defibrillator (AED) (60 minutes), injuries to muscles, bones and joints (30 minutes), sudden illness (30-40 minutes), and heat-and cold-related emergencies (30-45 minutes). Every participant is required to demonstrate skills such as immobilization of limbs, CPR technique (chest compressions and breaths), proper setup and use of the AED, unconscious choking techniques, conscious choking, and demonstration of wound care. Participants must pass the written sections with a score of at least 80%. Those who fail the exam must retake it until they score 80%. Re-certification is necessary every year for CPR/AED and every three years for first aid.

### *Athletic Trainer Compared to First Responder*

Technically, ATs are also first responders; however, their training is far beyond the basic care obtained in a First Aid/CPR/AED training course. An academic curriculum from an accredited institution that requires an entry-level bachelors or master's degree prepares an AT to provide care well beyond training from a 9.5 hour course in Standard First Aid/CPR/AED. First responders are taught basic skills and then asked to demonstrate it one time in order to meet the necessary requirement for certification. In contrast, the AT learns in a formal classroom setting where competencies and proficiencies are then reinforced during clinical instruction and clinical experiences throughout a four or two year accredited program. Upon completion of a 9.5 hour course, skill demonstration, and successful completion of the course exam first responders are awarded certification. The AT completes an accredited Athletic Training Education Program (ATEP) in a college or university and successfully passes the BOC exam to be eligible to practice. Clearly preparation to become an AT far surpasses the training required of a first responder.

Before the 1980s, care of high school athletes was the primary responsibility of coaches. However, increased participation, pressure from administrators and medical professionals, legal issues, and a decrease in athletic budgets brought attention to coaches' responsibilities as first responders (Hage & Moore, 1981). Historically, literature on injury prevention and care in high school sports focused on coaches' knowledge and perception of medical care since high schools did not have access to ATC (Armstrong, Caputo, Farley, & Whitehill, 2005; Culpepper, 1986; Ransone & Dunn-

Bennett, 1999; Rowe & Miller, 1991; Rowe & Robertson, 1986; Stapleton et al., 1984) Coaches were trained in injury prevention during their undergraduate degree in physical education (Redfern, 1980; Stapleton et al., 1984; Wrenn & Ambrose, 1980). Redfern (1980) supported the notion that injury prevention and treatment should be the responsibility of the coaches even though care was inadequate.

Concern has been expressed that coaches or volunteer first responders are not qualified to handle athletic emergencies due to the lack of training (Aukerman et al., 2006; Butler, Lester, Solomon, Kelly, & Soukup, 2005). First responders were found to be incompetent and did not feel comfortable treating athletic injuries (Rowe & Robertson, 1986; Stapleton et al., 1984). Rowe and Robertson (1986) found that only 27% of the 127 participants met the criteria for overall knowledge in anatomy, care and treatment, conditioning, diet and nutrition, equipment, and heat factors. Conley (1982) reported a majority of coaches (47%-71%) did not complete a first aid training course and only 43% completed CPR. Stapleton et al. (1984) found, and Wiedner (1989) concurred, that less than 50% of coaches had been formally trained in CPR and first aid and that 57% of the coaches were uncomfortable with providing medical care. This included 66% of football coaches. Rowe and Robertson (1986) noted 77-85% of coaches failed to pass the Inventory of Recent Knowledge in Physical Education with a passing score of 70%. Ransome and Dunn-Bennett (1999) noted only 27% of coaches (those responsible for medical care) passed the First Aid Assessment test. Therefore, possessing sufficient first aid knowledge alone does not ensure that adequate care is going to be provided nor does

it guarantee retention or acquisition of strategies to care for athletic injuries (Ransone & Dunn-Bennett, 1999).

Most medical professionals are unqualified to handle injuries associated with football and most are not trained to make a return to play decision (Hage & Moore, 1981; Porter et al., 1980). Stapleton et al. (1984) found that 77% of coaches decided return to play for their athletes. Flint and Weiss (1992) recommended that coaches serve as first responders should never make the decision about return to competition. First responders often face a potential conflict of interest in decisions to return star athletes to play even though they are hurt (Hage & Moore, 1981). Return-to-play decisions are made when less than 50% of coaches have had formal training in CPR or first aid (Weidner, 1989). A basic first aid and CPR course from the ARC does not prepare someone to properly assess a broken bone, evaluate the severity of an ankle injury, decide when to spine board a victim of a head injury, or properly assess a concussion; although, North Carolina's injury management workshop attempts to do just that in 20 hours of instruction.

In summary, there is an inherent risk of injury while participating in high school sports (Powell & Barber-Foss, 1999); and the type of care provided can positively or negatively impact a young person's life. Individual schools accept responsibility for providing the minimum health care should athletic programs exist. Parents, administrators, coaches, and athletes should expect to have the best possible care. Athletic trainers have been identified as the best medical professionals to manage athletic practices and competitions rather than a coach or a volunteer certified in first aid and

CPR. In a study by Koabel (1995), 77% of respondents agreed that an NATA certified athletic trainer was the most qualified health care professional to prevent and treat injuries. Additionally, athletic trainers who are knowledgeable in injury prevention and care are the most qualified to make return to play decisions, in turn decreasing the risk of re-injury especially during practice and competition (Knowles, Marshall, & Guskiewicz, 2006). In North Carolina, the employment of an AT lowered the re-injury rate of an athlete from 3% as in comparison to 71% without the services of an AT (Weidner, 1989). While the literature identifies that first responders are incapable of handling injuries, research is lacking to explore what they perceive their duties to be and the likelihood they are to perform them even with training.

## **CHAPTER III**

### **METHOD**

The purpose of this study was to examine first responders' perceived knowledge and the likelihood they would perform a variety of athletic health care skills and behaviors. A convenience sample of first responders at the 2009 Injury Management Workshop (IMW) was used to examine perceived duties and likelihood of behaviors. In this chapter, the research design and setting, description of the study participants, instrumentation, procedures, and data analysis techniques are presented.

#### **Design and Setting**

This study was best classified as descriptive and meant to identify whether differences exist between first responders' perceived knowledge and the likelihood they would perform specific behaviors based on their years of experience. Survey design was used to obtain data from a large population of first responders in North Carolina. Data collection for this study took place at the Injury Management Workshop (IMW) held in conjunction with the 2009 North Carolina High School Coaches Convention in Greensboro, North Carolina. Years of experience was indicated by the number of years they had been working as a first responder for high school football.

Data collection occurred on July 20<sup>th</sup> 2009, the first day of the IMW. Attendance at the workshop was required of all individuals who agreed to assume the role of first responders for the 2009 high school football season. Approval by the Institutional

Review Board (IRB) at the University of North Carolina at Greensboro (UNCG) was obtained prior to data collection (see Appendix G, IRB Approval at UNCG).

### **Participants**

A convenience sample of registered participants attending the IMW comprised the study sample population. Based on attendance records from 2007 and 2008, workshop coordinators estimated the number of participants for 2009 as approximately 100. Prior authorization to collect data at the workshop was obtained from a workshop coordinator (see Appendix H, Verification Letter). Any athletic trainers or physicians who attended the workshop were asked to complete the questionnaire. However, their data was excluded from analysis. Additionally, first responders that arrived late to the workshop were not permitted to participate in the data collection.

### **Instrumentation**

An original survey instrument was designed and pilot tested (see Appendix I, Survey). Knowledge items were based on the curriculum content from Levels I and II of the IMW. The instrument was separated into two sections: (a) demographic; and (b) perceived knowledge and likelihood of performing behaviors. The demographic section of the instrument contained fourteen multiple choice items to gather background information on the first responders. The second section, separated into 14 tables (internal injuries; environmental conditions; head, neck, and cervical spine; lower leg, ankle, and foot; knee; thigh; shoulder; hip and groin; low back; elbow; wrist and hand; fingers and thumb; general medical conditions; and other duties), contained 116 items that explored first responders' perceived knowledge and the likelihood they would perform specific



behaviors. Participants were asked to circle YES or NO indicating whether s/he perceived they had the knowledge to perform specific behaviors. For example, “I feel I have enough knowledge to take precautions to prevent heat illness.” Participants were also asked to indicate how likely they were to perform the same 116 behaviors if the opportunity presented itself while providing medical coverage for high school football. For example, “if given the opportunity, how likely would you be able to perform a neurological evaluation of cervical spine injuries?” Participants were asked to circle the number that corresponded to how likely they were to perform the described behavior if given the opportunity to do so. The following 4-point Likert scale was used:

- (1) Very Unlikely = The first responder is very unlikely to perform the duty
- (2) Unlikely = The first responder is unlikely perform the duty
- (3) Likely = The first responder is likely to perform the duty
- (4) Very Likely = The first responder is very likely to perform the duty

### **Pilot Test**

A pilot test to validate the survey was conducted utilizing a convenience sample of four local first responders with a combined 10 years of experience. A spreadsheet provided by the North Carolina Athletic Trainers’ Association and North Carolina High School Athletic Association was used to identify first responders in two counties. Three first responders were from Davidson County and one was from Randolph. A certified athletic trainer from Guilford County was also used. The athletic trainer had over 25 years of experience working with high school football. First responders and the athletic trainer were contacted via phone and asked to participate in the pilot test. Each participant was sent via e-mail a formal cover letter with questions (see Appendix J, First

Responders Pilot Cover Letter), a copy of the survey instrument, and the consent script. The cover letter contained a list of questions to answer after reading the script and completing the instrument. At the same time, two ATs who teach in an accredited undergraduate athletic training education program with a combined thirty years of experience were asked to evaluate face and content validity. Both educators have earned the Doctorate of Education degree and have experience with survey design. A formal cover letter with questions (see Appendix K, Athletic Training Education Program Educator Pilot Cover Letter) was sent via e-mail along with the attached consent form, introductory script, and survey. Feedback and recommendations by participants were returned to the researcher within one week, so that revisions to the instrument could be made. Early feedback by two first responder recommended restructuring the questionnaire to address what first responders perceived their coach and/or athletic director believed their duties to be. While completing the survey, there was confusion as to whether it was their self-perception or what they were expected to do by the coach and or AD. Since a significant change was made to the instrument, both athletic training educators were contacted and asked to wait a day to receive the revised survey and compare the two instruments and then provide feedback. Survey feedback and recommendations regarding the two surveys were provided by the athletic training educators one week following the original e-mail. Additional changes were made to the instrument utilizing feedback from the four first responders and two athletic training educators. The two major changes recommended during the pilot study where the section about the coach and or athletic director and a change to the frequency of behaviors scale.

While these data were collected it is not the focus of this study and were not analyzed. The frequency scale was changed to a scale exploring how likely first responders were to perform certain duties when faced with the opportunity. Additional recommendations regarding the consistency of wording in the demographics and perceived duties section also prompted changes.

### **Procedures**

Data collection was conducted in July 2009 at the IMW. It was estimated that 100 participants would attend the three day workshop. All first responders attending the workshop were asked to participate in the study. Participants signed an informed consent form prior to data collection. The instrument was administered on the first day of the workshop to decrease the possibility that responses would be influenced by any knowledge gained during the workshop. Participants were read the consent form (see Appendix L, IRB Consent Form). The consent form was collected from individuals agreeing to participate; those who chose not to participate were free to leave the room.

The researcher administered and collected all instruments when completed. The survey instrument was coded to identify the number of participants only. Thirty five minutes was allotted for participants to complete the survey. In its entirety, data collection took no more than 45 minutes. Participants arriving late were not permitted to participate in the study.

### **Data Reduction**

For ease of analysis data regarding perceived knowledge was reduced into five content areas: (a) upper extremity; (b) lower extremity; (c) head, neck, cervical spine and

low back; (d) general medical/internal; and (e) environmental conditions. Upper extremity consisted of items from shoulder, elbow, wrist and hand, and finger and thumb totaling 29 items. Lower extremity consisted of the items from hip and groin, lower leg, ankle and foot, knee, and thigh totaling 33 items. Head, neck, cervical spine, and low back were combined totaling 18 items. General medical conditions and internal conditions were combined with a total of 17 items. Lastly, environmental condition was the smallest category with a total of 8 items. Cronbach alphas were run to confirm internal consistency of each item in each content area. An acceptable score in research for internal consistency is .70 (Cronbach, 1951). Therefore, any value below .70 was interpreted as a non-reliable item and subject to be removed from analysis (Nunnally, 1978).

Participant responses regarding perceived knowledge were coded for analysis purposes. A no response was coded as “1” and a yes response was coded as “2.” A total sum score was calculated for each participant. Possible sum of scores for upper extremity could range from 29 to 58; lower extremity 33 to 66; head, neck, cervical spine, and low back 18 to 36; general medical/ internal 17 to 34; and environmental conditions range from 8 to 16. Because scores were summed and not averaged, the minimum, maximum, mean, and standard deviation were hand calculated (divided by the number of items in each content area) to more appropriately represent the coded data of “1” for no and “2” for yes.

For analysis purpose, scores were coded as “1, 2, 3, and 4” and a sum score was calculated for each participant in each of the likelihood of behaviors content areas.

Possible sum of scores for upper extremity could range from 29 to 116; lower extremity 33 to 132; head, neck, cervical spine, and low back 18 to 72; general medical and internal 17 to 68; and environmental conditions 8 to 32. Because scores were summed and not averaged, the minimum, maximum, mean, and standard deviation were hand calculated (divided by the number of items in each content area) to better represent the 4-point Likert scale.

### **Data Analysis**

The independent variable in the study was years of experience while the dependent variables were the five content areas for perceived knowledge and likelihood of behaviors. Two groups were created for analysis purpose. The group “three years or less” was created by combining participants that responded either (a) this will be my first year; (b) one year; (c) two years; and (d) three years to question seven of the survey. While the second group “four or more years” was created by combining (a) four to six years of experience; and (b) more than six years (see Appendix J, Survey). The five content areas were upper extremity; lower extremity; head, neck, cervical spine, and low back; general medical and internal conditions; and environmental conditions. Frequency data and descriptive statistics were calculated to determine the demographic characteristics of the first responder participants. Analysis was conducted using Statistical Package for the Social Sciences (SPSS) software. Statistical analysis is presented for each research question and associated hypothesis.

Research Question 1: What is the perceived knowledge of first responders providing athletic health care for football in North Carolina high schools?

No direct hypothesis for this question because it is descriptive in nature. Descriptive statistics for perceived knowledge in all five content areas were computed.

Research Question 2: What is the effect of first responders' years of experience on perceived knowledge?

Hypothesis 2: First responders with four or more years of experience will perceive themselves to be more knowledgeable than those with three or fewer years of experience.

A multiple analysis of variance (MANOVA) was conducted to examine perceived knowledge differences between the four or more years of experience and the three or fewer years of experience groups. Years of experience served as the independent variable and the five factors (content area) as the dependent variables. Descriptive and group statistics were provided.

Research Question 3: What is the likelihood that first responders will actually perform specific athletic health care skills and behaviors when provided the opportunity to do so during the football season?

No direct hypothesis for this question because it is descriptive in nature. Descriptive statistics for perceived knowledge in all five content areas were computed.

Research Question 4: What is the effect of first responders' years of experience on the likelihood they would perform specific athletic health care skills and behaviors when provided the opportunity to do so during the football season?

Hypothesis 4: First responders with four or more years of experience will be more likely to perform skills and behaviors than those with three or fewer years of experience.

A MANOVA was conducted to examine the likelihood of behavior differences between the four or more years of experience and the three or fewer years of experience groups. Years of experience served as the independent variable and the five factors (content area) as the dependent variables. Descriptive statistics for the groups were provided.

Research Question 5: What is the relationship between perceived knowledge of athletic health care skill and behaviors and a first responders' likelihood they would perform those skill and behaviors?

Hypothesis 5: There would be a strong positive correlation between those skills and behaviors that first responders perceived they were the most knowledgeable about and their likelihood to perform those skills and behaviors.

A bivariate correlation analysis was conducted to determine the strength of the relationship between first responders' perceived knowledge and the likelihood of behaviors.

## **CHAPTER IV**

### **RESULTS**

#### **Overview of Statistical Analysis**

The perceived knowledge and likelihood of behaviors of participants' data were analyzed using the Statistical Package for the Social Sciences (SPSS) 17.0 software. The chapter begins with a description of sample size and response rate and participant demographics. In addition, perceived knowledge and likelihood of behaviors descriptive statistics is provided followed by the three research questions. Then, analysis of the research questions: the difference between first responders' years of experience and perceived knowledge, the difference in years of experience and likelihood of performing athletic health care skills and behaviors, and the relationship between perceived knowledge and the likelihood of skills and behaviors is presented.

#### **Descriptive Data**

All participants attending the first morning session of the Injury Management Workshop (IMW) were given the opportunity to participate in the study; however, only first responders working high school football were eligible for analysis. One hundred and twenty eight individuals attended the first morning session, of which 126 (94.5%) filled out the consent form and completed the questionnaire. Thirty-three questionnaires were eliminated from the analysis because they were (a) incomplete ( $n = 5$ ), (b) participants did not meet the criteria for analysis, or (c) they did not respond to the health care



professional credentials item ( $n = 5$ ). This left a viable sample of 93 first responders. Demographic data for gender and first aid and cardiopulmonary resuscitation (CPR) certification are presented in Table 1.

