Spring 2015

Emergency cardiac care in athletic training education

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Emergency Cardiac Care in Athletic Training Education

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A thesis submitted to the Graduate Faculty of

JAMES MADISON UNIVERSITY

In

Partial Fulfillment of the Requirements

for the degree of

Master of Science in Education

Adult Education and Human Resource Development

May 2015

Dedication

This research is dedicated to Jen Stollery, Sarah Stiasny and Chris Bounnell, who I worked with as an athletic training student at Wiregrass Ranch High School in August 2011. The unexpected loss of Coach Chris Bounnell was unexpected and life changing for everyone at Wiregrass Ranch.

To my mom: my biggest supporter and best friend. Without your love and constant reassurance, I would not be the driven person I am today.

Acknowledgements

I'd like to thank Dr. Noorie Brantmeier for her continual support throughout my research project. Without her insight and guidance, conducting this research would have been daunting and difficult to complete. Her enthusiasm and counsel was so important to me and helped keep me grounded during this project. Noorie's experience with research has broadened my perspective and I am excited to continue researching athletic training education. Noorie has been one of the best additions to the AHRD program and I am thankful she was my committee chair.

Dr. Amy Thelk has been excited about my project since the beginning and I thank her for the countless emails and hours she spent helping me with my survey instrument and data analysis. Data analysis can be frightening, but Amy made it easy to understand. Coming from a large research institution, I was afraid I wouldn't have any idea how to create a survey instrument. Amy continues to give me the confidence to dive into the field and always reassured me during this research process.

Randy Snow has been supportive of my project and I am so grateful to him for agreeing to sit on my committee. His understanding of the field of athletic training and his appreciation for our work ethic has made my time in the AHRD program enjoyable.

Without the support of Dr. Jamie Frye and Tom Kuster, I do not know where I would be at this stage of my career. They have always supported my goals and gave me opportunities I would not have elsewhere. I am lucky to have been a part such a supportive staff with JMU Sports Medicine. When I was at my rock bottom, Jamie and Tom were always there for me and continue to support me to this day.

I would also like to acknowledge the help and support of my fellow graduate assistants within Health Sciences. Thank you so much for letting me brainstorm out loud, calming me down when I had moments of doubt, and just making me laugh during this process.

Finally, I want to thank Dr. Diane Wilcox. She welcomed me into the AHRD program with open arms. Her enthusiasm for athletic trainers, understanding of the field, and overall support has meant so much to me during my time in graduate school. I will always be grateful for her acceptance.

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Abstract

In the field of athletic training, preventing sudden cardiac arrest (SCA) has become a vital component of undergraduate athletic training students' education. Specifically, SCA is the "leading cause of death in young athletes due to a structural cardiac abnormality" (Casa et. al, 2012, p. 15). Numerous studies about sudden death in athletics have been conducted but there is a gap in educational literature. Teaching students how to respond to catastrophic injury or illness is still an area that needs to be expanded upon. Educational competencies and standards have rapidly evolved with each edition of the National Athletic Trainers' Association (NATA) educational competencies. A mixed-methods survey was sent out to all Commission on Accreditation of Athletic Training (CAATE) accredited program directors in order to determine if NATA competencies regarding SCA are being addressed, the availability of equipment and various teaching methods in the classroom versus clinical setting, and if program directors are covering the psychosocial aspect of SCA in their curriculum. Results show that program directors are covering the required competencies and addressing the emotional aftermath of SCA; however, there is a gap between the availability of tools between the classroom and the clinic. Program directors also reported teaching techniques commonly used in other areas of medical education, such as the use of simulators and standardized patients. Future research should be conducted on the availability of equipment used to teach SCA in the classroom and clinical setting, along with other teaching strategies to address SCA in athletic training education.

Keywords: sudden cardiac arrest, athletic training education, athletic training students, National Athletic Trainers' Association educational competencies, catastrophic injury or illness, Commission on Accreditation of Athletic Training Education.

Chapter 1: Introduction

In March 2015 at a high school in Kansas City, Missouri, Track season had just begun. Ja'leel Freeman was a distance runner during the second week of practice when suddenly he collapsed. Emergency medical services arrived and performed CPR until he was transported to the hospital. Ja'lell was in "perfect health" and was looking forward to graduation with his class. Unfortunately, Ja'lell passed away at the age of 17. It is not known why his heart stopped beating that day (McDowell, Bavley & Rice, 2015). The passing of Ja'lell Freeman reminds us that in rare instances, young and healthy athletes can experience sudden cardiac arrest and not survive. Often times, the athletic trainer is seen as the first line of defense against this type of catastrophic event. While maintaining a safe environment for physical activity for student-athletes is critical, sometimes the support staff (such as coaches, volunteers, and teachers) can fall victim to cardiac arrest and need support.

On August 23, 2011, at Wiregrass Ranch High School in Wesley Chapel, Florida, after school activities were starting up. It was the second day of school and everyone was buzzing about the new school year. I was a senior athletic training student assigned to this high school for my semester-long clinical rotation. The afternoons were always busy and student-athletes were coming in and out of the athletic training room getting ready for afternoon practices. All of a sudden, a frantic call on the radios went out: "AED needed outside the portable classrooms behind the field". My supervising athletic trainer (preceptor), a junior student and I rushed out to the area to assess the situation. Coach Chris Bounnell, 54, collapsed outside of his classroom where he was an anatomy teacher and volunteer soccer coach for the school. My preceptor performed CPR with the school

nurse and resource officer while I directed students/unnecessary individuals away from the scene with my junior student. We were also in charge of directing the ambulance to the scene. After what seemed like an eternity, EMS arrived and took Chris to the hospital where he unfortunately passed away (Knight & Solochek, 2011). From that moment on, I knew my professional career as an athletic trainer would never be the same.

Athletic training education is a rapidly evolving field, using teaching techniques from multiple healthcare professions to teach students enrolled in professional level programs vital competencies. Sudden cardiac arrest (SCA) is an emergency that all athletic training students must properly recognize and be prepared to intervene quickly and effectively. Toresdahl, Harmon and Drezner (2013) found that high schools with access to automated external defibrillators (AEDs) showed a survival rate from SCA up to 64% than previously reported (p.242). However, lack of access is still a problem. Toresdahl et al., (2013) claims that "many high schools are not prepared to respond to an SCA or have significant deficiencies that could be improved" (p.245). Casa et al., (2013) also advises that most deaths in the secondary school setting "can be avoided by providing appropriate prevention, recognition and treatment strategies" (p.547). Investigating the ways educators teach cardiac survival skills is necessary because each undergraduate-level program is allowed autonomy for creating instruction and curriculum. Program directors (PDs) are required to teach set competencies created by the National Athletic Trainers' Association (NATA) and adhere to the Commission on Accreditation of Athletic Training Education (CAATE) Standards. Using teaching strategies such as simulated scenarios and hands-on learning creates an environment for the student to learn without the consequences of real-life injury or harm to an athlete.

These teaching techniques can help improve students' confidence and ability to problem-solve. Once a student graduates from an athletic training program, they are responsible for the care and prevention of injuries to athletes. Lack of experience with new standards in emergency cardiac care can potentially include the delay of appropriate care to the patient (Casa et al., 2012).

Athletic training education has five domains in which all students must be declared competent in order to sit for the Board of Certification (BOC) exam. The domains are: Injury/Illness Prevention and Wellness Protection, Clinical Evaluation and Diagnosis, Immediate and Emergency Care, Treatment and Rehabilitation, and Organizational and Professional Health and Well-Being (Board of Certification, 2010). The condition of sudden cardiac arrest falls into the third domain, Immediate and Emergency Care (BOC, 2010). Each domain has specific competencies that all students must demonstrate in order to be eligible to sit for the BOC exam in their final semester of college. In the 6th edition of the Role Delineation Study, all athletic training students must be able to implement different adjunct airway tools and administer emergency oxygen to a victim suffering cardiac arrest (National Athletic Trainers' Association, 2011). The addition of adjunct airways and administering emergency oxygen to the educational competencies has been the largest change to the competencies in the 5th edition set forth by the NATA (NATA, 2011).

Problem Statement

Due to the autonomy granted to undergraduate-level athletic training programs when designing curriculum, there is a potential for some programs to leave out important competencies required for the recognition and treatment of SCA.

Purpose of the Study

The purpose of this study is to investigate how sudden cardiac arrest is taught to athletic training students in accredited programs. Students who graduate from accredited athletic training programs are taught these skills in a safe, yet controlled environment. These individuals do not get to experience treating conditions such as sudden cardiac arrest while they are still in school due to the rarity of this medical condition. Students who are newly certified also have been under supervision of a preceptor while they were enrolled in an athletic training program. This lack of independence can create a problem with confidence and problem solving once they transition to the field. Mazerolle, Pagnotta, Salvatore, and Casa (2013) investigated athletic training program directors' strategies for preparing students for sudden death. This study looked at sudden death as a whole, including all conditions that can cause sudden death in sport. Current evidence preparing students specifically for SCA is limited in athletic training education literature. In this section below, I will outline the research questions for the current study.

Research Questions

The research questions regarding this study include:

1. Which National Athletic Trainers' Association (NATA) competencies related to sudden cardiac arrest (SCA) are addressed in undergraduate AT programs?
2. What materials are being used in the classroom and clinical setting to transfer knowledge about SCA to athletic training students?
3. Are program directors addressing the psychosocial component of sudden cardiac death sports?

After outlining the questions of concern for this study, I will now move on to assumptions, limitations and scope of this research.

Assumptions, Limitations and Scope

Some components of this study include the assumption that PDs are ignoring new competencies set forth by the NATA in regards to SCA education. Specifically, PDs might be not utilizing adjunct airways and portable oxygen tanks in their curriculum due to budgetary reasons, unfamiliarity with equipment or other reasons. It is also assumed that CAATE-accredited programs are following the CAATE Standards set in 2012 to make sure their programs are in compliance with educational competencies.

Limitations includes survey nonresponse, truth of answers reported, PDs not completing all questions, or listing unique situations about their curriculum in regards to SCA. This study intends to add to athletic training education literature and the existing literature about sudden death in sport. Discovering which instructional materials program directors use in the classroom will help the profession understand the reality of teaching sudden cardiac arrest. Further research needs to be completed to discover the opportunities and challenges of teaching emergency cardiac care to the ATS.

Significance

The etiology of sudden cardiac arrest and the treatment of this emergency in the field is a required skill of all athletic trainers. Investigating how athletic training students are taught emergency skills in relation to sudden cardiac arrest can vastly improve the confidence of athletic training students and newly certified athletic trainers on how to treat this condition. Athletic training students are often taught cardiac survival skills in a controlled environment, which leaves them unprepared for external conditions that occur

when a cardiac emergency is present. The psychosocial aspect of sudden cardiac arrest in athletics is also an important aspect regarding educating athletic training students. The aftermath of sudden cardiac arrest can make lasting emotional impacts on the athletic trainer and student. Students are taught required skills to intervene in a cardiac emergency; however, the available evidence on how students process sudden cardiac death is limited. I have witnessed sudden cardiac arrest and other catastrophic injuries in sport during my undergraduate education. Many students do not have the opportunity to participate in a real life cardiac emergency because of the rarity of that condition. According to Harmon, Asif, Klossner, and Drezner (2011), approximately 1 in 43,000 NCAA athletes die from sudden cardiac arrest each year (p. 1597). For younger athletes, the incidence is an alarming 110 deaths per year in the United States (Casa et al., 2012).

Therefore, it is critical that athletic training students get the most up-to-date and advanced education regarding emergency cardiac care for the athlete. Literature about how athletic training students respond to catastrophic injury is extremely limited. In order for the reader to understand the key topics of this study in the appropriate context, there are terms that are defined below.

Key Term Definitions

Table 1.

Key Terms and Definitions

National Athletic Trainers' Association (NATA):	"The National Athletic Trainers' Association (NATA) is the professional membership association for certified athletic trainers and others who support the athletic training profession" (National Athletic Trainers' Association, 2014).
Commission on Accreditation of Athletic Training Education (CAATE):	"The purpose of the Commission on Accreditation of Athletic Training Education (CAATE) is to develop,

	maintain, and promote appropriate minimum education standards for quality for professional, post-professional, and residency athletic training programs" (Commission on Accreditation of Athletic Training Education, 2014).
Board of Certification (BOC):	"The Board of Certification, Inc. (BOC) was incorporated in 1989 to provide a certification program for entry-level Athletic Trainers (ATs)" (Board of Certification, 2010).
Role Delineation Study:	"The BOC Role Delineation/Practice Analysis (RD/PA) identifies essential knowledge and skills for the athletic training profession and serves as a blueprint for exam development. The RD/PA validates importance, criticality and relevance to practice for both broad content areas and tasks" (BOC, 2010).
Athletic Training Program:	"Professional Programs lead to eligibility to sit for the Board of Certification examination and to enter the profession of athletic training. Professional Programs are available at both the baccalaureate and post-baccalaureate degree levels" (CAATE, 2014).
Program Director (PD):	"The full-time faculty member of the host institution and a BOC Certified Athletic Trainer responsible for the implementation, delivery, and administration of the AT program" (CAATE, 2012, p.14).
Preceptor:	"A certified/licensed professional who teaches and evaluates students in a clinical setting using an actual patient base" (CAATE, 2012, p.14).
Athletic Training Student (ATS):	A student in the university admitted to the athletic training program (CAATE, 2012).
Sudden Cardiac Arrest (SCA)	"Sudden cardiac arrest (SCA) is the leading cause of death in young athletes on the playing field and is typically the result of undiagnosed structural or electrical

	cardiovascular disease" (Casa, 2012, p.15).
Catastrophic Injury or Illness:	"A sudden death or disability in which there is life-altering physical or mental impairment, or both" (Casa, 2012, p. 354).

Now that I have presented the key terms, in the literature review to follow, I will discuss the pertinent literature and theoretical frameworks that are applicable to this study.

Chapter 2: Literature Review

To provide the foundation for this study, a literature review was conducted. The available literature supporting athletic training education is vast. Narrowing down the search to include strategies to address sudden cardiac arrest is important because teaching the required competencies requires cognitive processing and sophisticated motor skills (Mazerolle & Benes, 2014; Mazerolle et al., 2013; Rich, 2009; Walker, Weidner & Armstrong, 2008; Heinrichs 2002; Peer and McClendon, 2002). The NATA 5th Edition Competencies, CAATE Standards for the Accreditation of Professional Athletic Training Programs, and Role Delineation Study, 6th Edition were consulted in order to clearly define the athletic training education framework.

Most of the literature in the following review was found in the *Journal of Athletic Training* and the *Athletic Training Education Journal* from 1999-2014. Other sources were discovered using databases such as PubMed and Google Scholar. Key search terms included, but not limited to the following: "Sudden Cardiac Arrest in Athletic Training Education", "NATA 5th Edition Competencies", "Commission on Accreditation of Athletic Training Education Standards", "Board of Certification Role Delineation Study", "Athletic Training Program Challenges", "Program Director Role Strain", "Learning theories used in athletic training", "Athletic training student challenges", "Catastrophic Injury or Illness and the athletic training student", and "challenges for the athletic training student". *Preventing Sudden Death in Sport and Physical Activity*, by D.J. Casa, was also consulted in order to give concrete definitions about sudden cardiac arrest and sudden cardiac death in sport. W.E. Prentice's *Principles of Athletic Training: A Competency*

Based Approach, 15th edition is a seminal work used by athletic training educators to teach foundational knowledge about the field (BOC, 2010).

Conceptual and Theoretical Framework

This conceptual framework for this study explores athletic training education as a whole, specifically isolating the topic of emergency cardiac care. Aside from didactic education, traditional clinical education and clinical proficiencies are required for the student to be declared competent as they exit their professional program (NATA, 2011). The uniting factor in this conceptual framework is the SCA curriculum practices in athletic training education across the country. The conceptual framework below illustrates the themes and learning theories that will be discussed in the literature review.

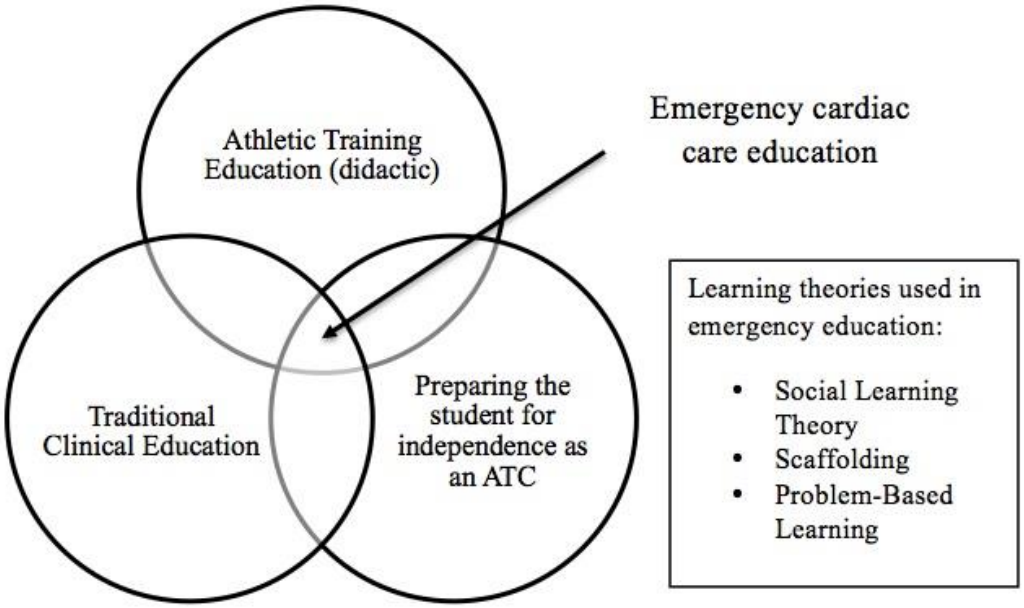


Figure 1. Conceptual and Theoretical Framework

Athletic Training Education

Athletic training has been recognized as an allied health profession since the early 1990s (Delforge & Behnke, 1999). The majority of athletic trainers work in collegiate and high school settings, which have been identified as "traditional settings" (Prentice, 2014). With the recognition of athletic training as an allied health profession, this has opened many doors for the certified athletic trainer (ATC), including the population in which he or she treats (Prentice, 2014). Athletic training has three governing bodies that oversee the development of the profession, board certification of all athletic trainers, and creates all competencies and clinical proficiencies for professional education programs. These three bodies are the National Athletic Trainers' Association (NATA), the Board of Certification (BOC), and the Commission on Accreditation of Athletic Training Education (CAATE). Athletic training educators must keep up with new standards of practice and updated educational competencies in order that best prepares the athletic training student. This structure is outlined below in Figure 2.

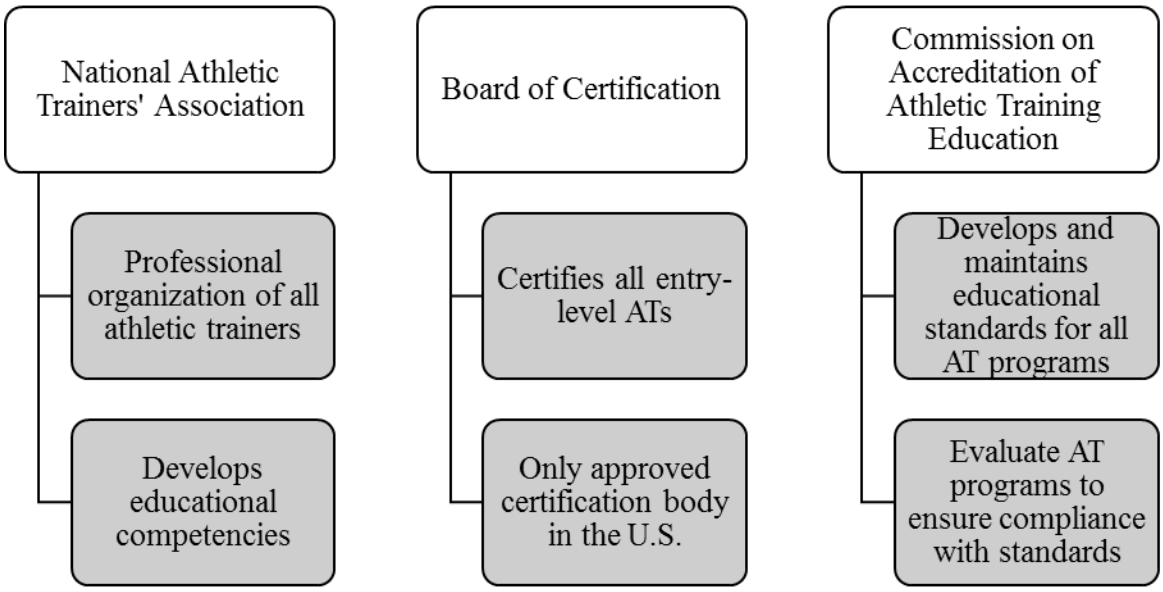


Figure 2. Governing Bodies of Athletic Training

The NATA and CAATE organizations work together in order to create competencies and clinical proficiencies for all athletic training programs in the United States. Every five years, the NATA delivers new educational competencies that all professional level programs must follow in order for their students to be eligible to sit for the BOC exam. The most current edition of the educational competencies is the 5th edition, published in 2011. The CAATE develops standards that all programs must follow in conjuncture with the NATA in order "for the development, evaluation, analysis, and maintenance of athletic training programs" (CAATE, 2012, p. 2).

Dodge, Walker and Laursen (2009) state that the structure of AT curriculum should help the student "understand the relationships among learning experiences in such a way that they are able to recognize the applicability of those experiences to the practice

of athletic training" (p. 46). Building a strong program that incorporates challenging and meaningful experiences for the student is an important factor for student success. In order to ensure the student builds a strong foundation in athletic training, it is important to consider the type of learning experiences athletic training students prefer.

Modes of learning preferred by the athletic training student (ATS).

Athletic training students (ATSs) are required to learn many different types of skills and information as they move forward in their professional education program. "The athletic training educator should also make an effort to stay informed about the availability of relevant audiovisual aids, multimedia, newsletters, journals, workshops, seminars that can enhance the breadth of the students' educational experience" (Prentice, 2014, p.19). This concept is not unlike other health professions, since standards of care and new treatments are created over time. It is important to consider different kinds of materials and learning styles when educating this particular type of student. Gould and Caswell (2005) declare in their findings that the undergraduate ATS does not "…prefer teaching methods that require active, individual participation" (Gould & Caswell, 2006). On the contrary, the ATS prefers active learning type lessons such as scenarios and case studies. Palmer, Edwards, and Racchini (2014) discovered through their study that the ATS revealed the simulation helped them work through a scenario not always present during every day tasks at clinic. (Palmer, Edwards, & Racchini, 2014). Also, Mazerolle, Pagnotta, Salvatore, and Casa (2013) found in their study that "AT educators in this study…reported facilitating in the classroom and laboratory setting with the use of case-studies, scenarios, and simulations" (p. 89). The notion of the ATS preferring "passive learning" (Gould & Caswell, 2005 p. 48) has been disputed with recent studies.

Scaffolding. Bruner's theory regarding contemporary cognitive processing most applies to athletic training education because it is focused on revisiting previous knowledge. Students are taught the foundations of athletic training and then progress to more complicated topics, such as SCA. "Bruner's theory also allows for concepts to be mentally represented in multiple modes simultaneously" (Schunk, 2012, p. 459). Athletic training students must be able to process concepts simultaneously in order to provide effective treatment to an athlete with suspected cardiac arrest. The student must assess pulse, breathing and other responses within ten seconds of the athlete/patient collapsing. Once they have determined the status of the athlete/patient, they must activate emergency medical services (EMS) and apply the proper treatment (CPR/AED use) to the athlete. CPR/AED skills require multiple cognitive processes to be functioning all at once. Using the students' previous knowledge of sudden cardiac arrest helps them put the motor skill of performing CPR into perspective in order to make the task important. The use of critical thinking is also required when students start building upon previous knowledge.

In a study by Fuller (1997) Bloom's Taxonomy was analyzed for categorizing critical thinking in undergraduate athletic training students. "Students can more adequately apply cryotherapy after understanding its theoretical principles (e.g. knowledge or comprehension) while assessing or analyzing injuries, students determine their severity and then choose a plan of action." (p. 243). Starting with theoretical principles, students build upon the knowledge they have learned about SCA in the classroom and then can move to the motor skill of CPR, inserting adjunct airways, and emergency oxygen administration. Knowledge and comprehension are also the first two steps in the cognitive strategy domain in Bloom's Taxonomy (Fuller, 1997). This aligns

with scaffolding because students must first gain knowledge before they can apply it to real world challenges with cardiac arrest. Students learn about the etiology of sudden cardiac arrest, and then transition to the skill of treating SCA. Fuller (1997) warns about creating poor learning objectives in athletic training education. "Learning objectives alone may not ensure that students will become critical thinkers" (Fuller, 1997, p. 243). This is why it is extremely important to use multiple learning outcomes and strategies when teaching athletic training students.

While students are working in small groups, the instructor can walk around the class and answer any questions or provide guidance to those who are struggling with the psychomotor skills at hand. Often times, program directors serve as professors in their associated program. McCormick (2012) states that "the greater involvement of the program director, the greater level of clinical and academic integration, which leads to more confident students" (p. 4). The self-efficacy of the ATS will be addressed later in this literature review.

Coker (2000) postulates that athletic training students change their learning styles depending on the learning environment. "Given the extensive experimental nature of the clinical setting in athletic training, a shift in an individuals' preferred learning mode and subsequent learning style may also occur when compared to the traditional classroom setting" (p. 442). This statement by the author aligns with transferring skills from the classroom to clinic. Learning in the classroom occurs in a controlled environment where external stimuli are unchanged, compared to the clinical setting. The clinical setting has many changing variables as athletes come in and out for treatment (Berry et al., 2004; Rich, 2009; Bowman & Dodge, 2013). The classroom provides a safe place for students

to make mistakes before they proceed to their clinical experience portion of their education. Even in the clinical setting, students are still under supervision of a certified athletic trainer serving as their preceptor (Rich, 2009). In contrast, the "hands on approach" in clinical learning is not new to athletic training education (Weidner & Henning, 2002). As technology evolves and more programs utilize technology in the classroom, it is only appropriate that this approach be incorporated in athletic training education.

Technology in the classroom. The question of utilizing new technology to reinforce skills has caused much debate in athletic training education. Peer and McClendon (2002) argue that even though new technology is being developed to assist the ATS, one must be sure that the media is enforcing critical-thinking skills and application of concepts (Peer & McClendon, 2002). One item of technology being utilized in athletic training programs is high-fidelity simulators. Palmer, Edwards and Racchini (2014) conducted a study using a high-fidelity simulator with undergraduate athletic training students. A high-fidelity simulator is a mannequin that has the ability to "perspire, talk, experience arrhythmias, blink, bleed, convulse and even die" (p. 97). The authors discussed the advantages of having access to more sophisticated technology, "Advantages of simulation with high-fidelity mannequins…include enhanced communication skills, critical thinking, clinical decision making, and technical skill practice" (Palmer et al., 2014, p. 96). Giving the ATS an environment where mistakes can be made and opportunity for correction in behavior is critical. "Students may reenact a scenario multiple times, practicing the same techniques without the fear of harming a patient or an overwhelming need for speed and efficiency" (Palmer et al., 2014, p. 97).

The use of high-fidelity simulation also provides the ATS with a chance to practice a skill independently of a preceptor at their clinical rotation. "…given the opportunity to take on the role of certified athletic trainers making professional, real time decisions without the possibility of adverse consequence…" (Palmer et al., 2014, p. 97). This study supports the use of technology in the classroom in order to aid in the learning process. Heinrichs (2002) also agrees that "technology assisted assessment supports the decision-making process" (p. 190). It is also important to note that students have to act quickly when SCA occurs, since the survival rate decreases about 10% with each minute passing without any cardiopulmonary resuscitation (CPR) or defibrillation intervention (Casa et al., 2013; Toresdahl et al., 2013; Hunziker et. al, 2013; Casa, 2012; Harmon et al., 2011; Terry et al., 2001). The opportunity to practice skills in a safe environment is very important in the professional development of the ATS. Practice with correction by the PD or other instructor is important to improve their self-efficacy and confidence in their ability to correctly treat the athlete for SCA (McCormick, 2012).

With new emergency competencies being added to athletic training education, it is important that accredited programs stay up-to-date with best practices. The National Athletic Trainers' Association (NATA) has updated the educational competencies that must be met by all athletic trainers. Some new additions to the education competencies include the ability to administer emergency oxygen and inserting adjunct airways; which are important in the skill of CPR (NATA, 2011). The other competencies that directly relate to emergency cardiac care include being able to correctly "differentiate between normal and abnormal findings of pulse and blood pressure recordings" (NATA, 2011, p. 20). Learning about these skills in the classroom is one aspect of athletic training

education; however, the clinical education portion of the program is vital to ensure the student is competent.

Traditional Clinical Education

Athletic training clinical education is derived from traditional medical education (Weidner & Henning, 2002). Traditional clinical education teaches students to work along patients inside hospitals in order to gain a better grasp of the knowledge taught in the classroom (Weidner & Henning, 2002). This model is still used today in athletic training although the settings are slightly different. Instead of hospitals, the clinical settings are universities, high schools and physical therapy clinics (Weidner & Henning, 2002). Athletic training education originally had two paths for practitioners to follow. One path was specifically for secondary school teaching and the other modeled after physical therapy programs (Delforge & Behnke, 1999). It was believed that skills acquired from physical therapy programs would make athletic trainers more marketable (Delforge & Behnke, 1999). However, in these early days of the profession, no formal clinical education was incorporated next to content from physical education classes (Delforge & Behnke, 1999). According to the 2012 CAATE Standards for the Accreditation of Professional Athletic Training Programs:

Clinical education must provide students with authentic, real-time opportunities to practice and integrate athletic training knowledge, skills, and clinical abilities, including decision-making and professional behaviors required of the profession in order to develop proficiency as an athletic trainer (CAATE, 2012, p. 7).

The clinical aspect of athletic training education cannot be ignored when incorporating different instructional methods for the athletic training student. Coker

(2000) emphasized, “In the clinical environment, the preference appears to shift to active experimentation, which emphasizes hands-on learning” (p. 433). Dodge et al. (2009) discussed the desired strength of athletic training programs. Since clinical education is required for all undergraduate-level athletic training programs, it is imperative that curriculum design includes relevant and challenging clinical experiences (Dodge et al., 2009). When students are first incorporated into their clinical experience, the knowledge level starts out at foundational levels, then progresses to incorporate skills learned in the classroom. Dodge et al. (2009) provides an example including emergency action plans (EAPs) and the ATS. New students will get their CPR certification and the listed EAP at their clinical site, then second year they will apply the skills of CPR and problem-solving skills in order to tackle an emergency scenario at the clinical site. Building foundational skills can be achieved by utilizing social learning theory and problem-based learning in the clinical setting.

Social learning theory. Social learning theory is defined as the process of learning through the use of a model by Bandura (1991). Prior to athletic training students entering the clinical setting, typically the instructor will model appropriate procedures how to perform proper cardiac survival skills. Social learning theory by Bandura (1991) utilizes the model and corrective feedback in order to achieve the desired behavior or outcome. The instructor or preceptor will typically model the correct behavior and skills to the ATS and then break up the students into small groups to practice. In athletic training education, the type of learning occurring is observational learning. Modeling the desired skill (correctly performing CPR, applying the automated external defibrillator to the correct areas of the chest, administering emergency oxygen, etc.) is critical for the

ATS to understand the desired outcome of treatment. Using a model that is credible (such as an instructor or PD) also provides the ATS with the foundation that this skill is important and should be practiced (Mazerolle & Benes, 2014; Carr & Volberding, 2014; Bates, 2014; Bowman & Dodge, 2013; Heinerichs et al., 2013). Using modeling and corrective feedback, the ATS can build upon prior knowledge and attempt to use problem-based learning.

Problem-based learning. Problem-based learning in the athletic training setting is typically understood as students acquiring knowledge from their peers who are in their cohort or another cohort in the clinical setting (Henning, Weidner, & Jones, 2006). Problem-based learning environments are conducive to athletic training because most often, students will be interacting with their clinical preceptor(s), other athletic training students, and athletes (Dodge et al., 2009). Learning is not isolated to one individual in athletic training education. "It appears that effective instructors in these athletic training programs created instructional tasks and environments that incorporate student control" (Mensch & Ennis, 2002, p. 205). Lastly, students must process the information themselves first before they can relate the knowledge to others. "…the student must synthesize the information in a different way in order to explain it to other students" (Henning, et al., 2006, p. 106). Students will troubleshoot problems with their plan of care with other students in their same cohort or more experienced students in the upper cohort.