**Table 1. Participant Demographics**

	<i>n</i>	%
<b>Gender</b>		
Male	59	63.4
Female	34	36.6
Total	93	100
<b>First Aid</b>		
<b>Years Certified</b>		
1-3 years	23	24.7
4-6 years	12	12.9
More than 6 years	52	55.9
Not certified	6	6.5
<b>CPR</b>		
1-3 years	25	26.9
4-6 years	10	10.8
More than 6 years	53	57
Not certified	4	4.3

Additional demographic data were categorized into five groups: (a) employment characteristics; (b) professional background; (c) continuing education; (d) educational background; and (e) job responsibilities. Employment characteristics consist of participants' current position at their high school and the number of years they have worked as a first responder as provided in Table 2.

<b>Table 2. Employment Characteristics</b>			
<b>Question</b>	<b>Characteristics</b>	<b><i>n</i></b>	<b>%</b>
Your current position at the High School?	Teacher/non-paid volunteer/FR	10	10.8
	Teacher/paid volunteer/FR	54	58.1
	Non-paid volunteer FR	5	5.4
	Paid volunteer FR	19	20.4
	Other	5	5.4
Years working as a First Responder?	This will be my first year	19	20.4
	1 year	21	22.6
	2 years	9	9.7
	3 years	12	12.9
	4-6 years	13	14
	More than 6 years	19	20.4

*FR=First Responder*

Professional background consisted of the types of first responder certifications and professional licenses. Certifications were from either the American Red Cross (ARC) or American Heart Association (AHA). Additionally, types of licenses participants obtained such as emergency medical technician (EMT), strength and conditioning, and registered nurse were collected and are provided in Table 3.

**Table 3. *Certifications and Licenses***

<b>Certification and Licensure Types</b>	<b><i>n</i></b>	<b>%</b>
<b>Certifications</b>		
American Red Cross Professional Rescuer	22	23.7
American Red Cross Community First Aid and Safety	52	55.9
American Red Cross Sport Safety Training	9	9.7
American Heart Association Basic Life Support	32	34.4
American Heart Association Heart Saver First Aid	29	31.2
<b>License Types</b>		
CSCS	1	1.1
EMT-I	3	3.2
EMT-P	2	2.2
RN	4	4.3
Other	15	16.1

Information regarding participants' continuing education in the form of attendance at the Injury Management Workshop consisted of four questions: (a) level of workshop currently attending; (b) number of workshops attended in the past; (c) to whom participants turn in attendance form; and (d) whether or not they attend the workshop each year. A summary of continuing education information is provided in Table 4.

Educational characteristics consist of athletic training coursework participants had taken and are provided in Table 5.

**Table 4. Continuing Education**

<b>Question</b>	<b><i>n</i></b>	<b>%</b>
Current workshop level attending?		
Level I	34	36.6
Level II	25	26.9
Level III	34	36.6
Number of workshops attended in the past?		
1	36	41.9
2	13	15.1
3	11	12.8
4-6	9	10.5
More than 6	17	19.8
Total	86	100
Do you attend every year?		
Yes	65	73
No	24	27
Total	89	100
To whom do you submit your attendance form?		
Athletic Director	58	63.7
Principal	5	5.5
Superintendent	0	0
County Office	6	6.6
Not required to submit	4	4.4
AD/Principal	13	14.3
AD, Principal, county office	4	4.4
AD, Principal, Superintendent	1	1.1

**Table 5. Participant Coursework**

	<i>n</i>	%
Courses Taken		
Medical Conditions	13	14
Health Care Administration	10	10.8
Pharmacology	12	12.9
Therapeutic Modalities	11	11.8
Nutrition	18	19.4
Orthopaedic Exam	8	8.6
Pathologies of Injury	11	11.8
Acute Care of Injury	23	24.7
Conditioning and Rehab	16	17.2
Risk Management	25	26.9
Psychosocial Intervention	6	6.5
No Courses Taken	51	54.8

*n* = number of participants that answered yes to taking the course.  
 Participants could have answered yes to multiple courses.

Participant job responsibilities regarding the events covered from varsity practice, to junior varsity away or home games is provided (see Table 6).

**Table 6. Job Responsibilities**

<b>Subscale</b>	<b>Characteristics</b>	<b><i>n</i></b>	<b>%</b>
<b>Coverage Provided*</b>			
	VFHG	1	1.1
	VFP, VFHG, VFAG	6	6.5
	VFHG, JVFGH	1	1.1
	VFP, VFHG, JVFP, JVFH	3	3.2
	VFP, VFHG, VFAG, JVFP, JVFH	3	3.2
	VFP, VFHG	2	2.2
	VFHG, VFAG, JVFP, JVFGH	1	1.1
	VFHG, VFAG	1	1.1
	VFP, VFHG, JVFGH	1	1.1
	VFP, JVFP, JVFGH, JVFGH	1	1.1
	Cover all	72	77.4
	No response	1	1.1
<b>Has Coaching Duties</b>			
	Yes	12	12.9
	No	78	83.9
	NA	1	1.1

\*VFP=varsity football practice, VFHG=varsity football home games  
 VFAG=varsity football away games, JVFP=junior varsity football practice,  
 JVFP=junior varsity football practice, JVFGH=junior varsity football home games,  
 JVFGH=junior varsity football away games

## Descriptive Statistics

### *Perceived Content Knowledge*

With Cronbach (1951) alpha coefficients ranging from (.80-.96) all five knowledge content areas demonstrated internal consistency. Descriptive statistics revealed that participants perceived themselves most knowledgeable in environmental conditions and are provided in Table 7. Participants' mean scores ranged from (1.47-1.89). Because these data were discrete (no = 1, yes = 2) a mean score greater than 1.5 in a content area was interpreted as participants perceiving to have enough knowledge, while a mean score less than 1.5 was interpreted as not perceiving to have enough

knowledge. Although a 1.5 is an arbitrary cutoff, it does have face validity in that 1.5 or higher represents a score higher than the midpoint between “yes” and “no.” All but one variable (environmental conditions) was fairly normally distributed while upper and lower extremity were slightly skewed to the left indicating that participants perceived themselves knowledgeable in those areas. The content area environmental condition was highly skewed (mean greater than 1.89) to the left indicating they perceived themselves to be very knowledgeable. Correlations ranging from ( $r = .45 - .85$ ) indicated individuals who perceived themselves knowledgeable in one area were more likely to perceive themselves knowledgeable in another.

**Table 7. Descriptive Statistics for Perceived Knowledge in each Content Area**  
(1 = no, 2 = yes)

Content Area	# of Items	Min	Max	M	SD
Environmental Conditions	8	1	2	1.89	.21
Lower Extremity	33	1	2	1.72	.29
Upper Extremity	29	.86	2	1.67	.31
General Medical and Internal	17	1	2	1.52	.37
Head/Neck/Cervical Spine and Low Back	18	.94	2	1.47	.29

### ***Likelihood of Behaviors***

With Cronbach alpha coefficients ranging from (.88-.97), likelihood content areas were internally consistent. Participants’ mean scores ranged from (2.54 to 3.39) and were fairly normally distributed for head/neck/cervical spine/low back; and upper extremity, lower extremity, general medical conditions, and environmental conditions being slightly

more skewed to the left indicating that participants were more likely to perform these behaviors (see Table 8). Correlations ranging from ( $r = .40-.89$ ) indicated that individuals who perceived themselves more likely to perform one health care behavior content area would perceive themselves likely to perform behaviors in another health care behavior content area.

**Table 8. Descriptive Statistics for Likelihood of Behaviors Content Areas**  
(1 = very unlikely, 2 = unlikely, 3 = likely, 4 = very likely)

<b>Content Area</b>	<b># of Items</b>	<b>Min</b>	<b>Max</b>	<b>M</b>	<b>SD</b>
Environmental Conditions	8	1.5	4	3.39	.58
Lower Extremity	33	1	4	3.17	.63
Upper Extremity	29	1	4	3.00	.63
General Medical and Internal	17	1	4	2.60	.82
Head/Neck/Cervical Spine and Low Back	18	1	4	2.54	.69

### **Research Questions One & Two: Perceived Knowledge**

The first research question set out to identify participants' perceived knowledge in providing athletic health care for high school football players. The 116 items assessed participants' perceived knowledge of information reflected in five content areas: (a) environmental conditions; (b) upper extremity; (c) lower extremity; (d) general medical and internal; and (e) head, neck, cervical spine, and low back. Content area descriptive statistics for perceived knowledge based on both years of experience groups are provided in Appendix M, Tables 11-15.



The second research question examined the differences between participants' years of experience and self-perceived knowledge. One hypothesis was tested. It was hypothesized (Hypothesis 2) that first responders with four or more years of experience would perceive themselves to be more knowledgeable than those with three or fewer years of experience. With moderate to high positive bivariate correlations ( $r = .45 - .85$ ) among the five knowledge content areas, a MANOVA was conducted. In this multivariate analysis, years of experience served as the independent variable and the five knowledge content areas served as the dependent variables. Results revealed no statistically significant differences between the groups on any of the content areas (see Appendix M, Additional Table 16); (Wilks  $\lambda = .91$ ,  $F_{(1,91)} = 1.73$ ,  $p > .05$ ). Thus, no further analysis was conducted. The findings indicate that both groups of participants perceived they were equally knowledgeable in the five content areas, regardless of their years of experience.

### **Research Questions Three & Four: Likelihood to Perform Behaviors**

The third research question set out to identify whether first responders were likely to perform specific athletic health care skills and behaviors when provided the opportunity to do so during the football season. The descriptive statistics for the likelihood to perform skills and behaviors based on years of experience are provided (see Appendix M, Additional Tables 17-21).

To examine the differences between first responders' years of experience and the likelihood of performing specific athletic health care skills and behaviors, one hypothesis was tested. It was hypothesized (Hypothesis 4) that first responders with four or more

years of experience would be more likely to perform skills and behaviors than those with three or fewer years of experience. With moderate to high positive bivariate correlations ( $r = .40 - .89$ ) among the five health care behaviors, a MANOVA was conducted. Years of experience served as the independent variable and the five athletic health care content areas served as the dependent variables. A multivariate analysis revealed significant differences between the groups in one of the five health care behaviors; (Wilks  $\lambda = .87$ ,  $F_{(1,91)} = 2.66$ ,  $p < .05$ ). Analysis at the univariate level revealed a statistically significant difference in environmental conditions only ( $F_{(1,91)} = 5.90$ ,  $p = .01$ ) and is provided in Table 9. Participants with four or more years of experience ( $M = 3.58$ ,  $SD = .48$ ) were more likely to perform skills and behaviors associated with environmental conditions than those with three or less years of experience ( $M = 3.28$ ,  $SD = .60$ ).

#### **Research Question Five: Content Area Relationships**

The fifth research question was to determine the relationship between perceived knowledge and the likelihood of skills and behaviors for the five content areas. Results indicated a moderate to high positive correlation for all five knowledge and likelihood of skills and behaviors content areas (see Table 10). Therefore, if first responders perceived themselves to be knowledgeable in one content area they were likely to perform the skills and behaviors if given the opportunity in the same content area.

**Table 9. Multivariate Analysis of Variance (MANOVA) Results for Likelihood of Behaviors***(1 = very unlikely, 2 = unlikely, 3 = likely, 4 = very likely)*

<b>Content Area</b>		<i>M</i>	<i>SD</i>	<i>F</i>	<i>df</i>	<i>sig</i>
Environmental Conditions				5.90	1	.01*
	3 years or less	3.28	.60			
	4 or more years	3.58	.48			
Upper Extremity				.58	1	.45
	3 years or less	2.97	.66			
	4 or more years	3.07	.54			
Lower Extremity				.40	1	.53
	3 years or less	3.14	.64			
	4 or more years	3.22	.60			
Head/Neck/Cervical Spine and Low Back				.01	1	.90
	3 years or less	2.55	.72			
	4 or more years	2.53	.65			
General Medical and Internal				1.04	1	.31
	3 years or less	2.66	.83			
	4 or more years	2.48	.82			

3 years or less ( $n = 61$ ); 4 years or less ( $n = 32$ )

**Table 10. Pearson Correlations of Content Areas**

<b>Content Area</b>	<b><i>r</i></b>	<b><i>p</i> Value</b>
Environmental Conditions Knowledge & Environmental Conditions Likelihood	.42	.000
Upper Extremity Knowledge & Upper Extremity Likelihood	.63	.000
Lower Extremity Knowledge & Lower Extremity Likelihood	.64	.000
Head, Neck, C-Spine, Low Back Knowledge & Head, Neck, C-Spine, Low Back Likelihood	.65	.000
General Medical and Internal Knowledge & General Medical and Internal Likelihood	.75	.000

## **CHAPTER V**

### **DISCUSSION**

This chapter reviews the overall purpose of the study, methodology, results, and the connection to previous research. In addition, study limitations and recommendations for future research are presented.

The purposes of this study were twofold: (a) identify North Carolina high school football first responders' perceived knowledge of a variety of athletic health care skills and behaviors; (b) to determine the likelihood that first responders would actually perform specific skills and behaviors when provided the opportunity to do so during the football season. An original survey instrument was developed to answer the research questions. Results indicated that first responders perceived themselves to be knowledgeable and were likely to perform specific athletic health care skill and behaviors in a majority of the content areas. Additionally, there were no differences in years of experience for perceived knowledge. However, there were differences that existed for likelihood of behaviors.

#### **Perceived Knowledge**

The first two research questions were to: (a) describe perceived knowledge of first responders; and (b) determine the effect of first responders' years of experience on perceived knowledge. Participants in this study perceived to have enough knowledge in all areas except, head, neck, cervical spine and low back and no significant differences

were found relative to years of experience. Prior to completion of this study, no data existed to describe the specific knowledge of first responders providing medical care to football athletes in North Carolina public high schools. However, only two previous studies had been conducted in North Carolina and concluded that care was lacking or inconsistent (Aukerman et al., 2006; Eilbacher & Tritschler, 2004). In addition, previous studies conducted in other states examined the knowledge of high school coaches acting as medical providers regarding first aid and athletic injury care (Barron, 2004; Kujawa & Coker, 2000; Ransone & Dunn-Bennett, 1999). Findings in these studies indicated that coaches lacked sufficient knowledge to provide suitable care. Comparatively speaking our study did not directly assess first responders' knowledge but rather their perception of having enough knowledge. Participants perception of "enough" knowledge could vary greatly from participant to participant regardless of years of experience; therefore, the interpretation of our results is based on self-reported data allowing for only assumptions to be made related to our hypotheses.

The unfortunate deaths of three high school football players in 2008 due to heat illness and head trauma make the content areas of environmental conditions and head, neck, cervical spine, and low back of particular interest. First responders in our study perceived themselves most knowledgeable in environmental conditions. This is an encouraging finding as an estimated 15,819 high school football players suffer some form of heat illness every year while thirty-one have died since 1995 as a result of environmental conditions (Mueller & Colgate, 2009). Our results offer hope that first responders working with football have the appropriate knowledge to handle

environmental emergencies effectively. Perhaps this can be attributed to the reinforcement of these issues at the beginning of the Injury Management Workshop (IMW), offered every year for all first responders.

First responders did not perceive themselves to have enough knowledge in the head, neck, cervical spine, and low back content area. Despite their perceived lack of expertise, first responders in North Carolina public high schools are responsible for identification and analysis of potential life threatening injuries such as concussions. This should be of major concern for administrators and parents considering every year approximately 60,000 athletes sustain a concussion during high school football (Broglia et al., 2009; Majerski et al., 2008). Treating an athlete with a concussion is complex and should be handled by a trained professional who is able to recognize the signs and symptoms, and properly determine when the athlete is well enough to return to play (Boden et al., 2007; Mueller, 2001). The seriousness of managing a concussion is illustrated in the 2005 Zurich Consensus Statement on Concussion in Sport (McCrory et al., 2009), and the 2008 mandate from the NCHSAA ad hoc Athletic Safety Task Force that recommended neuropsychological testing be used to assess cognitive function to determine return to play (North Carolina High School Athletic Association Athletic Safety Task Force, 2009). In an ideal situation, every high school would employ the services of a certified athletic trainer who is already trained in concussion management and neuropsychological testing. In the meantime, first responders need to be trained and feel comfortable addressing head injuries and the use of neuropsychological testing. This study identified that first responders did not perceive themselves to be knowledgeable in

the content area of head, neck, and cervical spine including return to play criteria. This finding indicates that more intense and specific training in this area is necessary.

The second research question examined if differences in perceived knowledge existed between first responders with four or more years of experience than those with three or fewer. Results indicated that perceived knowledge was the same regardless of the number years of experience. Ironically, about one-third of participants had four or more years of experience, which theoretically equates to over 80 hours of continuing education (based on the NC Injury Management Policy that requires 20 hours each year) while two-thirds had been attending for three years or less (equivalent to fewer than 60 hours of continuing education while some had none at all). Despite the disparity in the number of hours of training, both groups perceived themselves to have enough knowledge in each content area. Results were based on perception of knowledge only and do not offer any justification for the lack of significance. Reasons for this have yet to be explained or explored but provide a direction for future research.

### **Likelihood of Skills and Behaviors**

Research questions three and four focused on: (a) first responders' likelihood to perform specific athletic health care skills and behaviors; and (b) whether first responders with four or more years of experience more likely to perform skills and behaviors than those with fewer years of experience. This was the first study to explore whether or not first responders were likely to provide care if faced with the need to do so. A mean score of 2.5 or above on a 4-point Likert scale was interpreted as first responders being likely



to perform the skill or behavior. In this study first responders were likely to very likely to perform skills and behaviors in all five content areas.

Results identified that first responders are likely to perform athletic health care skills or behaviors. However, they were all equally likely to do so regardless of their years of experience except when responding to the content area of environmental conditions where a significant difference was found.

Studies have shown that injuries are inevitable in athletic competition, especially in football. The most common injuries players are likely to sustain are to the upper and lower extremities, and head, neck, and cervical spine (Ramirez et al., 2006; Rechel et al., 2008; Shankar et al., 2007). Therefore, first responders caring for North Carolina high school football players are likely to be exposed to athletes who may sustain a variety of injuries. The present study does not identify if the care provided was adequate or inadequate; rather, that they were likely to provide some type of care when required to do so.

The primary focus of the fourth research question was to examine whether or not first responders with more years of experience were likely to perform skills and behaviors more so than those with more limited experience. First responders with four or more years of experience were more likely to perform skills and behaviors associated with environmental conditions than those with fewer years of experience. In addition, individuals with four or more years of experience were more likely to perform skills and behaviors in environmental conditions relative to all other content areas. In light of the fact that differences did not exist in other content areas, this difference may be attributed

to the reinforcement of environmental and lightning emergencies by workshop coordinators at the beginning of the IMW every year. It is also important to note that individuals with three years or less of experience were more likely to perform skills and behaviors associated with environmental conditions more than the other content areas. This is a positive finding in that first responders are becoming more comfortable responding to environmental emergencies presumably as a result of increased clinical experiences and continuing education. Therefore, future research is necessary to confirm the impact of the workshop on first responders' behaviors in providing care especially in areas where proper care is critical such as head, neck, and cervical spine.

Again, given that two North Carolina football players died due to head trauma in 2008 the head, neck, cervical spine, and low back was of special interest to us. An alarming result of this study was regardless of first responders' years of experience they were likely to perform skills and behaviors associated with head, neck, cervical spine, and low back. While both groups were likely to perform skills and behaviors in the head content area, relative to the other four content areas (i.e. upper and lower extremity) they were *least likely*. This may be attributed to first responders recognizing the ramifications and implications were they to provide inappropriate care. The findings strengthen the need to employ a certified athletic trainer at every high school because of their intense didactic and clinical training in the recognition, assessment, and treatment of head injuries; especially concussions.

### **Content Area Relationship**

Research question five examined whether there was a relationship between perceived knowledge and the likelihood first responders would actually perform athletic health care skills and behaviors when faced with the opportunity to do so. On the surface, a positive finding in our study is that first responders were more likely to perform behaviors related to providing care for more significant injuries (i.e., internal injuries, and head/neck, spine) *only* if they perceived to be knowledgeable in those areas. However, caution should be used in interpreting these results because they are based on self-reported data rather than on actual assessment of the first responders' knowledge and skills. While the focus of this study was not to directly measure the effectiveness of the Injury Management Workshops (IMW) provided by the North Carolina Coaches Association we recommend that some form of knowledge and skill assessment be incorporated into the IMW format to better gauge the training of first responders in the high school setting.

### **Current State of Health Care for High School Athletes**

In the wake of the deaths during the 2008 football season greater attention has been given to the care being provided for high school athletics across the United States. The National Athletic Trainers' Association has made the high school setting a priority by conducting research, development of a high school sports medicine course, and supporting a high school career day (NATA News, 2009b). While states have been slow to progress in mandating the employment of an AT, North Carolina, Kentucky, South Carolina, and California have made it a priority. North Carolina senate bill 834 was

introduced to mandate the funding of an athletic trainer for all high schools (NATA News, 2009a). In addition, the North Carolina state high school athletic association requires all schools to submit an emergency action plan at the beginning of the school year. South Carolina introduced a bill in 2009 to create a foundation for individuals to donate money for the hiring of an AT in high schools and middle schools (NATA News, 2009a). The death of a high school football player in 2008 prompted the Kentucky high school athletic association and the Department of Education to begin a state wide study on sport safety and require coaches to complete a sport safety course for preventing injuries (Spears, 2009). California presented bill 1647 that requires every school have an emergency action plan, an automated external defibrillator (AED), and a most importantly, statewide regulation of the athletic training profession (Walcher & Edelman, 2010). The pursuit to provide the most appropriate care for high school athletes will be ongoing for years to come. Until a state mandates the employment of an AT, care may be provided by unqualified individuals. It is each state's responsibility to determine what constitutes appropriate care and strengthen the system of care that is currently in place.

### **Limitations**

A limitation of the study was the participants perception of what it meant to have "enough" knowledge. Participant perception of "enough" could vary from participant to participant and therefore may have impacted the results. Another limitation was the number of participants who attended the IMW. Because the NCSBE Injury Management Policy requires first responders to attend the Injury Management Workshop it was assumed that a large percentage would be in attendance therefore allowing for

generalization of findings within North Carolina. However, there was no control as to what schools abided by the policy and required their first responder to attend the workshop. Additionally, there was no control regarding the number of participants who represented the three levels of the workshop. Every effort was made by the researcher to identify the approximate number of participants based on attendance gathered by workshop coordinators from previous years. Because previous attendance records were not organized well the researcher could only make an educated guess. The researcher also did not have control over the number of participants who showed up late. The questionnaire was given on the first day of the workshop in the first session which did not account for those traveling a longer distance nor give them extra time to check in. Finally, there was a lack of control as to the knowledge participants had regarding medical terminology which could have impacted their interpretation and willingness to complete the questionnaire appropriately.

### **Delimitations**

First responders in the state of North Carolina served as the study participants limiting the ability to generalize the results beyond the state.

### **Recommendations for Future Research**

While change in medical coverage for high school athletes in North Carolina may be on the horizon, it may be instructive to further evaluate the system that is already in place. First responders are provided considerable content in a twenty hour workshop. Over the twenty years of the IMW, coordinators had never conducted a pre or a post assessment of first responders' knowledge. Therefore, a future study calls for an

evaluation as to whether participants are knowledgeable regarding the content learned during the workshop. These data would allow researchers to identify if first responders *are* retaining workshop information and are capable of applying that knowledge to provide adequate care for North Carolina high school football players. In addition, this information would assist the appropriate stakeholders who could influence and lead the NCSBE to move towards an implementation of employing a licensed, certified athletic trainer in all high schools.

Extensive research into the structure of the curriculum and administrative aspects of the IMW and its relation to the NCSBE Injury Management Policy, suggest an evaluation regarding the curriculum and the effectiveness of the workshop. Because content has not been changed in many years, individuals may be providing care using knowledge and skills that are outdated and therefore inadequate. For example, the IMW may not be educating participants consistent with current concussion assessment literature as of 2009. Additionally, a closer look into the management or compliance of the NCSBE policy may rightfully influence change. As of 2009, there was little to no enforcement of the policy for schools not in compliance. In addition, there seemed to be a noticeable disconnect between the IMW and administrators at the NCSBE in terms of who is or who is not providing care. Attendance rolls are not submitted to the state; only a record of attendance is given to the participant to submit to the athletic director. A statewide database tracking who is providing care, their qualifications, their history and completion of the IMW, and whether each high school is in compliance with the NCSBE

Injury Management Policy will assist in identifying if proper personnel or even basic care is being provided for NC high school football athletes.

### **Application of Study**

This study has many applications aimed to improve health care for high school athletes. First, the data can be used as a foundation for workshop coordinators to better understand the perceptions of first responders in North Carolina and to begin addressing the effectiveness of the IMW. For example, first responders with little experience perceive they have a lot of knowledge and are likely to perform many skills and behaviors related to athletic injuries. The focus of Level I workshop is to let participants know what they should not be doing. It seems that they are likely to perform skill and behaviors beyond what workshop coordinators expect, especially those with little experience. Second, these data can assist the North Carolina Athletic Trainers' Association with information to begin building their case to support the employment of athletic trainers as the most qualified medical professionals to provide medical care for high schools in North Carolina high schools. Additionally, the findings of the study can be presented to the North Carolina State Board of Education highlighting the lack in the regulation of injury management policy, specifically high schools compliance to the policy.

### **Conclusion**

With the increase in participation and risk of injury in high school athletics care being provided should be of major concern. The three NC deaths in high school football in 2008 was an eye opener for parents, coaches, and athletic administrators. While the

North Carolina High School Athletic Association's ad hoc task force committee comprised of physicians, athletic directors, and athletic trainers addressed the deaths focusing on traumatic brain injury, heat related illness and the implementation of an athletic trainer, the issue of *who* was providing care was never changed.

First responders continue to be eligible to provide care for high school football as implemented by the North Carolina State Board of Education decades ago. In addition, first responders have continuing education opportunities to gain knowledge and skills that are beyond their scope of training. If the employment of an athletic trainer at every high school in NC does not become a reality, a greater look into the current system is vital, even though this study found that first responders perceived to be knowledgeable and likely to provide care. Not only are the athletes at risk of injury, but they are at an even greater risk of receiving care from unqualified individuals, especially after attending a workshop where some of the curriculum content may be outdated or inadequate. Some might believe that having some coverage is better than none; however, it is a disservice to the athletes and, at the same time, the first responders by putting them in a position to make major medical decisions when they may not be qualified. This study created the foundation on which to build future research. Changes in medical coverage for football will only occur if further research is conducted that identifies athletic trainers as the most appropriate health professionals to provide medical coverage.



## REFERENCES

- Agerupm, G. (1985). The need for certified athletic trainers in the high schools. *The Washington Coach*, 4-5.
- Armstrong, K. J., Caputo, J. L., Farley, R. S., & Whitehill, W. R. (2005). Assessment of first aid knowledge of high school basketball coaches. *Medicine and Science in Sports & Exercise*, 37(5), S145.
- Aukerman, D. F., Aukerman, M., McManama, M., & Browning, D. (2006). Medical coverage of high school athletics in North Carolina. *Southern Medical Journal*, 99(2), 132-136.
- Barron, M. J. (2004). *The assessment of first aid and injury prevention knowledge and the decision making of youth basketball, soccer, and football coaches*. Michigan State University.
- Bell, G. W., Cardinal, R. A., & Dooley, J. N. (1984). Athletic trainer manpower survey of selected Illinois high schools. *Athletic Training*, 19(1), 23-24.
- Biddington, C. M., Wagner, R. W., Lyles, A., & Brunner, M. (2009). Athletic health care in Pennsylvania high schools. *Pennsylvania Journal of Health, Physical Education, Recreation & Dance* (Winter), 20-24.
- Boden, B., Tacchetti, R., Cantu, R., Knowles, S. B., & Mueller, F. O. (2007). Catastrophic head injuries in high school and college football players. *The American College of Sports Medicine*, 35(7), 1075-1081.
- Bostic, J., & Hunt, V. (2008). Sobering season: Sports fatalities put medical care in spotlight. *NATA News* (November), 16-17.
- Broglio, S., Sosnoff, J., Shin, S., He, X., Alcaraz, C., & Zimmerman, J. (2009). Head impacts during high school football: A biomechanical assessment. *Journal of Athletic Training*, 44(4), 342-349.
- Butler, L. L., Lester, R., Solomon, A., Kelly, D. J., & Soukup, G. J. (2005). What level of competence in sports medicine should be required of coaches? [personal statements]. *Journal of Physical Education, Recreation & Dance*, 76(8), 14-15.

- Buxton, B. P., Okasaki, E. M., Kwok, H. W., & McCarthy, M. R. (1995). Legislative funding of athletic training positions in public secondary schools. *Journal of Athletic Training, 30*(2), 115-120.
- Candon, T., & Medlin, K. (2008). Fatalities spark call for certified athletic trainers. [Online]. Available: <http://www.highschoolot.com/content/story/3639241>.
- Casa, D. J., Csillan, D., Armstrong, L. E., Baker, L. B., Bergeron, M. F., Buchanan, V. M., et al. (2009). Preseason heat-acclimatization guidelines for secondary school athletics. *Journal of Athletic Training, 44*(3), 332-333.
- Clairborne, T., Hou, S., & Cappaert, T. (2007). Certified athletic trainers provide effective care in the high school setting. *Athletic Therapy Today, 12*(2), 34-38.
- Conley, L. (1982). Are high school athletes receiving adequate care? *The First Aider, 1*-8.
- Coris, E., Walz, S., Konin, J., & Pescasio, M. (2007). Return to activity considerations in a football player predisposed to exertional heat illness: A case study. *Journal of Sport Rehabilitation, 16*, 260-270.
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16*, 297-334.
- Culpepper, M. J. (1986). The availability and delivery of health care to high school athletes in Alabama. *The Physician and Sports Medicine, 14*(1), 130-137.
- Delforge, G. D., & Behnke, R. S. (1999). The history and evolution of athletic training education in the United States. *Journal of Athletic Training, 34*, 53-61.
- Department of Public Instruction. Retrieved October 19, 2008, from [www.dpi.state.nc.us/acronyms](http://www.dpi.state.nc.us/acronyms).
- Ebel, R. (Ed.). (1999). *Far beyond the shoe box*. Forbes Custom Publisher, Canada.
- Eilbacher, C., & Tritschler, K. (2004). Survey of North Carolina public high school administrators: Opinions and attitudes toward athletic training services. *The North Carolina Journal for Alliance for Athletics, Health, Physical Education, Recreation, and Dance, 40*(2).
- Flint, F. A., & Weiss, W. R. (1992). Returning injured athletes to competition: A role and ethical dilemma. *Canadian Journal of Sport Sciences, 17*(1), 34-40.

- Gessel, L. M., Fields, S. K., Collins, C. L., Dick, R. W., & Comstock, D. (2007). Concussions among United States high school and collegiate athletes. *Journal of Athletic Training, 42*(4), 495-503.
- Guskiewicz, K. M., Weaver, N. L., Padua, D., & Garrett, W. (2000). Epidemiology of concussion in collegiate and high school football players. *American Journal of Sports Medicine, 28*, 643-650.
- Hage, P., & Moore, M. (1981). Medical care for athletes: What is the coach's role? *The Physician and Sports Medicine, 9*(5), 140-151.
- Herman, B. (2007). 2007 Football fatality survey shows decrease of deaths. Retrieved 12/07/08, from [www.NFHS.org/web/2008/02/2007\\_footballfatality\\_survey\\_fh.aspz](http://www.NFHS.org/web/2008/02/2007_footballfatality_survey_fh.aspz).
- Huffman, E., Yard, E. E., Fields, S. K., Collins, C. L., & Comstock, D. (2008). Epidemiology of rare injuries and conditions among United States high school athletes during the 2005-2006 and 2006-2007 school years. *Journal of Athletic Training, 43*(6), 624-630.
- Johnson, E. C., Ganio, M. S., Lee, E. C., Lopez, R. M., McDermott, B. P., Casa, D. J., et al. (2010). Perceptual Responses While Wearing an American Football Uniform in the Heat. *Journal of Athletic Training, 45*(2), 107-116.
- Knowles, S. B., Marshall, S. W., Bowling, J. M., Loomis, D., Millikan, R. W., Yang, J., et al. (2006). A prospective study of injury incidence among North Carolina high school athletes. *American Journal of Epidemiology, 164*(12), 1209-1221.
- Knowles, S. B., Marshall, S. W., & Guskiewicz, K. M. (2006). Issues in estimating risks and rates in sports injury research. *Journal of Athletic Training, 41*(2), 207-215.
- Koabel, B. P. (1995). *Assessment of the need for certified athletic trainers in New York state high schools*. Eugene, OR: Microform Publications, Int'l Institute for Sport and Human Performance, University of Oregon.
- Kujawa, R., & Coker, C. A. (2000). An examination of the influence of coaching certification and the presence of an athletic trainer on the extent of sport safety knowledge of coaches. *Applied Research in Coaching, 14*-23.
- Lackland, D. T., Testor, J. M., Akers, P. C., Hirata, I., Knight, R. M., & Mason, J. L. (1985). The utilization of athletic trainer/team physician services and high school football injuries. *Athletic Training, 20*(1), 20-23.