The use of problem-based learning relates directly to this study because students enrolled in an athletic training program are often paired together at clinical rotations outside the classroom. Problem-based learning is essential for the ATS to correctly

identify SCA. Decision- making skills are important, including when to call emergency medical services (EMS) and additional support services. Giving the ATS difficult clinical scenarios to troubleshoot will foster problem-based learning according to Dodge et al., 2009. “Such case studies can range from specific emergencies to uncommon rehabilitation cases” (p. 47).

Peer instruction has shown to be beneficial to athletic training students. Henning, Weidner and Jones (2006), investigated the use of “peer assisted learning (PAL)” in an athletic training clinical setting (Henning et al., 2006). Concepts of PAL include “*peers* and *near peers*”. “Near peers are students who have already surpassed the level at which they are teaching, tutoring, mentoring, etc… whereas co-peers are at the same academic or experiential level” (Henning et al., 2006, p. 102). Students can gain knowledge from upper level students who have already completed their emergency skills course in the clinical setting. Upper level athletic training students would be defined as *near peers* according to Henning et al. (2006), because they have “surpassed the level at which they are teaching” (p. 102). The use of “near peers” can be beneficial to the ATS when learning about emergency action plans (EAPs) or the chain of command in an SCA emergency. The *near peer* can guide the entry-level student and help them make decisions in relation to the scenario presented in the clinical setting (Henning et al., 2006).

Newly admitted athletic training students can also utilize their peers in their class for group learning. In the same study by Henning et al. (2006) PAL has shown to be effective because “outcomes identified by students engaging in PAL activities include a decreased level of stress or anxiety when working with peers than with clinical

instructors" (p. 102). This concept also noted in a study by Bates (2014). "The benefits of PAL have included the increased confidence of performing skills, decreased anxiety or stress when with peers rather than clinical instructors…" (p. 114). Bates (2014) also interviewed athletic training students in order to assess how PAL helped their transition to the field their first year out of school. "Nine of the 13 participants stated that the PAL experience helped them learn and develop critical teaching skills that are presently assisting them as they instruct and work with students" (p. 118). PAL has been shown to benefit the ATS when encountered with difficult decision-making experiences. Problem-based learning and social learning theory are necessary to teach the ATS proper techniques and best practices within athletic training. Using these two learning theories to educate the ATS will provide a foundation of expectations when they are tested for proficiency in their clinical skills.

Clinical integrated proficiencies (CIP). Clinical integrated proficiencies (CIPs) are required by the CAATE in order to document the baseline level competence of the student in the clinical setting (CAATE, 2012). Formal education competencies that have to be met by all athletic training students were not in existence until the 1980's (Weidner & Henning, 2002). While formal educational competencies act as an education checklist, athletic training faculty has to be sure they are helping their students develop clinical judgment. The CAATE has developed standards that all AT programs must follow in order for the student to be successful on their CIPs (CAATE, 2012).

One aspect of CIP is developing critical thinking skills and translating that to clinical judgment of an injury or condition. Clinical proficiencies, according to Heinrichs (2002) are a combination of foundational knowledge, motor skills, analysis of the current

problem and external conditions affecting the situation (Heinrichs, 2002). It was reported in 2008 by Walker, Weidner, and Armstrong that 89.4% of evaluation of CIPs was completed with an athlete and real-time injury evaluation (p. 392). This finding is important because if there is lack of opportunity to evaluate a real injury, the student will have to demonstrate the proficiency in a simulated scenario (Walker, Weidner & Armstrong, 2008). If there is no injury to evaluate in real time, the use of standardized patients can be substituted for a real injury (Mazerolle et al., 2013; Walker et al., 2008) Since the environment is controlled and the instructor can predetermine the outcome, it is important for the student to understand the importance of the evaluation. In the clinical setting, the preceptor is the instructor assigned to an ATS or multiple students (CAATE, 2012). The role of the preceptor is critical when evaluating students' clinical proficiencies.

Role of the preceptor. Depending on the institution where the ATC is employed, there is a responsibility to teach students enrolled in CAATE-accredited program. "The athletic trainer must also be able to evaluate student knowledge and competencies through the development and construction of appropriate tests" (Prentice, 2014, p. 19). It is a CAATE requirement that all preceptors assisting in an athletic training program must undergo a workshop to learn different teaching skills used to facilitate learning experiences for the ATS (Mazerolle, Bowman, & Dodge, 2014; CAATE, 2012).

The clinical setting has environmental and time-management challenges not posed in the classroom setting in which students must learn how to respond to injuries in a timely fashion (Bowman & Dodge, 2013; Rich 2009; Walker et al., 2008; Berry, Miller & Berry, 2004). Heinrichs, Curtis and Gardiner-Shires (2014), claims the ATS has to be

active in their education in order to be effective clinicians. "They are expected to be active participants during this time and to apply what they learn each day in the classroom with the people they treat" (p. 68). It is important for the clinical preceptor to understand each level their student is at academically and skill-wise. "Understanding students' perceived levels of emotional response during clinical situations is important because researchers have found that negative emotional responses may affect student learning, decision-making and caring capabilities" (Heinrichs, et al., 2014, p. 68). Emotional responses to clinical scenarios can affect a student's confidence in their perceived ability and skills outside of the classroom. This emotional response should be considered when mentoring the ATS in order for a positive learning environment (Heinrichs, et al., 2014; Berry et al., 2004; Bandura, 1991).

Dodge et al. (2009) proposes to bring in preceptors to the classroom environment in order to "bridge the gap between the classroom and clinic" (p. 49). Preceptors have a breadth of knowledge gained from working in the clinical setting. Students can learn different approaches to solving difficult injury rehabilitation plans or interventions from the preceptor acting as a guest lecturer in a class period (Dodge, et al., 2009, p. 49). Another benefit to inviting the preceptor into the classroom setting includes giving other students the opportunity to interact with this preceptor that they might not get the opportunity to otherwise. Because clinical education has to give students different sport experiences, some students might miss out on working with a preceptor with innovative ways to solve problems in the clinic (Rich, 2009). It also removes the preceptor from other job responsibilities (such as administration, patient education, coach interaction,

etc.) that can take away from the students' learning experience (Rich, 2009). This challenge is one of many that are encountered in clinical education.

Challenges in clinical education. Athletic training students are required to reinforce their didactic knowledge during the clinical experience portion of their education. As stated earlier in this literature review, the CAATE requires programs to provide students with real, authentic clinical experiences in order to reinforce didactic learning in the classroom (CAATE, 2012). Bowman and Dodge (2013) explored frustrations of athletic training students in relation to their experiences in the didactic (classroom) setting and the clinic. "Unexciting clinical education experiences often left students feeling disengaged and that their time was being wasted" (Bowman and Dodge, 2013, p. 83). The ATS could be spending many hours during a clinical rotation in an unsupportive environment due to the role strain of the preceptor. This problem can be attributed to the preceptor's main responsibilities (such as caring for athletes, administrative work, etc.) in addition to serving as a teacher in the clinical setting (Bowman & Dodge, 2013). Rich (2009) also cited the role strain of the clinical preceptor. 28% of clinical preceptors reported having to "perform other responsibilities" (28%), followed closely by caring for athletes (25%)" (p. 298). Rich (2009) also states that Clinical Instructors (CIs) who reported having other responsibilities "demanded the attention of the CI and did not allow him or her to focus on capturing the teachable moment" (Rich, 2009, p. 298). Heinerichs et al. (2014) note that these challenges will continue. However, if the educator, preceptor and student are actively involved in creating a positive learning environment, the likelihood for success will increase over

time (p. 69). This action will help prepare the student for independence as a certified athletic trainer.

Preparing the Student for Independence as an ATC

Athletic training programs across the country prepare their students for independence as they prepare to sit for the BOC exam (Dodge, Walker, & Laursen, 2009). It is important to structure curriculum in a way that fosters critical thinking and allows for the ATS to gain confidence required to be a certified athletic trainer (ATC). Dodge, Walker, and Laursen (2009) claim that the balance between traditional didactic education and clinical experience is essential for the ATS to understand the context of the field of athletic training. The authors define this balance as a "coherent program" (p. 46). In addition to the balance between didactic learning and clinical experience, Mazerolle and Benes (2014) conducted a qualitative study investigating athletic training students' preparedness to enter the workforce. The subjects in this study reported positive experiences about their clinical education because their education was dynamic and encouraged hands-on experience that helped prepare them to be independent certified athletic trainers (Mazerolle & Benes, 2014). Klossner (2008) noted students who were given opportunities to make decisions under the direction of their preceptor in order to achieve "professional socialization" (p. 383) helped the ATS understand their role in the field of athletic training. "Professional socialization" in the context of this study included giving the student proper direction and feedback in order for the student to find their identity in the profession (Klossner, 2008).

These experiences are vital for the ATS to have during their formal education because it helps them understand the profession and their role as they mature into an

independent athletic trainer (Dodge et al., 2009). Massie, Strang, and Ward in 2009 cited that 90% of employers of ATCs reported, "their entry-level employees were prepared academically and clinically" (p. 71). It is important to note that the preparedness of the ATS has remained consistent over time (Mazerolle & Benes, 2014; Massie et.al, 2009; Mensch & Ennis, 2002). Having a positive learning environment in athletic training is important because it can potentially keep students from leaving the field of athletic training to enter other healthcare professions. Weiss and Neibert (2013) discovered the positive traits associated reported by AT programs encouraged their students to develop inter-professional relationships, meet academic benchmarks and be more knowledgeable about the medical field as a whole (Weiss & Neibert, 2013).

Curriculum design in athletic training must accommodate different learning styles and the ability to transfer knowledge to make important decisions in the field. The knowledge gained in the classroom setting will then be transferred to the clinical experience aspect of the athletic training students' education. In an article by Heinerichs, Vela and Drouin (2013) the importance of developing strong clinical decision making skills has been addressed: "It is a complicated process by which a student must respond to an ill-structured problem in a dynamic context that includes clinician-patient feedback loops, a diverse knowledge base and a growing body of evidence" (Heinerichs, et al., 2013, p. 362). This statement is an appropriate summation of what is expected of all athletic training students performing care for an athlete experiencing cardiac arrest.

Mazerolle and Benes (2014) interviewed athletic training students who were about to graduate from their respective undergraduate-level programs. This study focused on methods that helped prepare subjects for independence in the field. The authors as

define *Professional Socialization* as "the process whereby the ATS is introduced to and educated about the roles and responsibilities of the profession of athletic training" (p. 6). This professional socialization gives the ATS a realistic expectation of what an ATC experiences in the field after college (Mazerolle & Benes, 2014). Giving the ATS this type of experience is important as it helps them transition to the field.

Self-efficacy of the ATS. Bandura (1977) outlines self-efficacy as the internal driving force of an individual given a task. "The strength of people's convictions in their own effectiveness is likely to affect whether they will even try to cope with given situations" (p. 196). In another study by Bandura (1991), "People's beliefs in their efficacy influence the choices they make, their aspirations, how much effort they mobilize in a given endeavor…" (p. 257) This directly relates to developing the ATS into an autonomous certified athletic trainer. Along with self-efficacy, the ATS needs appropriate feedback in order to take actions and make them significant with their learning experience. Carr and Volberding (2014) found in their study that students need feedback from a respected, credible source in order to achieve the desired learning outcome. "Students require appropriate corrective feedback in order to properly assess their competence level…" (p. 132). The need for constructive feedback is also illustrated by Nottingham and Henning (2014), "Participants indicated that it helped ATSs grow, confirmed and corrected behavior, facilitated deeper discussion and helped ATSs with their goals and careers" (p. 59). This type of feedback and the use of a model align with Bandura (1977)'s theory of self-efficacy. While constructive feedback is important, Bowman and Dodge (2013) note, "because ATEPs are rigorous, students may need to be reminded that they belong in the program and that they can be successful" (p. 84).

Instilling confidence in the student is just as important as providing corrective feedback. Pagnotta et al., (2013) recommends having the student perform the task with a peer or instructor when faced with emergency procedures in order to increase their levels of self-efficacy (Pagnotta et al., 2013).

Self-efficacy of athletic training students is important to consider during curriculum design because the ATC must be competent and confident in their clinical decision-making skills in order to perform their jobs properly. The ATC must also "rapidly solve problems in order to make critical decisions on the field and in the clinic and who can work as part of a team" (Heinrichs, 2002, p. 189). Carr and Volberding (2014) discuss self-efficacy in relation to the success of athletic training students. Their study explored *past accomplishments* and *vicarious experiences* in relation to success of the ATS. "An example of a previous accomplishment involves an individual producing a customized foot orthotic versus a vicarious experience of watching someone else produce the orthotic" (p. 128). These experiences are vital to the ATS because it gives them hands-on experience in the clinic, while providing a credible model for instruction (Carr & Volberding, 2014). If the PD or preceptor understands how to improve self-efficacy of the ATS, favorable and successful outcomes of tasks is highly likely (Carr & Volberding, 2014).

The existing literature on athletic training education has highlighted the methods and tools of instruction that benefit students enrolled in an undergraduate-level program. While there have been some studies analyzing how the ATS responds to sudden death in athletics, the studies have analyzed all conditions that can lead to sudden death. My research interest lies in the sub-category of SCA. The development of a survey

instrument that reflects questions about sudden cardiac arrest and current curriculum trends in athletic training education is outlined in the methodology chapter.

Chapter 3: Methodology

In order to assess how undergraduate athletic training students learn to treat and prepare for sudden cardiac arrest, current athletic training program directors (PDs) will provide insight about how their curriculum is structured in order to teach these important, life-saving skills. Currently, athletic training program directors are given autonomy when their programs deliver the required competencies set forth by the NATA. In this chapter, I will discuss the research design utilized, population and sample, instrumentation, data collection procedures, data analysis and limitations of the study.

As mentioned above, the research questions this survey aimed to answer included the following:

1. Which National Athletic Trainers' Association (NATA) competencies related to SCA are addressed in undergraduate AT programs?
2. What materials are being used in the classroom and clinical setting to transfer knowledge about SCA to athletic training students?
3. Are program directors addressing the psychosocial component of sudden cardiac death sports?

Next, I will discuss the research design utilized and procedures to conduct this study.

Research Design

This study utilized a mixed methods survey design. This design was chosen because surveys collect large amounts of data from the target population and incorporating open-ended questions allows the respondent to expand upon ideas or concerns not addressed in the survey for a more in depth understanding of the topic (Franekel, Wallen, & Hyun 2012). A mixed methods survey is most appropriate due to

the various teaching methods involved with covering cardiac emergencies. This survey was designed to investigate didactic learning of SCA and tools available to students in the clinical setting. Utilizing quantitative methods is appropriate for this study due to the time restraints of most athletic training program directors. Most undergraduate PDs have other responsibilities at their institutions, whether it is conducting research, assisting in the sports medicine department or teaching additional classes in the program (CAATE, 2012)

Quantitative data will also provide insight into how many hours SCA is covered in athletic training programs and available equipment for students. Two qualitative questions were created in order for the PD to share different methods of teaching SCA in their program and any other concerns they had about the study. These questions are important for uncovering new methods of instruction and providing alternative methods of teaching SCA. Uniqueness of methods or tools in the qualitative portion of the study is considered important in order for justifications to be made about additions to SCA curriculum. Specifically, this survey seeks to understand the ways program directors organize and develop their curriculum to address SCA.

Sample and Population

The target population for this study included current undergraduate-level PDs. Because this is a specific population, the study aligns with purposive sampling. According to Franekel, Wallen, and Hyun (2012), purposive sampling is chosen because "researchers do not simply study whoever is available but rather use their judgment to select a sample that they believe, based on prior information, will provide the data they need" (Fraenkel et al., p. 100). Each potential participant have to be certified athletic trainers serving as PD for their respective institution. According to the CAATE, there are

approximately 378 undergraduate-level programs in the United States (CAATE, 2014). The minimum sample size of this study was set to 30 PDs, aiming for a 10% survey response (Fraenkel et al., p. 405) and the maximum sample size was set to 378.

Instrumentation

The instrument that was created for this study combined quantitative and qualitative questions using Qualtrics©, an online survey tool. Mazerolle et al. (2013), created a qualitative survey instrument analyzing how PDs in undergraduate athletic training programs addressed all conditions that can lead to sudden death. My survey was created to isolate the condition of SCA from the other causes of sudden death in order to better understand how PDs teach this topic in their programs. The Emergency Cardiac Care Education (ECCE) survey was then drafted after analyzing the BOC Role Delineation Study, 6th edition; (2012) NATA Athletic Training Education Competencies, 5th edition (2011); and the CAATE Standards for the Accreditation of Professional Athletic Training Programs (2013).

The survey contained 13 questions regarding curriculum concerning SCA and how program directors educate their students on this topic. Demographic questions were used at the beginning of the survey order to understand the years of experience teaching athletic training, years active as a program director and overall clinical experience with cardiac emergencies. Questions about the amount of lectures, hands-on experience and available pieces of equipment were used to quantify the amount of time students have to learn about SCA in the classroom and in the clinical setting. In the final section, PDs were asked to list any other methods or tools used to teach SCA not listed in the survey.

The ECCE survey was pilot tested with a small group of people, including one program director and a graduate assistant athletic trainer for content and duration of time required to complete the survey. The remaining pilot-testers provided feedback on the format, clarity of the instructions and overall technical issues involving the survey. A faculty member in the College of Education at James Madison University also provided assistance in the survey creation, looking at question constructs in order to make sure the survey addressed the research question(s). Multiple pilot-testing sessions were conducted in order to test the validity and reliability of the survey. Examples of survey questions can be seen below in Table 2.

Table 2.

Survey Instrument Examples

Demographic Questions	Q1. How many years have you been a certified athletic trainer? Q3. How many years have you been the AT program director for your university?
Emergency Cardiac Care Curriculum Structure (Quantitative Questions)	Q4. Does your program have a single course dedicated to emergency care? Q7. The aftermath of a sudden cardiac emergency can cause psychological stress for the ATS and ATC. Does your program cover how to handle the psychosocial components of sudden cardiac emergencies?
Emergency Cardiac Care Curriculum Structure (Qualitative Questions)	Q12. Do you have any other methods of teaching sudden cardiac arrest/death to undergraduate AT students not included in this survey?

Data Collection Procedures

Institutional Review Board (IRB) approval was obtained on December 1, 2014. All athletic training program directors received an email with a description of the study and attached informed consent. If respondents choose not to participate, the respondent

could opt out of taking the survey. Participants for this survey were collected from the CAATE website listing all undergraduate level athletic training programs in the United States. The CAATE organizes their program search by state/territory, program type, and degree type. State/territory was left blank in order to collect a comprehensive list of all professional-level PDs in the United States. Under program type, professional level was selected in order to eliminate programs that are considered post-professional or residency. Finally, bachelor was selected under degree type in the CAATE program search to also confirm the number of undergraduate-level programs. This search engine also lists the status of the program. Program status indicates the level of compliance of an athletic training program. “Active-In Good Standing”, “Active-Progress Report Due”, “Probation- Academic”, “Degree Change Pending”, and “Program Closing” are the various labels programs can be listed on the CAATE database (CAATE, 2015). Programs with the status “Probation- Academic”, “Degree Change Pending”, and “Program Closing” were excluded from the study in order for the data to be reflective of AT programs in good standing with the CAATE. Email addresses of PDs were saved to a spreadsheet in Excel and then imported to Outlook to communicate with all participants. Subjects in the study were blind-copied on a mass email explaining the purpose of the study, a link to the survey and the attached informed consent to participate in research. A screenshot of the email sent to all PDs is provided below:

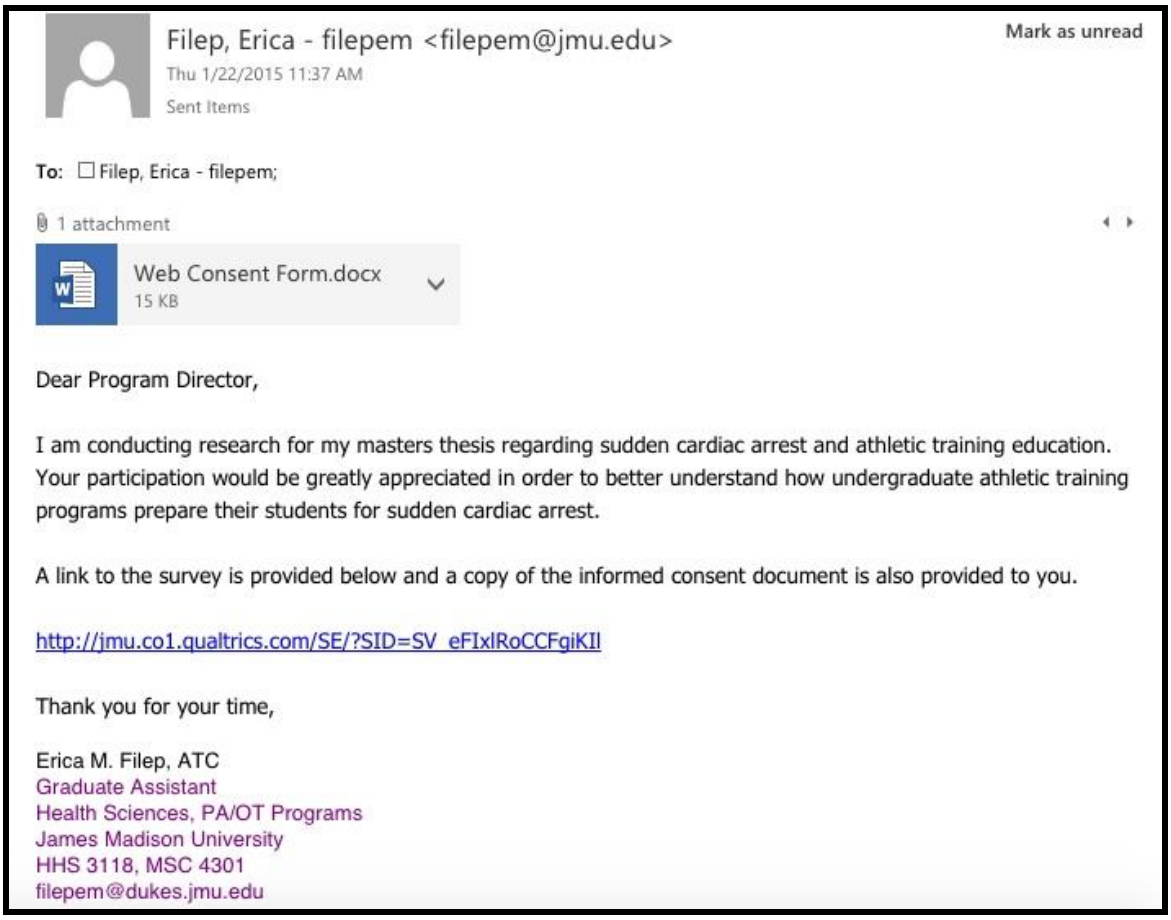


Figure 3. Email Notification to Participants

Once the survey was distributed, Qualtrics© collected data about the number of surveys started, completed and the dropout rate. The survey was open for 2 weeks in order to give PDs time to complete the survey during their free time. At the end of the two-week period, the survey was closed and a final email notification was sent. Since anonymity was constant throughout the study, another bulk email was sent to all 378 PDs thanking those who took the survey. The final email also stated if any person was interested in the results or had any additional questions about the study, they may communicate with me via email. Data was downloaded from Qualtrics in multiple formats in order for descriptive analysis.

Data were stored and analyzed within Qualtrics©, the online survey instrument utilized for this study. Furthermore, any statistical information being analyzed for reporting purposes was stored on a personal laptop computer that is password protected, with any statistical documents being password protected as well. Back-up copies of these documents were kept on an external hard drive and USB key, which was also password protected. I was the only individual who had access to this data, keeping all documents password protected on my personal laptop, USB key, and external hard drive. All records were destroyed at the end of the study.

Data Analysis

This study includes both qualitative and quantitative data, requiring both forms of analysis. Since the data from the survey were mostly categorical and exploratory in nature, inferential statistics did not need to be completed in order to make conclusions about the data (Fraenkel et al., 2012). The majority of the analysis was conducted using the tools in the Qualtrics system. Basic descriptive statistics were calculated in addition to chi-square analyses to compare differences between the classroom and clinical setting availability of equipment. Besides the questions regarding equipment availability, percentages and average responses of questions were taken into account to get an overall view of how SCA is structured in athletic training programs.

The qualitative data were analyzed by first reviewing the data in its entirety and then looking for overarching themes. Selective coding was used in order to isolate responses that were considered unique and materials not commonly found in athletic training programs at this point in time (Franekel et al., 2012). Responses that included materials or techniques newly discovered in the literature (such as high fidelity

simulators, online learning, incorporating other health professions, etc.) were recorded in order to understand the scope of SCA in athletic training programs.

Limitations

The survey instrument had to be created for this study and the validity and reliability are critical components to consider. In order to establish construct validity, I met with the Director of Assessment in the College of Education at James Madison University. With her assistance, each survey question was crafted to reflect the original research questions. In another attempt to address validity, the survey was piloted with a current program director in order to assess concerns about content and clarity of questions. Length was also a factor when creating this survey. Since PDs have many responsibilities, the survey instrument had to be concise yet provide information about their SCA curriculum. In order to assess reliability, the survey was pilot-tested with graduate assistant athletic trainers and other graduate assistants within the Health Sciences department at JMU. An additional pilot test was also conducted within the AHRD program. Feedback from this pilot-test included grammatical issues to be fixed and consistency of survey format (including fonts, colors and user-friendliness).

Threats

Threats to this study included mortality and survey instrumentation. The survey was sent out to 378 program directors, with 4 automatic-reply emails that the respondent was “out of the office” and would not return until after the survey closed. One respondent sent an email saying they were a ‘graduate level program director’ and would not be completing the survey. Since the emails were gathered from the CAATE database specifying professional-level, bachelor degree programs, this discrepancy can be

attributed to the program being incorrectly listed under the professional-level program section.

Protection of Human Subjects

PDs were notified that this study obtained IRB approval with the attached informed consent. Anonymity of PDs who responded was maintained throughout the duration of the survey. If the PD had questions or concerns about the research study, they were encouraged to email me with questions. The survey posed minimal risk to adults participating in the survey because it did not contain sensitive material according to the IRB protocol. All respondents were informed in email communication that their identity would remain anonymous throughout the duration of the study. Participants were also notified that all data would be securely stored on a password-protected laptop and encrypted USB storage device. All data regarding the study was destroyed after analysis. In the section to follow, I will present the findings from the research.

Chapter 4: Findings

In this section, I will present both quantitative and qualitative findings in from the current study. I will discuss the response rate of the survey and provide a breakdown of each question of the survey in this chapter.

A total of 82 surveys were returned, with 67 surveys fully complete. Sixty-seven respondents equates to a 17.7% response rate. The total number of responses per question varied, with $n = 71$ for the first three questions. Questions 5-8 yielded 68 total responses with total number of responses decreasing as the survey went on. Questions 8-10 had 66 responses and the last quantitative question (question 11) had 63 responses. The final two questions of the survey were qualitative, asking the respondent if they had any other methods of teaching SCA to their students and addressing any concerns not in the survey. Questions 12 and 13 only had 19 and 16 responses respectively, with most of those answers not applicable for data analysis. There were a few statements recorded about new materials and strategies used in SCA curriculum that was discovered in the qualitative data analysis. These questions will be addressed in the qualitative methods section.

Once the survey was activated, the statistics in Qualtrics reported 82 responses to the survey. However, once the survey was closed, 67 surveys were fully complete. This equates to a 17% dropout rate, which can be attributed to the respondent opening the survey, but not answering any questions. Fifty responses were recorded on the first day the survey was open and 12 responses were recorded on the second day, then numbers declined during the two-week period.

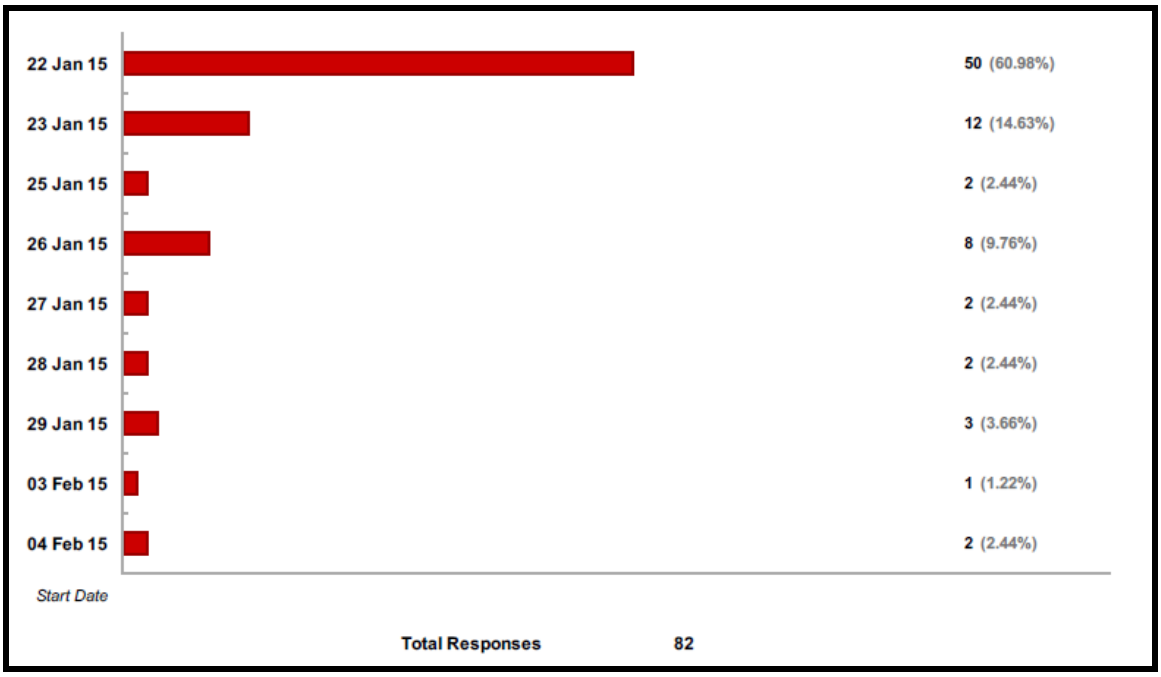


Figure 4. Survey Start Dates

The Emergency Cardiac Care Education survey (ECCE) was constructed with mixed methods in order to capture the amount of didactic and clinical experiences available to athletic training students. I also wanted to investigate other teaching practices/tools available in CAATE-accredited programs across the United States. This chapter will analyze the data collected from the ECCE survey.

Demographics

Program directors (PDs) who participated in the survey were asked three questions relating to their career and academic experience in athletic training. The following figures and tables depict the breakdown of experience between total years working as a certified athletic trainer and years spent as PD for their university.

Q1: How many years have you been a certified athletic trainer?

The largest number of PDs responded to the first question reported having 20+ years of experience as an athletic trainer (42%). The distribution of years of experience as an athletic trainer is illustrated in Table 3.1

Table 3.1

Years PDs have been a certified athletic trainer (ATC)

Answer		Response	%
1-5		1	1%
6-10		8	11%
11-15		16	23%
16-20		16	23%
20+		30	42%
Total		71	100%

Q2: Do you still practice as an athletic trainer? If 'Yes' please provide an example. (I.e. high school coverage, per-diem, clinic, etc.)

The second question (*n*= 71) of the survey asked respondents if they still currently practice as an athletic trainer. Sixty-one percent indicated 'yes' they still practice as an athletic trainer. Table 3.2 illustrates the percentage of PDs who still practice as an athletic trainer. There was a fill-in box, to provide an example of the setting they practice in if they responded yes to the question. Thirty-eight people who said yes filled in the box with the setting in which they currently practice. Those responses were coded to identify the work settings in which PDs currently practice as an athletic trainer (shown below in Figure 6). Forty-seven percent (18) of those who are still practicing work in the college/university setting providing additional help in the sports medicine department. The Educator category is highlighted because I did not consider this category practicing as a clinical athletic trainer. An issue with this question is the phrasing. In order for

respondents to understand my intention of the question, it could have been phrased differently in order for the PD to know I was looking for clinical practice as an athletic trainer.