- Letchworth, B. (2008). Player's death stirs up debate over trainers. *The Daily Reflector*. Retrieved from <http://www.reflector.com/news/players-death-stirs-up-debate-over-trainers-152288.html>.
- Lindaman, L. M. (1992). Athletic trainer availability in interscholastic athletics in Michigan. *Journal of Athletic Training*, 27(1), 9-16.
- Majerski, C., Mihalik, J., Ren, D., & Collins, M. (2008). Concussion in sports: Postconcussive activity levels, symptoms, and neurocognitive performance. *Journal of Athletic Training*, 43(3), 265-275.
- Mathews, E., & Esterson, P. (1983). Sports medicine in Northern Virginia high schools. *Athletic Training, summer*, 181-183.
- McGuine, T. (2006). Sports injuries in high school athletes: A review of injury-risk and injury-prevention research. *Clinical Journal of Sports Medicine*, 16(6), 488-499.
- MCrory, P., Meeuwisse, W., Johnston, K., Dvorak, J., Aubry, M., Malloy, M., et al. (2009). Consensus statement on concussion in sport 3rd international conference on concussion in sport held in Zurich, November 2008. *Clinical Journal of Sports Medicine*, 19(3), 185-200.
- Meuller, F., & Colgate, B. (2009). *Annual survey of football injury research*.
- Mihoces, G. (2008). Athletic trainers pushing for athletic health care in high schools. *USA TODAY*. Retrieved from [http://www.usatoday.com/sports/preps/2008-06-18-hs-trainers\\_n.htm](http://www.usatoday.com/sports/preps/2008-06-18-hs-trainers_n.htm).
- Mueller, F. O. (2001). Catastrophic head injuries in high school and collegiate sports. *Journal of Athletic Training*, 36(3), 312-315.
- Mueller, F. O., & Colgate, B. (2007). *Annual Survey of Football Injury Research, 1931-2006*.
- NATA. (2007). Appropriate Medical Care For Secondary School-Age Athletes: Consensus Statement. Retrieved August 2007, from [http://www.nata.org/statements/support/secondary\\_school\\_medcarecommunication.pdf](http://www.nata.org/statements/support/secondary_school_medcarecommunication.pdf).
- NATA News. (2008). Secondary schools: Squarely in the spotlight. *NATA News*(December), 24.
- NATA News. (2009a). The hub: Your information station. *NATA News*(May), 30-31.

- NATA News. (2009b). Secondary school market remains priority in 2010. *NATA News* (December ), 23.
- National Athletic Trainers' Association. [Online]. Available: [www.nata.org](http://www.nata.org).
- National Athletic Trainers' Association. (n.d.-a). Retrieved July 10, 2008 from [http://www.nata.org/statements/consensus/Consensus%20Statement\\_Final%20Version\\_Sept02.pdf](http://www.nata.org/statements/consensus/Consensus%20Statement_Final%20Version_Sept02.pdf).
- National Athletic Trainers' Association. (n.d.-b). What is an athletic trainer? Retrieved June 10, 2008, from [http://www.nata.org/about\\_AT/whatisat.htm](http://www.nata.org/about_AT/whatisat.htm).
- National Federation of High School Association. (2008). 2007-2008 High School Athletics Participation Survey. Retrieved 10/10/08, from <http://www.nfhs.org/core/contentmanager/uploads/2007-08%20Participation%20Survey.pdf>.
- Nelson, A. J., Collins, C. L., Yard, E. E., Fields, S. K., & Comstock, D. (2007). Ankle injuries among united states high schol sports athletes, 2005-2006. *Journal of Athletic Training*, 42(3), 381-387.
- North Carolina Board of Athletic Trainer Examiners. Retrieved June 14, 2008, from <http://www.ncbate.org/senate.html>.
- North Carolina High School Athletic Association. Retrieved July 15, 2008, from <http://www.nchsaa.org>.
- North Carolina High School Athletic Association Athletic Safety Task Force. (2009). Recommendations for appropriate medical coverage for prevention and management of catastrophic sport-related injuries in North Carolina high school athletic association member schools. Retrieved March 4, 2010, from [http://www.ncmedsoc.org/non\\_members/specialities/NCHSAA-proposal11-16-09.pdf](http://www.ncmedsoc.org/non_members/specialities/NCHSAA-proposal11-16-09.pdf).
- North Carolina State Board of Education. from [www.dpi.state.nc.us/state\\_board/](http://www.dpi.state.nc.us/state_board/).
- Nunnally, J. (Ed.). (1978). *Psychometric Theory*. New York: Mc-Graw Hill.
- Porter, M., Noble, B., Bachman, D. C., & Hoover, R. L. (1980). Sportsmedicine care in Chicago-area high schools. *The Physician and Sports Medicine*, 8(2).
- Powell, J. W. (1987). 636,000 injuries annually in high school football. *Journal of Athletic Training*, 10B.

- Powell, J. W., & Barber-Foss, K. D. (1999). Injury patterns in selected high school sports: A review of the 1995-1997 seasons. *Journal of Athletic Training, 34*(3), 277-284.
- Ramirez, M., Schaffer, K., Haikang, S., Kashani, S., & Kraus, J. (2006). Injuries to high school football athletes in California. *American Journal of Sports Medicine, 34*, 1147-1158.
- Ransone, J., & Dunn-Bennett, L. R. (1999). Assessment of first-aid knowledge and decision making of high school athletic coaches. *Journal of Athletic Training, 34*(3), 267-271.
- Rauh, M., Marshall, S. W., Powell, J. W., Mueller, F. O., & Queale, W. (2001). Sports injury epidemiology among high school athletes: Past, present and future perspectives. *The American College of Sports Medicine, 33*(5), S1.
- Rechel, J. A., Yard, E. E., & Comstock, D. (2008). An epidemiologic comparison of high school sports injuries sustained in practice and competition. *Journal of Athletic Training, 43*(2).
- Redfern, R. W. (1980). Emergency medical skills in high school coaches. *The Physician and Sports Medicine, 8*(11), 115-116.
- Rowe, J. P., & Miller, L. K. (1991). Treating high school sports injuries-Are coaches/trainers competent? *Journal of Physical Education, Recreation & Dance, 62*(1), 49-54.
- Rowe, J. P., & Robertson, D. M. (1986). Knowledge of care and prevention of athletic injuries in high schools. *Journal of Athletic Training, 21*, 116-119.
- Schottke, D. (Ed.). (2001). *First responder: Your first response in emergency care* (3rd ed.). Jones and Bartlett.
- Sexton, J., Schmoltdt, K., & Miles, H. (1994). Job marketability survey for athletic trainers in selected midwestern states. [Research Article]. *Journal of Athletic Training, 29*(3), 208-212.
- Shankar, P. R., Fields, S. K., Collins, C. L., Dick, R. W., & Comstock, D. (2007). Epidemiology of high school and collegiate football injuries in the United States, 2005-2006. *American Journal of Sports Medicine, 35*(5), 1295-1303.
- Sherman, B. (1985). A new approach to athletic training in southern Wisconsin high schools. *The Physician and Sports Medicine, 13*(1), 57-64.

- Spears, V. (2009). High school sports law is signed: Stronger safety measures required at practices, events. Retrieved February 23, 2010, from <http://www.kentucky.com/2009/03/25/737304/high-school-sports-law-is-signed.html>.
- Stapleton, K. L., Tomlinson, C. M., Shepard, K. F., & Coon, V. A. (1984). High school coaches' perceptions of the irresponsibilities in managing their athletes injuries. [Research]. *Journal of Orthopaedic and Sports Physical Therapy*, 5, 253-260.
- Stevens, T., & Van Der Horst, R. (2008). Panel hears need for trainers: An expert on injuries recommends that each N.C. high school have a licensed athletic trainer on staff. *New and Observer*. Retrieved from <http://www.newsobserver.com/821/story/1249634.html>.
- The American Red Cross. (2005). *First Aid- Responding to Emergencies*. Stay Well.
- Vangsness, T. C., Hunt, T., Uram, M., & Kerlan, R. (1994). Survey of health care coverage of high school football in southern California. [Research]. *American Journal of Sports Medicine*, 22(5), 719-722.
- Walcher, J., & Edelman, J. (2010). California state assembly bill aims to protect youth athletes. Retrieved 2/23/2010, from <http://newsblaze.com/story/201020213170600002.pnw/topstory.html>.
- Weidner, T. G. (1989). Injuries: Are coaches prepared? *Journal of Physical Education, Recreation & Dance*, 60, 82-84.
- Wrenn, J. P., & Ambrose, D. (1980). An investigation of health care practices of high school athletes in Maryland. *Journal of Athletic Training*, 85-92.

## Appendix A

### North Carolina State Board of Education Injury Management Policy

#### NC Athletic Injury Management Policy

#### II. STATE BOARD OF EDUCATION RULES REGARDING EMERGENCY CARE FOR ATHLETICS AND SCHOOL ACTIVITIES

##### A. G.S. 115C-12- Powers and Duties of the Board Generally

(12) Duty to Provide for Sports Medicine and Emergency Paramedical Program- The State Board of Education is authorized and directed to develop a comprehensive plan to train and make available to the public schools personnel who shall have major responsibility for exercising preventive measures against sports related deaths and injuries and for providing sports medicine and emergency paramedical services for injuries that occur in school related activities. The plan shall include, but is not limited to, the training, assignment of responsibilities, and appropriate additional reimbursement for individuals participating in the program.

##### B. 16 NCAC 6E.0201. School Athletics and Sports Medicine—Definitions

- a. “Paramedical emergency life saving services” means the provision of first aid and cardiopulmonary resuscitation services.
- b. “Sports medicine services” means those services which relate to the prevention and management of injuries received by students participating in school sports activities.

##### C. 16 NCAC 06e.0203 Athletic Injury Management

- a. Each LEA must designate for each high school within its jurisdiction either a licensed athletic trainer who is qualified pursuant to G.S. 90, Article 34 or a first responder. These persons may be employed on a full-time or part-time basis or may serve as a volunteer.
- b. A first responder must complete and maintain certification or be in the process of completing courses in the following:
  - i. Cardiopulmonary resuscitation as certified by an organization such as the American Red Cross or the American Heart Association;
  - ii. First aid as certified by an organization such as the American Red Cross or the American Heart Association; and



- iii. Injury prevention and management as certified by an organization such as the National Athletic Trainers' Association, the North Carolina Athletic Trainers' Association, or the North Carolina High School Athletic Association.

In addition, each first responder must complete 20 hours in staff development each school year.

- c. The licensed athletic trainer or first responder may not have coaching responsibilities during the season in which the person is working as a licensed athletic trainer or first responder. A licensed athletic trainer or first responder must attend all football practices and games, unless excused by the superintendent due to emergency. The LEA may require a licensed athletic trainer or first responder to attend practices or games that involve other sports.

## Appendix B

### Athletic Training and First Responder Education

<b>Educational Preparation</b>	<b>AT Educational Preparation</b>	<b>First Responder Educational Preparation</b>
<b>CPR/AED/First Aid Certification</b>		
ARC Professional Rescuer Training	✓	
ARC First Aid-Responding to Emergencies or ARC First Aid/CPR/AED for the Workplace		✓
<b>Injury Management Workshop (20 hours)</b>		✓
<b>Professional Content</b>	<i>Completed in a college or university program</i>	
Risk Management and Injury Prevention	✓	
Pathology of Injuries and Illnesses	✓	
Orthopedic Clinical Examination and Diagnosis	✓	
Medical Conditions and Disabilities	✓	
Acute Care of Injuries & Illness	✓	
Therapeutic Modalities	✓	
Conditioning, Rehabilitative Exercise and Pharmacology	✓	
Psychosocial Intervention and Referral	✓	
Nutritional Aspects of Injuries & Illnesses	✓	
Health Care Administration	✓	

*(Created by Craig Eilbacher March 12, 2009)*

**Appendix C****North Carolina Athletic Trainers' Practice ACT****General Assembly of North Carolina****1997 SESSION****S.L. 1997-387****SENATE BILL 660****AN ACT TO LICENSE ATHLETIC TRAINERS.**

The General Assembly of North Carolina enacts:

Section 1. Chapter 90 of the General Statutes is amended by adding a new Article to read:

"ARTICLE 34.  
Athletic Trainers.

**90-522. Title; purpose.**

(a) This Article may be cited as the 'Athletic Trainers Licensing Act'.

(b) The practice of athletic trainer services affects the public health, safety, and welfare. Licensure of the practice of athletic trainer services is necessary to ensure minimum standards of competency and to provide the public with safe athletic trainer services. It is the purpose of this Article to provide for the regulation of persons offering athletic trainer services.

**90-523. Definitions.**

The following definitions apply in this Article:

(1) Athletic trainer. A person who , under a written protocol with a physician licensed under Article 1 of Chapter 90 of the General Statutes and filed with the North Carolina Medical Board, carries out the practice of care, prevention, and rehabilitation of injuries incurred by athletes, and who, in carrying out these functions, may use physical modalities, including heat, light, sound, cold, electricity, or mechanical devices related to rehabilitation and treatment. A committee composed of two members of the North Carolina Medical Board and two members of the North Carolina Board of Athletic Trainer Examiners shall jointly define by rule the content, format, and minimum requirements for the written protocol required by this subdivision. The members shall be selected by their respective boards. The decision of this committee shall be binding on both Boards unless changed by mutual agreement of both Boards.

(2) Board. The North Carolina Board of Athletic Trainer Examiners as created by G.S. 90-524.

(3) License. A certificate that evidences approval by the Board that a person has successfully completed the requirements set forth in G.S. 90-528 entitling the person to perform the functions and duties of an athletic trainer.

(4) Athletes. Members of sport teams, including professional, amateur, and school teams; or participants in sports or recreational activities, including training and practice activities, that require strength, agility, flexibility, range of motion, speed, or stamina.

**90-524. Board of Examiners created.**

(a) The North Carolina Board of Athletic Trainer Examiners is created.

(b) Composition and Terms.--The Board shall consist of seven members who shall serve staggered terms. Four members shall be athletic trainers certified by the National Athletic Trainers' Association Board of Certification, Inc. One member shall be a licensed orthopedic surgeon, one member shall be a licensed family practice physician or pediatrician, and one member shall represent the public at large.

The initial Board members shall be selected on or before August 1, 1997, as follows:

(1) The General Assembly, upon the recommendation of the President Pro Tempore of the Senate, shall appoint two certified athletic trainers and an orthopedic surgeon. The certified athletic trainers shall serve for terms of three years, and the orthopedic surgeon shall serve for a term of one year.

(2) The General Assembly, upon the recommendation of the Speaker of the House of Representatives, shall appoint two certified athletic trainers and a family practice physician or pediatrician. The certified athletic trainers and the family practice physician or pediatrician shall serve for terms of two years.

(3) The Governor shall appoint for a three-year term a public member to the Board.

Upon the expiration of the terms of the initial Board members, each member shall be appointed for a term of three years and shall serve until a successor is appointed. No member may serve more than two consecutive full terms.

(c) Qualifications.--The athletic trainer members shall hold current licenses and shall reside or be employed in North Carolina. They shall have at least five years' experience as athletic trainers, including the three years immediately preceding appointment to the Board, and shall remain in active practice and in good standing with the Board as a licensee during their terms. The first athletic trainers appointed to the Board pursuant to this section shall be eligible for licensure under G.S. 90-529 and, upon appointment, shall immediately apply for a license.

(d) Vacancies.--A vacancy shall be filled in the same manner as the original appointment, except that all unexpired terms of Board members appointed by the General Assembly shall be filled in accordance with G.S. 120-122 and shall be filled within 45 days after the vacancy occurs. Appointees to fill vacancies shall serve the remainder of the unexpired term and until their successors have been duly appointed and qualified.

(e) Removal.--The Board may remove any of its members for neglect of duty, incompetence, or unprofessional conduct. A member subject to disciplinary proceedings as a licensee shall be disqualified from participating in the official business of the Board until the charges have been resolved.

(f) Compensation.--Each member of the Board shall receive per diem and reimbursement for travel and reimbursement for travel and subsistence as provided in G.S. 93B-5.

(g) Officers.--The officers of the Board shall be a chair, who shall be a licensed athletic trainer, a vice-chair, and other officers deemed necessary by the Board to carry out the purposes of this Article. All officers shall be elected annually by the Board for one-year terms and shall serve until their successors are elected and qualified.

(h) Meetings.--The Board shall hold at least two meetings each year to conduct business and to review the standards and rules for improving athletic training services. The Board shall establish the procedures for calling, holding, and conducting regular and special meetings. A majority of Board members constitutes a quorum.

**90-525. Powers of the Board.**

The Board shall have the power and duty to:

(1) Administer this Article.

(2) Issue interpretations of this Article.

(3) Adopt, amend, or repeal rules as may be necessary to carry out the provisions of this Article.

(4) Employ and fix the compensation of personnel that the Board determines is necessary to carry into effect the provisions of this Article and incur other expenses necessary to effectuate this Article.

(5) Examine and determine the qualifications and fitness of applicants for licensure, renewal of licensure, and reciprocal licensure.

(6) Issue, renew, deny, suspend, or revoke licenses and carry out any disciplinary actions authorized by this Article.

(7) In accordance with G.S. 90-534, set fees for licensure, license renewal, and other services deemed necessary to carry out the purpose of this Article.

(8) Conduct investigations for the purpose of determining whether violations of this Article or grounds for disciplining licensees exist.

(9) Maintain a record of all proceedings and make available to licensees and other concerned parties an annual report of all Board action.

(10) Develop standards and adopt rules for the improvement of athletic training services in the State.

(11) Adopt a seal containing the name of the Board for use on all licenses and official reports issued by it.

90-526. Custody and use of funds; contributions.

(a) All fees payable to the Board shall be deposited in the name of the Board in financial institutions designated by the Board as official depositories and shall be used to pay all expenses incurred in carrying out the purposes of this Article.

(b) The Board may accept grants, contributions, bequests, and gifts that shall be kept in a separate fund and shall be used by it to enhance the practice of athletic trainers.

90-527. License required; exemptions from license requirements.

(a) On or after January 1, 1998, no person shall practice or offer to practice as an athletic trainer, perform activities of an athletic trainer, or use any card, title, or abbreviation to indicate that the person is an athletic trainer unless that person is currently licensed as provided by this Article.

(b) The provisions of this Article do not apply to:

(1) Licensed, registered, or certified professionals, such as nurses, physical therapists, and chiropractors if they do not hold themselves out to the public as athletic trainers.

(2) A physician licensed under Article 1 of Chapter 90 of the General Statutes.

(3) A person serving as a student-trainer or in a similar position under the supervision of a physician or licensed athletic trainer.

(4) An athletic trainer who is employed by, or under contract with, an organization, corporation, or educational institution located in another state and who is representing that organization, corporation, or educational institution at an event held in this State.

(5) Boxing trainers, if they do not hold themselves out to the public as athletic trainers.

90-528. Application for license; qualifications; issuance.

(a) An applicant for a license under this Article shall make a written application to the Board on a form approved by the Board and shall submit to the Board an application fee along with evidence that demonstrates good moral character and graduation from an accredited four-year college or university in a course of study approved by the Board.

(b) The applicant shall also pass the examination administered by the National Athletic Trainers' Association Board of Certification, Inc.

(c) When the Board determines that an applicant has met all the qualifications for licensure and has submitted the required fee, the Board shall issue a license to the applicant. A license is valid for a period of one year from the date of issuance and may be renewed subject to the requirements of this Article.

90-529. Athletic trainers previously certified.

The Board shall issue a license to practice as an athletic trainer to a person who applies to the Board on or before August 1, 1998, and furnishes to the Board on a form approved by the Board proof of good moral character, graduation from an accredited four-year college or university in a course of study approved by the Board, and a current certificate from the National Athletic Trainers' Association Board of Certification, Inc.

90-530. Athletic trainers not certified.

(a) A person who has been actively engaged as an athletic trainer since August 1, 1994, and who continues to practice up to the time of application, shall be eligible for licensure without examination by paying the required fee and by demonstrating the following:

(1) Proof of good moral character.

(2) Proof of practice in this State since August 1, 1994.

(3) Proof of graduation from an accredited four-year college or university in a course of study approved by the Board.

(4) Fulfillment of any other requirements set by the Board.

An application made pursuant to this section shall be filed with the Board on or before August 1, 1998.

(b) A person is 'actively engaged' as an athletic trainer if the person is a salaried employee of, or has contracted with, an educational institution, an industry, a hospital, a rehabilitation clinic, or a professional athletic organization or another bona fide athletic organization and the person performs the duties of an athletic trainer.

**90-531. Reciprocity with other states.**

A license may be issued to a qualified applicant holding an athletic trainer license in another state if that state recognizes the license of this State in the same manner.

**90-532. License renewal.**

Every license issued under this Article shall be renewed during the month of January. On or before the date the current license expires, any person who desires to continue practice shall apply for a license renewal and shall submit the required fee. Licenses that are not renewed shall automatically lapse. In accordance with rules adopted by the Board, a license that has lapsed may be reissued within five years from the date it lapsed. A license that has been expired for more than five years may be reissued only in a manner prescribed by the Board.

**90-533. Continuing education.**

(a) As a condition of license renewal, a licensee must meet the continuing education requirements set by the Board. The Board shall determine the number of hours and subject matter of continuing education required as a condition of license renewal. The Board shall determine the qualifications of a provider of an educational program that satisfies the continuing education requirement.

(b) The Board shall grant approval to a continuing education program or course upon finding that the program or course offers an educational experience designed to enhance the practice of athletic trainer, including the continuing education program of the National Athletic Trainers' Association.

(c) If a continuing education program offers to teach licensees to perform advanced skills,

the Board may grant approval for the program when it finds that the nature of the procedure taught in the program and the program facilities and faculty are such that a license fully completing the program can reasonably be expected to carry out those procedures safely and properly.

**90-534. Expenses and fees.**

(a) All salaries, compensation, and expenses incurred or allowed to carry out the purposes of this Article shall be paid by the Board exclusively out of the fees received by the Board as authorized by this Article or funds received from other sources. In no case shall any salary, expense, or other obligation of the Board be charged against the State treasury.

(b) The schedule of fees shall not exceed the following:

(1) Issuance of a license \$100.00

(2) License renewal \$50.00

(3) Reinstatement of lapsed license \$75.00

(4) Reasonable charges for duplication services and material.

**90-535. Hiring of athletic trainers by school units.**

Local school administrative units may hire persons who are not licensed under this Article. The persons hired may perform the activities of athletic trainers in the scope of their employment but may not claim to be licensed under this Article. The persons hired may not perform the activities of athletic trainers outside the scope of this employment unless they are authorized to do so under G.S. 90-527(b).

**90-536. Disciplinary authority of the Board; administrative proceedings.**

(a) Grounds for disciplinary action against a licensee shall include the following:

(1) Giving false information or withholding material information from the Board in procuring a license to practice as an athletic trainer.

(2) Having been convicted of or pled guilty or no contest to a crime that indicates that the person is unfit or incompetent to practice as an athletic trainer or that indicates that the person has deceived or defrauded the public.

(3) Having a mental or physical disability or using a drug to a degree that interferes with the person's fitness to practice as an athletic trainer.

(4) Engaging in conduct that endangers the public health.

(5) Being unfit or incompetent to practice as an athletic trainer by reason of deliberate or negligent acts or omissions regardless of whether actual injury to a patient is established.

(6) Willfully violating any provision of this Article or rules adopted by the Board.



(7) Having been convicted of or pled guilty or no contest to an offense under State or federal narcotic or controlled substance laws.

(b) In accordance with Article 3A of Chapter 150B of the General Statutes, the Board may require remedial education, issue a letter of reprimand, restrict, revoke, or suspend any license to practice as an athletic trainer in North Carolina or deny any application for licensure if the Board determines that the applicant or licensee has committed any of the above acts or is no longer qualified to practice as an athletic trainer. The Board may reinstate a revoked license or remove licensure restrictions when it finds that the reasons for revocation or restriction no longer exist and that the person can reasonably be expected to practice as an athletic trainer safely and properly.

**90-537. Enjoining illegal practices.**

If the Board finds that a person who does not have a license issued under this Article claims to be an athletic trainer or is engaging in practice as an athletic trainer in violation of this Article, the Board may apply in its own name to the Superior Court of Wake County for a temporary restraining order or other injunctive relief to prevent the person from continuing illegal practices. The court may grant injunctions regardless of whether criminal prosecution or other action has been or may be instituted as a result of a violation.

**90-538. Penalties.**

A person who does not have a license issued under this Article who either claims to be an athletic trainer or engages in practice as an athletic trainer in violation of this Article is guilty of a Class 1 misdemeanor. Each act of unlawful practice constitutes a distinct and separate offense.

**90-539. Reports; immunity from suit.**

A person who has reasonable cause to suspect misconduct or incapacity of a licensee, or who has reasonable cause to suspect that a person is in violation of this Article, shall report the relevant facts to the Board. Upon receipt of a charge, or upon its own initiative, the Board may give notice of an administrative hearing or may, after diligent investigation, dismiss unfounded charges. A person who, in good faith, makes a report pursuant to this section shall be immune from any criminal prosecution or civil liability resulting therefrom.

**90-540. No third-party reimbursement required.**

Nothing in this Article shall be construed to require direct third-party reimbursement to persons licensed under this Article."

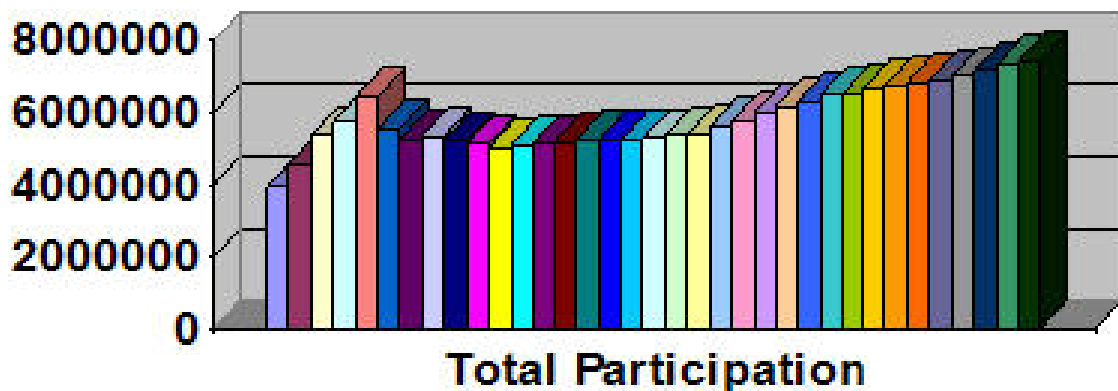
Section 2. This act is effective when it becomes law.

In the General Assembly read three times and ratified this the 5th day of August, 1997

**Appendix D-1**

**National Federation of State High School Association: Participation Graph**

**National High School Participation Graph**



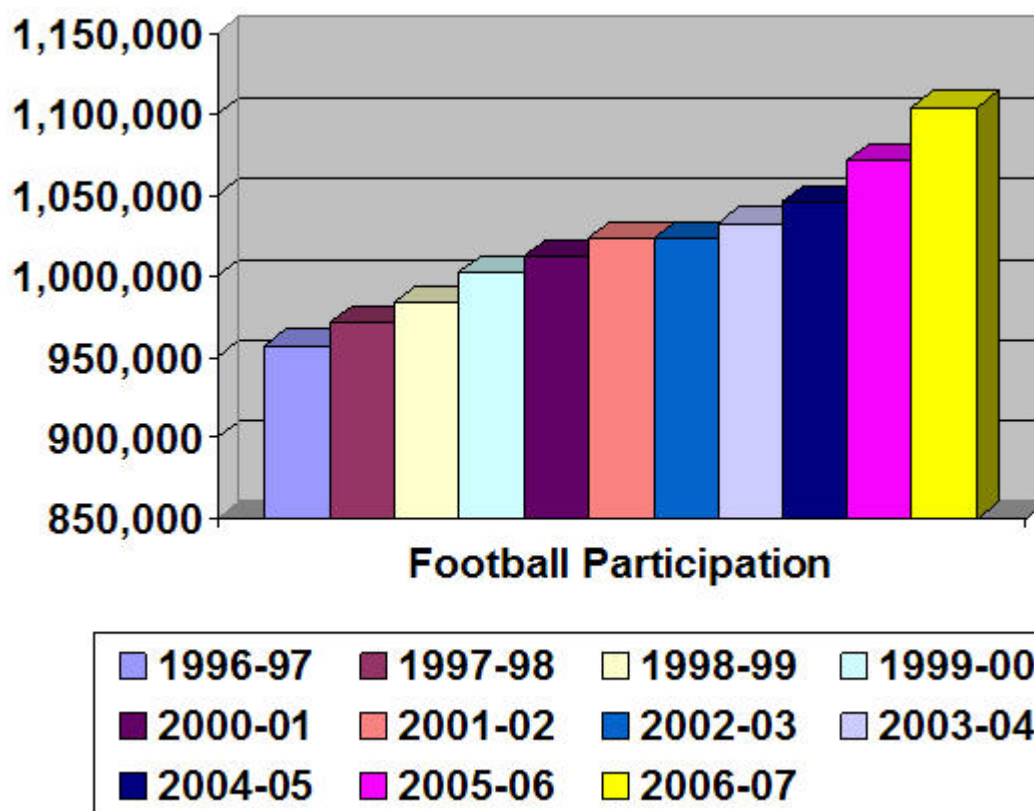
1971-72	1972-73	1973-74	1975-76	1977-78
1978-79	1979-80	1980-81	1981-82	1982-83
1983-84	1984-85	1985-86	1986-87	1987-88
1988-89	1989-90	1990-91	1991-92	1992-93
1993-94	1994-95	1995-96	1996-97	1997-98
1998-99	1999-00	2000-01	2001-02	2002-03
2003-04	2004-05	2005-06	2006-07	2007-08

(National Federation of High School Association, 2008)

(Permission to create the chart was granted by the National Federation of High Schools on 7/21/08)

### Appendix D-2

#### National Federation of State High School Association: Football Participation Graph



(National Federation of High School Association, 2008)

(Permission to create the chart was granted by the National Federation of High Schools on 7/21/08)

## Appendix E

### AMA Sports Medicine Policy

#### American Medical Association

Policy H-470.995

July 1998

##### H-470.995 Athletic (Sports) Medicine

The AMA believes that: (1) the Board of Education and the Department of Health of the individual states should encourage that an adequate Athletic Medicine Unit be established in every school that mounts a sports program; (2) the Athletic Medicine Unit should be composed of an allopathic or osteopathic physician director with unlimited license to practice medicine, an athletic health coordinator (preferably a NATABOC certified athletic trainer), and other necessary personnel; (3) the duties of the Athletic Medicine Unit should be prevention of injury, the provision of medical care with the cooperation of the family's physician and others of the health care team of the community, and the rehabilitation of the injured; (4) except in extreme emergencies, the selection of the treating physician is the choice of the parent or guardian and any directed referral therefore requires their consent; (5) the Athletic Medicine Units should be required to submit complete reports of all injuries to a designated authority; (6) medical schools, colleges, and universities should be urged to cooperate in establishing education programs for athletic health coordinators (NATABOC certified athletic trainers) as well as continuing medical education and graduate programs in Sports Medicine; (7) high school administrators, athletic directors, and coaches to work with local physicians, medical societies, and medical specialty societies, as well as government officials and community groups to undertake appropriate measures to ensure funding to provide the services of a certified athletic trainer to all high school athletes; and (8) not all high schools have the resources to procure the services of a certified athletic trainer and further recognizing that athletic trainers cannot be present at all practices and competitions, that the AMA encourage high school administrators and athletic directors to ensure that all coaches are appropriately trained in emergency first aid and basic life support. (Res. 112, A-69; Reaffirmed: CLRPD Rep. C, A-89; Modified and Reaffirmed by Ref. Cmt. D, I-96; Amended and Appended by CSA Rep. 5, A-98)

##### References:

Report of the Council on Scientific Affairs

CSA Report 5-A-98

Subject: Certified Athletic Trainers in Secondary Schools (Resolution 431, A-97)

## Appendix F

### Proposed North Carolina High Schools Athletic Training Bill

#### FUNDS FOR ATHLETIC TRAINERS AT HIGH SCHOOLS

#### GENERAL ASSEMBLY OF NORTH CAROLINA

#### SESSION 2009

#### SENATE DRS75164-LE-212 (3/13)

#### A BILL TO BE ENTITLED

AN ACT TO PROVIDE FOR THE HEALTH AND SAFETY OF SECONDARY SCHOOL STUDENTS BY REQUIRING THAT ALL PUBLIC HIGH SCHOOLS EMPLOY A LICENSED ATHLETIC TRAINER AND TO APPROPRIATE FUNDS FOR THAT PURPOSE.

The General Assembly of North Carolina enacts:

**SECTION 1.** It is the policy of the State of North Carolina that student health and safety is a top priority of the educational system. It is the intent of the General Assembly and the expectation of parents that there be quality and immediate care for a student athlete in case of a medical emergency. It is the further intent of the General Assembly and the expectation of parents that athletic health care in public secondary schools be coordinated by licensed athletic trainers.

**SECTION 2.** G.S. 115C-12(12) reads as rewritten:

**"§ 115C-12. Powers and duties of the Board generally.**

The general supervision and administration of the free public school system shall be vested in the State Board of Education. The State Board of Education shall establish policy for the system of free public schools, subject to laws enacted by the General Assembly. The powers and duties of the State Board of Education are defined as follows:

...