Table 3.2

Percentage of PDs still practicing as an athletic trainer

Answer		Response	%
Yes		43	61%
No		28	39%
Total		71	100%

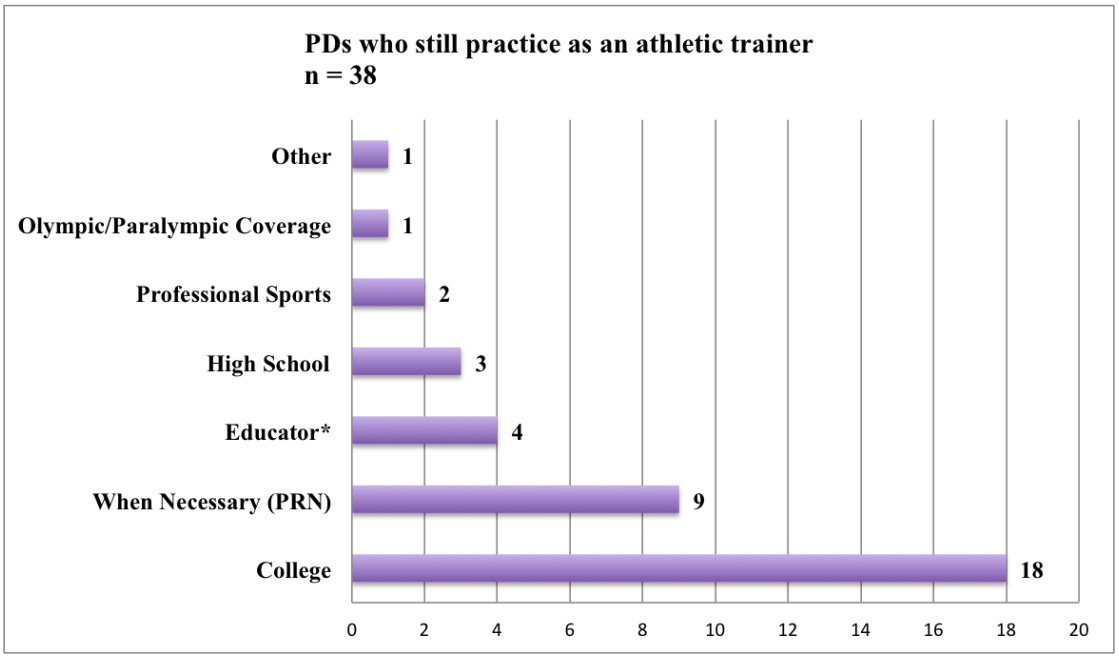


Figure 5. Settings PDs currently practice as an ATC

Q3: How many years have you been the AT program director for your university?

Question 3 looked at how long the respondent has served as the PD for their university. Interestingly, 22 out of the 71 respondents said they have been acting as PD for 1-5 years (31%). This percentage shows that PDs who responded to the survey are relatively new to the role of program director. The distribution of experience as PD is displayed below in Table 3.3

Table 3.3

Total years as a PD for their university

Answer		Response	%
Under 1 year		9	13%
1-5		22	31%
6-10		15	21%
11-15		19	27%
16-20		4	6%
20+		2	3%
Total		71	100%

Since this study was interested in the years respondents have been certified and employed as a PD for their institution, all demographic information is summarized and provided in a frequency table below. The following section will be looking at the breakdown of curriculum structure in relation to SCA in CAATE-accredited programs.

Table 3.4

Demographics Frequency Table

Demographic	Frequency	Percent
Years as a certified athletic trainer (ATC)		
1-5	1	1%
6-10	8	11%
11-15	16	23%
16-20	16	23%
20+	30	42%
Do you still practice as an athletic trainer?		
Yes	43	61%
No	28	39%
How many years have you been the AT program director for your university?		
Under 1 year	9	13%
1-5	22	31%
6-10	15	21%
11-15	19	27%
16-20	4	6%
20+	2	3%

Quantitative Methods

After the initial demographic questions, the survey transitioned into the quantitative section. This section asked respondents about the current structure of the program and how PDs organized sudden cardiac arrest curriculum. Questions 4-10 looked at structure of classes, how many lectures/contact hours are offered in this particular subject, and tools available to students in the classroom and clinic setting.

Q4: Does your program have a single course dedicated to emergency care?

In this question, $n = 68$, which was 3 responses down from the 71 responses in the demographics section. This trend continues for the next three questions of the survey. Seventy-two percent of respondents claimed their program has a single course dedicated to emergency care.

Table 3.5

Programs with a single course dedicated to emergency care

Answer		Response	%
Yes		49	72%
No		19	28%
Total		68	100%

Q5: Approximately how many lectures cover cardiac emergencies in your program?

The average number of lectures that cover cardiac emergencies was approximately 6.1 lectures. The most frequent response was three lectures, equating to 24% of respondents. It is interesting to note that there are no responses for “9 lectures”, but there are 10 responses for 10+ lectures.

Table 3.6

Number of lectures covering cardiac emergencies reported by PDs

Answer		Response	%
0		0	0%
1		1	1%
2		6	9%
3		16	24%
4		13	19%
5		10	15%
6		6	9%
7		1	1%
8		5	7%
9		0	0%
10+		10	15%
Total		68	100%

Q6: How many contact hours do students have to practice cardiac emergency scenarios in your program? (1 contact hour = hands on scenario in the classroom)

On average, students had 6.8 contact hours to practice cardiac survival skills in the classroom. The least amount reported was 1 contact-hour of hands-on practice. The most amounts of contact-hours reported by PDs were reported giving students 10+ hours of hands on scenarios in the classroom.

Table 3.7

Number of contact-hours reported by PDs

Answer		Response	%
0		0	0%
1		2	3%
2		6	9%
3		8	12%
4		10	15%
5		10	15%
6		11	16%
7		1	1%
8		3	4%
9		3	4%
10+		14	21%
Total		68	100%

Q7: The aftermath of a sudden cardiac emergency can cause psychological stress for the ATS and ATC. Does your program cover how to handle the psychosocial components of sudden cardiac emergencies?

Sixty-six percent of PDs reported that their programs cover the psychosocial components of SCA. This finding is important to note because it rejects the initial hypotheses regarding this research question. PDs are covering the emotional aspect of treating SCA in sport, which is beneficial to athletic training students as they learn about this type of emergency.

Table 3.8

Percentage of PDs covering psychosocial aspects of SCA

Answer		Response	%
Yes		45	66%
No		23	34%
Total		68	100%

Q8: Please indicate your level of agreement with the following statement: Our students can identify and utilize adjunct airways and supplemental oxygen during cardiac arrest scenarios when appropriate.

Fifty percent of PDs reported that their students could correctly identify and utilize adjunct airways and supplemental oxygen during SCA when appropriate. Twenty-four percent of PDs "strongly agree" that their students can recognize and use these tools. Fourteen percent of PDs did not agree nor disagree with the statement. Only 11% of respondents said that they "disagree" with the statement.

Table 3.9

Confidence of PDs regarding students' use of adjunct airways and supplemental oxygen

Answer		Response	%
Strongly Disagree		1	2%
Disagree		7	11%
Neither Agree nor Disagree		9	14%
Agree		33	50%
Strongly Agree		16	24%
Total		66	100%

Q9: Please indicate your level of agreement with the following statement: Our students are given the opportunity to manage a simulated cardiac emergency in the clinical setting.

Forty-eight percent of PDs 'agree' that their students are given the opportunity to manage a simulated cardiac emergency in the clinical setting. Only 20% 'strongly agree' and 20% 'disagree' with the statement.

Table 3.10

Confidence of PDs regarding opportunities for the ATS to practice cardiac emergencies in the clinical setting

Answer		Response	%
Strongly Disagree		3	5%
Disagree		13	20%
Neither Agree nor Disagree		5	8%
Agree		32	48%
Strongly Agree		13	20%
Total		66	100%

Questions 10-11 had respondents check all available equipment for their students to use in the classroom and clinical setting. Back-to-back graphs are provided to show the distribution of answers that PDs reported for these two questions.

Q10: Please select all the materials available to your students to practice cardiac emergencies in the classroom (check all that apply):

Table 3.11

Equipment available in the classroom to practice SCA skills

Answer		Response	%
CPR Mannequins		65	98%
Resuscitation Masks		62	94%
AED Trainers		65	98%
Bag-Valve Masks (BVMs)		63	95%
Non-Rebreather Mask		47	71%
Nasal Cannula		43	65%
Adjunct Airways (Nasopharangeal/Oropharangeal/Supraglottic)		52	79%
Suction Tools		44	67%
Portable Oxygen Tank		45	68%
Pulse Oximeter		59	89%
Standardized Patients		8	12%
High Fidelity Simulator (such as iStan, Resusci-Anne, SimMan, Harvey, etc.)		21	32%

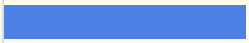
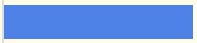
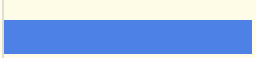
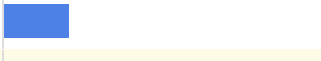
Question 11: Please select all of the materials available to your students to practice cardiac emergencies in the clinical setting (check all that apply):

It is important to know that 98% of PDs have access to CPR mannequins and AED trainers for their program. These two pieces of equipment are considered standard and required to teach CPR certification programs. The two pieces of equipment of interest from this question are adjunct airways and portable oxygen tanks. I wanted to find a statistically significant difference between the tools available in the classroom

versus the clinical setting. Budgeting, cost of maintenance, and placing importance on other supplies (such as tape, first aid, cleaning supplies, etc.) in the clinical setting can potentially lead to an absence of tools in the clinical setting.

Table 3.12

Equipment available in the clinical setting to practice SCA skills

Answer		Response	%
CPR Mannequins		37	59%
Resuscitation Masks		56	89%
AED Trainers		38	60%
Bag-Valve Masks (BVMs)		54	86%
Non-Rebreather Mask		29	46%
Nasal Cannula		26	41%
Adjunct Airways (Nasopharangeal/Oropharangeal/Supraglottic)		38	60%
Suction Tools		22	35%
Portable Oxygen Tank		35	56%
Pulse Oximeter		42	67%
Standardized Patients		4	6%
High Fidelity Simulator (such as iStan, Resusci-Anne, SimMan, Harvey, etc.)		4	6%
Emergency Room Experience		15	24%
Ride alongs with local EMS		10	16%
Scenarios conducted in the clinic by preceptors		48	76%

Looking at adjunct airway and portable oxygen availability in the classroom and clinical setting, a chi-square was used to determine if there was any statistical significance between the two settings. First, adjunct airways were compared from the

classroom (expected) to the availability of airways in the clinical setting (observed). It is assumed that the classroom setting has all necessary equipment in order to teach the current NATA competencies. The classroom (expected) value was 79% (n = 68), while clinical setting (observed) was 60% (n = 56) Using a p-value of 0.05, X^2 = 3.84. This means that the difference between the classroom and clinical setting is statistically significant when the confidence interval is at 95%. This finding is troublesome because it is now required that all students must learn the skill of applying adjunct airways and administering oxygen in a cardiac emergency.

A significant difference was not found with the availability of portable oxygen tanks in the classroom versus clinic. The chi-square for this distribution is listed in Table. 3.13.

Table 3.13

Chi-square value for adjunct airway and portable oxygen availability in the classroom versus clinic

Equipment	**Expected (Classroom)**	**Observed (Clinic)**	**Chi-square value**	**p-value**	**Confidence interval**
Adjunct Airways	79	60	4.57	0.05, 3.84	95%
Portable Oxygen	68	56	2.12	0.1, 2.71	99%

Qualitative Methods

After all quantitative questions were answered, the survey then asked respondents two open-ended questions. These two questions were designed to give the respondent the ability to put any concerns down they had about the content of the survey and any other additional teaching methods/tools they use in their programs not addressed by the survey. Overall, only 19 and 16 respondents added comments in the final two questions. Question 12 was coded using selective coding (Fraenkel et al., 2012), looking for unique teaching methods and materials used by PDs in order to teach SCA in a manner that is innovative and utilizing new technology. The last question of the survey asked respondents if they had any other questions or concerns about the survey. The responses in this section were analyzed by the use of themes. Specifically, the overall user-friendliness of the survey concerns about interpretation of questions and overall concerns respondents had during the survey were coded in order to highlight potential discrepancies within the survey instrument.

Q12: Do you have any other methods of teaching sudden cardiac arrest/death to undergraduate AT students not included in this survey?

Question 12 (n = 19) was coded for different teaching strategies that were not traditionally a part of the didactic curriculum and relatively new to AT education literature. Teaching methods and tools that are not typically utilized by AT programs but have been documented in the literature as useful, hands-on learning experiences were separated from traditional approaches to teaching SCA. Respondents who answered ‘no’ were thrown out for relevancy reasons. Answering ‘no’ did not provide any additional information regarding how their program addresses other methods of teaching sudden

cardiac arrest. Information such as ‘teaching CPR classes, CPR training or CPR for the professional rescuer training’ was also discarded because it is required that all athletic training students become CPR certified prior to entry of their professional-level program. Therefore, this is not a new or innovative teaching tool found in athletic training education curriculum.

Table 3.14

Other teaching methods/tools not mentioned in the survey

Useful Information about Curriculum Structure
We have a 3 hr lecture and a weekly lab. Students practice and apply emergency care/CPR/AED during lab sessions and then we have a single Saturday morning/afternoon we schedule all students to get skills tested and checked off.
Cases and conditions are also discussed in the General Medical Conditions class.
Students learn basic ECG interpretation and in-depth screening including criteria for referral for echocardiography or cardiac MRI
Simulation Center- new to us this semester, just started utilizing it today and it was a fantastic learning opportunity
Also, annual preseason emergency response drills with preceptors, EMS, clinical faculty and staff.
Position Statement Review
On-line scenarios
Guest lecturer who is an EMT/AT every year

Table 3.15

Irrelevant Information about Curriculum Structure

Irrelevant Information about Curriculum Structure

No, *n* = 8
in addition to course work we have recertification practice and exams annually with students.
CPR for the Professional Rescuer Training
Just realized that I didn't click nasal cannula in the last question asked.

Question 13: Do you have any additional questions or concerns not discussed in the survey?

Question 13 proved more difficult to code because this question asked if the respondent had any other questions or concerns not addressed in the survey. In this question, I was looking for responses that contained phrases that related to the clarity of the questions and structure of the survey. One respondent wrote that they have a graduate program not an undergraduate program and therefore did not follow directions when the survey was initially sent out. Their responses were discarded in order for the data to reflect undergraduate-level athletic training programs. One respondent also listed that they have "over 100 clinical education sites and not all of them offer the equipment listed, but, some sites do…" This statement is troublesome because the PD must have a list of all clinical sites, available equipment and calibrations of electrical equipment sent in to the CAATE for a self-study (CAATE, 2012).

Table 3.16

Responses to concerns not addressed in the survey

Concerns Relevant to Survey Organization
In your question involving number of lectures, it would be helpful to know how much time is considered one lecture. For instance, does one lecture encompass one clock hour or one entire class period?
Would have been nice to be able to go back to review responses to make sure that all areas were properly checked.

Table 3.17

Irrelevant information about concerns not addressed in the survey

Irrelevant Information
No, *n* = 11
We are a graduate program not an undergraduate program.
Clinical setting question is not necessarily accurate ....I have over 100 clinical education sites and not all of them offer the equipment listed, but, some sites do. So, they may have availability, but, not always.
PPE and specific screening for pre-existing cardiac conditions. Identifying patients at risk

In this section I presented the findings of this research. The Emergency Cardiac Care Education survey (ECCE) was constructed using a mixed-method design to quantify the amount of didactic and clinical experiences available to athletic training students. I also wanted to investigate other teaching practices/tools available in CAATE-accredited programs across the United States. Now I will discuss my conclusions, limitation and recommendations for practice.

Chapter 5: Discussion and Conclusion

In this final chapter, I will discuss the key findings of the Emergency Cardiac Care (ECCE) survey, implications for athletic training curriculum development, recommendations for future study, and overall conclusions from this research. This study was conducted in order to find gaps within athletic training education in relation to sudden cardiac arrest. The ECCE survey was sent out to all PDs in good standing with the CAATE in order to gather data about how SCA is taught in undergraduate-level athletic training programs.

Overview of Key Findings

To revisit the initial research questions for this study, it is important to analyze the following research questions for conclusions about SCA in athletic training programs:

1. Which National Athletic Trainers' Association (NATA) competencies related to sudden cardiac arrest (SCA) are addressed in undergraduate AT programs?
2. What materials are being used in the classroom and clinical setting to transfer knowledge about SCA to athletic training students?
3. Are program directors addressing the psychosocial component of sudden cardiac death sports?

Once the survey was closed and results were analyzed, the current state of emergency cardiac care in athletic training education appears to meets the required SCA competencies set by the NATA. In the NATA 5th Edition Competencies, the survey responses correspond to the following competencies: AC-9, AC-12-17, and AC-36 (NATA, 2011, p. 21-22). All programs reported multiple lectures and hands-on practice with SCA in their curriculum. This finding is important because all students must be

declared “minimally competent” in order for students to be eligible for the BOC exam (NATA, 2011). PDs also reported that they either “agree” or “strongly agree” that their students can identify and utilize adjunct airways and emergency oxygen. This question aligns with NATA competencies AC-9, AC-16, and AC-17 (NATA, 2011, p. 21-22). They also stated that they “agree” that their students are given opportunities to manage a simulated cardiac emergency in the clinical setting.