- (12) Duty to Provide for Sports Medicine and Emergency Paramedical Program. – The State Board of Education is authorized and directed to develop a comprehensive plan to train and make available to the public schools personnel who shall have major responsibility for exercising preventive measures against sports related deaths and injuries and for providing sports medicine and emergency paramedical services for injuries that occur in school related activities. The plan, at the high school level, shall require local school administrative units to employ a

full-time, nonteaching athletic trainer that is licensed pursuant to Article 34 of Chapter 90 of the General Statutes for each of their high schools. The licensed athletic trainer shall be responsible for the coordination of the athletic health care for the school. The plan for other schools shall include, but is not limited to, the training, assignment of responsibilities, and appropriate additional reimbursement for individuals participating in the program.

The State Board of Education is authorized and directed to develop an implementation schedule and a program funding formula that will enable each high school to have a qualified sports medicine and emergency paramedical program by July 1, 1984.

The State Board of Education is authorized and directed to establish minimum educational standards necessary to enable individuals serving as sports medicine and emergency paramedical staff to provide such services, including first aid and emergency life saving skills, to students participating in school activities."

**SECTION 3.** There is appropriated from the General Fund to the Department of Public Instruction the sum of twenty-one million five hundred thousand dollars (\$21,500,000) for the 2009-2010 fiscal year and the sum of twenty-one million five hundred thousand dollars (\$21,500,000) for the 2010-2011 fiscal year to employ licensed athletic trainers at all public high schools in the State.

**SECTION 4.** This act becomes effective July 1, 2009.

**Appendix G**

**IRB Approval at UNCG**

To: Jolene Henning

Dept of Kinesiology

237 HHP Building

From: UNCG IRB

Date: 5/15/2009

RE: Notice of IRB Exemption

Exemption Category: 2.Survey, interview, public observation

Study #: 09-0190

Study Title: Perceived Duties and the Likelihood of Behaviors of North  
Carolinian First Responders for High School Football

This submission has been reviewed by the above IRB and was determined to be  
exempt from further review according to the regulatory category cited above  
under 45 CFR 46.101(b).

Study Description: The purpose of this study is to examine the impact of the required North Carolina Sports Medicine Injury Management workshop hosted by the North Carolina Coaches Association (NCCA) on first responders' perceived duties and likelihood of performing duties during the football season.

#### Investigator's Responsibilities

Please be aware that any changes to your protocol must be reviewed by the IRB prior to being implemented. The IRB will maintain records for this study for five years from the date of the original determination of exempt status.

CC: Craig Eilbacher



**Appendix H**  
**Verification Letter**

April 23, 2009

To Whom It May Concern:

My name is Scott Barringer, M.Ed., LAT, ATC, CAA, Athletic/Sports Medicine Director for Cabarrus County Schools. I am responsible for coordinating the Injury Management Workshop held in conjunction with the North Carolina Coaches Association summer clinic. This summer the workshop will be held July 20<sup>th</sup> – 23<sup>rd</sup> at the Greensboro Coliseum.

First responders are required to obtain 20 hrs. in injury management each year. This Injury Management Workshop will successfully meet the 20 hr. requirement. Therefore, as one of the coordinators I grant Mr. Craig Eilbacher permission to collect data for his dissertation research, regarding first responders perceived duties and behaviors, on the first day of the workshop (July 20<sup>th</sup>). Please contact me if you have any questions.

Sincerely

**Scott Barringer, M.Ed., LAT, ATC, CAA**

Scott Barringer, M.Ed., LAT, ATC, CAA,  
Athletic/Sports Medicine Director  
Cabarrus County Schools  
704-262-6185 office  
980-521-0197 cell

## Appendix I

### Survey

#### North Carolina First Responders' Perceived Duties and Likelihood of Behaviors

The purpose of this survey is to discover what first responders for North Carolina high school football perceive their duties to be regarding medical care of athletes. In addition, the survey will explore and identify the likelihood of behaviors that are being performed by first responders. I ask that you to provide the most accurate and honest responses.

#### **Demographic Information**

Please read each statement carefully and check the box that best represents your answer.

1. Gender
  - Male                       Female
  
2. Check the box that best identifies your credentials as a health care professional.
  - Athletic Trainer (*If you checked this go to question #5*)
  - Physician (*If you checked this go to question #5*)
  - First Responder (*If you check this continue on to question #3*)
  
3. Please indicate which of the following best represents your current position at your high school.
  - Teacher/non-paid volunteer/first responder
  - Teacher/paid volunteer/first responder
  - Non-paid volunteer first responder
  - Paid volunteer first responder
  - Other \_\_\_\_\_
  
4. Please indicate which of the following certifications or licenses you currently maintain. (*Check all that apply.*)
  - Professional Rescuer (American Red Cross)
  - Community First Aid and Safety (American Red Cross basic first aid)
  - Basic Life Support (American Heart Association)
  - Heart Saver First Aid (American Heart Association)
  - Sports Safety Training (American Red Cross course)
  - Certified Strength and Conditioning Specialist (CSCS)
  - Emergency Medical Technician I (EMT-I)
  - Emergency Medical Technician P (EMT-P)
  - Registered Nurse (RN)
  - Other \_\_\_\_\_

5. How many years have you been certified in first aid?  
 1-3 years     4-6 years     more than 6 years     not certified
6. How many years have you been certified in basic CPR/AED?  
 1-3 years     4-6 years     more than 6 years     not certified
7. How many years have you been working as a first responder for high school football?  
 This will be my first year  
 1 year  
 2 years  
 3 years  
 4-6 years  
 more than 6 years
8. What workshop level are you attending this year?  
 Level I     Level II     Level III
9. How many Injury Management Workshops have you attended at the summer North Carolina Coaches Convention?  
 1     2     3     4-6     more than 6 years
10. Do you attend the Injury Management Workshop every year?  
 Yes     No
11. Upon completion of the workshop, to whom do you turn in your certificate of attendance?  
 Athletic Director  
 Principal  
 Superintendent  
 School Systems County Office  
 I am not require to turn in my certificate of attendance
12. In what situations do you provide first responder coverage during the football season?  
(Check all that apply.)  
 Varsity football practices  
 Varsity football home games  
 Varsity football away games  
 Junior varsity football practices  
 Junior varsity football home games  
 Junior varsity football away games
13. Do you have additional coaching responsibilities during the football season?  
 Yes     No     N/A

(if yes then please identify which sport(s))

---

Please indicate the following course(s) content you have taken in either your undergraduate or graduate studies.

*(Check all that apply)*

- Medical Conditions and Disabilities
- Health Care Administration
- Pharmacology
- Therapeutic Modalities
- Nutritional Aspects of Injury and Illnesses
- Orthopaedic Clinical Examination and Diagnosis
- Pathologies of Injury and Illnesses
- Acute Care of Injury and Illnesses
- Conditioning and Rehabilitative Exercises
- Risk Management and Injury Prevention
- Psychosocial Intervention and Referral
- Have not taken any of the course content listed above*

**The purpose of this section is to identify your perceived duties as a first responder and the likelihood you would perform those duties.**

**Directions:**

The left side (gray section) of the table is designed to measure what you feel your coach and/or athletic director perceive your duties to be and what you personally perceive your duties to be as a first responder in the high school setting. Please read each item carefully and circle YES or NO indicating whether you feel your coach and/or athletic director perceives it to be your duty; and whether you perceive it to be your responsibility as a first responder.

The right side (blue section) of the table is designed to measure how likely you are to perform the identified duties. Please read each item carefully and circle the number that corresponds with how frequently you perform the described behaviors. Use the following scale to determine your response:

- (1) Very Unlikely = The first responder is very unlikely to perform the duty**
- (2) Unlikely = The first responder is unlikely perform the duty**
- (3) Likely = The first responder is likely to perform the duty**
- (4) Very Likely = The first responder is very likely to perform the duty**

**Internal Injuries (Perceived Duties)**

**(Likelihood of Behaviors)**

My coach and/or athletic director perceive that it is my duty to...			I feel I have enough knowledge to...		How likely are you to perform each of the described duties when faced with the opportunity to ...			
YES	NO		YES	NO	Very Unlikely	Unlikely	Likely	Very Likely
y	n	Recognize chest, thorax, and abdominal injuries (internal injuries)	y	n	1	2	3	4
y	n	Evaluate internal injuries	y	n	1	2	3	4
y	n	Provide treatment for internal injuries	y	n	1	2	3	4
y	n	Determine if an athlete is able to return to play after sustaining an internal injury.	y	n	1	2	3	4

**Environmental Conditions (Perceived Duties)**

**(Likelihood of Behaviors)**

My coach and/or athletic director perceive that it is my duty to...			I feel I have enough knowledge to...		How likely are you to perform each of the described duties when faced with the opportunity to...			
YES	NO		YES	NO	Very Unlikely	Unlikely	Likely	Very Likely
y	n	Take precautions to prevent heat illness	y	n	1	2	3	4
y	n	Provide treatment for heat illnesses	y	n	1	2	3	4
y	n	Recognize the signs and symptoms associated with heat illness	y	n	1	2	3	4
y	n	Determine when athletes are suffering from heat illness	y	n	1	2	3	4
y	n	Monitor weight loss of athletes	y	n	1	2	3	4
y	n	Determine environmental risks (e.g. lightning distance)	y	n	1	2	3	4
y	n	Monitor environmental conditions	y	n	1	2	3	4
y	n	Determine if an athlete is able to return to play after sustaining heat illness	y	n	1	2	3	4

**Head/Neck/Cervical Spine (Perceived Duties)**

**(Likelihood of Behaviors)**

My coach and/or athletic director perceive that it is my duty to...			I feel I have enough knowledge to...		How likely are you to perform each of the described duties when faced with the opportunity to...			
YES	NO		YES	NO	Very Unlikely	Unlikely	Likely	Very Likely
y	n	Recognize the signs and symptoms of a concussion	y	n	1	2	3	4
y	n	Perform sideline evaluations of concussion	y	n	1	2	3	4
y	n	Evaluate the severity of concussions	y	n	1	2	3	4
y	n	Classify the severity of a concussion	y	n	1	2	3	4
y	n	Determine if an athlete is able to return to play after sustaining a concussion.	y	n	1	2	3	4
y	n	Recognize a cervical spine injury	y	n	1	2	3	4
y	n	Perform a neurological evaluation of cervical spine injuries	y	n	1	2	3	4
y	n	Evaluate spinal cord injuries	y	n	1	2	3	4
y	n	Evaluate a skull fracture	y	n	1	2	3	4
y	n	Develop a rehabilitation programs for head/neck/spine	y	n	1	2	3	4
y	n	Monitor a rehabilitation programs for head/neck/spine	y	n	1	2	3	4
y	n	Determine if an athlete is able to return to play after sustaining an injury to the head/neck/spine.	y	n	1	2	3	4

**Lower Leg/Ankle/Foot (Perceived Duties)**

**(Likelihood of Behaviors)**

My coach and/or athletic director perceive that it is my duty to...			I feel I have enough knowledge to...		How likely are you to perform each of the described duties when faced with the opportunity to...			
YES	NO		YES	NO	Very Unlikely	Unlikely	Likely	Very Likely
y	n	Recognize ankle and lower leg injuries	y	n	1	2	3	4
y	n	Evaluate the severity of ankle sprains and strains	y	n	1	2	3	4
y	n	Evaluate ankle and lower leg injuries	y	n	1	2	3	4
y	n	Provide treatment for ankle and lower leg injuries	y	n	1	2	3	4
y	n	Develop a rehabilitation program for ankle and lower leg injuries	y	n	1	2	3	4
y	n	Monitor a rehabilitation program for ankle and lower leg injuries	y	n	1	2	3	4
y	n	Tape and wrap ankle and lower leg injuries	y	n	1	2	3	4
y	n	Recognize foot injuries	y	n	1	2	3	4
y	n	Evaluate foot injuries	y	n	1	2	3	4
y	n	Provide treatment for foot injuries	y	n	1	2	3	4
y	n	Tape, wrap, or pad foot injuries	y	n	1	2	3	4
y	n	Determine if an athlete is able to return to play after sustaining an injury to the lower leg/ankle/foot.	y	n	1	2	3	4



**Knee (Perceived Duties)**

**(Likelihood of Behaviors)**

My coach and/or athletic director perceive that it is my duty to...			I feel I have enough knowledge to...		How likely are you to perform each of the described duties when faced with the opportunity to...			
YES	NO		YES	NO	Very Unlikely	Unlikely	Likely	Very Likely
y	n	Recognize knee injuries	y	n	1	2	3	4
y	n	Evaluate knee injuries	y	n	1	2	3	4
y	n	Evaluate a knee injury using appropriate special tests	y	n	1	2	3	4
y	n	Provide treatment for knee injuries	y	n	1	2	3	4
y	n	Develop a rehabilitation program for knee injuries	y	n	1	2	3	4
y	n	Monitor a rehabilitation program for knee injuries	y	n	1	2	3	4
y	n	Tape, wrap, or pad knee injuries	y	n	1	2	3	4
y	n	Determine if an athlete is able to return to play after sustaining an injury to the knee.	y	n	1	2	3	4

**Thigh (Perceived Duties)**

**(Likelihood of Behaviors)**

My coach and/or athletic director perceive that it is my duty to...			I feel I have enough knowledge to...		How likely are you to perform each of the described duties when faced with the opportunity to...			
YES	NO		YES	NO	Very Unlikely	Unlikely	Likely	Very Likely
y	n	Recognize thigh injuries	y	n	1	2	3	4
y	n	Evaluate thigh injuries	y	n	1	2	3	4
y	n	Provide treatment for thigh injuries	y	n	1	2	3	4
y	n	Develop a rehabilitation program for thigh injuries	y	n	1	2	3	4
y	n	Monitor a rehabilitation program for thigh injuries	y	n	1	2	3	4
y	n	Apply a protective wrap for thigh injuries	y	n	1	2	3	4
y	n	Tape, wrap, or pad thigh injuries	y	n	1	2	3	4
y	n	Determine if an athlete is able to return to play after sustaining an injury to the thigh.	y	n	1	2	3	4

**Shoulder (Perceived Duties)**

**(Likelihood of Behaviors)**

My coach and/or athletic director perceive that it is my duty to...			I feel I have enough knowledge to...		How likely are you to perform each of the described duties when faced with the opportunity to...			
YES	NO		YES	NO	Very Unlikely	Unlikely	Likely	Very Likely
y	n	Recognize shoulder injuries	y	n	1	2	3	4
y	n	Evaluate shoulder injuries	y	n	1	2	3	4
y	n	Evaluation shoulder injuries using special tests	y	n	1	2	3	4
y	n	Provide treatment for shoulder injuries	y	n	1	2	3	4
y	n	Develop a rehabilitation program for shoulder injuries	y	n	1	2	3	4
y	n	Monitor a rehabilitation program for shoulder injuries	y	n	1	2	3	4
y	n	Tape, wrap, or pad shoulder injuries	y	n	1	2	3	4
y	n	Determine if an athlete is able to return to play after sustaining an injury to the shoulder.	y	n	1	2	3	4

**Hip/Groin (Perceived Duties)**

**(Likelihood of Behaviors)**

My coach and/or athletic director perceive that it is my duty to...			I feel I have enough knowledge to...		How likely are you to perform each of the described duties when faced with the opportunity to...			
YES	NO		YES	NO	Very Unlikely	Unlikely	Likely	Very Likely
y	n	Recognize hip and groin injuries	y	n	1	2	3	4
y	n	Evaluate hip and groin injuries	y	n	1	2	3	4
y	n	Provide treatment for hip and groin injuries	y	n	1	2	3	4
y	n	Tape, wrap or pad hip and groin injuries	y	n	1	2	3	4
y	n	Determine if an athlete is able to return to play after sustaining an injury to the hip or groin.	y	n	1	2	3	4

**Low Back (Perceived Duties)**

**(Likelihood of Behaviors)**

My coach and/or athletic director perceive that it is my duty to...			I feel I have enough knowledge to...		How likely are you to perform each of the described duties when faced with the opportunity to...			
YES	NO		YES	NO	Very Unlikely	Unlikely	Likely	Very Likely
y	n	Recognize low back injuries	y	n	1	2	3	4
y	n	Perform evaluations of low back injuries	y	n	1	2	3	4
y	n	Treat low back injuries using electrical muscle stimulation.	y	n	1	2	3	4
y	n	Develop a rehabilitation program for low back injuries.	y	n	1	2	3	4
y	n	Monitor a rehabilitative program for low back injuries.	y	n	1	2	3	4
y	n	Determine if an athlete is able to return to play after sustaining an injury to the lower back.	y	n	1	2	3	4

**Elbow (Perceived Duties)**

**(Likelihood of Behaviors)**

My coach and/or athletic director perceive that it is my duty to...			I feel I have enough knowledge to...		How likely are you to perform each of the described duties when faced with the opportunity to...			
YES	NO		YES	NO	Very Unlikely	Unlikely	Likely	Very Likely
y	n	Recognize elbow injuries	y	n	1	2	3	4
y	n	Evaluate elbow injuries	y	n	1	2	3	4
y	n	Provide treatment for elbow injuries	y	n	1	2	3	4
y	n	Develop a rehabilitative program for elbow injuries	y	n	1	2	3	4
y	n	Monitor a rehabilitative program for elbow injuries	y	n	1	2	3	4
y	n	Tape, wrap, or pad elbow injuries	y	n	1	2	3	4
y	n	Determine if an athlete is able to return to play after sustaining an injury to the elbow.	y	n	1	2	3	4