The PD’s who responded to the qualitative questions in the survey provided additional teaching materials, tools, and strategies they employ in their undergraduate athletic training program. Materials that are being utilized in the classroom include simulation centers, high-fidelity simulations, standardized patients and online scenarios. Another PD reported their students are required to become certified Emergency Management Technicians (EMTs). During the two-week window while the survey was active, a PD from a large Midwest university emailed me with additional information about the structure of their AT program. This particular AT program is incorporated into the College of Public Health at their institution. EMT certification is required of all athletic training students at this university, which results in the athletic training student possessing a larger scope of practice. Incorporating additional emergency cardiac survival skills/tools from the EMT scope of practice will give the ATS an advantage in the field since they will be certified as an athletic trainer and EMT. According to the National Highway and Transit Safety Administration (NHTSA) National EMS Scope of Practice Model (2007), an EMT is allowed to “insert airway adjuncts intended to go into the oropharynx or nasopharynx, use of positive pressure ventilation devices such as manually triggered ventilators and automatic transport ventilators” (p.26). The inclusion

of these other devices used in cardiac emergencies is not included in the scope of practice of an athletic trainer. Therefore, this AT program requirement gives the student a larger knowledge base of emergency cardiac care skills not traditionally taught in other undergraduate-level AT programs.

The one area for potential improvement is the availability of adjunct airways and portable oxygen tanks in the clinical setting. It was discovered during the data analysis of the ECCE survey that there is a statistically significant difference between the availability of adjunct airways in the classroom versus clinic. PDs should be aware that students might not have the opportunity to practice using adjunct airways during their clinical experience, therefore affecting their skill practice and overall competency with these required tools to intervene in a cardiac emergency. Now that the key findings have been discussed, I will move on to limitations of the ECCE survey.

Limitations

The limitations for this study include the omission of gender from demographics, response rate, mortality of the survey instrument, and lack of existing survey instrument for question development. PDs who feel that their programs are deficient could have answered the questions in the survey in a way that does not truly reflect their SCA curriculum.

Response rate for the survey was approximately 17.7%. The total population of PDs is 378; 67 PDs responded to the ECCE survey. A total of 82 PDs started the survey, but when the survey was closed, only 67 full responses were recorded. This may be attributable to the decreasing interest in the survey, clicking on the link and not actually taking the survey, or not following directions. For future research, the instructions can be

improved to address the importance of isolating undergraduate-level PDs versus entry-level masters' programs. Another challenge of this study was the lack of existing survey instrument. The survey instrument developed by Mazerolle et al. (2013) was helpful in order to understand question constructs. However, I wanted to quantify the amount of lecture hours, hands-on practice time and materials available to students to practice SCA-related skills. After analyzing the limitations of my survey instrumentation and methods, I will now discuss the implications for curriculum development in AT programs.

Implications for Curriculum Development

After analyzing the key findings of the survey and limitations, mostly all PDs are following the current NATA 5th edition competencies in relation to sudden cardiac arrest. The largest issue that was revealed after the survey was the lack of access to adjunct airways and supplemental oxygen to athletic training students in the clinical setting. This finding is worrisome because the use of adjunct airways and supplemental oxygen are now being incorporated into state practice acts across the country. For example, the state of Virginia amended The Drug Control Act on April 3, 2014, to include administering oxygen in case of emergency. This update to the Act added athletic trainers to the list of appropriate healthcare professionals allowed to use supplemental oxygen when the emergency warrants (Drug Control Act, 2014, c.491). Now that states are amending their practice acts for athletic trainers to include oxygen administration and the use of adjunct airways, it is pertinent for professional-level programs to incorporate these skills into their curriculum. As these skills and materials are being incorporated into state practice acts, it is important to outline the recommendations and opportunities for future research.

Recommendations for Future Study

Future studies should be conducted on this topic in order to gain better perspective on SCA curriculum in AT programs across the United States. Currently, the literature on preventing sudden death in athletics is vast. There have been many studies conducted on best practices in emergency care that also includes SCA. However, narrowing research to include how athletic training students respond to catastrophic and emergent injuries is an important topic to consider as athletic training education evolves. While PDs reported their programs cover psychosocial aspects of SCA, future studies should also investigate the support services available to students if a SCA event occurs in their clinical site. Future direction of the field includes shifting undergraduate-level athletic training programs to be entry-level masters' programs. This motion to change the current AT curriculum structure is in order to put the field on par with other healthcare professions, such as physician assistant and occupational therapy programs (CAATE, 2015). As the profession makes the transition to graduate-level coursework, curriculums will have to be redesigned with adult learning theories and strategies. Research incorporating adult learning with athletic training education will be critical in this development stage. In addition to overall curriculum design, further studies will have to be conducted with the adult learner and catastrophic injury in athletics. These entry-level athletic trainers will have to be incorporated into the profession at a later stage in their academic career, versus the current population of students currently sitting for the BOC exam. With these recommendations for future research, I will now conclude this chapter.

Conclusions

The key findings from this survey indicate that PDs are following NATA competencies relating to SCA. PDs are also addressing the psychosocial aspects of SCA in their programs, however more research needs to be completed in order to gain a holistic understanding of the support provided by programs. Increasing the availability of adjunct airways and portable oxygen tanks in the clinical setting will give the certified athletic trainer the tools required to act in a cardiac emergency and provide opportunities for the ATS to practice using these materials in an applied setting. Future studies should also include how to translate traditional pedagogical strategies of athletic training education for the adult learner, as the profession moves towards an entry-level masters degree requirement. With these findings and recommendations, athletic training students will be armed with the best available evidence and tools to act in a sudden cardiac arrest emergency as certified athletic trainers.

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Appendix A: Institutional Review Board (IRB) Protocol

James Madison University
Human Research Review Request

FOR IRB USE ONLY:

Exempt:	☐	Protocol Number:	1st Review: _____	Reviewer: _____
Expedited:	☐	IRB: _____	2nd Review: _____	Reviewer: _____
Full Board:	☐	Received: _____	3rd Review: _____	

Project Title:	Emergency Cardiac Care in Athletic Training Education
Project Dates: (Not to exceed 1 year minus 1 day)	From: 11/10/14 (MM/DD/YY) To: 10/31/15 (MM/DD/YY)
Minimum # of Participants:	30
Maximum # of Participants:	300
External Funding:	Yes: ☐ No: ☒ **Internal Funding:** Yes: ☐ No: ☒
	If yes, Sponsor: _____
	Will monetary incentives be offered with funding? Yes: ☐ No: ☒
	If yes: How much per recipient? _____ In what form? _____
Must follow JMU Financial Policy:	http://www.jmu.edu/financemanual/procedures/4205.shtml#.391Incentives
Responsible Researcher(s):	Erica M. Filep, ATC
E-mail Address:	filepem@dukes.jmu.edu
Telephone:	727-255-3051
Department:	Health Sciences
Address (MSC):	4301
Please Select:	☐ Faculty ☐ Undergraduate Student ☐ Administrator/Staff Member ☒ Graduate Student
(if Applicable):	
Research Advisor:	Dr. Noorjehan Kelsey Brantmeier
E-mail Address:	brantmnk@jmu.edu
Telephone:	(540) 568-4530
Department:	Adult Education/Human Resource Development
Address (MSC):	6913

Investigator: Please respond to the questions below. The IRB will utilize your responses to evaluate your protocol submission.

1. ☒ YES ☐ NO Does the James Madison University Institutional Review Board define the project as *research?*

   The James Madison University IRB defines "research" as a "*systematic* investigation designed to develop or contribute to *generalizable knowledge*." All research involving human participants conducted by James Madison University faculty and staff and students is subject to IRB review.

2. ☒ YES ☐ NO Are the human participants in your study *living* individuals?

   "Individuals whose physiologic or behavioral characteristics and responses are the object of study in a research project. Under the federal regulations, human subjects are defined as: living individual(s) about whom an investigator conducting research obtains: (1) data through intervention or interaction with the individual; or (2) identifiable private information."

3. ☒ YES ☐ NO Will you obtain data through *intervention* or *interaction* with these individuals?

   "Intervention" includes both physical procedures by which data are gathered (*e.g.*, measurement of heart rate or venipuncture) and manipulations of the participant or the participant's environment that are performed for research purposes. "Interaction" includes communication or interpersonal contact between the investigator and participant (*e.g.*, surveying or interviewing).

4. ☐ YES ☒ NO Will you obtain *identifiable private information* about these individuals?

"Private information" includes information about behavior that occurs in a context in which an individual can reasonably expect that no observation or recording is taking place, or information provided for specific purposes which the individual can reasonably expect will not be made public (*e.g.*, a medical record or student record). "Identifiable" means that the identity of the participant may be ascertained by the investigator or associated with the information (*e.g.*, by name, code number, pattern of answers, etc.).

5. ☐ YES ☒ NO Does the study present *more than minimal risk* to the participants?

"Minimal risk" means that the risks of harm or discomfort anticipated in the proposed research are not greater, considering probability and magnitude, than those ordinarily encountered in daily life or during performance of routine physical or psychological examinations or tests. Note that the concept of risk goes beyond physical risk and includes psychological, emotional, or behavioral risk as well as risks to employability, economic well being, social standing, and risks of civil and criminal liability.

CERTIFICATIONS:

For James Madison University to obtain a Federal Wide Assurance (FWA) with the Office of Human Research Protection (OHRP), U.S. Department of Health & Human Services, **all** research staff working with human participants must sign this form and receive training in ethical guidelines and regulations. "Research staff" is defined as persons who have direct and substantive involvement in proposing, performing, reviewing, or reporting research and includes students fulfilling these roles as well as their faculty advisors. The Office of Research Integrity maintains a roster of all researchers who have completed training within the past three years.

Test module at ORI website http://www.jmu.edu/researchintegrity/irb/irbtraining.shtml

Name of Researcher(s) and Research Advisor	Training Completion Date
Erica M. Filep	9/19/2013
Noorjehan Kelsey Brantmeier	9/19/2013
Amy Thelk	8/11/14
Randy Snow	

For additional training interests, or to access a Spanish version, visit the National Institutes of Health Protecting Human Research Participants (PHRP) Course at: http://phrp.nihtraining.com/users/login.php

By signing below, the Responsible Researcher(s), and the Faculty Advisor (if applicable), certifies that he/she is familiar with the ethical guidelines and regulations regarding the protection of human research participants from research risks. In addition, he/she agrees to abide by all sponsor and university policies and procedures in conducting the research. He/she further certifies that he/she has completed training regarding human participant research ethics within the last three years.

Erica M. Filep, ATC — *11/6/14*

Principal Investigator Signature — Date

N. Brantmeier — *11/7/14*

Faculty Advisor Signature — Date

Submit an electronic version (in a Word document) of your **ENTIRE** protocol to researchintegrity@jmu.edu.
Provide a **SIGNED** hard copy of the Research Review Request Form to:
Office of Research Integrity, MSC 5738, 601 University Boulevard, Blue Ridge Hall, Third Floor, Room # 342

Purpose and Objectives

The purpose of this study is to investigate how sudden cardiac death is taught to athletic training students in accredited athletic training programs. Students who graduate from accredited athletic training programs are taught these skills in a safe, yet sterile environment. These individuals do not get to experience treating conditions such as sudden cardiac death (SCD) while they are still in school due to the rarity of these medical conditions. Students who are newly certified also have been under supervision of a preceptor while they were enrolled in an athletic training program. This lack of independence can create a problem with confidence in skills once they transition to the field.

Investigating how athletic training students are taught emergency skills in relation to sudden cardiac death can vastly improve the confidence of athletic training students and newly certified athletic trainers how to treat this condition. The psychosocial aspect of sudden cardiac death in athletics is also an important component regarding educating athletic training students. Students are taught the necessary skills required treating athletes in a cardiac emergency, however the available evidence on how students process sudden cardiac death is limited. The researcher has experienced sudden cardiac death and other catastrophic injuries in athletic training during their undergraduate education. Many students do not have the opportunity to participate in a real life cardiac emergency because of the rarity of that condition. According to Harmon et al. (2011), approximately 1 in 43,000 NCAA athletes die from sudden cardiac death each year (p. 1597), while the incidence for younger athletes is an alarming 110 deaths per year in the United States (Casa et al., 2012). Therefore, it is critical that athletic training students get the most up to date and advanced education regarding emergency cardiac care for the athlete.

The research questions for this proposed study are:

1. Which National Athletic Trainers' Association (NATA) competencies related to SCA are addressed in undergraduate AT programs?
2. What materials are being used in the classroom and clinical setting to transfer knowledge about SCA to athletic training students?
3. Are program directors addressing the psychosocial component of sudden cardiac death sports?

Hypothesis: After posing these questions, athletic training program directors will conduct a needs assessment in order to make curriculum changes that closely align with the current NATA competencies and Role Delineation Study. Additionally, athletic training program directors will seek additional materials and research regarding teaching emergency skills in the traditional classroom. Finally, program directors will address the psychosocial nature of sudden cardiac death in athletic training.

Procedures/Research Design/Methodology/Timeframe

Participants for this study will include current athletic training program directors (PDs) that oversee Commission on Accreditation of Athletic Training Education (CAATE) accredited programs in the United States. These individuals are currently listed on the CAATE website, with their contact information.

Subjects will be recruited via email with a description of the study, consent form and intents of the researcher. Draft email text is provided below:

Erica M. Filep, ATC, is a graduate student at James Madison University conducting research regarding sudden cardiac arrest/death (SCA/D) in athletic training education. The intent of the researcher is to investigate how SCA/D is taught in undergraduate athletic training programs for the purpose of contributing to the existing AT education literature. This survey contains 12 questions, requiring a maximum of 10 minutes of your time. Your participation is completely optional and will be kept anonymous.

The survey used in this study will utilize a mixed-methods design. Questions in the survey will be both quantitative and qualtiative in nature, with the majority of the questions requring quantiative analysis. The reasoning behind this research design is collect quantitative data to discover how programs are currently teaching about sudden cardiac arrest/death. Also, qualitative questions will be used to assess any other teaching methods program directors are utilizing not addressed in the survey. To respect program director's time the survey must be brief, but the qualitative questions would allow directors to contribute additional rich detail and description.

The question format of this survey will use Likert scales, 'select all that apply', nominal questions, and open ended response types.. The first four questions will address demographic information about the respondent's experience in athletic training education:

1. *How many years have you been a certified athletic trainer?*
2. *Do you still practice as an athletic trainer?*
3. *How many years have you been the athletic training program director at your university?*

Once demographic questions have been completed, the survey will move into the Emergency Cardiac Care Education (ECCE) section.

4. *Does your program have a single course dedicated to emergency care?*
5. *Approximately how many lectures cover cardiac emergencies in your program?*
6. *How many contact hours do students have to practice cardiac emergency scenarios in your program? (1 contact hour = hands on scenario in the classroom)*
7. *Does your program cover the psychosocial component of sudden death in sports?*
8. *Please indicate your level of agreement with the following statement: Our students can identify and utilize adjunct airways and supplemental oxygen during cardiac arrest scenarios when appropriate.*
9. *Please indicate your level of agreement with the following statement: Our students are given the opportunity to manage a simulated cardiac emergency in the clinical setting.*
10. *Please select all the materials that your program currently has access to teach students about cardiac emergencies:*
11. *Please select all of the materials currently available to your students to practice cardiac emergencies in the clinical setting.*

The final question of the survey will be qualtiative. This question will ask the respondent if they have any other opinions or concerns about how emergency cardiac care education is covered in their program.

12. *Do you have any other methods of teaching SCA to undergraduate AT students not included in this survey?*
13. *Do you have any additional questions or concerns not discussed in the survey?*

Minimal risk is associated with this study due to the nature of data collection. Data will be collected through a survey administered through Qualtrics (an online survey tool). The questions in the survey do not pose any psychological harm to the subjects. This survey is 13 questions and should take the respondent 10 minutes of their time.

While there are no direct benefits for participating in this anonymous online survey, the survey data will be used to expand the literature in athletic training education regarding how cardiac emergencies are taught in undergraduate athletic training programs.