**Wrist/Hand (Perceived Duties)**

**(Likelihood of Behaviors)**

My coach and/or athletic director perceive that it is my duty to...			I feel I have enough knowledge to...		How likely are you to perform each of the described duties when faced with the opportunity to...			
YES	NO		YES	NO	Very Unlikely	Unlikely	Likely	Very Likely
y	n	Recognize wrist/hand injuries	y	n	1	2	3	4
y	n	Evaluate wrist and hand injuries	y	n	1	2	3	4
y	n	Provide treatment for wrist and hand injuries	y	n	1	2	3	4
y	n	Develop a rehabilitative program for wrist and hand injuries	y	n	1	2	3	4
y	n	Monitor a rehabilitative program for wrist and hand injuries	y	n	1	2	3	4
y	n	Tape, wrap, pad wrist and hand injuries	y	n	1	2	3	4
y	n	Determine if an athlete is able to return to play after sustaining an injury to the wrist or hand.	y	n	1	2	3	4

**Fingers/Thumb (Perceived Duties)**

**(Likelihood of Behaviors)**

My coach and/or athletic director perceive that it is my duty to...			I feel I have enough knowledge to...		How likely are you to perform each of the described duties when faced with the opportunity to...			
YES	NO		YES	NO	Very Unlikely	Unlikely	Likely	Very Likely
y	n	Recognize finger and thumb injuries	y	n	1	2	3	4
y	n	Evaluate finger and thumb injuries	y	n	1	2	3	4
y	n	Provide treatment for finger and thumb injuries	y	n	1	2	3	4
y	n	Develop a rehabilitative program for finger and thumb injuries	y	n	1	2	3	4
y	n	Monitor a rehabilitative program for finger and thumb injuries	y	n	1	2	3	4
y	n	Tape, wrap, or pad finger and thumb injuries	y	n	1	2	3	4
y	n	Determine if an athlete is able to return to play after sustaining an injury to the fingers/thumb.	y	n	1	2	3	4



**General Medical Conditions (Perceived Duties)**

**(Likelihood of Behaviors)**

My coach and/or athletic director perceive that it is my duty to...			I feel I have enough knowledge to...		How likely are you to perform each of the described duties when faced with the opportunity to...			
YES	NO		YES	NO	Very Unlikely	Unlikely	Likely	Very Likely
y	n	Prevent dental injuries	y	n	1	2	3	4
y	n	Evaluate dental injuries	y	n	1	2	3	4
y	n	Provide treatment of dental injuries	y	n	1	2	3	4
y	n	Prevent nasal injuries	y	n	1	2	3	4
y	n	Evaluate nasal injuries	y	n	1	2	3	4
y	n	Provide treatment of nasal injuries	y	n	1	2	3	4
y	n	Prevent eye injuries	y	n	1	2	3	4
y	n	Evaluate eye injuries	y	n	1	2	3	4
y	n	Provide treatment of eye injuries	y	n	1	2	3	4
y	n	Prevent ear injuries	y	n	1	2	3	4
y	n	Evaluate ear injuries	y	n	1	2	3	4
y	n	Provide treatment of ear injuries	y	n	1	2	3	4
y	n	Determine if an athlete is able to return to play after sustaining a dental, nasal, or eye injury.	y	n	1	2	3	4

**Other Duties (Perceived Duties)**

**(Likelihood of Behaviors)**

My coach and/or athletic director perceive that it is my duty to...			I feel I have enough knowledge to...		How likely are you to perform each of the described duties when faced with the opportunity to...			
YES	NO		YES	NO	Very Unlikely	Unlikely	Likely	Very Likely
y	n	Manage athletes' prescribed medications	y	n	1	2	3	4
y	n	Dispense over the counter (OTC) medication	y	n	1	2	3	4
y	n	Manage blood related injuries	y	n	1	2	3	4
y	n	Facilitate physical conditioning of athletes	y	n	1	2	3	4
y	n	Complete and file injury reports	y	n	1	2	3	4
y	n	Collect athletes participation waiver forms	y	n	1	2	3	4
y	n	Review pre-participation physicals	y	n	1	2	3	4
y	n	Develop an Emergency Action Plan	y	n	1	2	3	4
y	n	Implement an Emergency Action Plan	y	n	1	2	3	4
y	n	Purchase medical supplies	y	n	1	2	3	4
y	n	Properly fit athletic equipment	y	n	1	2	3	4
y	n	Create and stock medical kits for athletic teams	y	n	1	2	3	4

## Appendix J

### First Responders Pilot Cover Letter

April 29, 2009

Dear First Responder,

I would like to thank you for agreeing to participate in the pilot testing of my survey instrument. As I indicated on the phone, I am studying the perceived duties and behaviors of first responders that cover North Carolina High School football for my dissertation research project. Your feedback following the completion of the survey is critical to ensure that the survey is a valid measurement tool.

The introductory script is only intended for the researcher to read to the participants on how to fill out the questionnaire. This script will not be given to the participants; however, I would like for you to evaluate the script for clarity.

Once you have completed reading the script please print the survey and complete it. Please keep track of the amount of time it takes to complete the survey (see attachments). Additionally, upon completion of the survey please address the questions provided below and e-mail your responses to [ceilbach@guilford.edu](mailto:ceilbach@guilford.edu) by May 4<sup>th</sup>.

1. Was the introductory script clear and easy to follow?
2. Were the directions for the demographic section clear and easy to follow?
3. Are the demographic questions appropriate considering the purpose of the survey?
4. Were the directions for the perceived duties and frequency of behaviors section clear and easy to follow?
5. Do the items in each table for perceived duties and behaviors appropriately address potential duties and behaviors of first responders?
6. Overall, how much time did the survey take you?
7. What final recommendations would you give to improve the structure and content of the survey so that first responders taking this are able to provide the most accurate responses?

Please feel free to contact me if you have any questions at 336-250-0030.

Again, I can't thank you enough for your time and expertise as a first responder.

Sincerely,

Craig Eilbacher, M.Ed., ATC  
UNC-Greensboro Doctoral Student

## Appendix K

### Athletic Training Education Program Educator Pilot Cover Letter

April 29, 2009

Dear ATEP Educator,

I would first like to thank you for your willingness to be an expert evaluator regarding my survey instrument that has been created to explore North Carolina High School Football first responders' perceived duties and frequency of clinical behaviors. The purpose of my doctoral research is to examine the impact of the required North Carolina Sports Medicine Injury Management workshop hosted by the NCCA on the frequency of first responders' perceived behaviors and duties during football season. Because different level workshops (I, II, III) are provided for first responders it is assumed a relationship exists in the frequency of behaviors and duties performed. This data will provide me with information to ascertain what first-responders are doing and the duties they feel they are responsible for providing during football season.

Currently, there are no previous studies pertaining to this topic in North Carolina in which a usable instrument exists. Therefore, I designed and developed a survey instrument that would help me answer the following critical research questions.

1. What are the perceived job duties of the first responder?
2. Is there a relationship between educational workshop level and the frequency of clinical behaviors in the different athletic training domains?
3. Is there a difference between level of workshop and perceived job related duties?
4. Are first-responders performing duties consistent with their level of workshop training?

Your expertise in the field of athletic training research, specifically, survey design, will help me with validating face and content validity of my research instrument. I have attached the introductory script and survey instrument and would ask that you provide feedback regarding the following questions below.

1. Do the survey items relate directly to the purpose of the study?
2. Is the design of the introductory script and survey instrument appropriate for this audience?
3. Are the directions clear and concise in the survey?
4. Is the survey layout easy to follow?
5. Is the content of the items directly related to first responder's duties?
5. Please provide recommendations for the script and survey instrument that would strengthen the validity of the instrument.

I would greatly appreciate if you could complete your evaluation of the survey and provide me feedback by May 3<sup>rd</sup>. If this deadline is problematic please contact me at 336-250-0030 or e-mail [ceilbach@guilford.edu](mailto:ceilbach@guilford.edu).

Thank you,

Craig Eilbacher, M.Ed., ATC  
UNC-Greensboro Doctoral Student

## Appendix L

### IRB Consent Form: Long Form

#### CONSENT TO ACT AS A HUMAN PARTICIPANT: LONG FORM

Project Title: Perceived Duties and the Likelihood of Behaviors of North Carolina First Responders for High School Football.

Project Director: Dr. Jolene Henning, Ed.D., ATC

Participant's Name: \_\_\_\_\_

#### **What is the study about?**

The purpose of this research study is to examine the impact of the required North Carolina Sports Medicine Injury Management workshop hosted by the North Carolina Coaches Association (NCCA) on first responders' perceived duties and likelihood of performing duties during the football season.

#### **Why are you asking me?**

To answer the research questions participation by first responders is necessary. According to the North Carolina Board of Education Injury Management Policy, you are required to attend the three day Injury Management workshop held in conjunction with the NCCA Coaches Clinic. Participants that show up late to the workshop will not be permitted to participate.

#### **What will you ask me to do if I agree to be in the study?**

A survey instrument will be administered on the first day of the workshop by the student researcher, Craig Eilbacher. Explanation of the study, consent form, and directions to complete the survey will be conducted by the student researcher. The survey will take approximately 30 minutes to complete.

#### **Is there any audio/video recording?**

There will be no use of audio or video technology during this study.

#### **What are the dangers to me?**

There are no risks associated with this study. "The Institutional Review Board at the University of North Carolina at Greensboro has determined that participation in this study poses no risk to participants."

If you have any concerns about your rights or how you are being treated please contact Eric Allen in the Office of Research and Compliance at UNCG at (336) 256-1482. Questions about this project or your benefits or risks associated with being in this study can be answered by Dr. Jolene Henning who may be contacted at 336-334-3694.

**Are there any benefits to me for taking part in this research study?**

The study will provide information that is not yet known in North Carolina regarding first responders' perceived duties and likelihood of behaviors for high school football. This is the first study of its kind. Data may help to strengthen future workshops.

**Are there any benefits to society as a result of me taking part in this research?**

The research may benefit the care given to high school football players if the data is used to strengthen future Injury Management Workshops provided for first responders.

**Will I get paid for being in the study? Will it cost me anything?**

"There are no costs to you or payments made for participating in this study."

**How will you keep my information confidential?**

Your privacy will be protected. You will not be identified by name or other identifiable information as being part of this project. Your information is strictly anonymous and each survey will only be identified by a code to verify that the number of surveys completed is the number administered. Completed instruments will be kept in the primary investigator's (Henning) locked office. Electronic versions of de-identified data will be stored on the PI and student researchers' office computers. There are no potential risks to the participant with a breach of confidentiality. All information obtained in this study is strictly confidential unless disclosure is required by law.

**What if I want to leave the study?**

You have the right to refuse to participate or to withdraw at any time, without penalty. If you do withdraw, it will not affect you in any way. If you choose to withdraw, you may request that any of your data which has been collected be destroyed unless it is in a de-identifiable state.

**What about new information/changes in the study?**

If significant new information relating to the study becomes available which may relate to your willingness to continue to participate, this information will be provided to you.

**Voluntary Consent by Participant:**

By signing this consent form you are agreeing that you read, or it has been read to you, and you fully understand the contents of this document and are openly willing consent to take part in this study. All of your questions concerning this study have been answered. By signing this form, you are agreeing that you are 18 years of age or older and are agreeing to participate, or have the individual specified above as a participant participate, in this study described to you by Craig Eilbacher.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## Appendix M

### Additional Results Tables

**Table 11. Mean Score for Participants in Content Area: Environmental Conditions**  
(1 = no, 2 = yes)

<b>Statement: <i>I feel I have enough knowledge to...</i></b>	3 years or less <i>M(SD)</i>	4 years or more <i>M(SD)</i>
Take precautions to prevent heat illness	1.90 (.30)	2.00 (.00)
Provide treatment for heat illnesses	1.89 (.32)	1.97 (.18)
Recognize the signs and symptoms associated with heat illness	1.90 (.30)	2.00 (.00)
Determine when athletes are suffering from heat illness	1.87 (.34)	1.91 (.39)
Monitor weight loss of athletes	1.75 (.47)	1.94 (.25)
Determine environmental risks (e.g. lightning distance)	1.92 (.28)	1.97 (.18)
Monitor environmental conditions	1.92 (.28)	1.97 (.18)
Determine if an athlete is able to return to play after sustaining heat illness	1.66 (.48)	1.78 (.42)

**Table 12. Mean Score for Participants in Content Area: General Medical Conditions and Internal Conditions**  
(1= no, 2= yes)

<b>Statement: I feel I have enough knowledge to...</b>	3 years or less M(SD)	4 years or more M(SD)
Recognize chest, thorax, and abdominal injuries (internal injuries)	1.61 (.53)	1.63 (.49)
Evaluate internal injuries	1.36 (.52)	1.38 (.55)
Provide treatment for internal injuries	1.23 (.46)	1.41 (.50)
Determine if an athlete is able to return to play after sustaining an internal injury.	1.21 (.45)	1.41 (.50)
Prevent dental injuries	1.69 (.47)	1.69 (.47)
Evaluate dental injuries	1.52 (.50)	1.56 (.50)
Provide treatment of dental injuries	1.39 (.49)	1.44 (.50)
Prevent nasal injuries	1.67 (.47)	1.59 (.50)
Evaluate nasal injuries	1.64 (.48)	1.59 (.50)
Provide treatment of nasal injuries	1.52 (.50)	1.56 (.50)
Prevent eye injuries	1.69 (.47)	1.66 (.48)
Evaluate eye injuries	1.61 (.49)	1.53 (.51)
Provide treatment of eye injuries	1.49 (.50)	1.53 (.51)
Prevent ear injuries	1.67 (.47)	1.66 (.48)
Evaluate ear injuries	1.59 (.50)	1.53 (.51)
Provide treatment of ear injuries	1.44 (.50)	1.50 (.51)
Determine if an athlete is able to return to play after sustaining a dental, nasal, or eye injury.	1.46 (.53)	1.44 (.50)



**Table 13. Mean Score for Participants in Content Area: Upper Extremity**  
(1 = no, 2 = yes)

<b>Statement: I feel I have enough knowledge to...</b>	3 years or less M(SD)	4 years or more M(SD)
Recognize shoulder injuries	1.87 (.34)	2.00 (.00)
Evaluate shoulder injuries	1.72 (.45)	1.88 (.34)
Evaluation shoulder injuries using special tests	1.56 (.50)	1.69 (.47)
Provide treatment for shoulder injuries	1.69 (.47)	1.75 (.44)
Develop a rehabilitation program for shoulder injuries	1.30 (.46)	1.50 (.51)
Monitor a rehabilitation program for shoulder injuries	1.52 (.50)	1.72 (.46)
Tape, wrap, or pad shoulder injuries	1.80 (.40)	1.91 (.30)
Determine if an athlete is able to return to play after sustaining an injury to the shoulder	1.51 (.50)	1.53 (.51)
Recognize elbow injuries	1.87 (.34)	1.97 (.18)
Evaluate elbow injuries	1.72 (.45)	1.84 (.39)
Provide treatment for elbow injuries	1.72 (.45)	1.84 (.39)
Develop a rehabilitative program for elbow injuries	1.30 (.46)	1.44 (.50)
Monitor a rehabilitative program for elbow injuries	1.57 (.50)	1.59 (.50)
Tape, wrap, or pad elbow injuries	1.82 (.39)	1.88 (.34)
Determine if an athlete is able to return to play after sustaining an injury to the elbow.	1.44 (.53)	1.50 (.51)
Recognize wrist/hand injuries	1.82 (.47)	1.94 (.35)
Evaluate wrist and hand injuries	1.72 (.52)	1.81 (.47)
Provide treatment for wrist and hand injuries	1.69 (.53)	1.78 (.55)

Develop a rehabilitative program for wrist and hand injuries	1.33 (.47)	1.31 (.54)
Monitor a rehabilitative program for wrist and hand injuries	1.57 (.53)	1.59 (.56)
Tape, wrap, pad wrist and hand injuries	1.75 (.51)	1.88 (.42)
Determine if an athlete is able to return to play after sustaining an injury to the wrist or hand.	1.46 (.59)	1.63 (.55)
Recognize finger and thumb injuries	1.89 (.32)	1.94 (.35)
Evaluate finger and thumb injuries	1.80 (.40)	1.84 (.45)
Provide treatment for finger and thumb injuries	1.79 (.41)	1.75 (.51)
Develop a rehabilitative program for finger and thumb injuries	1.34 (.48)	1.34 (.55)
Monitor a rehabilitative program for finger and thumb injuries	1.56 (.53)	1.59 (.56)
Tape, wrap, or pad finger and thumb injuries	1.82 (.39)	1.88 (.42)
Determine if an athlete is able to return to play after sustaining an injury to the fingers/thumb.	1.56 (.50)	1.53 (.62)

---

**Table 14. Mean Score for Participants in Content Area: Lower Extremity**  
(1 = no, 2 = yes)

<b>Statement: I feel I have enough knowledge to...</b>	<b>3 years or less M(SD)</b>	<b>4 years or more M(SD)</b>
Recognize ankle and lower leg injuries	1.93 (.25)	1.97 (.18)
Evaluate the severity of ankle sprains and strains	1.77 (.42)	1.94 (.25)
Evaluate ankle and lower leg injuries	1.84 (.37)	1.94 (.25)
Provide treatment for ankle and lower leg injuries	1.82 (.39)	1.91 (.30)
Develop a rehabilitation program for ankle and lower leg injuries	1.46 (.53)	1.56 (.50)
Monitor a rehabilitation program for ankle and lower leg injuries	1.61 (.53)	1.75 (.44)
Tape and wrap ankle and lower leg injuries	1.89 (.37)	1.97 (.18)
Recognize foot injuries	1.84 (.42)	1.94 (.25)
Evaluate foot injuries	1.70 (.49)	1.84 (.37)
Provide treatment for foot injuries	1.74 (.44)	1.81 (.40)
Tape, wrap, or pad foot injuries	1.85 (.36)	1.97 (.18)
Determine if an athlete is able to return to play after sustaining an injury to the lower leg/ankle/foot.	1.69 (.47)	1.72 (.46)
Recognize knee injuries	1.85 (.40)	1.91 (.30)
Evaluate knee injuries	1.70 (.49)	1.84 (.37)
Evaluate a knee injury using appropriate special tests	1.54 (.53)	1.63 (.55)
Provide treatment for knee injuries	1.61 (.53)	1.78 (.42)
Develop a rehabilitation program for knee injuries	1.31 (.47)	1.41 (.61)
Monitor a rehabilitation program for knee injuries	1.57 (.50)	1.66 (.55)

Tape, wrap, or pad knee injuries	1.84 (.37)	1.97 (.18)
Determine if an athlete is able to return to play after sustaining a knee injury	1.50 (.50)	1.50 (.57)
Recognize thigh injuries	1.85 (.36)	1.88 (.42)
Evaluate thigh injuries	1.69 (.50)	1.81 (.47)
Provide treatment for thigh injuries	1.77 (.42)	1.78 (.49)
Develop a rehabilitation program for thigh injuries	1.34 (.48)	1.41 (.61)
Monitor a rehabilitation program for thigh injuries	1.54 (.56)	1.66 (.60)
Apply a protective wrap for thigh injuries	1.82 (.39)	1.81 (.54)
Tape, wrap, or pad thigh injuries	1.84 (.37)	1.84 (.51)
Determine if an athlete is able to return to play after sustaining an injury to the thigh.	1.56 (.50)	1.47 (.62)
Recognize hip and groin injuries	1.79 (.41)	1.84 (.48)
Evaluate hip and groin injuries	1.67 (.51)	1.84 (.37)
Provide treatment for hip and groin injuries	1.69 (.50)	1.81 (.40)
Tape, wrap or pad hip and groin injuries	1.80 (.40)	1.94 (.25)
Determine if an athlete is able to return to play after sustaining an injury to the hip or groin.	1.52 (.54)	1.69 (.47)

---

**Table 15. Mean Score for Participants in Content Area: Head/Neck/Cervical Spine and Low Back**  
(1= no, 2= yes)

<b>Statement: I feel I have enough knowledge to...</b>	3 years or less M(SD)	4 years or more M(SD)
Recognize the signs and symptoms of a concussion	1.87 (.34)	1.97 (.18)
Perform sideline evaluations of concussion	1.82 (.39)	2.00 (.00)
Evaluate the severity of concussions	1.51 (.50)	1.75 (.44)
Classify the severity of a concussion	1.44 (.50)	1.66 (.48)
Determine if an athlete is able to return to play after sustaining a concussion.	1.33 (.51)	1.60 (.50)
Recognize a cervical spine injury	1.70 (.46)	1.72 (.52)
Perform a neurological evaluation of cervical spine injuries	1.28 (.49)	1.66 (.48)
Evaluate spinal cord injuries	1.28 (.45)	1.56 (.50)
Evaluate a skull fracture	1.23 (.46)	1.38 (.49)
Develop a rehabilitation program for head/neck/spine	1.13 (.39)	1.28 (.46)
Monitor a rehabilitation program for head/neck/spine	1.33 (.51)	1.50 (.51)
Determine if an athlete is able to return to play after sustaining an injury to the head/neck/spine	1.20 (.40)	1.34 (.48)
Recognize low back injuries	1.75 (.51)	1.69 (.64)
Perform evaluations of low back injuries	1.54 (.59)	1.56 (.62)
Treat low back injuries using electrical muscle stimulation	1.26 (.51)	1.19 (.54)
Develop a rehabilitation program for low back injuries	1.23 (.50)	1.22 (.55)
Monitor a rehabilitative program for low back injuries	1.44 (.56)	1.43 (.62)
Determine if an athlete is able to return to play after sustaining an injury to the lower back	1.33 (.54)	1.31 (.59)

**Table 16. Multivariate Analysis of Variance (MANOVA) Result for Knowledge**  
(1 = no, 2 = yes)

Content Area		<i>M</i>	<i>SD</i>	<i>F</i>	<i>df</i>	<i>sig</i>
Environmental Conditions				4.12	1	.05
	3 years or less	1.85	.24			
	4 or more years	1.94	.13			
Upper Extremity				1.46	1	.23
	3 years or less	1.64	.33			
	4 or more years	1.71	.25			
Lower Extremity				1.93	1	.17
	3 years or less	1.69	.31			
	4 or more years	1.78	.23			
Head/Neck/Cervical Spine and Low Back				3.52	1	.06
	3 years or less	1.43	.30			
	4 or more years	1.54	.28			
General Medical and Internal				.04	1	.83
	3 years or less	1.52	.36			
	4 or more years	1.53	.39			

3 years or less (*N* = 61); 4 years or less (*N* = 32)

**Table 17. Mean Score for Participants in Content Area: Environmental Conditions**  
(very unlikely=1, unlikely=2, likely=3, very likely=4)

<b>Statement: How likely are you to perform each of the described duties when faced with the opportunity to...</b>	<b>3 years or less M(SD)</b>	<b>4 years or more M(SD)</b>
Take precautions to prevent heat illness	3.58 (.59)	3.78 (.49)
Provide treatment for heat illnesses	3.52 (.57)	3.69 (.64)
Recognize the signs and symptoms associated with heat illness	3.51 (.57)	3.72 (.46)
Determine when athletes are suffering from heat illness	3.48 (.65)	3.63 (.49)
Monitor weight loss of athletes	2.84 (1.0)	3.31 (.90)
Determine environmental risks (e.g. lightning distance)	3.23 (.86)	3.69 (.64)
Monitor environmental conditions	3.30 (.74)	3.63 (.71)
Determine if an athlete is able to return to play after sustaining heat illness	3.15 (.91)	3.22 (.97)

**Table 18. Mean Score for Participants in Content Area: General Medical Conditions and Internal Conditions**  
(very unlikely=1, unlikely=2, likely=3, very likely=4)

<b>Statement: How likely are you to perform each of the described duties when faced with the opportunity to...</b>	<b>3 years or less M(SD)</b>	<b>4 years or more M(SD)</b>
Recognize chest, thorax, and abdominal injuries (internal injuries)	2.97 (1.04)	2.91 (.96)
Evaluate internal injuries	2.63 (1.19)	2.39 (1.05)
Provide treatment for internal injuries	2.20 (1.08)	2.19 (1.09)
Determine if an athlete is able to return to play after sustaining an internal injury.	2.19 (1.10)	2.03 (1.09)
Prevent dental injuries	2.98 (1.02)	2.78 (1.01)
Evaluate dental injuries	2.77 (1.02)	2.59 (1.04)
Provide treatment of dental injuries	2.49 (1.07)	2.22 (1.04)
Prevent nasal injuries	2.97 (1.02)	2.75 (1.11)
Evaluate nasal injuries	2.85 (1.00)	2.66 (1.10)
Provide treatment of nasal injuries	2.67 (1.06)	2.47 (1.11)
Prevent eye injuries	2.95 (.98)	2.84 (1.08)
Evaluate eye injuries	2.79 (1.05)	2.56 (1.08)
Provide treatment of eye injuries	2.56 (1.10)	2.28 (1.08)
Prevent ear injuries	2.92 (1.00)	2.75 (1.12)
Evaluate ear injuries	2.77 (1.02)	2.53 (1.14)
Provide treatment of ear injuries	2.56 (1.09)	2.22 (1.10)
Determine if an athlete is able to return to play after sustaining a dental, nasal, or eye injury.	2.55 (1.11)	2.09 (1.09)



**Table 19. Mean Score for Participants in Content Area: Upper Extremity**  
(very unlikely=1, unlikely=2, likely=3, very likely=4)

<b>Statement: How likely are you to perform each of the described duties when faced with the opportunity to...</b>	<b>3 years or less M(SD)</b>	<b>4 years or more M(SD)</b>
Recognize shoulder injuries	3.48 (.62)	3.66 (.48)
Evaluate shoulder injuries	3.13 (.92)	3.47 (.76)
Evaluation shoulder injuries using special tests	2.80 (1.01)	3.09 (1.09)
Provide treatment for shoulder injuries	3.07 (.93)	3.13 (1.07)
Develop a rehabilitation program for shoulder injuries	2.34 (1.03)	2.59 (1.21)
Monitor a rehabilitation program for shoulder injuries	2.70 (.99)	2.91 (1.09)
Tape, wrap, or pad shoulder injuries	3.41 (.69)	3.41 (.84)
Determine if an athlete is able to return to play after sustaining an injury to the shoulder	2.74 (1.06)	2.50 (1.16)
Recognize elbow injuries	3.36 (.63)	3.56 (.50)
Evaluate elbow injuries	3.08 (.86)	3.34 (.79)
Provide treatment for elbow injuries	3.07 (.87)	3.19 (.93)
Develop a rehabilitative program for elbow injuries	2.25 (.94)	2.38 (1.13)
Monitor a rehabilitative program for elbow injuries	2.67 (.91)	2.67 (1.07)
Tape, wrap, or pad elbow injuries	3.36 (.68)	3.28 (.81)
Determine if an athlete is able to return to play after sustaining an injury to the elbow	2.62 (1.07)	2.41 (1.10)
Recognize wrist/hand injuries	3.47 (.62)	3.63 (.49)
Evaluate wrist and hand injuries	3.28 (.85)	3.47 (.67)
Provide treatment for wrist and hand injuries	3.22 (.92)	3.39 (.76)

Develop a rehabilitative program for wrist and hand injuries	2.30 ( 1.01)	2.42 (1.12)
Monitor a rehabilitative program for wrist and hand injuries	2.75 (.97)	2.88 (1.10)
Tape, wrap, pad wrist and hand injuries	3.47 (.72)	3.59 (.67)
Determine if an athlete is able to return to play after sustaining an injury to the wrist or hand.	2.73 (1.10)	2.78 (1.07)
Recognize finger and thumb injuries	3.46 (.62)	3.63 (.55)
Evaluate finger and thumb injuries	3.30 (.76)	3.56 (.62)
Provide treatment for finger and thumb injuries	3.25 (.87)	3.31 (.97)
Develop a rehabilitative program for finger and thumb injuries	2.31 (1.09)	2.31 (1.03)
Monitor a rehabilitative program for finger and thumb injuries	2.75 (1.01)	2.75 (1.08)
Tape, wrap, or pad finger and thumb injuries	3.41 (.72)	3.47 (.72)
Determine if an athlete is able to return to play after sustaining an injury to the fingers/thumb.	2.82 (1.06)	2.69 (1.20)

---

<b>Table 20. Mean Score for Participants in Content Area: Lower Extremity</b> (very unlikely=1, unlikely=2, likely=3, very likely=4)		
<b>Statement: How likely are you to perform each of the described duties when faced with the opportunity to...</b>	<b>3 years or less M(SD)</b>	<b>4 years or more M(SD)</b>
Recognize ankle and lower leg injuries	3.61 (.59)	3.72 (.46)
Evaluate the severity of ankle sprains and strains	3.46 (.81)	3.50 (.67)
Evaluate ankle and lower leg injuries	3.49 (.74)	3.58 (.62)
Provide treatment for ankle and lower leg injuries	3.38 (.84)	3.61 (.67)
Develop a rehabilitation program for ankle and lower leg injuries	2.74 (1.12)	2.84 (1.17)
Monitor a rehabilitation program for ankle and lower leg injuries	2.89 (1.08)	3.09 (1.06)
Tape and wrap ankle and lower leg injuries	3.66 (.57)	3.91 (.30)
Recognize foot injuries	3.54 (.65)	3.63 (.71)
Evaluate foot injuries	3.31 (.87)	3.53 (.80)
Provide treatment for foot injuries	3.28 (.90)	3.38 (.91)
Tape, wrap, or pad foot injuries	3.58 (.59)	3.75 (.44)
Determine if an athlete is able to return to play after sustaining an injury to the lower leg/ankle/foot.	2.98 (1.01)	3.16 (1.05)
Recognize knee injuries	3.51 (.56)	3.46 (.84)
Evaluate knee injuries	3.28 (.88)	3.38 (.79)
Evaluate a knee injury using appropriate special tests	2.92 (1.02)	3.19 (.95)
Provide treatment for knee injuries	3.07 (1.03)	3.13 (1.07)
Develop a rehabilitation program for knee injuries	2.48 (1.11)	2.63 (1.25)
Monitor a rehabilitation program for knee injuries	2.83 (.99)	2.97 (1.11)

Tape, wrap, or pad knee injuries	3.46 (.70)	3.63 (.49)
Determine if an athlete is able to return to play after sustaining a knee injury	2.77 (1.11)	2.71 (1.19)
Recognize thigh injuries	3.38 (.71)	3.44 (.84)
Evaluate thigh injuries	3.08 (.92)	3.34 (.87)
Provide treatment for thigh injuries	3.15 (.93)	3.28 (.96)
Develop a rehabilitation program for thigh injuries	2.38 (1.01)	2.66 (1.18)
Monitor a rehabilitation program for thigh injuries	2.79 (.95)	2.91 (1.06)
Apply a protective wrap for thigh injuries	3.34 (.77)	3.41 (.76)
Tape, wrap, or pad thigh injuries	3.34 (.77)	3.53 (.72)
Determine if an athlete is able to return to play after sustaining an injury to the thigh.	2.72 (1.07)	2.59 (1.19)
Recognize hip and groin injuries	3.20 (.73)	3.23 (.80)
Evaluate hip and groin injuries	3.10 (.85)	3.03 (.97)
Provide treatment for hip and groin injuries	3.00 (.91)	3.00 (.92)
Tape, wrap or pad hip and groin injuries	3.21 (.80)	3.31 (.78)
Determine if an athlete is able to return to play after sustaining an injury to the hip or groin.	2.79 (1.00)	2.66 (1.10)

---

**Table 21. Mean Score for Participants in Content Area: Head/Neck/Cervical Spine and Low Back**  
(very unlikely=1, unlikely=2, likely=3, very likely=4)

<b>Statement: How likely are you to perform each of the described duties when faced with the opportunity to...</b>	<b>3 years or less M(SD)</b>	<b>4 years or more M(SD)</b>
Recognize the signs and symptoms of a concussion	3.41 (.78)	3.56 (.67)
Perform sideline evaluations of concussion	3.34 (.85)	3.63 (.49)
Evaluate the severity of concussions	2.93 (1.05)	3.13 (1.04)
Classify the severity of a concussion	2.61 (1.07)	2.56 (1.16)
Determine if an athlete is able to return to play after sustaining a concussion.	2.43 (1.20)	2.41 (1.13)
Recognize a cervical spine injury	2.88 (1.04)	3.03 (1.02)
Perform a neurological evaluation of cervical spine injuries	2.41 (1.31)	2.59 (1.13)
Evaluate spinal cord injuries	2.39 (1.10)	3.78 (1.21)
Evaluate a skull fracture	2.30 (1.12)	2.16 (1.17)
Develop a rehabilitation program for head/neck/spine	2.00 (.99)	1.91 (1.09)
Monitor a rehabilitation program for head/neck/spine	2.23 (1.05)	2.16 (1.14)
Determine if an athlete is able to return to play after sustaining an injury to the head/neck/spine.	2.10 (1.13)	1.78 (1.07)
Recognize low back injuries	3.32 (.68)	3.23 (.86)
Perform evaluations of low back injuries	2.91 (.96)	2.00 (1.02)
Treat low back injuries using electrical muscle stimulation	2.15 (1.02)	1.97 (1.13)
Develop a rehabilitation program for low back injuries.	2.08 (.98)	2.13 (1.04)
Monitor a rehabilitative program for low back injuries	2.47 (1.00)	2.63 (1.07)
Determine if an athlete is able to return to play after sustaining an injury to the lower back.	2.38 (1.06)	2.27 (1.11)