The time frame for this study is approximately 11 months. As soon as IRB approval is granted, the researcher aims to send out the survey in late November 2014. The survey will close after a three-week period, with the

researcher analyzing the data in January-February 2015. The study will remain open through October 31st, 2015 for publishing purposes.

Data will be collected from the following populations:

_____ Minors (under 18 years of age); Specify Age: _____
_____ Prisoners
_____ Pregnant Women, fetuses, or neonates
_____ Cognitively impaired persons
_____ Other protected or potentially vulnerable population
__x__ Not Applicable

Research will be conducted at:
James Madison University
Department of Health Sciences
801 Carrier Drive, MSC 4301
Harrisonburg, Virginia 22807

Data Analysis

Data will be stored and analyzed within Qualtrics, the online survey instrument being utilized for this research project. The survey being issued will be anonymous, in that there will be no identifying information attached to any of the research questions being asked. The researcher will not be present while the survey is being completed. Furthermore, any statistical information being analyzed for reporting purposes will be stored on a personal laptop computer that is password protected, with any statistical documents being password protected as well. A back-up copy of these documents may be kept on a portable hard drive, which will also be password protected. The researcher will be the only individual who will have any access to this data, which will remain within a password-protected electronic file once the research has been completed. At the end of the study, all records will be destroyed.

The people who will have access to the data include the researcher and the thesis committee listed below:
Dr. Noorie Brantmeier- Assistant Professor/Thesis Committee Chair
Dr. Amy Thelk- Director of Assessment, COE/Committee Member
Randy Snow, MSEd- Instructor/Committee Member

Reporting Procedures

The audience that will receive the report of the study includes the thesis committee for Erica Filep. This committee includes two graduate faculty members from AHRD/LTLE graduate school and one committee member from Health Sciences who currently serves as the athletic training interim program director.

Dr. Noorjehan Kelsey Brantmeier –Committee Chair
Dr. Amy Thelk – Committee Member/Director of Asessment for COE
Randy Snow, MSEd- Committee Member

Results will be presented to the Research Review Committee in a classroom setting. These results will be presented to the mentioned committee members above through a "defense" of the research and the resulting conclusions of the research.

In the consent form sent out to the research subjects, the email correspondence of the researcher will be listed and respondents may inquire if they choose to do so.

Experience of the Researcher (and advisor, *if student)*:

Erica M. Filep holds a Bachelor's of Science in Athletic Training (BSAT) from the University of South Florida. She is also a certified athletic trainer (ATC) in good standing with the Board of Certification. Currently, Erica is a graduate student at James Madison University enrolled in the Adult Education/Human Resource Development Master's program. She has completed the following classes within the AHRD program: Foundations of Human Resource Development, Design and Development of Digital Media, Research Methods and Inquiry in AHRD, Performance Analysis and Needs Assessment, Learning Theories, Principles of Instructional Design. She also has had experience with her research topic as an undergraduate athletic training student, experiencing how to treat sudden cardiac arrest and other catastrophic injuries in sport.

Dr. Noorie Kelsey Brantmeier has a Ph.D. in Adult Education and Human Resource Studies with a specialization in research methods from Colorado State University. She has a master's degree in social work from Washington University in St. Louis where she conducted research on social and economic development in Native American communities. Dr. Brantmeier has been a principal investigator, co-principal investigator, and/or research coordinator on studies related to the measurement of student attitudes regarding diversity in higher education; youth civic engagement; and adolescent attitudes toward violence. She holds the rank of Graduate Faculty at JMU and teaches research methods courses at both the master's and doctoral levels.

Past and current research methods courses taught include:
PSY 840: Qualitative and Mixed Research Methods
AHRD 600: Needs Assessment
AHRD/EDUC 630: Research Methods & Inquiry
AHRD 680/700: Reading & Research/Thesis

Dr. Amy Thelk has a Ph.D. in Assessment and Measurement from James Madison University. She has served on several grants as researcher and more often, as grant evaluator or faculty consultant. She has worked at JMU since 2006 and was a graduate student from 2001-2006.

Randy Snow received his Master's Degree in Adult Education/Human Resource Development from James Madison University in May, 2006 and received his BS in Education from Eastern Mennonite University. He has over 12 years of experience in the corporate sector working for pharmaceutical companies Merck and PRA. His main duties included process analysis, process improvement initiatives, corrective and preventive actions, root cause analysis and the development and reporting of business metrics. Professor Snow currently teaches the Foundations of Human Resource Development (AHRD 520) and Needs Assessment (AHRD 600) classes in the AHRD master's program.

"Web" / "Email" Consent to Participate in Research (confidential research)

Identification of Investigators & Purpose of Study

You are being asked to participate in a research study conducted by Erica M. Filep, ATC from James Madison University. The purpose of this study is to *investigate current teaching methods regarding cardiac emergencies in athletic training*. This study will contribute to the researcher's completion of her master's thesis.

Research Procedures

This study consists of an online survey that will be administered to individual participants through Qualtrics (an online survey tool). You will be asked to provide answers to a series of questions related to emergency cardiac care education. Should you decide to participate in this confidential research you may access the anonymous survey by following the web link located under the "Giving of Consent" section.

Time Required

Participation in this study will require 10 minutes of your time.

Risks

The investigator does not perceive more than minimal risks from your involvement in this study (that is, no risks beyond the risks associated with everyday life).

Benefits

While there are no direct benefits from your participation in this anonymous online research study, your input will be used to provide insight into how athletic training programs are currently teaching emergency cardiac care skills in the classroom. This research will add to the literature regarding preparedness of athletic training students and sudden death in sport.

Confidentiality

The results of this research will be presented at the thesis defense of the researcher. While individual responses are anonymously obtained and recorded online through Qualtrics (a secure online survey tool), data is kept in the strictest confidence. The results of this project will be coded in such a way that the respondent's identity will not be attached to the final form of this study. Aggregate data will be presented representing averages or generalizations about the responses as a whole. All data will be stored in a secure location accessible only to the researcher. Upon completion of the study, all information will be destroyed. Final aggregate results will be made available to participants upon request.

Participation & Withdrawal

Your participation is entirely voluntary. You are free to choose not to participate. Should you choose to participate, you can withdraw at any time without consequences of any kind.

Questions about the Study

If you have questions or concerns during the time of your participation in this study, or after its completion or you would like to receive a copy of the final aggregate results of this study, please contact:

Erica M. Filep, ATC
Health Sciences

Noorjehan Brantmeier, PhD
Learning, Technology and Leadership Education

James Madison University
filepem@dukes.jmu.edu

James Madison University
Telephone: (540) 568-4530
Email Address: brantmnk@jmu.edu

Questions about Your Rights as a Research Subject

Dr. David Cockley
Chair, Institutional Review Board
James Madison University
(540) 568-2834
cocklede@jmu.edu

Giving of Consent

I have read this consent form and I understand what is being requested of me as a participant in this study. I freely consent to participate. The investigator provided me with a copy of this form through email. I certify that I am at least 18 years of age. By clicking on the link below, and completing and submitting this confidential online survey, I am consenting to participate in this research.

http://jmu.co1.qualtrics.com/SE/?SID=SV_eFIxlRoCCFqiKll

Erica M. Filep, ATC — Name of Researcher (Printed)
11/4/14 — Date

This study has been approved by the IRB, protocol # No. 15-0266.

Appendix B: Survey Instrument

Emergency Cardiac Care Education Survey

Welcome to the Emergency Cardiac Care Education (ECCE) Survey. Erica M. Filep, ATC, is a graduate student at James Madison University conducting research regarding sudden cardiac arrest/death (SCA/D) in athletic training education. The intent of the researcher is to investigate how SCA/D is taught in undergraduate athletic training programs and to add to the existing AT education literature. This survey contains 13 questions, requiring a maximum of 10 minutes of your time. Your participation is completely optional and will be kept anonymous.

Q1 How many years have you been a certified athletic trainer?

- ❍ 1-5
- ❍ 6-10
- ❍ 11-15
- ❍ 16-20
- ❍ 20+

Q2 Do you still practice as an athletic trainer? If 'Yes' please provide an example. (i.e. high school coverage, per-diem, clinic, etc.)

- ❍ Yes _____
- ❍ No

Q3 How many years have you been the AT program director for your university?

- ❍ Under 1 year
- ❍ 1-5
- ❍ 6-10
- ❍ 11-15
- ❍ 16-20
- ❍ 20+

Q4 Does your program have a single course dedicated to emergency care?

- ❍ Yes
- ❍ No

Q5 Approximately how many lectures cover cardiac emergencies in your program?

- ❍ 0
- ❍ 1
- ❍ 2
- ❍ 3
- ❍ 4
- ❍ 5
- ❍ 6
- ❍ 7
- ❍ 8
- ❍ 9
- ❍ 10+

Q6 How many contact hours do students have to practice cardiac emergency scenarios in your program? (1 contact hour = hands on scenario in the classroom)

- ❍ 0
- ❍ 1
- ❍ 2
- ❍ 3
- ❍ 4
- ❍ 5
- ❍ 6
- ❍ 7
- ❍ 8
- ❍ 9
- ❍ 10+

Q7 The aftermath of a sudden cardiac emergency can cause psychological stress for the ATS and ATC. Does your program cover how to handle the psychosocial components of sudden cardiac emergencies?

- ❍ Yes
- ❍ No

Q8 Please indicate your level of agreement with the following statement: Our students can identify and utilize adjunct airways and supplemental oxygen during cardiac arrest scenarios when appropriate.

- ❍ Strongly Disagree
- ❍ Disagree
- ❍ Neither Agree nor Disagree
- ❍ Agree
- ❍ Strongly Agree

Q9 Please indicate your level of agreement with the following statement: Our students are given the opportunity to manage a simulated cardiac emergency in the clinical setting.

- ❍ Strongly Disagree
- ❍ Disagree
- ❍ Neither Agree nor Disagree
- ❍ Agree
- ❍ Strongly Agree

Q10 Please select all the materials available to your students to practice cardiac emergencies in the classroom (check all that apply):

- ❑ CPR Mannequins
- ❑ Resuscitation Masks
- ❑ AED Trainers
- ❑ Bag-Valve Masks (BVMs)
- ❑ Non-Rebreather Mask
- ❑ Nasal Cannula
- ❑ Adjunct Airways (Nasopharangeal/Oropharangeal/Supraglottic)
- ❑ Suction Tools
- ❑ Portable Oxygen Tank
- ❑ Pulse Oximeter
- ❑ Standardized Patients
- ❑ High Fidelity Simulator (such as iStan, Resusci-Anne, SimMan, Harvey, etc.)

Q11 Please select all of the materials available to your students to practice cardiac emergencies in the clinical setting (check all that apply):

- ❑ CPR Mannequins
- ❑ Resuscitation Masks
- ❑ AED Trainers
- ❑ Bag-Valve Masks (BVMs)
- ❑ Non-Rebreather Mask
- ❑ Nasal Cannula
- ❑ Adjunct Airways (Nasopharangeal/Oropharangeal/Supraglottic)
- ❑ Suction Tools
- ❑ Portable Oxygen Tank
- ❑ Pulse Oximeter
- ❑ Standardized Patients
- ❑ High Fidelity Simulator (such as iStan, Resusci-Anne, SimMan, Harvey, etc.)
- ❑ Emergency Room Experience
- ❑ Ride alongs with local EMS
- ❑ Scenarios conducted in the clinic by preceptors

Q12 Do you have any other methods of teaching sudden cardiac arrest/death to undergraduate AT students not included in this survey?

Q13 Do you have any additional questions or concerns not discussed in the survey?

Appendix C: Figures 1-5

Figure 1. Conceptual and Theoretical Framework

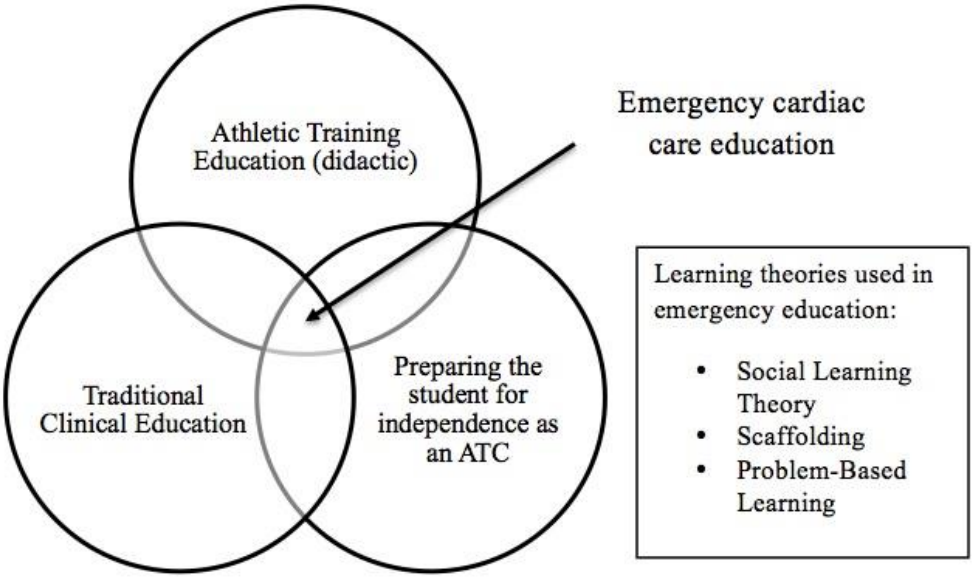


Figure 2. Governing Bodies of Athletic Training

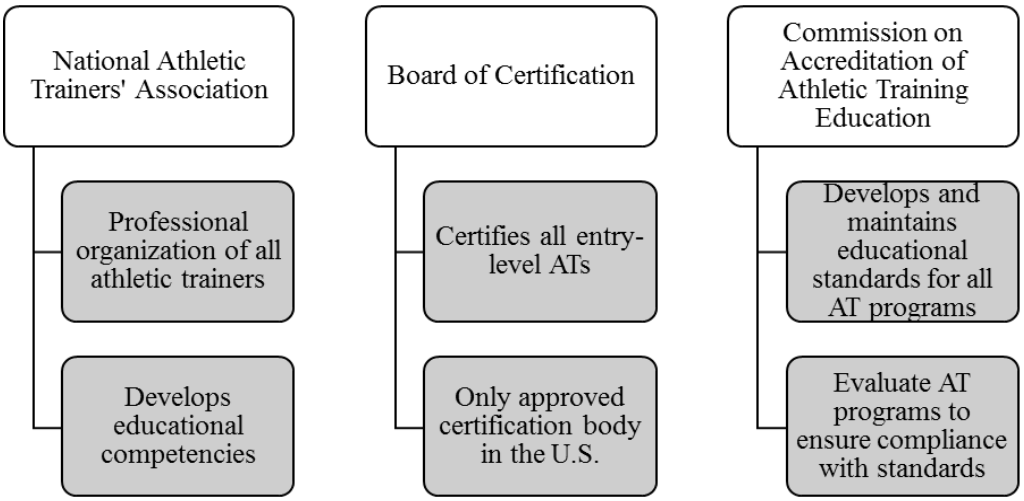


Figure 3. Email Notification to Participants

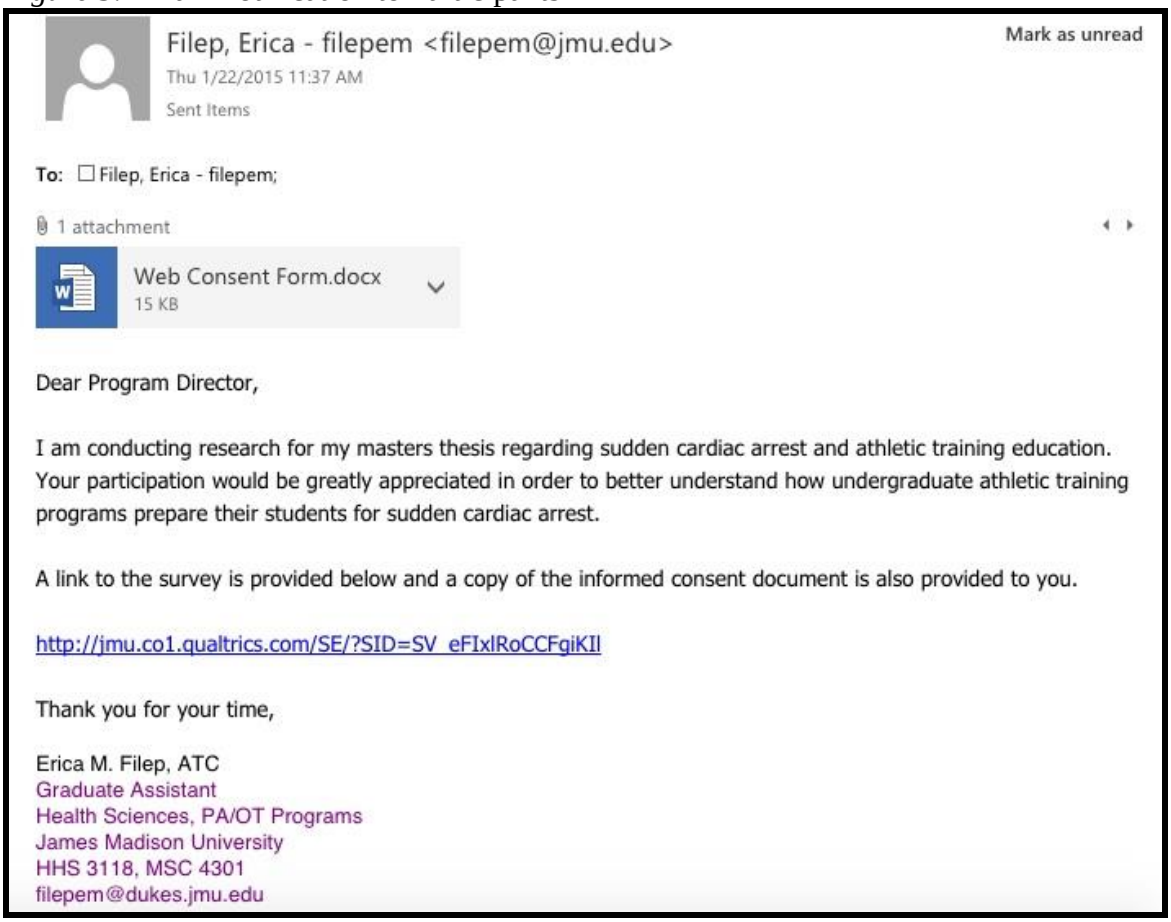


Figure 4. Survey Start Dates

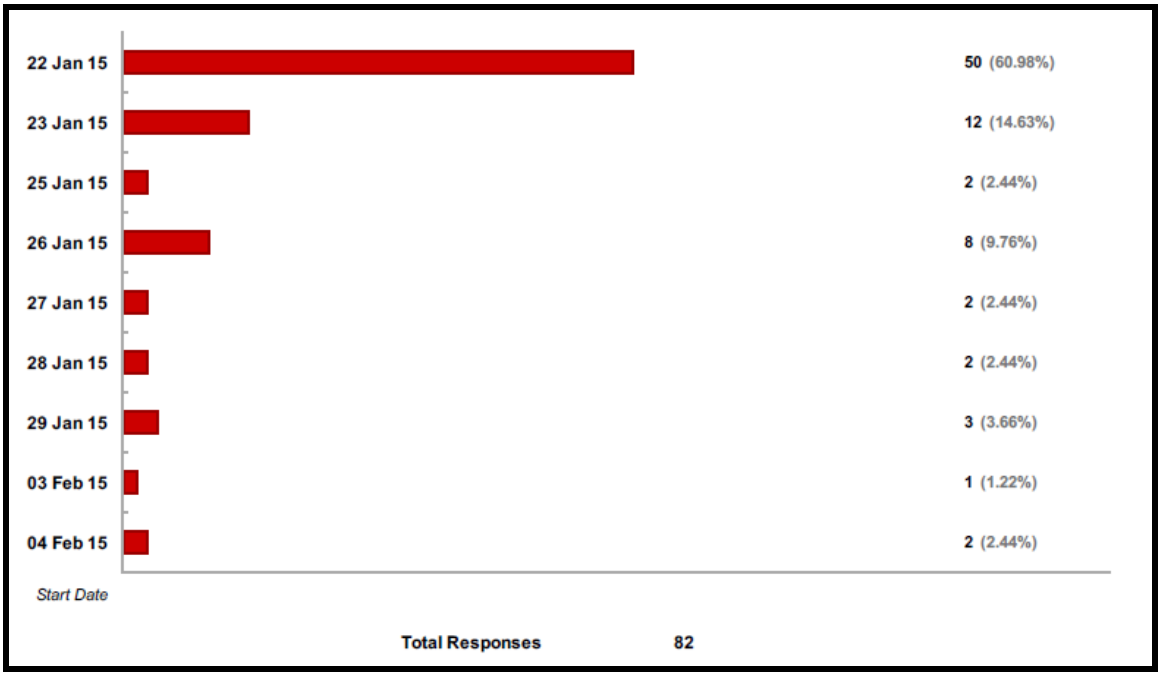
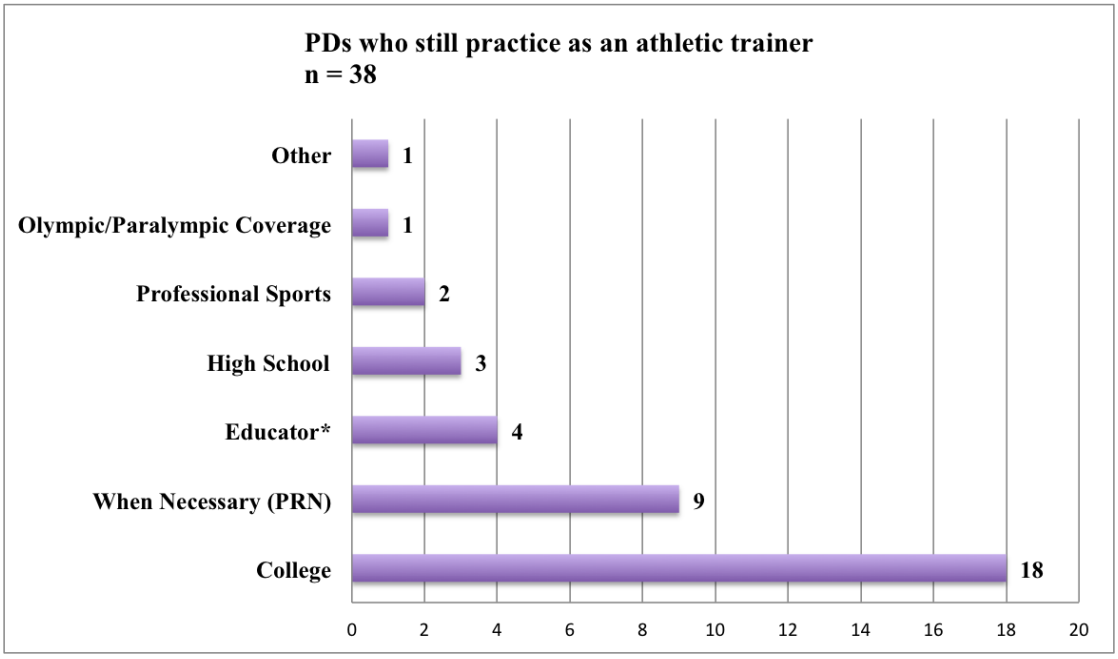


Figure 5. Settings PDs currently practice as an ATC



Appendix D: Tables 1-2

Table 1.

Key Terms and Definitions

National Athletic Trainers' Association (NATA):	"The National Athletic Trainers' Association (NATA) is the professional membership association for certified athletic trainers and others who support the athletic training profession" (National Athletic Trainers' Association, 2014).
Commission on Accreditation of Athletic Training Education (CAATE):	"The purpose of the Commission on Accreditation of Athletic Training Education (CAATE) is to develop, maintain, and promote appropriate minimum education standards for quality for professional, post-professional, and residency athletic training programs" (Commission on Accreditation of Athletic Training Education, 2014).
Board of Certification (BOC):	"The Board of Certification, Inc. (BOC) was incorporated in 1989 to provide a certification program for entry-level Athletic Trainers (ATs)" (Board of Certification, 2010).
Role Delineation Study:	"The BOC Role Delineation/Practice Analysis (RD/PA) identifies essential knowledge and skills for the athletic training profession and serves as a blueprint for exam development. The RD/PA validates importance, criticality and relevance to practice for both broad content areas and tasks" (BOC, 2010).
Athletic Training Program:	"Professional Programs lead to eligibility to sit for the Board of Certification examination and to enter the profession of athletic training. Professional Programs are available at both the baccalaureate and post-baccalaureate degree levels" (CAATE, 2014).
Program Director (PD):	"The full-time faculty member of the host institution and a BOC Certified Athletic Trainer responsible for the implementation, delivery, and administration of the AT

	program" (CAATE, 2012, p.14).
Preceptor:	"A certified/licensed professional who teaches and evaluates students in a clinical setting using an actual patient base" (CAATE, 2012, p.14).
Athletic Training Student (ATS):	A student in the university admitted to the athletic training program (CAATE, 2012).
Sudden Cardiac Arrest (SCA)	"Sudden cardiac arrest (SCA) is the leading cause of death in young athletes on the playing field and is typically the result of undiagnosed structural or electrical cardiovascular disease" (Casa, 2012, p.15).
Catastrophic Injury or Illness:	"A sudden death or disability in which there is life-altering physical or mental impairment, or both" (Casa, 2012, p. 354).

Table 2.

Survey Instrument Examples

Demographic Questions	Q1. How many years have you been a certified athletic trainer? Q3. How many years have you been the AT program director for your university?
Emergency Cardiac Care Curriculum Structure (Quantitative Questions)	Q4. Does your program have a single course dedicated to emergency care? Q7. The aftermath of a sudden cardiac emergency can cause psychological stress for the ATS and ATC. Does your program cover how to handle the psychosocial components of sudden cardiac emergencies?
Emergency Cardiac Care Curriculum Structure (Qualitative Questions)	Q12. Do you have any other methods of teaching sudden cardiac arrest/death to undergraduate AT students not included in this survey?

Appendix E: Tables 3.1-3.3

Table 3.1

Years PDs have been a certified athletic trainer (ATC)

Answer		Response	%
1-5		1	1%
6-10		8	11%
11-15		16	23%
16-20		16	23%
20+		30	42%
Total		71	100%

Table 3.2

Percentage of PDs still practicing as an athletic trainer

Answer		Response	%
Yes		43	61%
No		28	39%
Total		71	100%

Table 3.3

Total years as a PD for their university

Answer		Response	%
Under 1 year		9	13%
1-5		22	31%
6-10		15	21%
11-15		19	27%
16-20		4	6%
20+		2	3%
Total		71	100%

Appendix F: Table 3.4

Table 3.4

Demographics Frequency Table

Demographic	Frequency	Percent
Years as a certified athletic trainer (ATC)		
1-5	1	1%
6-10	8	11%
11-15	16	23%
16-20	16	23%
20+	30	42%
Do you still practice as an athletic trainer?		
Yes	43	61%
No	28	39%
How many years have you been the AT program director for your university?		
Under 1 year	9	13%
1-5	22	31%
6-10	15	21%
11-15	19	27%
16-20	4	6%
20+	2	3%

Appendix G: Tables 3.5-3.6

Table 3.5

Programs with a single course dedicated to emergency care

Answer		Response	%
Yes		49	72%
No		19	28%
Total		68	100%

Table 3.6

Number of lectures covering cardiac emergencies reported by PDs

Answer		Response	%
0		0	0%
1		1	1%
2		6	9%
3		16	24%
4		13	19%
5		10	15%
6		6	9%
7		1	1%
8		5	7%
9		0	0%
10+		10	15%
Total		68	100%

Appendix H: Tables 3.7-3.8

Table 3.7

Number of contact-hours reported by PDs

Answer		Response	%
0		0	0%
1		2	3%
2		6	9%
3		8	12%
4		10	15%
5		10	15%
6		11	16%
7		1	1%
8		3	4%
9		3	4%
10+		14	21%
Total		68	100%

Table 3.8

Percentage of PDs covering psychosocial aspects of SCA

Answer		Response	%
Yes		45	66%
No		23	34%
Total		68	100%

Appendix I: Tables 3.9-3.10

Table 3.9

Confidence of PDs regarding students' use of adjunct airways and supplemental oxygen

Answer		Response	%
Strongly Disagree		1	2%
Disagree		7	11%
Neither Agree nor Disagree		9	14%
Agree		33	50%
Strongly Agree		16	24%
Total		66	100%

Table 3.10

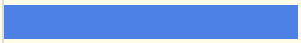
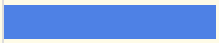
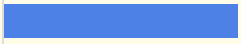
Confidence of PDs regarding opportunities for the ATS to practice cardiac emergencies in the clinical setting

Answer		Response	%
Strongly Disagree		3	5%
Disagree		13	20%
Neither Agree nor Disagree		5	8%
Agree		32	48%
Strongly Agree		13	20%
Total		66	100%

Appendix J: Table 3.11

Table 3.11

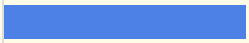
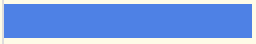
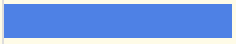
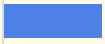
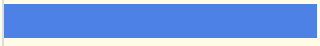
Equipment available in the classroom to practice SCA skills

Answer		Response	%
CPR Mannequins		65	98%
Resuscitation Masks		62	94%
AED Trainers		65	98%
Bag-Valve Masks (BVMs)		63	95%
Non-Rebreather Mask		47	71%
Nasal Cannula		43	65%
Adjunct Airways (Nasopharangeal/Oropharangeal/Supraglottic)		52	79%
Suction Tools		44	67%
Portable Oxygen Tank		45	68%
Pulse Oximeter		59	89%
Standardized Patients		8	12%
High Fidelity Simulator (such as iStan, Resusci-Anne, SimMan, Harvey, etc.)		21	32%

Appendix K: Table 3.12

Table 3.12

Equipment available in the clinical setting to practice SCA skills

Answer		Response	%
CPR Mannequins		37	59%
Resuscitation Masks		56	89%
AED Trainers		38	60%
Bag-Valve Masks (BVMs)		54	86%
Non-Rebreather Mask		29	46%
Nasal Cannula		26	41%
Adjunct Airways (Nasopharangeal/Oropharangeal/Supraglottic)		38	60%
Suction Tools		22	35%
Portable Oxygen Tank		35	56%
Pulse Oximeter		42	67%
Standardized Patients		4	6%
High Fidelity Simulator (such as iStan, Resusci-Anne, SimMan, Harvey, etc.)		4	6%
Emergency Room Experience		15	24%
Ride alongs with local EMS		10	16%
Scenarios conducted in the clinic by preceptors		48	76%

Appendix L: Table 3.13

Table 3.13

Chi-square value for adjunct airway and portable oxygen availability in the classroom versus clinic

Equipment	**Expected (Classroom)**	**Observed (Clinic)**	**Chi-square value**	**p-value**	**Confidence interval**
Adjunct Airways	79	60	4.57	0.05, 3.84	95%
Portable Oxygen	68	56	2.12	0.1, 2.71	99%

Appendix M: Tables 3.14-3.17

Table 3.14

Other teaching methods/tools not mentioned in the survey

Useful Information about Curriculum Structure
We have a 3 hr lecture and a weekly lab. Students practice and apply emergency care/CPR/AED during lab sessions and then we have a single Saturday morning/afternoon we schedule all students to get skills tested and checked off.
Cases and conditions are also discussed in the General Medical Conditions class.
Students learn basic ECG interpretation and in-depth screening including criteria for referral for echocardiography or cardiac MRI
Simulation Center- new to us this semester, just started utilizing it today and it was a fantastic learning opportunity
Also, annual preseason emergency response drills with preceptors, EMS, clinical faculty and staff.
Position Statement Review
On-line scenarios
Guest lecturer who is an EMT/AT every year

Table 3.15

Irrelevant Information about Curriculum Structure

Irrelevant Information about Curriculum Structure
No, $n = 8$
in addition to course work we have recertification practice and exams annually with students.
CPR for the Professional Rescuer Training
Just realized that I didn't click nasal cannula in the last question asked.

Table 3.16

Responses to concerns not addressed in the survey

Concerns Relevant to Survey Organization
In your question involving number of lectures, it would be helpful to know how much time is considered one lecture. For instance, does one lecture encompass one clock hour or one entire class period?
Would have been nice to be able to go back to review responses to make sure that all areas were properly checked.

Table 3.17

Irrelevant information about concerns not addressed in the survey

Irrelevant Information
No, *n* = 11
We are a graduate program not an undergraduate program.
Clinical setting question is not necessarily accurate ....I have over 100 clinical education sites and not all of them offer the equipment listed, but, some sites do. So, they may have availability, but, not always.
PPE and specific screening for pre-existing cardiac conditions. Identifying patients at risk